

Nexus between ESG scores and financial performance: evidence from the Indian banking sector

Ramesh Prasad

*Department of Commerce and Management, St. Xavier's University,
Kolkata, India, and*

Amitava Mondal

Department of Commerce, Sidho-Kanho-Birsha University, Purulia, India

Abstract

Purpose – This research analyzes the impact of “Environmental, Social, and Governance” (ESG) practices on Indian banks’ performances with respect to market and operational performance.

Design/methodology/approach – This research examines 28 Indian banks (12 public sector and 16 private sector) from 2021 to 2023, using multiple regression models and a robust generalized least square (GLS) estimation. The models include Tobin’s Q (TQ) and Return on Assets (ROA) as dependent variables, while current and lagged ESG performance scores (sourced from Refinitive database) constitute the main independent variables. Additionally, five control variables specific to banks and the COVID-19 pandemic are also incorporated into the analysis.

Findings – The study reveals that ESG practices have a time sensitive impact, meaning that the current year ESG activities have a substantial influence in driving financial performance of Indian banks than past year ESG activities. The benefits derive from past year ESG activities tend to diminish over time. The findings reinforce the necessity for banks to maintain dynamic and evolving ESG framework to remain competitive. Additionally, it is also found that private banks show greater initiative in implementing ESG practices than public banks.

Practical implications – This study offers noteworthy inputs for academicians, banks, regulators and other stakeholders. Additionally, this research broadens the understanding of sustainable banking practices in Indian domain across different time horizons, offering an initial assessment of how ESG transparency affects bank performance during the post-mandatory ESG disclosure phase.

Originality/value – This research investigates the time-sensitive impacts of ESG-centric practices (considering current and lagged effect) on bank performance, undertaken after the implementation of the Reserve Bank of India’s (RBI) 2020 circular relating to mandatory ESG disclosure for the Indian commercial banks.

Keywords ESG performance score, Lagged ESG, Tobin’s Q, ROA, Commercial banks, India

Paper type Research paper

1. Introduction

Over the past few years, with a growing emphasis on the notion of “sustainable development”, organizations are now being scrutinized more closely under the umbrella of “Environmental, Social and Governance” (ESG) practices. ESG practices have achieved widespread attention across various sectors, notably in the banks and financial institutions, as these institution act as an active agent in the reallocation of financial resources to drive sustainable economic development (Jaiwani and Gopalkrishnan, 2025). Across the world, financial institutions are progressively acknowledging to embrace a broader spectrum of ESG considerations owing to intensified regulatory pressure relating to their sustainable lending and investment decisions, investors’ demand for sustainable products, stakeholders call for transparency and a greater



understanding of the long-term risks associated with unsustainable business practices. It is, therefore, adopting ESG-centered strategies has become an imperative task for banking institutions (Menicucci and Paolucci, 2023; Mishar and Sant, 2024). Neglecting ESG considerations have surfaced a significant source of corporate risks, including environment risks, social and governance issues, having potential to adversely affect a bank's performance (Srivastava, 2022; Zhao *et al.*, 2018; Gutiérrez- Ponce and Wibowo, 2023; Muré *et al.*, 2021; Shakil *et al.*, 2019; Buallay *et al.*, 2021; Azmi *et al.*, 2021; Ersoy *et al.*, 2022; Aras and Kazak, 2022; Muré *et al.*, 2021; Menicucci and Paolucci, 2023). Hence, to mitigate ESG risk and generate shareholder value alongside sustainable performance, the financial institutions have come to realize the importance of considering ESG issues into their business model. Previous research argues that a company with higher ESG performance is positioned to deliver greater shareholder value and sustainable financial performance than those with inferior ESG performance. ESG-focused practices are likely to mitigate environment risks, enhance reputation and long-term financial stability (Bruno *et al.*, 2024; Liu *et al.*, 2023). The growing awareness of sustainability-centric business practices has led to increased interest among academicians, the research community and policymakers in evaluating the nexus between ESG-oriented practices and bank performance.

Indian banking industry is progressively transitioning towards sustainable business approach, consequently, ESG considerations have gained heightened prominence, especially following the COVID-19 pandemic (Jaiwani and Gopalkrishnan, 2025).

In India, banking regulators are experiencing substantial pressure in the wake of the 2015 Paris Climate Agreement, the G20 Summit, and a close examination of the Climate Risk and Sustainable Finance report in 2022. According to Moody's report, India's banking system allocates 25%–30% of loans to carbon-intensive sector such as “power generation, oil and gas, coal mining, transportation and logistics”, which are highly susceptible to increase transition risks. Furthermore, approximately 12% of loans are linked to the agricultural sector, which is vulnerable to climate risks from extreme weather events, including “droughts, floods, and cyclones”. As per the Reserve Bank of India (RBI) circular issued in 2020, Indian banks are now obligated to compile annual reports encompassing ESG information and are required to follow “Task-Force on Climate-related Financial Disclosure” (TCFD) guidelines, with assets exceeding 5,000 Cr (Kwatra, 2023). Additionally, according to 2023 Climate Risk Horizons, 10 out of 34 Indian banks have initiative reporting their Scope 1 and 2 emissions, with eight of these have begun disclosing Scope 3 emissions. National regulatory bodies are increasingly acknowledging the significance of green economy. As per RBI's 2023 circular pertaining to Green Deposits, commercial banks are required to implement a board-approved framework for sustainable financing. Moreover, the Central Bank is also planning to release guidelines in respect to green asset ratio. Recently, RBI issued a draft guideline in February (2024) mandating the integration of climate-related financial risks (“Governance, Strategy, Risk Management, Metrics and Targets”) aligning with global standard such as “EU's Corporate Sustainability Reporting Directive” (CSRD), “US Securities and Exchange commission” (SEC) climate disclosure rule to enhance transparency and accountability within the financial sector. Recent advancements in sustainability guidelines within the Indian banking system provide a compelling impetus to scrutinize the nexus between ESG-focused practices and bank performance. Recent research by Srivastava (2022), Jaiwani and Gopalkrishnan (2025), Sain and Kashiramka (2024) suggests that Indian banks with a strong focus on ESG practices are likely to generate higher performance in comparison to non-ESG-focused banks. It is, therefore, the research on ESG practices' impact on Indian bank performance is gaining substantial interest. Despite the growing significance of ESG considerations in Indian banks, empirical studies are limited. Jaiwani and Gopalkrishnan (2025), Sain and Kashiramka (2024) studied the impact of ESG-focused practices on Indian banks' performance prior to the regulatory shift introduced by the RBI. These studies have predominantly focused on periods when ESG disclosure was not obligatory and bank had the discretion to adopt ESG practices at their own pace. The regulatory shift (RBI's 2020 circular) represents a critical turning point, as

mandatory disclosure is likely to alter bank's ESG practices, enhance transparency, and potentially affect their financial performance. Previous literature has not yet fully examined how this new regulatory framework influences the financial health of the Indian banks in the post-mandatory disclosure phase. Moreover, Buallay *et al.* (2021) believes that the benefits derived from ESG integration tend to materialize in the subsequent periods rather than immediately. Indian researchers have not yet extensively addressed the temporal dynamic effect of ESG considerations. Therefore, this study examines current as well as lagged effect of ESG practices on financial health of banks. This research uses the ESG performance scores, sourced from the Refinitive database and employed multiple regression analysis and robust estimation. This study holds wide practical implications and is of considerable significance for banking regulators, policymakers, prospective investors and other stakeholders. The current research offers several noteworthy additions to the previous literature. Firstly, it enhances prior literature understanding regarding the connection between ESG practices and diverse aspects of Indian banks' market performance and operational performance. Second, the results heighten the priority of the sustainability agenda in the Indian banking sector concerning different time horizons. The findings of this paper may be useful for banking regulators in designing effective ESG policies for Indian banks in the era of sustainable banking. The current paper is a novel attempt from an Indian standpoint, exploring the temporal dynamic effects of ESG-driven initiatives on bank performance during the post-mandatory ESG disclosure phase.

The current study proceeds with the following sections. The beginning section covers with an introduction and then proceeds on to background theories, previous literature, and hypothesis framework. The third section covers research design and methodology followed by data analysis and a discussion of results. The last two sections end with practical implications and conclusions.

2. Background theories, previous literature and hypothesis development

2.1 Background theories

Past research by Menicucci and Paolucci (2023), Ersoy *et al.* (2022), Menicucci and Paolucci (2023), Bakri *et al.* (2022), Khoury *et al.* (2023), Azmi *et al.* (2021), Khelif *et al.* (2015), Nizamuddin *et al.* (2024) used several theories, including stakeholders' theory, social contract theory, signaling theory, agency theory, neoclassical theory, to establish the connection of ESG practices with banks' performance.

The present study is founded on Stakeholder theory and Signaling theory. Stakeholder theory posits that organizations are surrounded by different stakeholders, including shareholders, employees, investors, customers, suppliers, communities, and regulatory bodies. With growing emphasis on ESG considerations within Indian banks, stakeholders are increasingly demanding sustainability efforts. ESG initiatives can strengthen trust with regulatory bodies, boost employee morale, increase market reputation, and fulfilling expectations to a broader array of stakeholders. Furthermore, ESG reporting or Sustainability report also acts as a medium of signal information to stakeholders.

2.2 Review of previous studies and research gap

ESG practices in banking parlance refers to the actions and strategies implemented to address ESG issues, such as sustainable financing, carbon footprint reduction, issuing green bond, climate risk management, financial inclusion, responsible lending, ethical governance practices, etc. A substantial volume of existing literature has addressed the interplay between ESG practices and bank performance within the setting of China, Indonesia, the USA, Malaysia, India and other emerging economies. Shakil *et al.* (2019) validated that environmental and social practices help to enhance ROA and ROE of banks in an emerging country. Similarly, Xia *et al.* (2022) illustrated that environment-related information has a

significantly favourable effect on the financial performance of 30 listed banks in China. Further, [Buallay et al. \(2021\)](#) using data from 232 listed banks in both developed and developing countries, evaluated sustainability reporting's impact on bank performance for eight years. They demonstrated that ESG affects market performance positively in developed countries' banks and insignificantly in the case of developing countries' banks. Further, ESG affects financial performance negatively in developed countries' banks and positively in the case of developing countries' banks. Another study by [Azmi et al. \(2021\)](#) evaluated ESG initiatives of 251 banks from 44 emerging economies and observed their influence on the values of banks. They reported that a low degree of ESG involvement leads to a positive contribution on the value of banks, with environmental practices exhibiting a substantial effect on bank value. [Muré et al. \(2021\)](#) reported in their research paper that banks resort to ESG adoption for bettering their reputation to alleviate the repercussion of financial penalties. [Buallay et al. \(2021\)](#) assessed the effect of the ESG dimension on financial performance (ROE, ROA), and Tobin's Q of seven different countries' banks and demonstrated that the ESG pillar has deteriorated financial performance. Furthermore, [Ersoy et al. \(2022\)](#) evaluated the ESG scores' effect on the US commercial banks' market value and confirmed that a high ESG score can boost a bank's market value. Similarly, [Bakri et al. \(2022\)](#) analyzed the data of 24 Malaysian banks for 10 years (2011–2020) and evaluated the impact of ESG on Tobin's Q considering the social pillar as a moderating variable. The study reported that ESG enhanced Tobin's Q of Malaysian banks. Moreover, [Hasan et al. \(2022\)](#) found that the environmental performance of 56 Gulf Cooperative Council banks has a significantly negative effect on their financial performance over a period of 9 years. Another study by [Aras and Kazak \(2022\)](#) using four-year data of banks in "Organisation for Economic Co-operation and Development" (OECD) countries demonstrated that the ESG factor significantly increases the P/B ratio and Tobin's Q of companies. [Khoury et al. \(2023\)](#) examined ESG's effect on ROE, ROA and Tobin's Q of 46 listed banks in the MENAT region for 13 years. They highlighted that investment in ESG activities up to a certain level improves financial performance and deteriorates after higher investment. [Menicucci and Paolucci \(2023\)](#) studied ESG impact on financial performance considering 105 Italian banks for four years. They found mixed results; the overall impact is negative on financial performance but positive while examining the individual dimension of ESG. Another recent study by [Liu et al. \(2023\)](#) demonstrated an adverse link between ESG rating and non-performing assets which leads to enhanced bank performance. Another recent study by [Galletta et al. \(2023\)](#) investigated the association of ESG scores with operation risk. They demonstrated that a higher ESG score leads to minimized operational risk in the bank. Meanwhile, another recent study by [Gutiérrez- Ponce and Wibowo \(2023\)](#) considered 10-year data from Indonesian banks to study the association between sustainability performance and financial achievements. The study reported that overall ESG activities are inversely linked to ROA, ROE and Tobin's Q, while the individual dimension of ESG denotes varied results. Recent research by [Al-Ajmi et al. \(2023\)](#) analyzed data from 246 banks in emerging economies over a 12-year period data and scrutinized the effect of environment disclosure on ROA, ROE and Tobin's Q, and revealed a negative impact on banks' performance. [Jaiwani and Gopalkrishnan \(2025\)](#) analyzed data from 22 Indian banks and the effect of ESG on ROA and ROE over a five-year period (2016–2021) in the context of ownership heterogeneity. They reported a negative impact of ESG practices on private banks, with no significant impact on the public sector banks. [Mishar and Sant \(2024\)](#) recently assessed the ESG adoption level in Indian banks and demonstrated that private banks comply more with ESG disclosure than public banks, with a major emphasis on environmental dimensions. Another recent study by [Nizamuddin et al. \(2024\)](#) assessed the effect of ESG risk on ROA, ROCE and ROE using 2021–2022 data for Indian bank. The study reported a negative impact of ESG risk on financial health of Indian banks. Similarly, [Sain and Kashiramka \(2024\)](#) examined the impact of ESG disclosure and governance mechanism using 41 Indian banks over 12 years (2008–2020), and the static and dynamic regression reported a positive effect on profitability and financial stability.

Despite the extensive global research on ESG and financial performance, limited studies are available in the Indian context. The authors believe that existing studies in India have primarily been researched prior to the mandatory ESG disclosure requirement introduced for the Indian commercial bank in the year 2020 by the RBI. As a result, these studies do not reflect the impact of the regulatory shift on bank performance. This research endeavors to bridge this void by investigating the impact of ESG-focused initiatives on the financial performance of Indian bank in the period subsequent to mandatory ESG disclosure period (2021–2022 and 2022–2023) in the context of different time horizons (current and lagged effect), offering fresh insights into the evolving regulatory landscape.

2.3 Hypothesis development

Extensive research has analyzed the association between ESG practices and bank performance. [Ersoy et al. \(2022\)](#), [Buallay et al. \(2021\)](#), [Aras and Kazak \(2022\)](#), [Shakil et al. \(2019\)](#), [Azmi et al. \(2021\)](#) and [Buallay et al. \(2021\)](#) have consistently shown a positive association, particularly in terms of Tobin's Q and ROA. Conversely, [Gutiérrez- Ponce and Wibowo \(2023\)](#) and [Menicucci and Paolucci \(2023\)](#) highlight a negative relationship. Earlier studies has primarily centered on the current year's effect of ESG integration on bank performance.

Additionally, existing research also asserts that ESG practices may not immediately improve financial performance. Implementing ESG initiative often involves significant change in corporate strategy, processes and culture. Hence, companies may not see an immediate financial return. [Buallay et al. \(2021\)](#) assert that ESG integration is a strategic approach, and its benefits tend to materialize in the subsequent periods rather than immediately. Therefore, in the light of this research argument, this study explores both the current effect and the potential lagged effect of ESG practices on bank performance. We, therefore, propose two research hypotheses:

- H1. ESG practices in the current year have positively affected the performance of banks.
- H2. ESG practices in prior to current year have positively affected the performance of banks.

3. Research design and methodology

3.1 Selected sample and study period

This study inquired the impact of present and past year ESG initiatives on the financial health of Indian banks. The analysis employs a sample of 28 Indian banks (comprising 12 public sector and 16 private sector banks) for two-year periods (2021–2022 and 2022–2023). The list of banks included in the study is provided in Annexure [Table A1](#). The selected timeframe is particularly relevant as it represents the first instance of mandatory ESG-related disclosure, following a 2020 RBI circular mandating commercial banks with assets of Rs 5,000 Cr to disclose their ESG-related information in their annual reports, aligning with the “TCFD” guidelines ([Kwatra, 2023](#)). This study's periods (2021–2022 and 2022–2023) allows for an initial assessment of the effects of the RBI's directive on bank behavior concerning ESG transparency. Moreover, the selection of sample banks depends on the availability of financial data, ESG information and banks with assets worth 5,000 Cr or more. Five private banks were eliminated due to unavailability of ESG-related data in the period of 2021–2022 and 2022–2023. Further, the annual report and Refinitive database were used to extract the necessary financial and ESG data for the sample banks. Refinitive database is an internationally recognized databank that provides comprehensive reliable information on over 450 different ESG metrics. A number of previous studies with regard to the banking

sector extracted data from Refinitive's database (Menicucci and Paolucci, 2023; Khoury *et al.*, 2023).

3.2 Selected variables explanation and measurement

3.2.1 Dependent variable. This study uses two dependent variables (performance of the bank), ROA and Tobin's Q (TQ) as a proxy of operational and market performance, guided by Menicucci and Paolucci (2023), Gutiérrez- Ponce and Wibowo (2023), Al-Ajmi *et al.* (2023), Hasan *et al.* (2022), Shakil *et al.* (2019), and Buallay *et al.* (2021). ROA shows bank's operational efficiency in generating profit from its total assets and calculated as net profit after tax to total assets ratio (Buallay *et al.*, 2021; Bătae *et al.*, 2020). On the other side, TQ is a widely used indicator of market performance, defined as the quotient of a firm's market value over its total assets, traditionally calculated as the market value of company to replacement cost of assets. Previously, "TQ is calculated as the sum of market value of equity and book value of debts divided by total assets" (Chung and Pruitt, 1994; Singh *et al.*, 2018; Bhargav and Tandon 2023; Ciftci *et al.*, 2019). Here, we have considered enterprise value of bank to total assets ratio to measure Tobin's Q.

3.2.2 Independent variable. ESG practices (independent variable) have been proxied by ESG performance scores, following previous research by Khoury *et al.* (2023), Menicucci and Paolucci (2023), sourced from Refinitive's database. It provides ESG performance score based on verified ESG/sustainability report of banks. This ESG performance score is assessed using three fundamental pillars: environment, social and governance. Environment pillar (ENV_{pillar}) incorporates three dimensions: "Emission, Innovation, and Resource use". Social pillar (SOC_{pillar}) considers four dimensions: "Community, Human rights, Product responsibility, and Workforce". Governance pillar (GOV_{pillar}) combines three dimensions: "CSR strategy, Management, Shareholders". Each dimension again considers on different sub-theme under each dimension (ESG Refinitive, May 2022). The ESG performance scores ranges from 0 to 100, categorized into different indicators. The range of ESG performance scores and their indicators is shown in Table 1 below.

This study uses combined ESG performance scores in two different time horizon: (1) ESG_{*t*}, which shows the current year's ESG performance score; (2) ESG_{*t-1*}, which shows one-year lagged ESG performance score, guided by Khoury *et al.* (2023). The variable ESG_{*t*} assesses the impact of current-year ESG initiatives on Indian bank performance, while ESG_{*t-1*} allows capturing the potential lagged effects (time sensitive effect) of ESG initiatives from previous year. These holistic ESG measure (current effect and lagged effect) might be helpful for measuring time sensitive impact, facilitating balance between quick wins and sustainable growth.

3.2.3 Control variable. This study uses five bank attribute control variables, including capital adequacy ratio (CAR), assets quality (AQ), size of bank (Siz), Age of the bank, leverage (Lev) following previous research (Khoury *et al.*, 2023; Ersoy *et al.*, 2022; Menicucci and Paolucci, 2023; Buallay *et al.*, 2021; Gutiérrez-Ponce and Wibowo, 2023). CAR is represented as proportion of bank's capital to risk-weighted asset, while AQ is measured by the ratio of gross NPA to gross advances. Bank size (siz) is proxied as log of total asset and age as

Table 1. ESG performance scores tiers and transparency levels

Score range	Indicator
0 ≤ 25	"Poor ESG performance: Insufficient degree of transparency"
>25 ≤ 50	"Satisfactory ESG performance: Moderate degree of transparency"
>50 ≤ 75	"Good ESG performance: Above average degree of transparency"
>75 ≤ 100	"Excellent ESG performance: High degree of transparency"

Source(s): Author's compilation (ESG Refinitive report, May 2022)

log of the number of years since incorporation. Lev is measured by log of total debt holding by bank. Additionally, the impact of Covid-19 (Cov19) pandemic is accounted for using a dummy variable, with 2021–2022 coded as 1 and 2022–2023 as 0, reflecting the pandemic’s potential effect on performance of bank during these periods, guided by [Shabir et al. \(2023\)](#).

3.3 Selected statistical tools and models

The current study begins with descriptive statistics to recognize the fundamental properties of the selected variables. Then, the current study performs pooled OLS regression for estimating the link between bank performance and ESG practices, guided by [Bakri et al. \(2022\)](#). Finally, the study applies generalized least square (GLS) method for robust estimation guided by [Yaqub et al. \(2015\)](#), [E-Vahdati et al. \(2023\)](#). This study develops four regression models explained below.

$$TQ = \beta_0 + \beta_1 ESG_t + \beta_2 CAR + \beta_3 AQ + \beta_4 Siz + \beta_5 Age + \beta_6 Lev + \beta_7 Dummy_{Cov19} + \varepsilon_{it}$$

(Model 1)

$$TQ = \beta_0 + \beta_1 ESG_{t-1} + \beta_2 CAR + \beta_3 AQ + \beta_4 Siz + \beta_5 Age + \beta_6 Lev + \beta_7 Dummy_{Cov19} + \varepsilon_{it}$$

(Model 2)

$$ROA = \beta_0 + \beta_1 ESG_t + \beta_2 CAR + \beta_3 AQ + \beta_4 Siz + \beta_5 Age + \beta_6 Lev + \beta_7 Dummy_{Cov19} + \varepsilon_{it}$$

(Model 3)

$$ROA = \beta_0 + \beta_1 ESG_{t-1} + \beta_2 CAR + \beta_3 AQ + \beta_4 Siz + \beta_5 Age + \beta_6 Lev + \beta_7 Dummy_{Cov19} + \varepsilon_{it}$$

(Model 4)

Here, ε_{it} is the error term.

4. Data analysis

[Section 4](#) presents the data analysis, starts with descriptive statistics, followed by correlation analysis, pooled OLS regression and finally robust GLS estimation.

4.1 Overview of descriptive statistics

[Table 2](#) illustrates the fundamental statistics for bank performance, ESG performance scores and other selected variables for the sample Indian banks.

Table 2. Descriptive statistics of selected variables

Variables	n	Mean	S.D	Min	Max	Skewness	Kurtosis
TQ	56	0.958	0.134	0.7983	1.5610	2.826	9.208
ROA	56	0.857	0.539	−0.07	2.23	0.732	−0.018
ESG _t	56	50.143	20.741	10	87	−0.093	−1.154
ESG _{t−1}	56	50.382	20.854	10	87	−0.101	−1.140
CAR	56	17.510	2.896	13.23	27.10	1.317	2.638
AQ	56	0.0569	0.037	0.010	0.190	1.360	2.021
Siz	56	12.760	1.270	10.140	15.523	0.106	−0.573
Age	56	4.1394	0.710	2.560	5.720	−0.002	−0.406
Lev	56	9.865	1.563	6.663	13.108	−0.029	−0.674

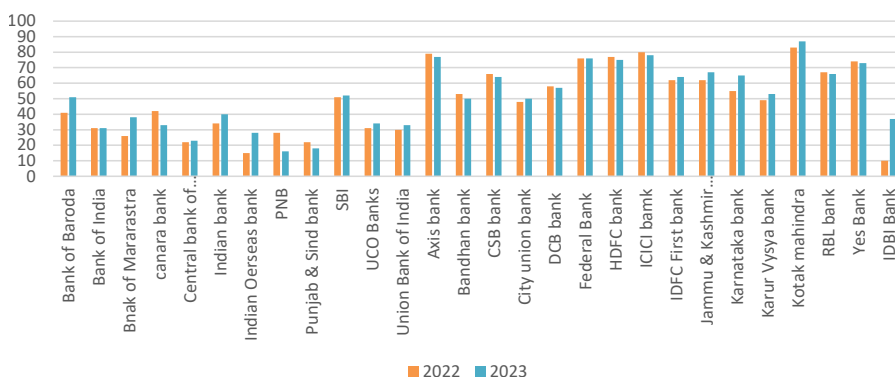
Source(s): Authors’ computation

Regarding Tobin's Q, the average values of the 28 sample banks are 0.958. As far as ROA is concerned, the average ROA during the study period is 0.85% with a standard deviation of 0.53% which varies between -0.07% and 2.23% . The average current year ESG performance score (ESG_t) after mandating TCFD guidelines for Indian banks is found 50.14 with a minimum score of 10 and a maximum 87. This suggests that sample Indian banks are performing somewhat above the moderate level (as value is 50.14) in ESG practices. Figure 1 reflects the ESG transparency of Indian banks. From Figure 1, it is seen that public sector banks, such as Bank of India, Central Bank of India and Punjab National Bank (PNB), have poor ESG commitment, while private banks, including Axis Bank, ICICI Bank, HDFC Bank, Kotak Mahindra and Yes bank exhibit higher level of ESG engagement. This implies that private banks are ahead of public bank in ESG practices in India, consistent with recent study by Mishar and Sant (2024). The average value of one-year lagged ESG performance score (ESG_{t-1}) is 50.382. The average values of bank-specific control variables, including capital adequacy ratio (CAR), assets quality (AQ), size (Siz), age and leverage (Lev) are 17.510, 0.0569, 12.760, 4.139 and 9.865 with a minimum value of 13.23, 0.010, 10.140, 2.560 and 6.663 to a maximum value of 27.10, 0.190, 15.523, 5.720 and 13.108 respectively. Additionally, skewness and kurtosis are used to validate the data set's normality. Kline (2011) believes that the accepted range of skewness and kurtosis for the normality of data should be $(+ -3)$ and $(+ -10)$. Our results of skewness and kurtosis fall between the acceptance range and confirm that the data have been distributed normally.

4.2 Pearson correlations test

Table 3 illustrates the Pearson correlation between performance of bank (POB) with ESG performance scores (ESG_t , ESG_{t-1}) and other selected variables.

Table 3 shows that the correlation coefficients (0.491, 0.336) indicate a significant positive relationship between market performance (measured by Tobin's Q) and both current year's ESG performance (ESG_t) and the previous year's lagged ESG performance (ESG_{t-1}). Additionally, coefficients of correlation (0.503 and 0.254) for operational performance, measured by ROA, also indicate a significant positive association with different measures of ESG performance (ESG_t and ESG_{1-t}). Pearson correlation result is also used to find out the presence of multicollinearity. Copper and Schindler (2003) opined that a correlation value of 0.80 or more is a matter of concern for serious multicollinearity. Here, highest correlation value is 0.87 (between size of bank and leverage), indicating the sign of a multicollinearity issue. The emergence of multicollinearity can produce unreliable and erroneous inferences.



Source(s): Authors' computation (www.refinitiv.com)

Figure 1. ESG performance score of select Indian banks

Table 3. Pearson correlation among selected variables

	TQ	ROA	ESGt	ESGt-1	CAR	AQ	Siz	Age	Lev
TQ	1								
ROA	0.670*	1							
ESG _t	0.491*	0.503*	1						
ESG _{t-1}	0.336**	0.254***	0.699*	1					
CAR	0.457*	0.673*	0.377*	0.278**	1				
AQ	-0.347*	-0.508*	-0.676*	-0.330**	-0.369*	1			
Siz	0.192	-0.045	-0.055	-0.181	-0.442*	0.082	1		
Age	-0.322**	-0.079	0.519*	-0.487*	-0.114	0.270**	0.014	1	
Lev	0.261	-0.025	0.183	0.040	-0.266**	-0.096	0.873*	-0.268**	1
<i>VIF test for collinearity</i>									
Model1 and Model3			2.621		1.553	2.390	7.061	1.788	6.937
Model2 and Model4				1.485	1.492	1.580	7.074	1.772	6.947
Note(s): Here *, **, *** shows significance at 1%, 5% level									
Source(s): Authors' computation									

Therefore, before proceeding with regression analysis, the existence of multicollinearity is further examined using variance inflation factors (VIF), as shown in Table 3. The highest VIF value is 7.074, followed by 7.061, then 6.947 and so on. So far as tolerance VIFs values are concerned, Gujarati (2004) and Hair *et al.* (2010) suggest that a VIF value exceeding 10 became the cause of multicollinearity. The VIF values in this study are found to be below 10 and finally conclude the absence of a multicollinearity problem. This allows the study to move forward with regression analysis.

4.3 Regression results for ESG practices and performance of bank

Tables 4 and 5 present pooled OLS regression results on the effect of ESG performance scores (proxy of ESG practices) on market performance and operational performance of bank, respectively.

Table 4. Regression results (Model 1–2)

D.V TQ Model 1				D.V TQ Model 2			
	B.Coff.	t-value	Sig.		B.Coff.	t value	Sig.
Constant		-0.839	0.406	Constant	-	-0.878	0.384
ESG _t	0.246	1.526	0.134	ESG _{t-1}	0.163	1.323	0.192
CAR	0.594	4.790	0.000*	CAR	0.614	4.975	0.000*
AQ	-0.023	-0.150	0.881	AQ	-0.134	-1.055	0.297
Siz	0.890	3.369	0.002*	Siz	0.914	3.399	0.001*
Age	-0.259	-1.948	0.057***	Age	-0.265	-1.968	0.055***
Lev	-0.475	-1.815	0.076***	Lev	-0.456	-1.712	0.094***
Cov19	0.055	0.490	0.627	Cov19	0.079	0.695	0.491
Adjusted <i>r</i> ²		0.466		Adjusted <i>r</i> ²		0.458	
(std. error)		0.098		(std. error)		0.100	
<i>F</i> -value		7.728		<i>F</i> -value		7.402	
(Sig.)		0.000*		(Sig.)		0.000*	
Autocorrelation:		Yes		Autocorrelation:		yes	
Heteroscedasticity:		Yes		Heteroscedasticity:		yes	
Note(s): *, **, *** shows significance at 1%, 5% and 10% level, D.V = Dependent variable							
Source(s): Authors' computation							

Table 5. Regression results (model 3–4)

D.V ROA model 3	B.Coff.	t-value	Sig.	D.V ROA model 4	B.Coff.	t-value	Sig.
Constant		−5.483	0.000*	Constant		−4.857	0.000*
ESG _t	0.292	2.364	0.022**	ESG _{t−1}	0.116	1.185	0.242
CAR	0.730	7.669	0.000*	CAR	0.765	7.765	0.000*
AQ	−0.097	−0.819	0.417	AQ	−0.243	−2.391	0.021**
Siz	0.963	4.747	0.000*	Siz	0.981	4.570	0.000*
Age	−0.038	−0.372	0.711	Age	−0.084	−0.784	0.437
Lev	−0.752	−3.799	0.001*	Lev	−0.729	−0.3428	0.001*
Cov19	−0.185	−2.139	0.038**	Cov19	−0.153	−1.700	0.096***
Adjusted <i>r</i> ²		0.685		Adjusted <i>r</i> ²		0.655	
(std. error)		0.301		(std. error)		0.317	
<i>F</i> -value		17.775		<i>F</i> -value		15.364	
(Sig.)		0.000*		(Sig.)		0.000*	
Autocorrelation:		Yes		Autocorrelation:		Yes	
Heteroscedasticity:		Yes		Heteroscedasticity:		Yes	

Note(s): *, **, *** shows significance at 1%, 5% and 10% level, D.V = dependent variable

Source(s): Authors' computation

The coefficients (0.246 and 0.116) for the ESG_t and ESG_{t−1} have a positive impact on TQ. The results imply that a one-unit gain in current year ESG performance score associates with a 0.246 unit increase in Tobin's Q. Additionally, these further highlights that for every one unit increase in past year ESG performance score corresponds to 0.116 unit rise in current year TQ, though results are not statistically significant. Moreover, capital adequacy ratio (CAR) and bank size (siz) exhibit a significantly positive influence on Tobin's Q. Furthermore, the analysis reveals that AQ has a negative impact on TQ. Interestingly, Cov19 has a positive impact on TQ, but the results are statistically insignificant. Additionally, Age and Lev have a statistically negative impact on TQ in models 1 and 2. The adjusted *R*² values for model 1 and 2 are 0.466 and 0.458, respectively. These values suggest that approximately 46%, and 45% of the variation in the Tobin's Q can be accounted for by ESG practices and other variables included in the models.

Similarly, regarding ROA, ESG_t has a positive and statistically significant impact. While this is not true in case of ESG_{t−1}, ESG_{t−1} exerts a positive influence on ROA. CAR exhibits a statistically significant positive effect on ROA. Conversely, Lev and Cov19 exhibit a significant negative consequence on ROA in both models 3 and 4, consistent with previous research by [Gutiérrez-Ponce and Wibowo \(2023\)](#), [Shabir et al. \(2023\)](#). Model 3 predicts 68% of the variation in ROA explained by ESG performance scores, along with other variables. Model 4, on the other hand, predicts 65% variation in ROA. The *F*-values indicate the models are statistically significant.

Additionally, for investigating the serial autocorrelation and heteroscedasticity, this study performs Breusch–Godfrey LM test and Breush–Pagan/Cook Weisberge test. The test statistics indicate the existence of both the issues in the models. The regression results could be biased, inefficient and inconsistent in the presence of autocorrelation and heteroscedasticity ([Yaqub et al., 2015](#)). Therefore, to demonstrate the efficient and robustness of our findings, this study employs generalized least square (GLS) estimation to account for both autocorrelation and heteroscedasticity issues. The analysis proceeds further for robust GLS estimation.

4.4 Robustness of the results

Tables 6 and 7 represent the results of GLS estimation.

From the above tables, it is found that ESG_t has a positive and significant (at 10% and 5% levels) impact on TQ and ROA of Indian bank. However, ESG_{t-1} has a favorable effect on both performance measures (TQ and ROA), although these outcomes lack statistical significance. The effects of control variables on banks' performance correspond with the results obtained in the OLS regression models. The positive impact of current year ESG practices suggests that ESG initiative need to be continually updated and integrated into core strategy to yield immediate financial benefits. This suggests ESG activities must be dynamic, as positive effects may diminish if not consistently reinforced. The Wald chi2 values are statistically significant, indicating the results are robust.

5. Discussions of findings

Section 5 underlines the discussion of reported results. The results demonstrate that the current year ESG performance score (ESG_t) yields a robust and statistically meaningful impact (positive) on both the market performance (TQ) and operational performance (ROA) of Indian banks. Hence, H1 hypothesis is accepted. Our results align with the findings drawn in the previous research (Bakri *et al.*, 2022; Buallay, 2019; Azmi *et al.*, 2021; Ersoy *et al.*, 2022; Buallay *et al.*, 2021; Aras and Kazak, 2022; Shakil *et al.*, 2019), but contradict with Menicucci and Paolucci (2023), Gutiérrez- Ponce and Wibowo (2023). Additionally, the lagged year ESG performance scores have revealed a positive impact (statistically insignificant) on TQ and ROA. Therefore, H2 cannot be accepted. These findings implies that investors and other stakeholders in the Indian banking sector are increasingly valuing current year environment sustainability, social responsibility, ethical governance and perceive current year ESG initiatives as valuable and impactful. These practices are likely to increase bank's reputation (Sain and Kashiramka, 2024), attract responsible investors, increase overall stock price and enjoy greater public trust. Furthermore, the Indian banks are poised to generate additional economic value for their stakeholders. This aligns with stakeholder and signaling theory. Conversely, past-year ESG initiatives may lose their signaling power over time. It seems likely that past-year ESG practices may not have lasting impact, as they may no longer serve as fresh or relevant signals to stakeholders, whose expectations tend to change rapidly. Stakeholders may prioritize current year ESG initiatives rather than past year. As a result, the past year's

Table 6. Generalized least square (GLS) results for robustness

D.V				D.V			
Tobin's Q	B.Coff.	z-value	Sig.	Tobin's Q	B.Coff.	z-value	Sig.
Constant	−0.212	−0.90	0.366	Constant	−0.231	−0.95	0.344
ESG_t	0.0016	1.65	0.099***	ESG_{t-1}	0.0010	1.43	0.152
CAR	0.027	5.18	0.000*	CAR	0.028	5.39	0.000*
AQ	−0.0008	−0.16	0.872	AQ	−0.0047	−1.14	0.254
Siz	0.095	3.65	0.000*	Siz	0.098	3.68	0.000*
Age	−0.049	−2.11	0.035**	Age	−0.050	−2.13	0.033**
Lev	−0.040	−1.96	0.050**	Lev	−0.039	−1.86	0.063***
Cov19	0.014	0.53	0.596	Cov19	0.021	0.75	0.451
Wald chi2		63.32		Wald chi2		60.84	
p-value		0.000*		p-value		0.000*	
Autocorrelation		No		Autocorrelation		No	
Heteroscedasticity		No		Heteroscedasticity		No	
Robust standard error		Yes		Robust Standard Error		Yes	
Note(s): *, **, *** shows significance at 1%, 5% and 10% level, D.V = Dependent variable							
Source(s): Authors' computation							

Table 7. Generalized least square (GLS) results for robustness

D.V ROA	B.Coff.	z-value	Sig.	D.V ROA	B.Coff.	z-value	Sig.
Constant	−4.251	0.717	0.000*	Constant	−4.073	−5.26	0.000*
ESG _t	0.007	2.55	0.011**	ESG _{t-1}	0.0030	1.28	0.201
CAR	0.134	8.30	0.000*	CAR	0.141	8.42	0.000*
AQ	−0.137	−0.89	0.375	AQ	−0.034	−2.59	0.010**
Siz	0.408	5.14	0.000*	Siz	0.418	4.96	0.000*
Age	−0.029	−0.41	0.680	Age	−0.064	−0.86	0.390
Lev	−0.257	−4.05	0.000*	Lev	−0.251	−3.72	0.000*
Cov19	−0.196	−2.31	0.021**	Cov19	−1.641	−1.84	0.065***
Wald chi2		145.63		Wald chi2		126.31	
p-value		0.000*		p-value		0.000*	
Autocorrelation:		No		Autocorrelation:		No	
Heteroscedasticity:		No		Heteroscedasticity:		No	
Robust standard error		Yes		Robust Standard Error		Yes	

Note(s): *, **, *** shows significance at 1%, 5% and 10% level, D.V = Dependent variable
Source(s): Authors' computation

ESG practices may not contribute significantly to banks' current year performance. Indian banks should prioritize ongoing and real-time implementation of ESG initiatives, rather than relying on past efforts.

6. Practical implications

The results obtained from this novel study contribute noteworthy inputs for academicians, banking regulators, policymakers, investors and other stakeholders. This study has valuable insights in both theoretical and practical realms. This research broadens the existing body of research concerning the empirical significance of ESG practices in the Indian banking domain, an aspect that had previously not been investigated by prior researchers after mandating ESG guidelines by RBI (2020). This study is the first empirical study for Indian banking institutions, as banking regulators and policymakers have been emphasizing ESG factors in their lending and investment decision-making to promote sustainability. By prioritizing ESG factors, Indian banks can contribute to addressing international concerns such as climate change and green finance. Additionally, banks leading in ESG commitments may be better equipped to tackle risks relating to climate change, regulatory risk and reputational damage, etc. However, there is no standardized ESG guideline, particularly for Indian banking institutions. In India, the “Business Responsibility and Sustainability Reporting” (BRSR), formerly referred to as National Voluntary Guidelines (NVG) and “National Guidelines on Responsible Business Conduct” (NGRBC) provides guidelines for the preparation of sustainability reports that are exclusively applicable to listed companies (Prasad and Mondal, 2021). The results of this study could potentially prompt India's central bank and banking regulator to consider taking essential measures to broaden the scope of the BRSR guidelines. This would enable Indian banking institutions to adhere to ESG guidelines and communicate a substantial volume of ESG information to their stakeholders. Consequently, Indian banks could enhance their operational performance in the long run. This implies that policymakers should emphasize the significance of ESG for Indian banks' long-term sustainable performance. The results might be helpful within the realm of practical relevance. Banks can mitigate environmental risks by charging higher interest rates to industries that emit a high volume of carbon footprint, leading to minimize finance from banks. They can also incentivize borrowers by offering preferential terms such as lower interest rates or other financial incentives to encourage investment environment friendly projects, such as renewal energy,

energy efficient technologies and green finance initiatives. Additionally, banks can encourage in dialogues and collaborations with stakeholders, including NGOs, regulators and communities, to better understand environment as well as social risks. Encouraging customers to use online banking and e-statement services instead of paper passbook, as well as adoption of solar energy within the bank, can lead to a more sustainable banking approach. Moreover, fostering a strong corporate governance culture of integrity and accountability within banks can effectively mitigate governance risks.

7. Conclusion

The prominence of ESG risks has exerted intensified pressure on banking institution to continually reassess and refine their ESG practices to effectively mitigate potential ESG-related risks. In this respect, this study is a pioneering effort that aims to analyze the consequence of ESG performance scores on banks' performance, from 2021 to 2023, particularly within 28 Indian banking institutions. We applied multiple regression models, and GLS estimation for robustness using current and lagged ESG performance scores as a predictor of bank performance.

The study demonstrates that the impact of ESG practices is closely tied to their timeliness. Current year ESG initiatives played a pivotal role in driving financial performance than those from previous year ESG practices. The findings underscore the need for Indian banks to adopt ongoing and forward-looking ESG strategies.

Further, Indian banks are at the very initial stage of embracing the ESG agenda into their business processes. According to RBI's SFG survey report, top leading commercial banks in India have initiated measures to address climate risk and sustainable finance, but there is still a pressing need for collective and additional efforts in this area. Only a limited subset of Indian banks incorporates key performance indicators (KPIs) related to climate risk, sustainability and ESG into their performance assessment process. Furthermore, despite the growing emphasis on ESG, Indian banks' alignment with the BRSR guidelines has not yet been wholeheartedly achieved. Indian banks have no single set of standardized ESG reporting frameworks. Therefore, Indian banks are still lagging behind in the adoption of ESG practices. Further, this study holds a significant importance in the current era of sustainable banking and offers valuable insight into the timing and intensity of ESG efforts by Indian banks. Bank should prioritize ongoing and real-time implementation of ESG initiatives, rather than relying on past efforts.

Nevertheless, this study has few weaknesses that could limit its generalizability. First, this study is restricted to a two year's data. Second, the analysis relies on the overall ESG performance score and does not take into account individual ESG dimensions. Further research can be conducted in this direction in the future with advance statistical tools. Regardless of these limitations, this research offers novel insights, with particular attention to the sustainability-driven practices of Indian banking sector.

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Annexure**Table A1.** Selected sample bank

Name of sample banks

- (1) Bank of Baroda
- (2) Bank of India
- (3) Bank of Maharashtra
- (4) Canara bank
- (5) Central Bank of India
- (6) Indian Bank
- (7) Indian Overseas Bank
- (8) PNB
- (9) Punjab and Sind Bank
- (10) SBI
- (11) UCO Banks
- (12) Union Bank of India
- (13) Axis Bank
- (14) Bandhan Bank
- (15) CSB Bank
- (16) City Union Bank
- (17) DCB Bank
- (18) Federal Bank
- (19) HDFC Bank
- (20) ICICI Bank
- (21) IDFC First Bank
- (22) Jammu and Kashmir Bank
- (23) Karnataka Bank
- (24) Karur Vysya Bank
- (25) Kotak Mahindra
- (26) RBL Bank
- (27) Yes Bank
- (28) IDBI Bank

Source(s): Authors' compilation

Corresponding author

Amitava Mondal can be contacted at: amitavakalna@gmail.com