

Sustainable Finance and Banks Performance: Evidence from Selected Indian Banks

Ms. Trinayana Gohain

Student

Abstract

Purpose: The purpose of this paper is to study the trend of sustainable finance and its impact on the financial performance of selected Indian banks.

Methodology: The sample of the study consists of 24 Indian banks (12 public sector and 12 private sector) based on market capitalization as of 31st March 2023, for a period of 4 years (2019-20 to 2022-23). All the information pertaining to this study has been collected from annual reports, business responsibility reports and ACE Equity database. Sustainable finance has been measured based on green loan and sustainable finance normalised by total assets to total advances.

Findings: The findings revealed that only a few banks in India have adopted sustainable finance policy. However, a significant increase in sustainable finance policy has been observed over the years which depicts that banks have started to invest more in environmentally viable projects and will continue to do so in the near future. It was also observed that private sector banks outperform public sector banks in terms of investment in sustainable finance projects. The study finds a positive relationship between sustainable finance and banks' performance.

Keywords: Sustainable Finance, Green Loan, Green Bonds, Profitability, Market performance, Indian Banks

1. Introduction

1.1. Importance of sustainable finance

With the increase in global warming at an alarming rate, the reduction of carbon footprints and adoption of sustainable practices have drawn considerable attention from world leaders. According to a few environmental scientists, the prime cause of the greenhouse gas effect is excessive consumption of energy, particularly from fossil fuels (Ahmad et al., 2021; Abbasi et al., 2022) of which carbon dioxide (CO₂) is a key component causing extreme level of heat in the atmosphere, popularly known as 'global warming' (Hao et al., 2021). One of the many key factors contributing towards global warming is rapid economic growth, which in turn has created significant concern for the environment worldwide (Fang et al., 2022). Concern towards the rapidly changing climate brought about an agreement on climate change through the Paris Agreement, 2015 within the United Nations Framework Convention on Climate Change (UNFCCC). While 196 member countries of the Paris Agreement have decided to cooperatively work for the alleviation of the acute problem of CO₂ emissions and adaptation to the effect of climate change, one of the major challenges faced by UNFCCC was regarding the financing of such mitigation and adaptive action that would require a handsome amount of investment. The ultimate goal of the Paris Agreement was to limit global warming to a threshold below 2°C temperature which requires an investment of \$53

trillion in energy-related activities by 2035 (International Energy Agency, 2014). The agreement emphasizes the need for climate finance and directs the developed country to take the first step or initiative in mobilizing climate finance from a wide variety of sources, instruments, and channels for supporting country-driven strategies as well as prioritizing the needs of developing countries.

The terms sustainable finance (SF) and green finance are often used synonymously, as it is generally hard to distinguish between the two. According to the United Nations Environment Programme (UNEP), sustainable finance is a broader term as it includes Environmental, Social, and Corporate Governance (ESG) factors in its scope. While IFC (2017) defines green finance as the “financing of investments that provide environmental benefits”. Thus, to ensure board coverage, this paper uses the term ‘Sustainable Finance’ as all the financing tools for coping with climate change and sustainability get covered in it.

1.2. History

While the roots of sustainable finance can be traced back to the 1970s, it gained its much-needed eminence in 2010 when 194 countries established the Green Climate Fund to provide financial aid to developing countries to mitigate and adapt to climate change (Zhang et al., 2019). Subsequently, the adoption of the Paris Agreement, Sustainable Development Goals (SDGs), and Sendai Framework for Disaster Risk Reduction in 2015 have recognized sustainable finance to be crucial for making the earth a better place to live by way of financing actions for the reduction of carbon footprints (IFC, 2017). Both private and public institutions have provisions for green finance and it also encompasses different classes of assets like green bonds, green securities, green loans, green municipal bonds, social bonds, green credits, climate finance, environmental finance, carbon finance, sustainable finance etc (Berrou et al., 2019).

Since the emergence of sustainable finance, its importance in saving the environment from the hazardous effects of CO₂ is clear from the intensive discussions on the same among international organizations and national governments. Before 2015, studies or research related to green finance was quite limited as compared to the present day. The significant increase in the study on green finance after 2015 can be traced back to the Paris Agreement, 2015. Accordingly, the key driver alluring researchers to investigate such issue is the Paris Agreement, 2015. (Zhang et al., 2019). Some researchers have contributed to the theoretical literature on green finance as the concept was at its early stage and it was the need of the hour to devise the pathways for further work (Soundarrajan and Vivek, 2016; Wang and Zhi, 2016; Dikau and Volz, 2018; Zhang et al., 2019; Akomea-Frimpong et al., 2022).

Along with the development of theoretical literature, researchers have started to empirically investigate into the issue by addressing and exploring the ultimate impact of green finance on the financial performance of those institutions providing and raising such finance. (Song et al., 2019; Alonso-Conde and Rojo-Suárez, 2020; Kruse et al., 2020; Yeow and Ng, 2021).

With the passage of time, people have started to realize the importance of the financial implications of green finance, however, one cannot ignore its goal of achieving a sustainable environment, parallel to the Paris Agreement goals. Hence, with the realization of the importance of green finance, a number of research works, particularly in recent years have bloomed its way by investigating the importance of green finance on environmental performance and sustainability performance using diverse parameters. (Tran, 2021; Xiong and Sun, 2021; Wu et al., 2022; Khan et al., 2022; Fang et al., 2022; Meo and Karim, 2022; Rasoulnezhad and Taghizadeh-Hesary, 2022).

1.3. Research gap

This study highlights that even though the importance of adopting sustainable finance is on the rise, there is very little literature on the topic in the context of Indian banking sector. Indian banking sector plays

significant role in Indian Economy, However, there is mandatory green finance policy for Banks in India. The Landscape of Green Finance in India report (2022) clearly indicates that the flow of green finance is very less as compared to the need for Indian economy. Thus, this research aims to answer the following questions:

RQ1: Do the banks have any sustainable finance policy?

RQ2: What is the trend of sustainable finance in the context of Indian banks?

RQ3: Is there any difference between the public sector and the private sector relating to sustainable finance?

RQ4: What is the association between sustainable finance and firm performance?

The present study is an effort to find out the relationship between sustainable finance and bank performance and other variables directly or indirectly correlated to green finance practices as well as bank performance. Hence, our overall aim in this study is to determine the impacts of sustainable finance practices on banks' performance.

1.4. Objectives of the study

Based on the research questions, The following are the main objectives of the study.

- To study the present status of the sustainable finance of Indian banks
- To examine the trend of sustainable finance of Indian banks
- To investigate the association between sustainable finance and bank performance

1.5. Plan of the study

Section 1: Introduction

Section 2: Review of Literature and Hypothesis Formulation.

Section 3: Methodology

Section 4: Results and Discussion

Section 5: Conclusion

2. Literature Review and Hypothesis

2.1 Sustainable Finance and Bank Performance

Climate elevated warming is one of the major challenges that the world has to combat. Hitherto, global CO₂ emission has developed to levels so far beyond the earth's capacity to purify itself naturally (Guo et al., 2022). Owing to its importance in sustainability, The United Nations' Sustainable Development Goals (SDGs), 2015 require all nations, developed and developing to come forward and work towards achieving the ultimate goal of sustainable growth.

The role of the financial sector in the protection of the ecosystem was recognized only a few years back and they have begun to introduce various financial products and instruments with a specific target of environmental protection, which broadly comes under the umbrella of sustainable finance. sustainable finance instruments like green bonds, green loans, sustainability bonds and loans, climate funds, etc. can help to achieve a sustainable environment (Sachs, 2015). Interest in sustainable finance in recent years has grown substantially as finance has become more widely available (Meo and Karim, 2022).

Since the development of sustainable resource theory and resource dependency theory during the 1970s and 80s, the theoretical relationship between sustainable finance and sustainable development strategies has been documented. However, the practical relevance of sustainable finance has been lately acknowledged. Organizations need to be sustainable through the utilization of resources to a great extent. Sustainable resource utilization can be attained by using sustainable finance. Hence, sustainable finance

has emerged as a tool that enables nations to take long-term benefit of resources through investing in environmentally friendly actions (Garza, 2013).

Performance of banks is usually measured using financial metrics like ROA (Return on Assets), ROE (Return on Equity), market capitalization, loans and advances, leverages etc. Performance is also measured using non-financial metrics in the context of sustainable finance like ESG measures, carbon emission etc.

2.2 Empirical Literature

Theoretical works disclose that sustainable finance is a broad term including a wider range of financial products designed to mitigate environmental degradation (Dikau and Volz, 2018; Zhang et al., 2019; Debrah et al., 2022), however, much of the empirical works consider only a single instrument of it as its proxy, thus depicts a partial view about the present status of green finance or what we call as sustainable finance. In particular, the majority of empirical works have largely used green bonds as a proxy for sustainable finance (EeYeow and Ng, 2021; Alonso-Conde and Rojo-Suárez, 2022; Meo and Karim, 2022; Rasoulinezhad and Taghizadeh-Hesary, 2022), while few studies have used some exclusive measurements like renewable energy consumption (Newas et al., 2021), climate mitigation finance (Khan et al., 2022) and climate bonds (Fang et al., 2022) as an alternative measure of sustainable finance. Moreover, the empirical literature on sustainable finance is generally skewed towards some parts of the globe like the top-performing economies (Fang et al., 2022; Meo and Karim, 2022) or a few Asian countries (Khan et al., 2022) so far again causing a lack of understanding about the global scenario of sustainable finance.

Most of the prior literature largely acknowledges the fact that environmental degradation can be reduced through investing in environmentally friendly projects (Jones, 2015; Wang and Zhi, 2016; Li and Jia, 2017), but very few studies have examined it empirically.

For instance, a positive correlation between sustainable finance strategy and banks' performance was observed. It was found that banks that are either directly or indirectly adopting sustainable finance strategy, i.e., lending to renewable energy projects or financing environmentally friendly projects, usually outperform others. (Rehman et al, 2021). Also, research by Scholtens (2017) and Yawar and Seuring (2017) depicted similar results.

Existing literature on sustainable finance highlights key finance products offered by banks, such as green loans, green bonds, green securities, green investments etc. It also studies various environmental policies, interest rates, and other such relevant information related to sustainable finance. This ultimately indicates that the overall performance of banks can be improved to a great extent by adopting sustainable finance policy by banks (Brooks and Oikonomou, 2017). Research by Lazzaroni et al. (2017) focused on the impact that sustainable finance would have on the financial performance of commercial banks.

Accordingly, banks that have incorporated sustainable finance policy into their lending decisions tend to have lower levels of NPAs and higher profits as compared to traditional banks. The reason is that banks that invest in environmentally friendly projects are exposed to a lower level of risks as compared to their peer banks (Kumar et al. 2018). However, this assertion can be objected to as many banks find it difficult to effectively communicate the benefits of sustainable finance products to their clients because of the lack of skilled professionals within the organization to effectively implement sustainable finance strategies in its lending decisions (Chakrabarti et al., 2018). Another obstacle faced by banks is the limited availability of reliable data and information on environmental risks and opportunities. Without adequate data, the banking sector struggles to identify high-impact projects that will ultimately align with sustainable finance goals (Sharma et al, 2020).

Based on the prior literature, the following hypothesis is formulated.

H₁: Sustainable finance is positively associated with bank performance.

3. Methodology

3.1. Sample

The study is based on quantitative data to investigate sustainable finance practices and banks performance. Use of secondary data allows a deeper and more intense research on the topic by making use of the available information and further analysing the viability and truthfulness on those available information. The population of the study is all listed Indian commercial banks. The sample of the study is top 12 banks from public sector and private sector each based on market capitalization as of 31st March 2023. These banks constitute about 70% of the total assets of Indian listed banks. The justification for the selection of top 24 banks is that since the sustainable finance policy is not mandatory and there is no specific guidelines for this, the information collected from top banks may provide better picture about the SF of Indian banks. The required data are collected from the sustainability report and ACE equity database for a period of 4 years (2019-20 to 2022-23). The recent period may provide better insight about SF of select banks.

3.2. Variables

For measuring sustainable finance, the study has considered green loan and sustainable finance (including all the components). Accordingly, two ratios – green loan/total assets and sustainable finance/total assets, are computed. For measuring bank performance, the study has employed two measures – return on assets (ROA) and market capitalisation (MC). Natural log of MC is used to normalise the data. Since, corporate governance plays vital role in managing the affairs of the business, we have used some important corporate governance variables like size of board, independence of board, gender diversity. Further, bank size and bank leverage are also used. The definition of the variables are presented in the following table.

Table 1: Definition of variables

Variables	Acronyms	Definition	Source
Return on Assets	ROA	Net profit/total assets	ACE Equity database
Market capitalisation	MC	Number of outstanding shares x closing price of share	ACE Equity database
Green loan	GLTA GLADV	Green loan/total assets Green loan/total advances	Sustainability report/Annual report of banks
Sustainable Finance	SFTA SFADV	(Green loan + green bond)/total assets (Green loan + green bond)/total advances	Sustainability report/Annual report of banks
Size of board	BS	Total number of board members	Sustainability report/Annual report of banks
Independence of board	BI	Independent director/ board size	Sustainability report/Annual report of banks
Bank leverage	LEV	Borrowings/ total assets	ACE Equity database

Bank size	BZ	Includes total assets, loans, deposits, market capitalization	ACE Equity database
-----------	----	---	---------------------

3.3 Techniques used

To study the present status of SF of Indian banks, the study has adopted appropriate diagrams and statistical techniques like mean, minimum, maximum and, standard deviation. The analysis has been conducted for overall sample and based on banks classified into two groups.

To examine the association between SF and bank performance, correlation and linear regression techniques have been used. While, Pearson bi-variate correlation is used to see the moment between the variables whether in the same direction or in the opposite direction, regression is used to investigate the impact of SF on bank performance after controlling firm-specific and corporate governance specific factors, where bank performance is the dependent variable. As the study has used two measures of bank performance- ROA and LnMC, the following two regression models are employed to test the hypothesis.

$$ROA_{i,t} = \alpha + \beta_1 SF_{i,t} + \beta_2 LnTA_{i,t} + \beta_3 LEV_{i,t} + \beta_4 BS_{i,t} + \beta_5 BI_{i,t} + \beta_6 WD_{i,t} + \varepsilon_{i,t} \quad \dots (Model 1)$$

$$LnMC_{i,t} = \alpha + \beta_1 SF_{i,t} + \beta_2 LnTA_{i,t} + \beta_3 LEV_{i,t} + \beta_4 BS_{i,t} + \beta_5 BI_{i,t} + \beta_6 WD_{i,t} + \varepsilon_{i,t} \quad \dots (Model 2)$$

Where, $\varepsilon_{i,t}$ is the error term of the regression model.

4. Results and Discussion

4.1. Descriptive Analysis

Table 2: descriptive statistics of the variables

Variables	Minimum	Maximum	Mean	Std. Deviation
GLTA	0	15.23	0.61	2.34
GLADV	0	23.84	0.97	3.67
SFTA	0	15.27	0.62	2.34
SFADV	0	23.88	0.99	3.68
ROA	-0.06	0.33	0.04	0.01
LnMC	6.66	13.71	10.56	1.38
BS	6	15	10.46	2.24
BI	0.25	90	56.90	25.31
Gender diversity	0	33.33	13.09	7.88
LnTA	10.65	15.52	12.99	1.05
LEV	0.01	0.44	0.09	0.08

Table 2 shows the descriptive statistics of the variables used in this study. The observed mean value of SF is 0.62% and 0.99% as a percentage of total assets and total advances. The range varies between 0 to about 23%. This implies that there are some banks without any green loan or SF. The average value is also very less, indicating that SF is in an embryonic stage in India. ROA indicates the existence of both profitable and loss making banks with average profitability of 4 percent on total assets. Average board size of banks is 10 with maximum size of 15. Again, on an average 56 percent of the directors are ID, which is also a good sign. However, the share of women on the board is less which is ranging between 0 and 33 percent.

Although minimum one women director on the board is required as per the regulation, from the published CG report, it is evident that one or some banks have no women director on the board, may be for a specific period. On an average around 13 percent of the directors are women director for the sample Indian banks.

4.2. Analysis of SF based on bank category

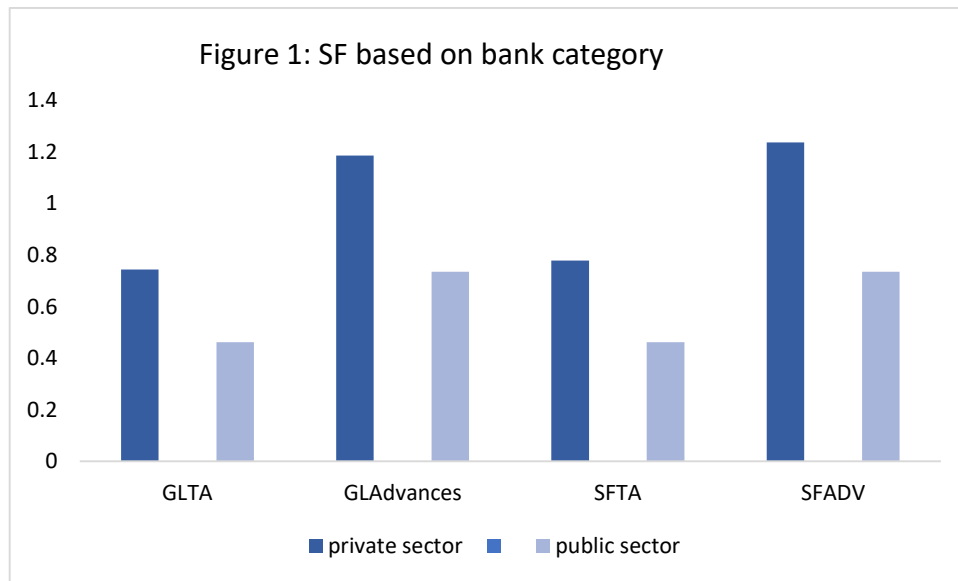
Table 3: Analysis of variables based on bank category

Variables	Private sector (Mean)	Public sector (Mean)
GLTA	0.744898	0.46234
GLADV	1.186327	0.735532
SFTA	0.778776	0.46234
SFADV	1.236939	0.735745
BS	11.36957	9.543478
BI	62.66744	51.13672
SFDummy	0.591837	0.574468
Gender diversity	13.73584	12.47599
LnTA	12.70571	13.28596
LEV	0.136668	0.047687
ROA	0.007845	0.001627
LnMC	11.07286	10.02681

As evident from the above table, the private sector seems to be more engaged in green and sustainable financing compared to the public sector. This is evident from higher percentages of green loans as a proportion of total assets (GLTA), sustainable finance as a percentage of total assets (SFTA), and sustainable finance as a percentage of advances (SFADV) in the private sector. While the average SF as a percentage of total assets is 0.78 percent for private sector banks, it is only 0.46 percent for public sector banks. The same is true for green loan.

The board size is however larger for private-sector banks relative to public-sector banks. Board independence is also significantly higher in the private sector compared to the public sector. The mean values of loans as a % of total assets, leverage, Return on Assets, and Loan as a percentage of market capitalization are almost equal in both sectors.

The figures relating to GL and SF between public sector banks and private sector banks are shown in the figure 1. It can be said that in terms of sustainable finance and green loans, private-sector banks outperform the public-sector banks.



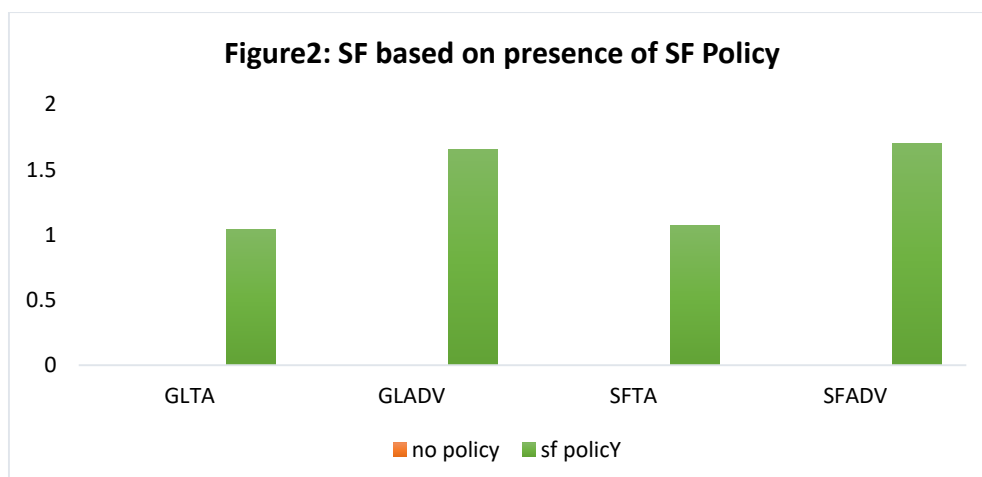
4.3. Analysis based on SF policy

To get an idea of SF policy, a content analysis has been conducted using the published sustainability or business responsibility reports. If the banks have any specific SF policy, the code “1” is given, otherwise code “0” is given. Accordingly, GL and SF ratios have been computed for these two groups. The results are shown in table 3. The results clearly indicate that the banks who have SF policy, they are issuing SF and are concerned about the environmental protection. On the other hand, there are some banks where no indication of SF policy in the published reports and these banks do not issue any GL or SF.

Table 4: SF based on SF policy

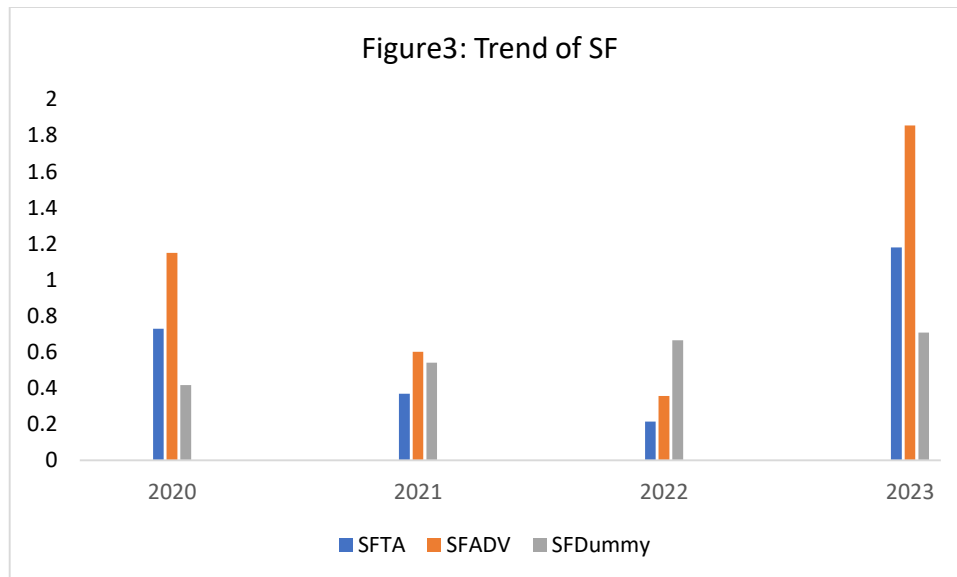
Variables	No policy	SF policy
GLTA	0	1.039821
GLADV	0	1.655357
SFTA	0	1.069464
SFADV	0	1.699821

Data of table 4 are presented in figure 2.



4.4. Trend Analysis

In order to achieve the second objective of the study, year-wise average value of SF has been computed and the results are presented in fig. 3. The figure shows that there is no definite trend of SF for the top Indian banks. The reason may be due to the absence of any regulatory provision on this aspect and as observed, some banks have no SF policy. It has also been observed while compiling the data that the banks who are issuing GL and GB also do not follow any trend. For some years, the amount is very high while it is very less in the immediate year. A decline in the overall mix of sustainable finance policy in the years 2021 and 2022 as compared to the preceding year is also evident. This may be due to the impact of COVID 19 pandemic when the banks issued less quantum of SF. However, a significant increase in sustainable finance can be observed in the year 2023 which shows that banks have started to invest more in environmentally friendly projects and will continue to do so for a foreseeable future period.



4.5. Correlation Analysis

Table 5: Correlation matrix

Variables	ROA	LnMC	GLTA	GLADV	SFTA	SFADV
ROA	1.000					
LnMC	0.436*	1.000				
GLTA	0.089	0.075	1.000			
GLADV	0.087	0.075	0.999*	1.000		
SFTA	0.093	0.073	0.997*	0.997*	1.000	
SFADV	0.091	0.072	0.998*	0.998	0.999*	1.000

Note: * indicate correlation significant at 1 percent level

Pearson's correlation coefficient has been employed to assess the strength and direction of the relationship between sustainable finance practices and bank performance indicators. Table 5 shows that the correlation between SF or GL and bank performance (ROA and LnMC) is positive. This implies that when SF or GL increases, banks' financial performance is also increases. This is according to the theoretical expectation. The correlation between GLAdvances and GLTA, SFTA and GLAdvances, and, SFADV and SFTA is quite

high because there is an insignificant difference of amount between the variables. Also, the correlation of GLTA and GLAdvances with other variables are almost similar because in the variables GL is constant.

4.6. Regression Analysis

Green Loan and Profitability (ROA)

Table 6 shows the results of the association between green loan ratio based on total assets and bank profitability (ROA) after controlling bank size, leverage and corporate governance variables. The coefficient of green loan ratio is found to be positive, but not statistically significant. The positive coefficient implies that banks can improve profitability (ROA) by increasing green loan. The result is not significant may be due to few banks adopted the practice of green loan in India in recent times. The observed coefficients of bank size and board size are also positive but not statistically significant. However, leverage is negatively associated with ROA and the coefficient is significant. This implies that by reducing leverage, banks can improve profitability. On the other hand, board independence and share of women in the board positively and significantly influence the ROA. This indicate that by increasing the number of independent directors in the board, banks can enhance profitability. Similarly, profitability can be improved by increasing the number of women directors in the board.

Similar results are observed when green loan ratio is computed based on total advances and the results are shown in table 7. The impact of green Loan ratio on ROA is positive but not significant. Again, board independence and share of women in the board positively and significantly influences bank profitability. As observed earlier, the impact of leverage on ROA is found to be negative. The other variables are insignificantly associated with ROA. The value of R-square is above 0.30 and F-statistics are significant for both the cases.

Table 6. Regression results on the association between GLTA ratio and ROA

Variables	Coefficient	t-value
GLTA	0.01	0.98
LnTA	.001	0.71
LEV	-.054	-3.35***
BS	.001	0.91
BI	0.01	3.46***
WD	0.04	1.82*
Constant	-.019	-1.17
Notes: R-squared = 0.307; F-statistic = 6.25***		
*** p<.01, ** p<.05, * p<.1		

Table 7. Regression results on the association between GLADV ratio and ROA

Variables	Coefficient	t-value
GLADV	0.04	0.95
LnTA	.001	0.74
LEV	-.057	-3.42***
BS	.001	0.97
BI	0.03	3.31***
WD	0.07	1.79*

Constant	-0.019	-1.17
Notes: R-squared	0.309	F-stat 6.241***
*** p<.01, ** p<.05, * p<.1		

Sustainable finance and Profitability (ROA)

Table 8 shows the results of the association between sustainable finance ratio based on total assets and bank profitability (ROA) after controlling bank size, leverage and corporate governance variables. The coefficient of sustainable finance ratio is found to be positive, but not statistically significant. The positive coefficient implies that banks can improve profitability (ROA) by increasing sustainable finance. The result is not significant may be because only a few banks adopted the practice of sustainable finance in India in recent times. The observed coefficients of bank size and board size are also positive but not statistically significant. However, leverage is negatively associated with ROA and the coefficient is significant. This implies that by reducing leverage, banks can improve profitability. On the other hand, board independence and share of women in the board positively and significantly influence the ROA. This indicate that by increasing the number of independent directors in the board, banks can enhance profitability. Similarly, profitability can be improved by increasing the number of women directors in the board.

Similar results are observed when sustainable finance ratio is computed based on total advances and the results are shown in table 9. The impact of sustainable finance ratio on ROA is positive but not significant. Again, board independence and the share of women in the board positively and significantly influences bank profitability. As observed earlier, the impact of leverage on ROA is found to be negative. The other variables are insignificantly associated with ROA. The value of R-square is above 0.30 and F-statistics are significant for both the cases.

Table 8. Regression results on the association between SFTA and ROA

Variables	Coefficient	t-value
SFTA	0.03	1.08
LnTA	.003	0.83
LEV	-.054	-3.38***
BS	.001	0.98
BI	0.002	3.42***
WD	0.05	1.84*
Constant	-.019	-1.17
Notes: R-squared	0.306	F-stat 6.242***
*** p<.01, ** p<.05, * p<.1		

Table 9. Regression results on the association between SFADV and ROA

Variables	Coefficient	t-value
SFADV	0.03	1.09
LnTA	.001	0.71

LEV	-0.054	-3.35***
BS	.001	0.91
BI	0.002	3.46***
WD	0.044	1.82*
Constant	-.019	-1.17
Notes: R-squared 0.309		
F-stat 6.242***		
p<.01, ** p<.05, * p<.1		

Green Loan and Market Value (LnMC)

Table 10 shows the results of the association between green loan ratio based on total assets and market value (LnMC) after controlling bank size, leverage and corporate governance variables. The coefficient of green loan ratio is found to be positive, but not statistically significant. The positive coefficient implies that banks can improve market value (LnMC) by increasing green loan. The result is not significant may be due to few banks adopted the practice of green loan in India in recent times. The observed coefficients of bank size and board size are also positive but not statistically significant. However, leverage is negatively associated with LnMC and the coefficient is significant. This implies that by reducing leverage, banks can improve market value. On the other hand, board independence and share of women in the board positively and significantly influence the LnMC. This indicate that by increasing the number of independent directors in the board, banks can enhance its market value. Similarly, market value can be improved by increasing the number of women directors in the board.

Similar results are observed when green loan ratio is computed based on total advances and the results are shown in table 11. The impact of green Loan ratio on LnMC is positive but not significant. Again, board independence and share of women in the board positively and significantly influences bank's market value. As observed earlier, the impact of leverage on LnMC is found to be negative. The other variables are insignificantly associated with LnMC. The value of R-square is above 0.6 and F-statistics are significant for both the cases.

Table 10. Regression results on the association between GLTA and LnMC		
Variables	Coefficient	t-value
GLTA	0.52	1.49
LnTA	1.014	9.73***
LEV	-3.239	-2.55**
BS	.021	0.42
BI	0.21	4.66***
WD	0.12	0.92
Constant	-4.065	-3.18***
Notes: R-squared 0.633 F-stat 24.386***		
*** p<.01, ** p<.05, * p<.1		

Table 11. Regression results on the association between GLADV and LnMC

Variables	Coefficient	t-value
GLADV	0.34	1.51
LnTA	1.015	9.74***
LEV	-3.238	-2.55**
BS	.021	0.42
BI	0.21	4.66***
WD	0.12	0.92
Constant	-4.071	-3.19***
Notes: R-squared 0.633		
F-stat 24.406***		
*** p<.01, ** p<.05, * p<.1		

Sustainable finance and market value (LnMC)

Table 12 shows the results of the association between sustainable finance ratio based on total assets and bank market value (LnMC) after controlling bank size, leverage, and corporate governance variables. The coefficient of sustainable finance ratio is found to be positive and statistically significant. The positive coefficient and significant result imply that banks can improve market value (LnMC) by increasing sustainable finance. The observed coefficients of bank size and board size are also positive but not statistically significant. However, leverage is negatively associated with LnMC and the coefficient is significant. This implies that by reducing leverage, banks can improve market value. On the other hand, board independence and the share of women in the board positively and significantly influence the ROA. This indicates that by increasing the number of independent directors on the board, banks can enhance their market value. Similarly, market value can be improved by increasing the number of women directors in the board.

Similar results are observed when the sustainable finance ratio is computed based on total advances and the results are shown in table 13. The impact of sustainable finance ratio on LnMC is positive and significant. Again, board independence and the share of women in the board positively and significantly influence the bank's market value. As observed earlier, the impact of leverage on LnMC is found to be negative. The other variables are insignificantly associated with LnMC. The value of the R-square is above 0.60 and F-statistics are significant for both cases.

Table 12 Regression results on the association between SFTA and LnMC

Variables	Coefficient	t-value
SFTA	0.53	1.83*
LnTA	1.04	9.75***
LEV	-3.25	-2.54**
BS	.022	0.41
BI	0.24	4.63***
WD	0.12	1.93
Constant	-4.069	-3.19***

Notes: R-squared 0.633 F-stat 24.435***

*** p<.01, ** p<.05, * p<.1

Table 13 Regression results on the association between SFADV and LnMC

Variables	Coefficient	t-value
SFADV	0.034	1.85*
LnTA	1.015	9.75***
LEV	-3.232	-2.54**
BS	.021	0.42
BI	0.21	4.67***
WD	0.12	1.92*
Constant	-4.075	-3.12***
Notes: R-squared 0.633 F-stat. 24.453***		
*** p<.01, ** p<.05, * p<.1		

5. CONCLUSION

Considering the growing importance of sustainable finance, this study is attempted to examine the relationship that exists between sustainable finance and banks' performance in the Indian context. Apart from the relationship, the study has addressed the present scenario and the movement of SF of Indian banks. Considering top 12 listed banks from each of the public sector and private sector, the study has adopted appropriate methodology to address the research issues.

The findings revealed that only a few banks in India have adopted sustainable finance policies. Out of all the top banks that were selected for the purpose of this study, approximately only 57% of banks have adopted sustainable finance policy. However, an increase in sustainable finance policy has been observed over the years which depicts that banks have started to invest more in environmentally viable projects and if the trend continues, the quantum of investment in SF of Indian banks would be significant. In terms of active sustainable finance policy, it was observed that the private sector has been investing more in environmentally sustainable projects as compared to public sector banks.

The results of the regression analysis indicate that there is a positive association between SF and bank performance. The results are significant when market value is used to measure the bank performance. As indicated, the quantum of SF is still negligible and hence the positive sign of the coefficient with ROA should not be overlooked. Substantial investment in SF over a long period of time may significantly enhance the accounting profitability of the banks. Based on the observed results, the research hypothesis (H_1) should not be rejected, and it can be concluded that SF positively influences bank performance.

Although this study has tried to address the SF scenario of Indian banks and its impact on financial performance from different dimensions, it has some limitations which can be addressed in the future research. This study is based on only the top banks in India. Hence there is a scope of research in this area taking into consideration all the banks. Second, this study examined the nexus between SF and bank performance. Future study may be undertaken to link between SF and environmental performance. Third, this research is based on secondary data, and hence future research may be undertaken collecting data from the ground level from employees and top management.

References

1. Abbasi, K. R., Shahbaz, M., Zhang, J., Irfan, M., & Alvarado, R. (2022). Analyze the environmental sustainability factors of China: The role of fossil fuel energy and renewable energy. *Renewable Energy*, 187, 390–402. <https://doi.org/10.1016/j.renene.2022.01.066>
2. Ahmad, B., Da, L., Asif, M. H., Irfan, M., Ali, S., & Akbar, M. I. U. D. (2021). Understanding the antecedents and Consequences of Service-Sales Ambidexterity: A Motivation-Opportunity-Ability (MOA) Framework. *Sustainability*, 13(17), 9675. <https://doi.org/10.3390/su13179675>
3. Alonso-Conde, A. B., & Rojo-Suárez, J. (2020). On the Effect of Green Bonds on the Profitability and Credit Quality of Project Financing. *Sustainability*, 12(16), 6695. <https://doi.org/10.3390/su12166695>
4. Berrou, R., Dessertine, P., & Migliorelli, M. (2019). An overview of green finance. In *Palgrave studies in impact finance* (pp. 3–29). https://doi.org/10.1007/978-3-030-22510-0_1
5. Brooks, C., & Oikonomou, I. (2017). The effects of environmental, social and governance disclosures and performance on firm value: A review of the literature in Accounting and Finance. <https://www.semanticscholar.org/paper/The-Effects-of-Environmental%2C-Social-and-Governance-Brooks-Oikonomou/ccd5d01deef0a2564d2df427ec6cad751658b2b8>
6. Dikau, S., & Volz, U. (2019). Central banking, climate change, and green finance. In *Springer eBooks* (pp. 81–102). https://doi.org/10.1007/978-981-13-0227-5_17
7. Dong, F., Li, Y., Gao, Y., Zhu, J., Qin, C., & Zhang, X. (2022). Energy transition and carbon neutrality: Exploring the non-linear impact of renewable energy development on carbon emission efficiency in developed countries. *Resources, Conservation and Recycling*, 177, 106002. <https://doi.org/10.1016/j.resconrec.2021.106002>
8. Fang, Z., Yang, C., & Song, X. (2022). How do green finance and energy efficiency mitigate carbon emissions without reducing economic growth in G7 countries? *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.879741>
9. Khan, M. A., Riaz, H., Ahmed, M., & Saeed, A. (2022). Does green finance really deliver what is expected? An empirical perspective. *Borsa Istanbul Review*, 22(3), 586–593. <https://doi.org/10.1016/j.bir.2021.07.006>
10. Kruse, T., Mohnen, M., Pope, P., & Sato, M. (2020). Green revenues, profitability and market valuation: Evidence from a global firm level dataset. <https://www.semanticscholar.org/paper/Green-revenues%2C-profitability-and-market-valuation%3A-Kruse-Mohnen/37f27397b463388ff5e931dc7721f686512b2c9f>
11. Kumar, A., & Sharma, S. (2018). Green banking: A strategic imperative for sustainable development. *International Journal of Bank Marketing*.
12. Miah, M. D., Rahman, S. M., & Haque, M. (2018). Factors affecting environmental performance: evidence from banking sector in Bangladesh. *International Journal of Financial Services Management*, 9(1), 22. <https://doi.org/10.1504/ijfsm.2018.089917>
13. Rasoulinezhad, E., & Taghizadeh-Hesary, F. (2022). Role of green finance in improving energy efficiency and renewable energy development. *Energy Efficiency*, 15(2). <https://doi.org/10.1007/s12053-022-10021-4>
14. Rehman, A., Ullah, I., Afridi, F., Ullah, Z., Zeeshan, M., Hussain, A., & Rahman, H. U. (2021). Adoption of green banking practices and environmental performance in Pakistan: a demonstration of structural equation modelling. *Environment, Development and Sustainability*, 23(9), 13200–13220. <https://doi.org/10.1007/s10668-020-01206-x>

15. Risal, N., & Joshi, S. K. (2018). Measuring Green Banking Practices on Bank's Environmental Performance: Empirical Evidence from Kathmandu valley. *Journal of Business and Social Science*, 2(1), 44–56. <https://doi.org/10.3126/jbss.v2i1.22827>
16. Sachs, J. D. (2015). The age of sustainable development. In Columbia University Press eBooks. <https://doi.org/10.7312/sach17314>
17. Scholtens, B. (2017). Why finance should care about ecology. *Trends in Ecology & Evolution*, 32(7), 500–505.
18. Sharma R., Choudhury P., & Sharma S.(2020). Impact Of Green Banking On The Financial Performance Of Commercial Banks In India. *International Journal of Business and Management Invention*
19. Shaumya, S., & Arulrajah, A. (2017). The Impact of Green Banking Practices on Banks Environmental Performance: Evidence from Sri Lanka. <https://www.semanticscholar.org/paper/The-Impact-of-Green-Banking-Practices-on-Banks-from-Shaumya-Arulrajah/b38c05b07e6b3ef5a42b71462a16c0b65c37d0ff>
20. Song, N., Deng, N., & Wu, N. (2019). Comparing the influence of green credit on commercial bank profitability in China and abroad: Empirical test based on a dynamic panel system using GMM. *International Journal of Financial Studies*, 7(4), 64. <https://doi.org/10.3390/ijfs7040064>
21. Tran, Q. H. (2021). The impact of green finance, economic growth and energy usage on CO2 emission in Vietnam – a multivariate time series analysis. *China Finance Review International*, 12(2), 280–296. <https://doi.org/10.1108/cfri-03-2021-0049>
22. Wang, Y., & Zhi, Q. (2016). The role of Green Finance in Environmental Protection: Two aspects of market mechanism and policies. *Energy Procedia*, 104, 311–316. <https://doi.org/10.1016/j.egypro.2016.12.053>
23. Wu, X., Sadiq, M., Chien, F., Ngo, Q., Nguyen, A., & Trinh, T. (2021). Testing role of green financing on climate change mitigation: Evidences from G7 and E7 countries. *Environmental Science and Pollution Research International*, 28(47), 66736–66750. <https://doi.org/10.1007/s11356-021-15023-w>
24. Xiang, H., Chau, K. Y., Iqbal, W., Irfan, M., & Dagar, V. (2022). Determinants of social commerce usage and online impulse purchase: Implications for Business and Digital Revolution. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.837042>
25. Xiong, Q., & Sun, D. (2022). Influence analysis of green finance development impact on carbon emissions: an exploratory study based on fsQCA. *Environmental Science and Pollution Research International*, 30(22), 61369–61380. <https://doi.org/10.1007/s11356-021-18351-z>
26. Yang, Y., Ren, L., Wu, M., Wang, H., Song, F., Leung, L. R., Hao, X., Li, J., Chen, L., Li, H., Zeng, L., Zhou, Y., Wang, P., Liao, H., Wang, J., & Zhou, Z. (2022). Abrupt emissions reductions during COVID-19 contributed to record summer rainfall in China. *Nature Communications*, 13(1). <https://doi.org/10.1038/s41467-022-28537-9>
27. Yawar, S. A., & Seuring, S. (2015). Management of Social Issues in Supply Chains: A literature review exploring social issues, actions and performance outcomes. *Journal of Business Ethics*, 141(3), 621–643. <https://doi.org/10.1007/s10551-015-2719-9>
28. Yeow, K. E., & Ng, S. (2021). The impact of green bonds on corporate environmental and financial performance. *Managerial Finance*, 47(10), 1486–1510. <https://doi.org/10.1108/mf-09-2020-0481>
29. Zhang, D., Zhang, Z., & Managi, S. (2019). A bibliometric analysis on green finance: Current status, development, and future

directions.https://econpapers.repec.org/article/eeefinlet/v_3a29_3ay_3a2019_3ai_3ac_3ap_3a425-430.htm