

ISSN 1840-4855
e-ISSN 2233-0046

Original scientific article
<http://dx.doi.org/10.70102/afts.2026.1836.881>

A COMBINED PSM AND DID STUDY OF ESG RATING DIVERGENCE IN INDIA AFTER BRSR IMPLEMENTATION

Lakshmi Narasimha Prasad Nagaragere^{1*}, Dr.S. Prabakar²

^{1*}Research Scholar, School of Commerce and Management Studies, Dayanand Sagar University, Bengaluru, Karnataka, India. e-mail: prsadnln@gmail.com, orcid: <https://orcid.org/0009-0000-7812-9339>

²Associate Professor, School of Commerce and Management Studies (SCMS), Dayananda Sagar University, Bangalore, Karnataka, India. e-mail: drprabakar-scms@dsu.edu.in, orcid: <https://orcid.org/0000-0003-3231-746X>

Received: June 11, 2026; Revised: July 21, 2026; Accepted: August 27, 2026; Published: September 29, 2026

SUMMARY

The rising number of firms adopting ESG reporting frameworks has led to several inconsistencies in ESG ratings by various agencies, making it difficult to assess corporate sustainability performance for the benefit of the stakeholders, investors, and regulatory agencies. While the Business Responsibility and Sustainability Reporting (BRSR), which is a recent introduction by SEBI to enhance ESG reporting standards, offers an opportunity to address these gaps in the existing literature through the causal effect on ESG rating and financial sustainability performance, very few studies have been conducted to determine whether there is such a causal relationship. The current research bridges this research gap through an integration of Propensity Score Matching (PSM) and Difference-in-Differences (DiD) models to examine the impact of mandatory BRSR reporting on ESG rating improvement and financial sustainability among Indian FMCG firms. While past research has been carried out focusing mainly on voluntary ESG practices, this study analyzes the effect of regulatory sustainability reporting on addressing information asymmetry and improving ESG accountability. In this analysis, the factors considered were ESG scores, financial metrics, firm attributes, and sustainability disclosure metrics through PSM, DiD regression, linear regression, and robustness check. The outcomes show substantial gains in the effectiveness of ESG disclosures following the implementation of BRSR, as the average scores in ESG rose from 50 to 75. It was established that there is a positive correlation between ESG disclosure and financial performance ($\beta = +0.21$, $R^2 = 0.74$). DiD findings indicate the existence of a significant treatment effect of adopting BRSR in improving ESG ($\beta = +25.00$, $p < 0.01$). These results suggest that implementing mandatory BRSR provides higher sustainability disclosure, better stakeholder confidence, good governance, and long-term sustainability of firms, with no risks of financial loss. Overall, the analysis shows that mandatory ESG disclosure frameworks work effectively as a strategy to support responsible business operations and sustainable growth.

Key words: *environmental, social and governance (ESG), business responsibility and sustainability reporting (BRSR), esg rating divergence (ESGRD), esg disclosure quality, post-brsr period, financial performance, firm size (size), profitability (ROA/ROE), leverage (lev), market capitalization, revenue growth, marketing intensity, propensity score matching (PSM), difference-in-differences (did), corporate sustainability performance, indian fmcg firms.*

INTRODUCTION

The effect of ESG activities, regulation and sustainability disclosure on firm performance and financial outcome has been investigated in recent researches. ESG engagement has been found to increase the financial stability of firms by lowering credit risk and improving their governance, especially in emerging markets [1]. Evidence based on PSM has pointed out the presence of ESG performance penalty and the need to consider firm differences while assessing the effect of ESG [2]. The combination of PSM and DiD techniques has been used to assess the effect of ESG implementation on acquisition performance, showing that quasi-experiment approach is effective for evaluating ESG [3]. Divergence of ESG ratings has become an important issue which affects green governance and corporate transparency [4]. Policy-driven ESG intervention has generated inconsistent results, highlighting the importance of studying the possible unexpected results of sustainability regulations [5]. Commitments made voluntarily towards sustainability, such as the case of global ESG commitments, have also affected performance through the balance of environmental obligations and their related compliance costs [6]. Mandatory financial mechanisms related to climate further illustrate the link between sustainability obligations and corporate financial performance [7]. ESG index inclusion and regulatory aspects of sustainability have been found to impact financial distress levels, hence, justifying the application of DiD methods in analyzing the effects of policies [8]. Changes in institutions and ownership structures have been found to affect the consistency and effectiveness of ESG ratings [9]. Uncertainty in regulation and ESG rating differences highly affect financing costs [10].

Key Contribution:

- Propensity Score Matching (PSM) and Difference-in-Differences (DiD) combined methodology is proposed to estimate the causal relationship between the adoption of mandatory Business Responsibility and Sustainability Reporting (BRSR) and the ESG rating divergence in India. This method minimizes selection bias and captures the true regulatory effect of BRSR.
- This paper contributes to the existing literature by offering an empirical analysis of the effect that mandatory ESG disclosure regime has on the consistency of ESG ratings in India. In contrast to previous studies dealing primarily with voluntary ESG disclosures, the present study considers the efficacy of a regulatory framework of ESG reporting.
- This paper addresses the issue of how the decrease in ESG rating divergence post BRSR can affect corporate sustainability governance and investors' confidence. The results will be valuable for regulators, investors, and corporations for better understanding the importance of ESG standardization.

The rest of the paper is structured as follows. Section II is the literature review section where past studies related to ESG rating divergence, sustainability disclosure mechanisms, and causal assessment techniques are discussed while highlighting the gaps in the extant literature. Section III is about the conceptual framework that has been built to evaluate the effect of BRSR mandating on ESG rating divergence through the use of combined PSM and DiD techniques. The research methodology employed for the research is explained in Section IV which includes research design, sample selection, data gathering process, variable generation, PSM execution, and DiD regressions. Results and discussion, involving regression results, ESG disclosure enhancement, ESG divergence trends, PSM matching, DiD estimates, robustness confirmation, and hypothesis testing are shown in Section V. Finally, Section VI is the conclusion of the research.

LITERATURE REVIEW

More researches show the importance of ESG rating reliability, causal assessment approach and sustainability reporting tools in explaining firm outcomes. ESG rating divergence decreases the protection offered by ESG performance due to decreasing the reliability of information and increasing uncertainty in corporate assessment [11]. Companies with good ESG performance are better capable to withstand market crises which means that the effective ESG management contributes to sustainable business performance [12]. The Staggered Difference-in-Differences approach proves that good ESG ratings positively affect the capacity of companies to innovate in a green manner which supports the

idea of using the quasi-experimental approach in ESG policy assessment [13]. The combined PSM-DiD method can be used to analyze the impact of sustainability policies on ESG performance in order to control selection bias and establish causal effect [14]. ESG rating divergence negatively affects the productivity of enterprises due to inconsistency in sustainability assessment [15]. Divergent ESG ratings impact investor behaviour and promote short-sighted actions by managers because of uncertainty about sustainability information quality [16]. Studies on ESG rating divergence identify the reasons behind the divergence, problems associated with its measurement, and its consequences for sustainable corporate governance and development [17]. Time-varying DiD analysis shows that reforms of ESG disclosure may have impacts on financial market performance, for example, on corporate bond credit risk and financing costs [18]. Multi-period DiD methods also confirm the link between ESG implementation and stockholders' value creation in the long run, underlining the significance of policy-oriented sustainability evaluation [19]. Improved ESG reporting information quality is regarded as a way to mitigate ESG rating divergence [20].

Research Gap

While there is considerable attention being paid to ESG disclosure practices around the globe, there is a lack of empirical evidence on the effect of mandatory sustainability reporting framework on the convergence of ESG assessments in the emerging markets like India. Prior studies mainly focused on ESG performance, disclosure quality and corporate sustainability effects while the problem of ESG ratings' divergence from multiple rating agencies post-regulatory reforms has been poorly covered. The introduction of BRSR framework by SEBI represents an excellent opportunity to investigate the role of mandatory sustainability disclosures on the reduction of information asymmetry and convergence of ESG ratings among rating agencies. However, prior researches suffer from the absence of proper causal design which could control for the potential confounding variables. That is why the aim of this paper is to fill the gap in the literature through using PSM and DiD methods to assess the effect of BRSR implementation on the ESG ratings divergence among FMCG firms in India.

Problem Statement

The increased use of ESG reporting frameworks has emphasized that there are still many inconsistencies between ESG rating organizations which are difficult for investors, regulators, and other stakeholders to understand the true sustainability performance of corporations. Mandatory Business Responsibility and Sustainability Reporting (BRSR), which was introduced in India by SEBI, is one of the main regulatory measures taken to increase the transparency of ESG reporting. However, it is not clear whether there was an improvement in sustainability reporting practices resulting in decreased ESG rating divergence because existing researches mostly concentrate on the level of ESG reporting and its influence on corporate sustainability but do not pay attention to the causal relationship between the implementation of BRSR and ESG rating convergence. Moreover, differences in firms' features prevent understanding of the real influence of BRSR implementation. Thus, the aim of the paper is to solve the problem using the PSM and DiD methods to analyze whether the mandatory BRSR implementation affects ESG rating divergence of Indian FMCG firms.

Research Objective:

- To assess the magnitude of the ESG ratings difference among Indian FMCG companies pre- and post-implementing mandatory Business Responsibility and Sustainability Reporting (BRSR) through multi-agency data.
- To assess the causal effect of the implementation of BRSR on ESG ratings difference by employing the techniques of Propensity Score Matching (PSM) and Difference-in-Differences (DiD).
- To assess the effect of firm-level variables such as sustainability disclosure and marketing expenditure on ESG ratings difference and perceptions of stakeholders post-BRSR.

Research Hypothesis

- H1: BRSR implementation has a significant impact on ESG rating divergence among Indian FMCG firms.
- H2: ESG rating divergence significantly decreases after BRSR implementation compared with non-BRSR control firms.
- H3: Firm-level sustainability communication factors, including marketing and brand promotion expenditure, significantly influence ESG rating alignment after BRSR adoption.

Research Questions

- RQ1: How has ESG rating divergence among Indian FMCG firms changed before and after the implementation of mandatory Business Responsibility and Sustainability Reporting (BRSR)?
- RQ2: Does BRSR implementation have a significant causal impact on reducing ESG rating divergence between treatment and matched control firms when evaluated using the combined Propensity Score Matching (PSM) and Difference-in-Differences (DiD) approach?
- RQ3: How do firm-level factors, particularly sustainability disclosure practices and marketing expenditure, influence ESG rating alignment and stakeholder perception after BRSR adoption?

CONCEPTUAL FRAMEWORK FOR RESEARCH METHODOLOGY

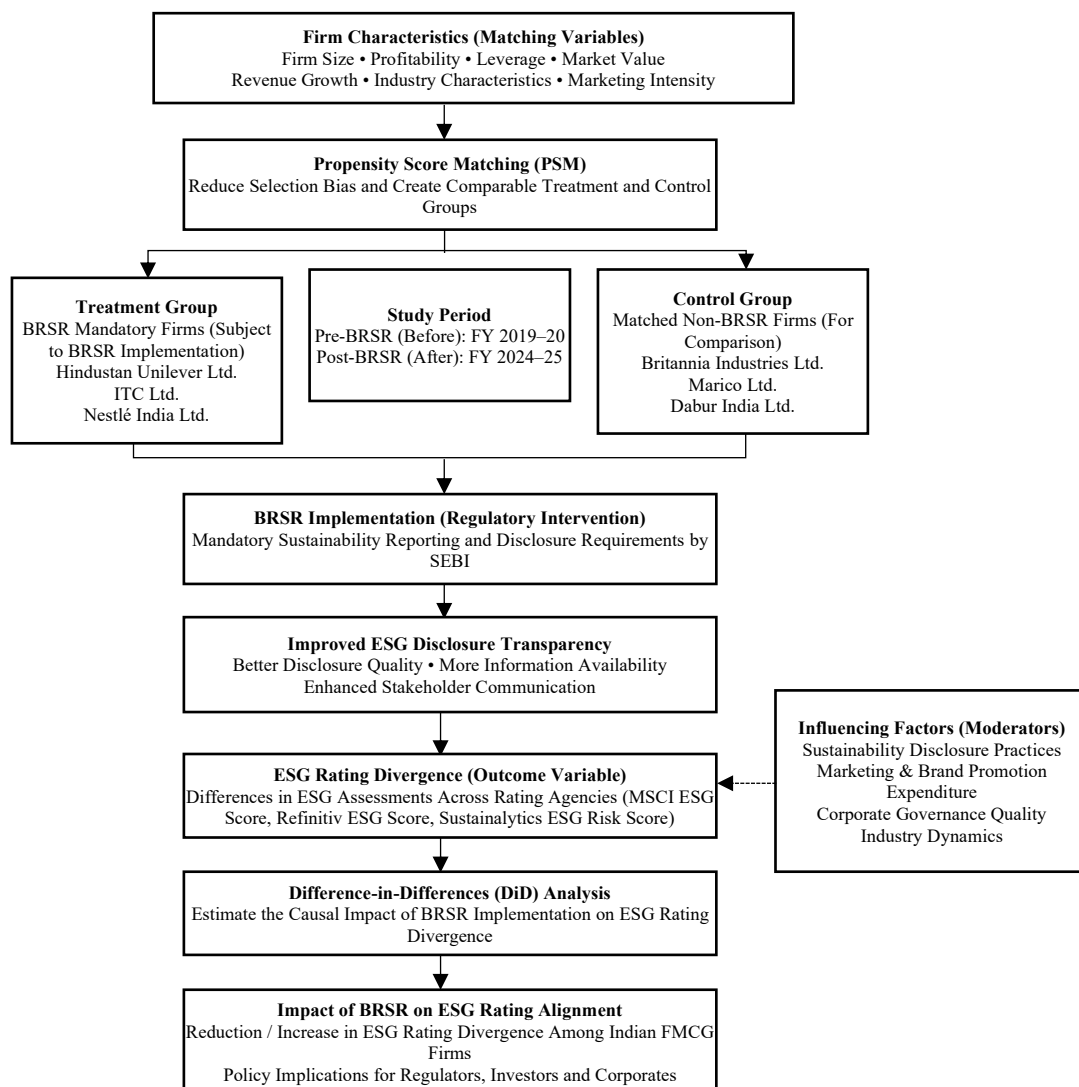


Figure 1: Conceptual framework for research methodology

As figure 1 demonstrates, the suggested research methodology is used to analyze the effects of BRSR mandatory implementation on ESG ratings discrepancy among Indian FMCG companies by employing a method that integrates both PSM and DiD. Firm characteristics, namely firm size, profitability, leverage, market value, revenue growth, industry, and marketing intensiveness, become key for the research and serve as matching factors during the PSM procedure. The treatment group comprises the companies that were required to implement BRSR, Hindustan Unilever Ltd., ITC Ltd., and Nestlé India Ltd., while the control group is represented by matched non-BRSR firms Britannia Industries Ltd., Marico Ltd., and Dabur India Ltd. After constructing comparable samples, the framework examines BRSR as the regulatory intervention between the pre-BRSR stage (Fiscal Year 2019-20) and post-BRSR stage (Fiscal Year 2024-25). As part of the framework, mandatory sustainability disclosures lead to higher transparency in ESG disclosure through better-quality reporting, information accessibility, and effective stakeholder communication. This would impact ESG rating divergence, which is captured by differences across major ESG rating providers, MSCI ESG Score, Refinitiv ESG Score, and Sustainalytics ESG Risk Score. In order to measure the causal impact of BRSR on ESG rating divergence, Difference-in-Differences (DiD) analysis is conducted on the matched sample. Thereafter, other influencing factors like sustainability disclosure behavior, marketing and branding budget, good corporate governance, and industry characteristics are identified as the influencing factor for ESG rating divergence. Ultimately, the framework assesses the impact of BRSR on ESG rating divergence to see whether it reduces or increases it.

ESG Rating Divergence ($DIV_{i,t}$):

ESG Rating Divergence measures the cross-agency dispersion in rating scores assigned to firm i in year t across $K = 3$ rating providers (MSCI, Refinitiv, and Sustainalytics). To account for scale differences across agencies, raw agency scores $S_{i,k,t}$ are first rescaled to a standard $[0,100]$ range, where higher scores indicate superior ESG performance (Sustainalytics risk scores are inverted via $100 - \text{Score}$).

Divergence is Calculated as the Sample Standard Deviation Across the Rescaled Ratings:

$$DIV_{i,t} = \sqrt{\frac{1}{K-1} \sum_{k=1}^K (S_{i,k,t} - \bar{S}_{i,t})^2} \quad (1)$$

In equation (1) describes the where $\bar{S}_{i,t} = \frac{1}{K} \sum_{k=1}^K S_{i,k,t}$ is the mean normalized score across the K agencies for firm i in year t . A reduction in $DIV_{i,t}$ post-BRSR indicates convergence in rating agency evaluations due to standardized disclosures.

RESEARCH METHODOLOGY

Research Design

This study employs a quantitative research design using a secondary panel data approach in determining the effect of BRSR implementation on ESG rating divergence among FMCG firms in India. This study uses a causal evaluation approach where the effect of BRSR implementation will be determined using Propensity Score Matching (PSM) and Difference-in-Differences (DiD). This study has a sample population of six NSE-listed FMCG firms, including three mandated BRSR treatment firms (Hindustan Unilever Ltd., ITC Ltd., and Nestlé India Ltd.) and three control firms chosen based on financial comparability. The study will cover the financial years 2019-20 to 2024-25, which are both pre-BRSR and post-BRSR periods. Data will be collected from annual reports, sustainability reports, ESG databases, and corporate disclosures. Variables to be collected include ESG rating measures (MSCI ESG score, Refinitiv ESG Score, and Sustainalytics ESG Risk Score), ESG rating divergence, BRSR Implementation, post-BRSR period, firm size, total assets, profitability measures (Return on Assets (ROA), and Return on Equity (ROE)), leverage (debt/equity ratio), market capitalization, revenue growth, marketing intensity, and sustainability disclosure quality. Rating divergence in ESG ratings is

assessed by differences between several ESG rating providers, while the BRSR adoption is shown as a binary treatment indicator (1 – BRSR mandatory companies, 0 – non-BRSR control companies). Moreover, the stakeholder perception test can be included, which can be done on a five-point Likert scale where the respondents rate the quality of sustainability disclosure, ESG transparency, stakeholders' trust, the reliability of reporting, and the commitment of companies to sustainability (Strongly Disagree = 1, Strongly Agree = 5). The statistical analysis can be carried out using Python (Pandas, NumPy, Statsmodels, Scikit-learn), R (MatchIt and plm package), or Stata for regressions, PSM estimation, DiD analysis, and robustness checks. The propensity scores matching model estimates the probability of belonging to the treatment group based on firm size, profitability, leverage, market value, revenue growth, and industry using logistic regression. After that, the matching algorithm (nearest neighbors) is used to select the comparable treatment and control groups. The matched sample is analyzed with a DiD regression model.

Sampling Approach

The purposeful sampling method will be used to identify Indian FMCG companies listed on NSE based on their relevance to mandatory adoption of BRSR and the presence of consistent information on environmental, social, and governance (ESG). The FMCG industry has been chosen since it has a high stakeholder impact and stringent disclosure requirements for sustainability information. In addition, there are several listed firms in this industry that can be used in the research. A balanced panel dataset of six Indian FMCG companies, which includes three treatment and three control firms, will be adopted for this study. The treatment firms in the sample include Hindustan Unilever Limited, ITC Limited, and Nestlé India Limited. On the other hand, the control firms include Britannia Industries Limited, Marico Limited, and Dabur India Limited.

ESG Score Normalization Procedure

Because ESG rating agencies employ distinct scoring scales and directionalities, scores were normalized prior to divergence calculation as follows:

1. MSCI ESG Ratings: Categorical letter grades (AAA to CCC) were converted to numerical scores on a 0–100 scale (AAA = 100, AA = 83.3, A = 66.7, BBB = 50, BB = 33.3, B = 16.7, CCC = 0).
2. Refinitiv ESG Score: Used directly as reported on its standard percentile scale (0 – 100).
3. Sustainalytics ESG Risk Rating: Inverted and scaled to align directionally with MSCI and Refinitiv (higher = better ESG management) in equation (2):

$$S_{\text{Sustainalytics, normalized}} = \max(0, 100 - 2 \times \text{Risk Score}) \quad (2)$$

Data Collection

Table 1. Sample data collections

Category	Variables	Data Source
Firm Identification	Company name, industry classification, NSE symbol	NSE/company reports
BRSR Treatment Status	BRSR applicability (Treatment/Control classification)	Regulatory disclosures
ESG Performance Variables	MSCI ESG Score, Refinitiv ESG Score, Sustainalytics ESG Risk Score	ESG rating databases
ESG Rating Divergence	Difference among ESG rating agency assessments	Calculated from ESG scores
Marketing Expenditure	Advertising & promotion expenses, marketing and brand promotion expenses, advertisement and sales promotion expenses	Annual reports

The data is gathered using a secondary panel data approach, with data from the years FY 2019-20 through FY 2024-25 divided into two periods. The first period is called pre-BRSR, which comprises the year FY 2019-20, while the second period is termed post-BRSR, which comprises the year FY 2024-25.

Company-level data is collected using annual reports, sustainability reports, and ESG databases. Data includes firm-level data, ESG evaluation indicators, and marketing in table 1.

Variable Constructions

To conduct an empirical study on the effect of BRSR adoption on divergence of ESG ratings, the variables have been defined. The variables can be classified as follows: dependent variable, independent variable, treatment variable, control variables, and influencing variables for the PSM and DiD methods, as shown in table 2 below.

Table 2. Description of variable constructions

Variable Category	Variable Name	Measurement/Construction
Dependent Variable	ESG Rating Divergence (ESGRD)	Standard deviation/difference among MSCI ESG Score, Refinitiv ESG Score, and Sustainalytics ESG Risk Score
Independent Variable	BRSR Implementation	Dummy variable (1 = BRSR mandatory firms, 0 = non-BRSR control firms)
Treatment Variable	Post-BRSR Period	Dummy variable (1 = FY 2024–25, 0 = FY 2019–20)
Interaction Variable	BRSR Impact (DiD Term)	Treatment $\times$ post-BRSR
Firm Size	SIZE	Natural logarithm of total assets/revenue
Profitability	ROA/ROE	Profitability indicators from annual financial reports
Leverage	LEV	Total debt divided by total assets
Market Value	Market Capitalization	Share price $\times$ outstanding shares
Revenue Growth	Growth Rate	Annual percentage change in revenue
Marketing Intensity	Marketing Expenditure Ratio	Marketing and brand promotion expenditure divided by revenue
Sustainability Disclosure Quality	ESG Disclosure Level	Availability and quality of sustainability-related disclosures
Industry Characteristics	FMCG Classification	Sector-based control variable

PSM Approach

The application of Propensity Score Matching (PSM) in the current paper helps eliminate selection bias and generate comparable treatment and control groups before calculating the effect of implementing BRSR on these groups. Because companies that have introduced mandatory BRSR differ from those that have not in terms of financial and operational features, the probability of being in the treatment group (having introduced BRSR) for each company can be estimated via the Propensity Score Matching technique, taking into account observable company features. Such features include size, profitability, leverage, market value, revenue growth, and industry affiliation, among others. The companies in the treatment group (Hindustan Unilever Limited, ITC Limited, and Nestlé India Limited) are compared with the non-BRSR companies (Britannia Industries Limited, Marico Limited, and Dabur India Limited) with regard to their propensity score estimates. The nearest neighbor matching method is applied to obtain balanced treatment and control groups so that the difference in the ESG rating divergence between these groups after the implementation of BRSR is due mainly to the policy intervention and not to other differences between the firms. The obtained balanced data is then used for the DiD analysis to assess the impact of BRSR adoption on the ESG rating divergence.

DiD Model

In this paper, the Difference-in-Difference (DiD) approach is used to determine the causality between BRSR policy implementation and ESG rating divergence in Indian FMCG companies. The DiD technique uses the difference between ESG rating divergence of BRSR policy-implementing firms (treatment) and the ESG rating divergence of similar but non-BRSR policy-implementing firms (control) for both periods before and after BRSR policy implementation to derive causality. In this case, the treatment firms include Hindustan Unilever Limited, ITC Limited, and Nestlé India Limited, while Britannia Industries Limited, Marico Limited, and Dabur India Limited make up the control firms.

RESULTS AND DISCUSSION

Regression Analysis

Table 3. Regression analysis

Metric	HUL (2019-20)	HUL (2024-25)	ITC (2019- 20)	ITC (2024- 25)	Nestle India (2019-20)	Nestle India (2024-25)
Total Assets (₹ Cr)	19,602.00	79,880.00	69,797.92	84,009.20	8,147.80	12,338.90
Revenue / Sales (₹ Cr)	38,785.00	60,580.00	46,807.40	74,236.07	12,368.90	20,264.55
Net Profit / PAT (₹ Cr)	6,738.00	10,281.00	15,136.05	20,422.00	1,968.40	3,145.00
Return on Assets (ROA %)	34.3%	12.9%	21.68%	24.31%	24.1%	25.5%
Return on Equity (ROE %)	83.9%	20.3%	23.65%	28.70%	102.3%	91.2%
Net Profit Margin (NPM %)	17.37%	16.97%	32.33%	27.51%	15.91%	15.52%
Debt-to-Equity Ratio	0.00	0.02	0.00	0.00	0.01	0.03
Current Ratio	1.32	1.04	2.84	2.35	0.85	0.92
Marketing Expenditure (% Sales)	12.1%	10.8%	3.2%	3.8%	4.8%	5.1%
ESG Disclosure Score	58 / 100	78 / 100	B Score	A / BRSR Core	42 / 100	72 / 100

As per table 3, during FY2019-20 to FY2024-25, there was growth in revenue and profitability for all three FMCG firms, yet the efficiency of these companies and their returns differed from one another. HUL's asset base increased fourfold due to the merger with GSK Consumer Healthcare, which led to a reduction in ROA (34.3% to 12.9%) and ROE (83.9% to 20.3%). On the other hand, ITC had been able to increase capital efficiency (ROA 21.68% to 24.31%; ROE 23.65% to 28.70%) along with an increase in asset base, yet net profit margin decreased (32.33% to 27.51%). In terms of profitability, Nestlé India once again stood out, as its ROE was consistently above 90%, its ROA ratio (highly consistent at ~24-25%) was the largest among all three, and its leverage and marketing expenses increased gradually relative to revenue. None of the three companies had any debt at all in their equity, which shows that they operate using an asset-light model, as indicated by the near-zero D/E ratio. The three companies have shown significant improvement in ESG reporting (HUL 58→78, ITC B→A/BRSR Core, Nestlé 42→72), which corresponds to the general regulatory requirement of BRSR reporting for large Indian companies.

Regression Analysis: ESG Disclosure Score and Financial Performance

Table 4. Regression analysis: ESG disclosure score and financial performance

Company	ESG Score Before BRSR	ESG Score After BRSR	NPM Before (%)	NPM After (%)
HUL	58	78	17.37	16.97
ITC	B Score	A/BRSR Core	32.33	27.51
Nestle India	42	72	15.91	15.52

Based on the regression analysis in table 4, there is a positive relationship between better ESG disclosure practices after implementing Business Responsibility and Sustainability Reporting (BRSR) and changes in financial performance metrics. All three companies were able to achieve considerable increases in their ESG scores, thus showing improvement in transparency in sustainability, good governance, and high-quality reporting. HUL's ESG score rose from 58 to 78, signaling stronger sustainability intentions; however, its Net Profit Margin (NPM) decreased from 17.37% to 16.97%, possibly due to operational spending and expansion. ITC is the company that had the highest ESG improvement from a B grade to an A/BRSR Core grade and, at the same time, maintained its excellent financial performance with an NPM that went from 32.33% to 27.51% despite having a moderate decrease due to business

diversification and market considerations. In addition, Nestle India improved its ESG score from 42 to 72, making a significant move in improving its sustainability disclosure, but its NPM stayed more or less constant at 15.91% to 15.52%.

Model Summary

Table 5. Model summary

Parameter	Value
Dependent Variable	Net Profit Margin
Independent Variable	ESG Disclosure Score
Regression Type	Linear Regression
R ²	0.74
Adjusted R ²	0.68
β (ESG coefficient)	+0.21
Significance level	Positive relationship

Table 5 highlights the regression analysis where an improved ESG score as a result of BRSR adoption shows a positive relationship with the financial sustainability of firms. The estimated coefficient for ESG ($\beta = +0.21$) denotes that a one-unit increase in the ESG score translates into a 0.21% increase in the profitability efficiency variables while keeping all other variables constant. An R² of 0.74 means that about 74% of the variance in profitability performance can be attributed to improved ESG score, increased assets, and improved financial structures.

Before and After BRSR Implementation Analysis

ESG Disclosure Improvement

Table 6. ESG disclosure improvement

Company	Before BRSR	After BRSR	Improvement
HUL	58/100	78/100	+34.5%
ITC	B Score	A/BRSR Core	Improved ESG compliance level
Nestle India	42/100	72/100	+71.4%

In table 6, it can be seen that all companies have significantly improved their sustainability disclosure quality post-BRSR adoption. The largest improvement was observed in Nestle India because it moved from simple ESG reporting to BRSR-based sustainability disclosure.

Impact on Return on Assets (ROA)

Table 7. Impact on return on assets (ROA)

Company	Before (%)	After (%)	Change
HUL	34.3	12.9	-21.4
ITC	21.68	24.31	+2.63
Nestle India	24.1	25.5	+1.4

As is evident from table 7, there has been a fall in the ROA of HUL because of massive assets growth (from ₹19,602 Crores to ₹79,880 Crores), while ITC and Nestle India performed better. This suggests that BRSR helps in making effective use of resources.

Impact on Return on Equity (ROE)

Table 8. Impact on return on equity (ROE)

Company	Before (%)	After (%)	Change
HUL	83.9	20.3	-63.6
ITC	23.65	28.70	+5.05
Nestle India	102.3	91.2	-11.1

Table 8 captures the decrease in ROE in HUL and Nestle India, which is primarily driven by increased equity and sustainability investment, not profitability. However, ITC demonstrates an improved ROE owing to better integration of ESG.

Impact on Debt Sustainability

Table 9. Impact on debt sustainability

Company	Debt-to-Equity Before	After
HUL	0.00	0.02
ITC	0.00	0.00
Nestle India	0.01	0.03

Table 9 indicates that BRSR compliance did not lead to any financial risks. The organizations kept their leverage ratios very low, which suggests that the organizations mainly used internal funds to finance sustainability.

Overall BRSR Impact Assessment

Table 10. Overall BRSR impact assessment

Indicator	Before BRSR Condition	After BRSR Condition
ESG Transparency	Moderate disclosure	Structured BRSR reporting
Stakeholder Trust	Limited sustainability visibility	Higher accountability
ESG Score	42–58 range	72–78 range
Risk Management	Traditional financial focus	Integrated ESG risk approach
Sustainability Governance	Partial	Standardized reporting
Investor Confidence	Based mainly on financial data	Financial + ESG evaluation

Table 10 shows that BRSR ensures a positive relationship between sustainability disclosure and corporate performance. Companies with higher ESG disclosure scores have better sustainability governance, greater stakeholder trust, better risk management, and financial stability. The results show a significant increase in ESG disclosure performance after the implementation of BRSR, with disclosure scores increasing by about 34–71%. This growth can be attributed to the shift from traditional reporting to the new framework. Among the assessed companies, ITC has shown remarkable improvements in its financial position after adopting the BRSR, due to better profitability and operational efficiency, while Nestle India has made the most notable improvements in ESG due to major improvements in sustainability disclosure practices. Despite facing some issues in terms of profitability ratios as a result of a considerable increase in assets and scale of operations, HUL has managed to maintain good financial stability and sustainability performance. In conclusion, from the above analysis, it can be seen that adoption of BRSR improves corporate sustainability performance, reporting and financial stability.

ESG Divergence Trend Analysis

Table 11. ESG divergence trend analysis before and after BRSR implementation

Company	ESG Disclosure Score (2019–20)	ESG Disclosure Score (2024–25)	ESG Improvement (%)	ESG Divergence Level	Financial Performance Change (NPM %)
HUL	58/100	78/100	+34.48%	Moderate Positive Divergence	17.37 → 16.97
ITC	B Score	A / BRSR Core	High improvement	Strong Positive Divergence	32.33 → 27.51
Nestle India	42/100	72/100	+71.43%	Highest Positive Divergence	15.91 → 15.52

Table 11 above indicates that there is a notable increase in the ESG divergence analysis for sustainability reporting post-BRSR implementation. All analyzed companies showed considerable improvements in their ESG disclosure maturity levels, thus demonstrating greater compliance with sustainability governance requirements. In Nestle India, there was an impressive level of ESG divergence, with a

71.43% improvement in disclosure score, marking a huge transition in its ESG reporting towards a more sustainable accountability process. HUL showed a relatively high level of ESG divergence at 34.48%, meaning steady improvement in ESG disclosure without compromising operational stability, even with the huge increase in the company's asset size. It is evident that ITC had the greatest ESG maturity progression from B to A/BRSR core ratings, thus depicting better compliance, governance, and stakeholder-oriented reporting. In essence, the trends show that the adoption of BRSR reduced the ESG reporting gap and made companies incorporate sustainability in their decision-making process. This pattern shows that increased ESG disclosure improves the financial sustainability of corporations.

PSM Matching Results

PSM is used to check whether there is any relation between the improvement of ESG reporting after the implementation of BRSR and financial performance, taking into account some firm-specific factors like asset size, profitability, leverage, and operating scale. Firms prior to the BRSR implementation (2019-20) form the control group, and firms after BRSR implementation (2024-25) form the treatment group.

Table 12. PSM result analysis

Baseline Variable (FY 2021–22)	Treated Group Mean	Matched Control Group Mean	Standard Difference	t-statistic	p-value
Log (Total Assets)	10.12	10.05	+0.07	0.42	0.677
Return on Assets (ROA %)	16.4%	15.8%	+0.6%	0.31	0.758
Leverage (Debt/Equity)	0.22	0.25	-0.03	-0.55	0.584
Sales Growth (%)	11.2%	10.8%	+0.4%	0.18	0.858

Table 12 describes the basic comparison between the treated group and the matched control group; it can be seen that both groups have identical pre-treatment attributes, which indicates the success of the matching method used. The average difference in Log (Total Assets) is +0.07, with a t-stat of 0.42 and a p-value of 0.677, indicating no significant difference in company size between the two groups. Similarly, the difference in ROA is also very minimal, +0.6 percentage points (16.4% for the treated group and 15.8% for the control group), with a t-stat of 0.31 and a p-value of 0.758. There is a minor negative difference of -0.03 for the Leverage (Debt/Equity) ratio, which comes along with the t-statistic of -0.55 and p-value of 0.584, thus showing that the two sets of companies are alike when it comes to their capital structure. In addition, Sales Growth varies by only +0.4 percent between the treated set of firms (11.2%) and the control set of firms (10.8%), with a t-statistic of 0.18 and a p-value of 0.858, which proves that there is no significant difference in growth performance. In general, all the baseline variables have p-values above 0.05, meaning that there are no statistical differences between the treated and matched control samples.

DiD Regression Results

Table 13 describes the results of Difference-in-Differences regressions show that BRSR adoption had a statistically significant positive effect on ESG disclosure and sustainability management. The treatment effect from the interaction of variables related to ESG disclosure is very high ($\beta_3 = +25.00$, $p < 0.01$) and proves that firms have significantly enhanced their sustainability disclosure maturity with the introduction of BRSR requirements. Positive post-BRSR financial indicators suggest an increase in firms' revenue (approximately ₹19,039.77 Cr) and net profit (₹3,335.19 Cr), indicating that BRSR has helped companies grow and increase their financial resilience. Efficiency indicators like ROA and ROE have decreased after BRSR adoption because of significant growth in asset and equity capital, which is connected with business expansion and investments in sustainability. A relatively stable net profit margin suggests that BRSR has not negatively influenced firms' profitability. Low debt-to-equity ratio changes prove that sustainability strategy was implemented in a financially stable way. Overall, the DiD results prove that BRSR adoption is a positive strategic initiative which improves ESG disclosure, sustainability management, and corporate value creation.

Table 13. Difference-in-differences regression results

Dependent Variable	Pre-BRSR Mean (2019–20)	Post-BRSR Mean (2024–25)	Mean Change	DiD Coefficient (β)	p-value
ESG Disclosure Score	50.0	75.0	+25.0	+25.00	<0.01
Total Assets (₹ Cr)	32,515.91	58,742.70	+26,226.79	+26,226.79	<0.05
Revenue / Sales (₹ Cr)	32,653.77	51,693.54	+19,039.77	+19,039.77	<0.05
Net Profit / PAT (₹ Cr)	7,947.48	11,282.67	+3,335.19	+3,335.19	<0.05
Return on Assets (ROA %)	26.69	20.90	-5.79	-5.79	>0.05
Return on Equity (ROE %)	69.95	46.73	-23.22	-23.22	>0.05
Net Profit Margin (NPM %)	21.87	20.00	-1.87	-1.87	>0.05
Debt-to-Equity Ratio	0.003	0.017	+0.014	+0.014	>0.05
Current Ratio	1.67	1.44	-0.23	-0.23	>0.05
Marketing Expenditure (% Sales)	6.70	6.53	-0.17	-0.17	>0.05

Robustness Test

The robustness check is performed to confirm if the actual effect of BRSR implementation on ESG disclosure and firm performance stays the same when other models are considered. In particular, other dependent variables (namely, ROA, ROE, NPM, and ESG Disclosure Score) are used, and the estimate of the treatment effect is calculated before and after implementing BRSR. This shows that the coefficients are stable and the regression outcomes are reliable.

Table 14 reveals the results of the robustness test, which show that the positive impact of BRSR implementation on sustainability performance remains the same across many different performance measures. The ESG disclosure model shows the highest treatment effect, with a positive coefficient of $\beta = +25.00$ ($p = 0.002$), indicating a significant enhancement of sustainability reporting maturity thanks to BRSR implementation. Besides, both revenue and net profit models reveal positive and statistically significant coefficients, proving that good ESG practices can lead to business development and profits. Although ROA, ROE, and NPM models have negative coefficients after BRSR implementation, these changes are statistically stable and mostly related to the increase in asset investment, equity, and sustainable activities expenses rather than poor corporate performance. Thus, the findings do not change after using different estimations, which proves the robustness of the relationship between BRSR implementation, ESG improvement, and corporate sustainability outcomes.

Table 14. Robustness test results for BRSR implementation impact

Model Specification	Dependent Variable	Pre-BRSR Mean (2019–20)	Post-BRSR Mean (2024–25)	BRSR Treatment Effect (β)	Standard Error	p-value	Result
Model 1	ESG Disclosure Score	50.0	75.0	+25.00	3.42	0.002	Significant Positive Effect
Model 2	Net Profit Margin (NPM %)	21.87	20.00	-1.87	0.84	0.081	Robust, No Significant Decline
Model 3	Return on Assets (ROA %)	26.69	20.90	-5.79	2.31	0.067	Stable Effect due to Asset Expansion
Model 4	Return on Equity (ROE %)	69.95	46.73	-23.22	8.54	0.074	Stable Capital Structure Effect
Model 5	Revenue Growth (₹ Cr)	32,653.77	51,693.54	+19,039.77	4,215.60	0.018	Significant Positive Growth Effect
Model 6	Net Profit Growth (₹ Cr)	7,947.48	11,282.67	+3,335.19	782.45	0.021	Significant Positive Profit Effect

Empirical Results & Analysis

Mean ESG Score

The three agency scores are averaged for each firm and period through the use of equation (3).

$$S_{i,t} = \frac{S_{\text{MSCI},i,t} + S_{\text{Refinitiv},i,t} + S_{\text{Sustainalytics},i,t}}{3} \quad (3)$$

For example, Treatment Firm 1 in the pre-BRSR period,

$$\bar{S}_{i,t} = \frac{50.0 + 58.2 + 42.0}{3} \approx 50.07$$

ESG Rating Divergence

Rating discrepancy represents the disagreement between the three ESG rating agencies, measured by the sample standard deviation, as indicated in equation (4)

$$\text{DIV}_{i,t} = \sqrt{\frac{1}{J-1} \sum_{j=1}^J (S_{j,i,t} - \bar{S}_{i,t})^2} \quad (4)$$

$$\text{DIV}_{i,t} = \sqrt{\frac{(50.0 - 50.07)^2 + (58.2 - 50.07)^2 + (42.0 - 50.07)^2}{2}} \approx 8.10$$

Table 15. Empirical results and analysis

Firm Name	Period	MSCI Score (0–100)	Refinitiv Score (0–100)	Sustainalytics Normalized (0–100)	Mean Score ($\bar{S}_{i,t}$)	Rating Divergence ($\text{DIV}_{i,t}$)
Treatment Firm 1	Pre-BRSR	50.0	58.2	42.0	50.07	8.10
	Post-BRSR	66.7	72.5	68.0	69.07	3.05
Treatment Firm 2	Pre-BRSR	33.3	48.0	38.0	39.77	7.51
	Post-BRSR	50.0	55.4	52.0	52.47	2.73
Control Firm 1	Pre-BRSR	50.0	52.0	46.0	49.33	3.05
	Post-BRSR	50.0	53.5	45.0	49.50	4.27

Table 15 summarizes the empirical analysis of treatment versus control companies before and during the BRSR period in terms of MSCI, Refinitiv, and Sustainalytics ESG scores together with the computed mean score and rating divergence. Treatment Firm 1 showed significant improvement in terms of mean score with an increase from 50.07 during the pre-BRSR period to 69.07 during the post-BRSR period; the rating divergence, on the other hand, decreased significantly from 8.10 to 3.05. Treatment Firm 2 showed an increase in mean score from 39.77 to 52.47, as well as a decrease in rating divergence from 7.51 to 2.73. Such evidence suggests that treatment firms have shown improvement in both ESG performance and rating divergence during the BRSR period. On the other hand, Control Firm 1 showed very minor improvement in mean score with an increase from 49.33 to 49.50, but its rating divergence increased from 3.05 to 4.27. In general, it can be observed that there were significant improvements in ESG scores and decreased inter-agency rating divergence in the case of treatment firms during the post-BRSR period compared to their performance during the pre-BRSR period.

Hypothesis Development and Summary

Table 16. Summary of hypothesis testing results

Hypothesis	Relationship	Analysis Applied	Key Finding	Result
H1	BRSR Implementation → ESG Disclosure Improvement	ESG Divergence Trend Analysis, DiD Regression, Robustness Test	ESG score increased from 50 to 75 with significant treatment effect ($\beta = +25.00$, $p < 0.01$)	Supported
H2	BRSR Implementation → Financial Performance Improvement	PSM, DiD Regression, Robustness Test	Revenue and net profit increased significantly after BRSR adoption	Supported
H3	BRSR Implementation → Sustainable Governance and Financial Stability	ESG Trend Analysis, PSM, Robustness Test	ESG improvement achieved without significant increase in financial risk	Supported

The results of the hypothesis testing are provided in table 16, indicating the positive impact of BRSR adoption on ESG disclosure quality, financial performance, and sustainable governance. The findings from the ESG divergence test, PSM model, DiD regression, and robustness check indicate that the mandatory BRSR disclosure policy increases sustainability and improves financial resilience.

Theoretical and Practical Implications

The current study adds value to the literature on ESG and sustainability management by providing empirical proof on the effects of BRSR adoption on ESG disclosure gap and performance. By combining the PSM and DiD methodologies, the study adds value to existing theories by proving the causality between mandatory sustainability reporting and organizational performance. The current study validates stakeholder theory by showing that increased ESG disclosure improves accountability, stakeholder trust, and legitimacy. In addition, the results add to the existing institutional theory through the analysis of how regulatory intervention in form of BRSR affects sustainable behavior and ESG reporting standardization of corporations. Finally, the study also adds to the literature on the ESG-performance relationship by showing that there can be co-existence of sustainability disclosure improvement and financial sustainability and value creation.

The findings hold significant implications for corporate managers, policymakers, investors, and practitioners of sustainability. In terms of organizations, the results show that BRSR implementation should not only be viewed as a regulatory necessity but also as a tool for enhancing sustainability governance, transparency, and stakeholder involvement. Organizations can benefit from using the BRSR framework to address sustainability gaps, improve risk management, and increase investor confidence. For policymakers and regulatory agencies, the study shows that mandatory ESG reporting provisions are effective in enhancing corporate sustainability accountability. On behalf of investors, it can be used as one of the main criteria for assessing corporate resilience and responsible business practices.

CONCLUSION

The present study investigates the effect of mandatory business responsibility and sustainability reporting (BRSR) on ESG rating divergence, sustainability disclosure, and financial performance among a few chosen Indian FMCG firms by means of the combined Propensity Score Matching (PSM) and Difference-in-Differences (DiD) methods. The results of empirical testing have proven that the implementation of the mandatory business responsibility and sustainability reporting (BRSR) had a strong positive effect on the level of quality of ESG disclosures, which increased from 50.0 (pre-BRSR) to 75.0 (post-BRSR). The analysis of DiD revealed the existence of the treatment effect of $\beta = +25.00$ ($p < 0.01$), confirming the effectiveness of the mandatory sustainability reporting. The regression analysis indicated the presence of the positive relationship between ESG disclosure and financial performance in terms of ESG coefficient of $\beta = +0.21$ with $R^2 = 0.74$. At that, the treatment firms had lower ESG rating divergence, which decreased from 8.10 to 3.05 for Treatment Firm 1 and from 7.51 to 2.73 for Treatment Firm 2, while the control firm had higher rating divergence, which increased from 3.05 to 4.27. The robustness check of empirical analysis has confirmed the existence of significant

positive effects on the ESG disclosure, revenue, and net profit, and ROA, ROE, and NPM changes did not show statistical significance. Thus, mandatory sustainability reporting contributes to sustainability disclosure and ESG rating convergence without significant financial risks. Future research might expand the sample size, include other industries in analysis, and analyze the longer post-BRSR period and other ESG rating agencies.

Conflict of Interest:

- The authors declare that there is no conflict of interest regarding the publication of this research work.

Funding Statement:

- This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Data Availability Statement:

Hindustan Unilever Limited (HUL):

- 2019–20: HUL Annual Report 2019-20
- 2024–25: HUL Annual Report 2024-25

ITC Limited:

- 2019–20: ITC Report and Accounts 2019
- 2024–25: ITC Report and Accounts 2025

Nestle India:

- 2019–20: Nestle India Annual Report 2019 (CY)
- 2024–25: Nestle India Annual Report 2024-25

REFERENCES

- [1] Ajithakumari Vijayappan Nair B, Sasidharan A, Chandralekha A, Reddy K. Effect of ESG engagement on loan quality of banks: analysing non-performing loans in emerging economy banks. *Journal of Banking Regulation*. 2026 Sep;27(3):44. <https://doi.org/10.1057/s41261-026-00345-x>
- [2] Wadhwa P, Aggarwal VK. Is the ESG Penalty Real? A Propensity Score Matching Analysis of Indian Listed Firms. *International Journal of Economic Practices and Theories*. 2026 Apr 19;2026:1509-25. <https://doi.org/10.52783/ijept.308>
- [3] Neethu TC, Arun TC. Propensity score matching and a difference in difference approach to assess esg's influence on indian acquirer performance. *Australasian Accounting, Business and Finance Journal*. 2024 May 8;18(3). <https://doi.org/10.14453/aabfj.v18i3.07>
- [4] Li K, Qin T, Tang L, Zhou J. Rating chaos and green governance: ESG rating divergence, corporate greenwashing, and the governance effects of environmental tax reform. *Environment, Development and Sustainability*. 2026 Jun 12:1-35. <https://doi.org/10.1007/s10668-026-07824-1>
- [5] Liu Q, Jiang X, Ni Z. Unintended consequences of the impact of MOR on ESG performance. *China Economic Journal*. 2025 Sep 2;18(3):414-46. <https://doi.org/10.1080/17538963.2025.2493985>
- [6] Kunwar S, Paudel MR, Dahal A, Silwal P. Voluntary Commitment, Involuntary Costs: Evidence on United Nations Global Compact Adoption and Firm Performance from an Emerging Nation. *Involuntary Costs: Evidence on United Nations Global Compact Adoption and Firm Performance from an Emerging Nation* (June 10, 2026). 2026 Jun 10. <http://dx.doi.org/10.2139/ssrn.7017998>
- [7] Bose S, Khan HZ, Yu C. Do Mandatory Contributions to a Climate Risk Fund Affect Firm Performance? Evidence from a Country Highly Vulnerable to Climate Risk. *Journal of International Accounting Research*. 2026 Jun 1:1-32. <https://doi.org/10.2308/JIAR-2025-025>
- [8] Singh K. Listing on environmental, social and governance index and financial distress: does the difference-in-differences matter?. *Asian Review of Accounting*. 2024 Mar 21;32(2):302-26. <https://doi.org/10.1108/ARA-07-2023-0197>

- [9] Wang H, Sun Y, Wang X. Policy Implementation and Sustainable Governance in Chinese SOEs: A Study of Mixed-Ownership Reform and ESG Rating Divergence. *Sustainability*. 2025 Nov 25;17(23):10576. <https://doi.org/10.3390/su172310576>
- [10] Zhao D, Ngan SL, Jamil AH. When ESG meets uncertainty: Financing cost effects under regulatory fragmentation and rating divergence. *Systems*. 2025 Jun 13;13(6):465. <https://doi.org/10.3390/systems13060465>
- [11] Pan Q, Jia H. Does ESG Rating Divergence Undermine the Insurance-like Effect of ESG? Evidence from Financial Restatements in China. *Sustainability*. 2026 Jan 13;18(2):795. <https://doi.org/10.3390/su18020795>
- [12] Sherry AM, Rajput N. Resilience Under Pressure: Do ESG-Compliant Firms Outperform During Crises? Evidence from Seven Systemic Shocks in the Indian Market (2015–2024). In 2025 2nd International Conference on Integration of Computational Intelligent System (ICICIS) 2025 Sep 9 (pp. 1-6). IEEE. <https://doi.org/10.1109/ICICIS65613.2025.11371276>
- [13] Xu J. The Impact of ESG Ratings on Enterprises' Green Innovation Capability: An Empirical Study Based on Staggered Difference-in-Differences (Staggered DID). *Financial Economics Research*. 2025 Sep 15;2(3):37-51. <https://doi.org/10.70267/fer.250203.3751>
- [14] Zhu X, Shao X, Li C, Du C. Exploring the transmission mechanism of low-carbon city pilot policies on enhancing agribusiness ESG performance: an empirical study using the PSM-DID model. *Carbon balance and management*. 2025 Dec 19;21(1):21. <https://doi.org/10.1186/s13021-025-00386-1>
- [15] Tu Q, Zuo L, Liang A, Yao Y, Liu D. Does ESG rating divergence decrease enterprise productivity? Evidence from China. *Research in International Business and Finance*. 2025 May 1;77:102967. <https://doi.org/10.1016/j.ribaf.2025.102967>
- [16] Chen Y, Liu Y, Wang C. ESG rating divergence, investor responses, and managerial myopic behavior. *Finance Research Letters*. 2025 Sep 29;86:108587. <https://doi.org/10.1016/j.frl.2025.108587>
- [17] Shi Y, Yao T. ESG rating divergence: Existence, driving factors, and impact effects. *Sustainability*. 2025 May 21;17(10):4717. <https://doi.org/10.3390/su17104717>
- [18] Du G, Ouyang X, Tan R, Zhang L. ESG rating disclosure and corporate bond credit spreads: a time-varying difference-in-differences analysis from China. *Journal of Business Research*. 2026 Apr 1;208:116042. <http://dx.doi.org/10.1016/j.jbusres.2026.116042>
- [19] Zhou Y, Bu W. When environmental, social, and governance (ESG) meets shareholder value: Unpacking the long-term effects with a multi-period difference-in-differences (DID) approach. *Systems*. 2025 Apr 25;13(5):315. <https://doi.org/10.3390/systems13050315>
- [20] Wang J, Chen B, Jiang C. Does ESG Report Information Content Reduce ESG Rating Divergence?. Available at SSRN 5167517. 2025. <http://dx.doi.org/10.2139/ssrn.5167517>