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Editorial

Greetings from the Editorial Board of Business Spectrum, a bi-annual peer-reviewed journal of the Indian Accounting Association South Bengal Branch. You will be glad to know that each article undergoes a constructive peer review and editing process to enhance the article's value. For the issue of July-December 2022, we have published six interesting articles from academics and research scholars, covering different aspects of finance and marketing. The first article by Dr. Sk. Nasiruddin and Prof. Santanu Kumar Ghosh describes the Sustainability Practices by Consumer Products engaged in International Trade with the help of an exploratory study of 193 Countries. The study examines whether the sustainability practices in consumer products among the 193 nationals have been used as barriers to trade or not. The second article by Purnendu Basu examines the performance of Indian Private and Public Life Insurance Companies' Performance from the standpoint of Premium Collection. The third article by Soumyadwip Das and Dr. Sumit Kumar Maji examines the factors affecting Farmer's Financial Literacy with an insight from West Bengal. The fourth article by Dr. Purnima Mallick tries to measure sustainable economic development through sustainable tourism in Purulia District with the help of a critical appraisal of common peoples' need. The fifth article by Dr. Sanbad Banerjee tries to measure the Efficiency of Select Public and Private Sector Indian Banks in Pre-merger regime using CAMEL Ratios and Non-Parametric DEA. The final article by Pankaj Kumar Mahato tries to analyse the impact of Bonus Share Announcement on NSE Nifty 200 stocks with the help of an event study. My deepest respect to Professor Arindam Gupta, the Editor-in-Chief and also to the entire editorial team and reviewers for their thoughtful comments for improving the manuscript in a pin-pointed and guiding manner, and congratulations to the authors for their publication in Business Spectrum. We hope that you enjoy reading these articles. Kindly submit your article for the next issues to editor.businessspectrum@gmail.com.

Prof. Pranam Dhar

Associate Editor.

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Sustainability Practices by Consumer Products Engaged in International Trade: A Study of 193 Countries

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Abstract

Sustainability has become an important issue in the twenty-first century. Business practices are prescribed in standards prepared by the standard setters around the globe. In the case of SMEs also several standards are available. This study tries to examine whether the sustainability practices in consumer products among the 193 nations have been used as barriers to trade or not. The outcomes of the current study provide evidence of the concentration of countries at low levels of practice. The possibility of using such practices as barriers to trade is found to be remote. However, a specific study may provide the actual position in this regard.

Keywords: Sustainability, dimensions, dimensions index, diversity, diversity index, environment, social, management, quality, ethics

1 .Introduction

To know about sustainability standards, first, one needs to specify, ‘what are standards’ in the context of international trade. According to Negi et al (2020), standards mean some common rules and policies which are met appropriately to achieve the level of acceptability and are implemented for the operation of a cross-border context. However, there is no denying the fact that standards may be designed to suit the protectionist purposes keeping in mind the task of protecting the domestic producers from the foreign ones. In another word, standards may be used as a barrier to trade, even if they are not designed with that intention when producers are differentially equipped to meet it. The twenty-first century and the movements for sustainability are inseparable. Business is required to follow the practices relating to it that are suggested in the standards prepared by various standard-setting bodies. From among the available standards, the International Trade Centre (ITC) approves the appropriate ones for worldwide trade. ITC is an agency of the ‘United Nations Organization’ and the ‘World Trade Organization’. It is the only multilateral agency that is fully devoted to supporting the internationalization of SMEs. It extends its technical assistance to support the internationalization of SMEs.

Different standards, available for the purpose of international trade, are used in different countries. Hence, differences in sustainability practices across countries may occur. Also, sometimes these diverse practices may result in differential treatments against countries to create barriers to trade. Such a possibility has been explored in the context of the Islamic States by Ghosh et al (2020). The present study makes a modest attempt to address the issue of using sustainability practices (standards) as barriers to trade among 193 nations to identify whether or not sustainability standards are used as barriers to trade among 193 nations. For this purpose, a brief literature survey is prescribed in the following section.

2. Review of Literature

Various studies have been made on Sustainability practices around the globe. Several researchers have tried to address the issues relating to environmental practices, in the contexts of different countries. Roome (1994), for example, has shown that in case of Canada R&D organizations are not only wanted to apply new administration techniques but also have to play a leading role in innovative organizational structures in order to fulfill the full potential of environmentally sensitive products and processes. In case of Hong Kong, Studer et al (2006) have analyzed the key barriers and incentives of voluntary environmental initiatives and have compared their relevance for companies of different sizes. In the Australian context, SMEs’ participation is reported to be much lower in such environment-related activities than those of large firms. The participation of SMEs in Australia on average reduces hazardous waste generation to the extent of 48%, perchloroethylene consumption by 30%, and improved energy efficiency by 9% (Altham, 2007).

In India, Yadav et al (2018) reviewed 733 articles and find that there are two drivers of sustainability practices in the SMEs background namely External drivers and Internal drivers. According to Gandhi et al (2018) upperadministrationobligation, technology upgradation, current legislation, green brand image, and future legislation are the five important drivers of sustainability practices. Upper administration obligation emerged as a key driver as per their study which is maintained by the initiatives taken by the government towards entrepreneurial and management development.

However, in the survey of the literature, no specific study has been found to address the issue of using sustainability practices as barriers to trade among the nations. Hence, the present study makes a modest attempt to fill in this gap. Pertaining to this gap, the following selected objectives are taken for the present study:

1. To analyze the behavior of 193 nations regarding sustainability practices for cross-border trades.
2. To examine whether or not the requirements of sustainability practices are used as barriers to trade.

3. Methodology of the Study

In order to conduct the study, every major sustainability issue is mentioned here as a ‘dimension’. Altogether we will have five dimensions namely environmental, management, social, quality, and ethics. All sustainability performance indicators are grouped by the standards under these five dimensions and each of the available standard’s scores relating to these dimensions (performance indicators) are noted. The present study has been developed for consumer products and currently 75 standards are available for this sector.

Here, diversity is measured at the standards level as well as at the country level. Measurement of diversity has been accomplished by pegging the observed variations with the help of an index which is named here as ‘**diversity index (ID)**’ (standard level). In order to compute this index, the method suggested by Sharma (2008) has been adopted.

First, a ‘dimension index (id)’ (standard level) is computed for each of the five dimensions as under:

$$d_i = \frac{A_i - m_i}{M_i - m_i} \dots \dots \dots (1)$$

where A_i is the actual score of the dimension of i^{th} , m_i is the minimum score of i^{th} dimensions, and the maximum score of i^{th} dimensions is represented as M_i . The value of d_i varies between 0 and 1. A higher value of d_i will represent a higher degree of disclosure in the concerned dimension. Here d_i represents ‘dimension index (id)’ ($id_1, id_2, \dots id_n$), and id_1, id_2, id_3, id_4 , and id_5 stand for the dimension index of environment, social, management, quality, and ethics respectively.

The Diversity Index (ID) at the standards level is then measured by the normalized Euclidean distance of d_i from the aforesaid ideal point 1. For this following formula has been applied:

$$ID = \sqrt{\frac{(1-d_1)^2 + (1-d_2)^2 + \dots + (1-d_n)^2}{n}} \dots \dots \dots (2)$$

In the above formula, the numerator represents the Euclidean distance of d_i from the ideal point-1. This has been used for normalization purpose. The normalization is necessary to keep the derived value between 0 and 1. In the present case, the study is concerned with the value of the normalized distance which has been accepted as the measure of diversity. As the distance of the dimension value d_i represents the extent of diversity, a simple average of all five values (for five dimensions) could provide an average measure of diversity. Hence, a higher value of the normalized distance (ID) will represent a higher degree of diversity and vice-versa.

After the standard-level dimension index and diversity index, the country-level dimension index and country-level diversity index are computed. This is followed by grouping of standards as per the choices of the countries for both the Destination Market (DM) and Producing Country (PC). This process offers five country-specific dimension indices (d_i) and one overall index i.e., country-specific diversity index (DI) for both sets separately. It is the simple average of the standard specific dimension indices for d_i and the simple average of the standard specific diversity indices for DI, i.e.

$$DI = \sum_{i=1}^n \frac{d_i}{n} \dots \dots \dots (3)$$

The computed d_i varies between 0 and 1 such that a higher value of it represents a higher degree of practices relating to the concerned aspect of sustainability and vice versa. Similarly, DI also varies between 0 and 1. A high value of it naturally indicates high degree of diversity and vice versa. In this way the process offers five-dimension indices and one diversity index of 193 countries separately for PC and DM. These two represent the data set on the basis of which analyses are done with a view to fulfilling the stated objectives.

In order to satisfy the first objective, present study uses the summary statistics of the above data set. This is followed by identification of the countries which lie either above or below the average performance for all indices. This may provide clue about the differences in sustainable trade practices of the select nations as PC and DM as well. Results are reported in the following section (Table-1 and Table-2). In order to accomplish the second objective, the data set has been put into some diagnostic processes so that the detection of the appropriately applicable test method (s) is possible. In order to check whether the data set is suitable for parametric test or not, tests for- (A) Normality and, (B) Homogeneity have been conducted. In order to check for normality Skewness and Kurtosis values have been computed besides applying the Kolmogorov- Smirnov Test over the data set. Homogeneity, on the other hand, has been checked by using Levene's test.

These test procedures clearly divide the data set into two distinct parts: i) normal & homogeneous and ii) non-normal and nonhomogeneous. The observed results are reported in the following section.

The next process is obviously the correction of that part of the data set which is found to be non-normal and nonhomogeneous. Three different tools have been applied for this purpose.

These are: Log Transformation; Square Root Transformation and Reciprocal Transformation. To check whether the correction mechanisms applied have been successful or not in transforming the data set into the desired normality and homogeneity, test processes mentioned for (A) and (B) above have been reiterated. Based on the nature of the resulting data set, according to applicability, non-parametric (Mann-Whitney test) tests have been used. Observed findings of these statistical processes are reported and analyzed in the following section in a sequential manner.

4. Analysis and Interpretation

As mentioned in the previous section, an analysis of the sustainability behavior of 193 nations in the matter of production and cross-border trades in consumer products is the first objective of the study. For this purpose, dimension index-wise and diversity index-wise country positions have been shown in Table-1 by dividing the countries in terms of above and below average performances. Under the PC, nations with above the average sustainability performance are found in respect of environment (94), social (85), management (90), quality (108), and ethics (98). More than 50% of the nations are seen to have registered the above average sustainability performances in case of quality and ethics. The important point to note in this respect is that dimension-wise distribution of countries which are found to have below the average sustainability practices is: environment 99, social 108, management 103, quality 85, and ethics 95. So, in the case of PC, only for quality and social dimensions most of the countries have registered more than the respective mean dimension index value.

Table- 1
Dimension- wise number of countries above and below the mean

Name of Dimension	Number of Countries			
	Above the Mean		Below the Mean	
	PC	DM	PC	DM
Environment	94	99	99	94
Social	85	82	108	111
Management	90	97	103	96
Quality	108	118	85	75
Ethics	98	98	95	95

On the other hand, under DM, distribution of countries having above the mean sustainability practices is: environment 99, social 82, management 97, quality 118 and ethics 98. For all dimensions except social more than 50% of the country population lie above the mean. However, dimension-wise distribution of countries for environment 99, social 108, management 103, quality 85 and ethics 95 are found to have below the average sustainability practices. A summary statistic is shown in Table-2 to understand the actual position of the countries in this regard.

Maximum, minimum, mean, and standard deviation (SD) of country-wise dimension indices (di) for both PC and DM are shown in Table- 2. As the dimension index varies between 0 and 1, the mid-point i.e., 0.5 may be used as a benchmark to assess the performance of the

nations in respect of dimension-specific sustainability practices. Consider the maximum index values of the dimensions. Under PC, the maximum value is 0.507 for the environment, 0.625 for social, 0.540 for management, 0.267 for quality, and 0.508 for ethics. But under DM, the maximum index value for the environment is 0.420, for social is 0.536, for management is 0.469, for quality is 0.286, and for ethics is 0.375. These observed values may be used as evidence of better performances with regard to those dimensions whose index values are greater than the benchmark point of 0.5. More specifically, superior performance is seen to have occurred in the case of social dimension (0.625) under PC-based analysis. It may be noted that the maximum index value varies between 0.625 and 0.267. While the highest maximum value occurs in the case of the social dimension (PC), the lowest value of the same is seen to have occurred in the quality dimension (PC). Dimension specific minimum index values under PC are: 0.265 for the environment, 0.450 for social, 0.335 for management, 0.034 for quality, and 0.286 for ethics. In DM-based computations, the observed minimum index values are 0.324, 0.379, 0.303, 0.151, and 0.273 representing environment, social, management, quality and ethics respectively. These values vary between 0.450 and 0.034 which indicates a wide variation in the sustainability practices among the nations. These variations, in turn, may have a countable impact on the dimension-specific mean country performances. Another important indicator used to develop a general understanding of the dimension-specific country performance is the mean index value. A higher mean value indicates higher sustainability practices and vice versa. Under PC, the mean value is 0.378 for the environment, 0.523 for social, 0.447 for management, 0.178 for quality, and 0.382 for ethics. On the other hand, under DM mean values are: for the environment 0.376, for social 0.466, for management 0.392, for quality 0.231 and for ethics 0.329. The computed mean values vary between 0.523 and 0.178. In view of the range of the maximum and the minimum mean values, it seems to be logical to argue that the variation in the sustainability practices among the nations is high which is evidenced by the SD values discussed in the following paragraph. In the case of PC, computed SD values are: for environment 0.056, for social 0.032, for management 0.037, for quality 0.037, and for ethics 0.041. On the other hand, in the case of DM, the SD values are: 0.020 for the environment, 0.022 for social, 0.029 for management, 0.037 for quality, and 0.021 for ethics. The observed values of the standard deviation of the dimension-specific indices may be used as the indicator of varying degrees of dimension-related sustainability practices. The reported SD values read together with the respective mean values (rule of thumb--SD lower than $1/3^{\text{rd}}$ of the mean value indicates a lower degree of deviation) speak in favour of a low degree of deviations between the country's practices.

Table-2**Country Level summary statistics of dimensions index (di)**

Particulars	Environment		Social		Management		Quality		Ethics	
	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.

Mean	0.378	0.376	0.523	0.466	0.447	0.392	0.178	0.231	0.382	0.329
SD	0.056	0.020	0.032	0.022	0.037	0.029	0.037	0.037	0.041	0.021
Maximum	0.507	0.420	0.625	0.536	0.540	0.469	0.267	0.286	0.508	0.375
Minimum	0.265	0.324	0.450	0.379	0.335	0.303	0.034	0.151	0.286	0.273

As mentioned in the forgoing section, fulfilment of the second objective involves a diagnostic process of examining the data set using two types of tests: normality and homogeneity. This is required to ensure whether parametric or non-parametric test will be appropriate for the present purpose. For normality test, graphical displays (histogram and Q-Q Plot), Skewness&Kurtosis, and Kolmogorov-Smirnov test are used. In this regard, different charts are shown in the different appendices. In tables 3 and 4 test results are presented. A summary view of the results and the final diagnoses in respect of all dimensions as well as diversity positions in respect of sustainability practices for both PC and DM are shown in table-5. With the help of charts of the histogram, it may be argued that all index values for both PC and DM are normally distributed except for quality (DM). On the other hand, the Q-Q plots show that all dimensions except quality (DM) for both PC and DM are normally distributed as the observed values fall exactly along the straight line in the said plot.

It is widely held that for the data set to be considered as normally distributed the computed values of the Skewness and the Kurtosis should lie between -1 to +1. Table- 3 shows that under PC, all dimension index values except quality are normally distributed. Under DM also, all dimension index values except social are normally distributed.

Table: -3
Skewness/ Kurtosis (-1 to 1)

	Skewness		Kurtosis	
	P.C.	D.M.	P.C.	D.M.
Environment	0.045	0.106	-0.753	-0.585
Social	0.638	-0.080	0.425	1.115
Management	0.166	-0.096	-0.255	0.184
Quality	-0.815	-0.727	2.258	-0.739
Ethics	0.022	-0.411	-0.467	-0.400
Diversity	-0.290	0.370	-0.036	0.188

The test results relating to the Diversity index values are also shown in table-3. Under PC, the distribution of the diversity index (skewness value is -0.290 and kurtosis value is -0.036) is normal and a similar condition (normality) is found also in case of the analysis under DM (skewness value is 0.370 and kurtosis value is 0.188). Therefore, like in the agricultural sector, in case of consumer products also a mixed result is found which needs to be verified further using another test mechanism. For this purpose, the Kolmogorov-Smirnov test has been applied, the results of which are shown in Table-4. If the P value of the Kolmogorov-Smirnov test is greater than 0.05, then the data may be treated as normal. Table-4 shows that under PC, out of five dimensions only environment (PValue- 0.200) and management

(PValue- 0.057) are normally distributed, and the remaining three dimensions (social: P value0.003, quality: P value0.000 and ethics: P value0.013) have non-normal distribution. On the other hand, under DM, all five dimensions (P valueless than 0.05) are not normally distributed.

The P valueof the Kolmogorov-Smirnov test for diversity index is also shown in Table-4. Under PC, the P valueof the diversity index is 0.006 and, hence, the diversity index for PC is not normally distributed. Under DM, P value for the same is 0.002. Therefore, the distribution of the diversity index for DM also is not normal.

Table: -4
Kolmogorov-Smirnov Test

Variables	PC		DM	
	Z- Statistic	P value	Z Statistic	P value
Environment	0.055	0.200	0.075	0.011
Social	0.082	0.003	0.098	0.000
Management	0.063	0.057	0.077	0.008
Quality	0.093	0.000	0.179	0.000
Ethics	0.074	0.013	0.119	0.000
Diversity	0.078	0.006	0.083	0.002

For consumer products, in order to provide the synoptic view of the test outcomes, all results relating to normality along with the final diagnosis are shown in Table-5. The final diagnosis under PC is that environment and management dimensions are normally distributed and indices for other dimensions are non-normal. On the other hand, under DM, no dimension is normally distributed. The final diagnosis for the diversity index also may be found in Table-5. Under both PC and DM, the diversity indices are not normally distributed.

Table: - 5
Summary of Diagnosis (Normality)

Index	Skewness		Kurtosis		Histogram		Q-Q plot		Kolmogoro v-Smirnov test		Final Diagnosis	
	P.C	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C	D.M.
Environment	Nor	Nor	Nor	Nor	Nor	Nor	Nor	Nor	Nor	N-Nor	Nor	N-Nor
Social	Nor	Nor	Nor	N-Nor	Nor	Nor	Nor	Nor	N-Nor	N-Nor	N-Nor	N-Nor
Management	Nor	Nor	Nor	Nor	Nor	Nor	Nor	Nor	Nor	N-Nor	Nor	N-Nor
Quality	Nor	Nor	N-Nor	Nor	Nor	N-Nor	Nor	N-Nor	N-Nor	N-Nor	N-Nor	N-Nor

Ethics	Nor	Nor	Nor	Nor	Nor	Nor	Nor	Nor	N-Nor	N-Nor	N-Nor	N-Nor
Diversity	Nor	Nor	Nor	Nor	Nor	Nor	Nor	Nor	N-Nor	N-Nor	N-Nor	N-Nor

Note: Nor= Normally Distributed, and N-Nor= Not Normally Distributed.

The above discussions suggest that a mix of parametric and non-parametric tests will be appropriate for consumer products. However, another set of tests for homogeneity needs to be conducted to make the final choice. Therefore, this test is performed and reported in the following paragraph.

For the homogeneity test, the technique suggested by Levene has been used. According to this test, for homogeneity of the data, the observed P-values based on mean should be greater than .05. In this study, for all dimension indexes and also for the diversity index the observed PValues based on the mean are less than 0.05 (as per Table- 6). Hence, the data sets may be identified as non-homogeneous.

Table: -6
Homogeneity Test: Levene's Test

Index	(P Value)Levene's Statistic	(P Value) Levene's Statistic after Log Transformation	Levene's Statistic (P Value) after Square Root Transformation	Levene's Statistic (P Value) after Reciprocal Transformation
Environment	156.82(0.000)	156.63(0.000)	156.23(0.000)	156.37(0.000)
Social	21.99(0.000)	18.10(0.000)	16.23(0.000)	14.56(0.000)
Management	10.54(0.001)	7.22(0.007)	5.27(0.022)	4.52(0.034)
Quality	4.20(0.041)	2.22(0.137)	0.04(0.842)	0.894(0.345)
Ethics	89.97(0.000)	81.41(0.000)	73.56(0.000)	73.01(0.000)
Diversity	9.56(0.002)	9.95(0.002)	10.05(0.002)	10.34(0.001)

It is apparent from the above discussion that some variables are normal while some other variables are not normal, but all variables are not homogeneous. So, there are some problems in the data set that may be corrected by using some techniques namely, log transformation, square root transformation, and reciprocal transformation. After making this correction, further tests for normality and homogeneity of the corrected data set will be conducted by using the same techniques. The test results of homogeneity are reported also in table- 6 of data sets after log transformation, square root transformation, and reciprocal transformation. In case of quality, the P-values, after correction of data for all three techniques are greater than 0.05 (after Log Transformation 0.137, after Square Root Transformation 0.842, and after Reciprocal Transformation 0.034). Therefore, only the dimension value of quality is homogeneous. But according to tables 7, 8, and 9 the dimension index value of quality is not normal. Hence, in case of consumer products the data sets are appropriate for the non-parametric test.

Table: - 7: Summary of Diagnosis after Log Transformation (Normality)

Index	Skewness		Kurtosis		Histogram		Q-Q plot		Kolmogorov-Smirnov test		Final Diagnosis	
	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.
Environment	Nor	Nor	Nor	Nor	Nor	Nor	Nor	Nor	Nor	N-Nor	Nor	N-Nor
Social	Nor	Nor	Nor	N-Nor	Nor	Nor	Nor	Nor	N-Nor	N-Nor	N-Nor	N-Nor
Management	Nor	Nor	Nor	Nor	Nor	Nor	Nor	Nor	Nor	N-Nor	Nor	N-Nor
Quality	Nor	N-Nor	Nor	N-Nor	N-Nor	N-Nor	N-Nor	N-Nor	N-Nor	N-Nor	N-Nor	N-Nor
Ethics	Nor	Nor	Nor	Nor	Nor	Nor	Nor	Nor	N-Nor	N-Nor	N-Nor	N-Nor
Diversity	Nor	Nor	Nor	Nor	Nor	Nor	Nor	Nor	N-Nor	N-Nor	N-Nor	N-Nor

Note: Nor= Normally Distributed, and N-Nor= Not Normally Distributed.

Table: - 8

Summary of Diagnosis after Square Root Transformation(Normality)

Index	Skewness		Kurtosis		Histogram		Q-Q plot		Kolmogorov-Smirnov test		Final Diagnosis	
	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.
Environment	Nor	Nor	Nor	Nor	Nor	Nor	Nor	Nor	Nor	N-Nor	Nor	N-Nor
Social	Nor	Nor	Nor	N-Nor	Nor	Nor	Nor	Nor	N-Nor	Nor	N-Nor	N-Nor
Management	Nor	Nor	Nor	Nor	N-Nor	N-Nor	N-Nor	N-Nor	N-Nor	N-Nor	N-Nor	N-Nor
Quality	N-Nor	Nor	N-Nor	Nor	Nor	N-Nor	Nor	Nor	N-Nor	N-Nor	N-Nor	N-Nor
Ethics	Nor	Nor	Nor	Nor	Nor	Nor	Nor	Nor	N-Nor	N-Nor	N-Nor	N-Nor
Diversity	Nor	Nor	Nor	Nor	Nor	Nor	Nor	Nor	N-Nor	N-Nor	N-Nor	N-Nor

Note: Nor= Normally Distributed, and N-Nor= Not Normally Distributed.

Table: - 9

Summary of Diagnosis after Reciprocal Transformation(Normality)

Index	Skewness		Kurtosis		Histogram		Q-Q plot		Kolmogorov-Smirnov test		Final Diagnosis	
	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.
Environment	Nor	Nor	Nor	Nor	Nor	Nor	Nor	Nor	Nor	N-Nor	Nor	N-Nor
Social	Nor	Nor	Nor	N-Nor	Nor	Nor	Nor	Nor	N-Nor	N-Nor	N-Nor	N-Nor
Management	Nor	Nor	Nor	Nor	Nor	Nor	Nor	Nor	Nor	N-Nor	Nor	N-Nor
Quality	N-Nor	Nor	N-Nor	Nor	N-Nor	N-Nor	N-Nor	N-Nor	N-Nor	N-Nor	N-Nor	N-Nor

Ethics	Nor	Nor	Nor	Nor	Nor	Nor	Nor	Nor	N-Nor	N-Nor	N-Nor	N-Nor
Diversity	Nor	Nor	Nor	Nor	Nor	Nor	Nor	Nor	N-Nor	N-Nor	N-Nor	N-Nor

Note: Nor= Normally Distributed, and N-Nor= Not Normally Distributed.

In order to accomplish the second objective following two hypotheses may be tested for five dimensions of selected sectors separately.

H0: There are no significant differences between the destination market-wise requirements and the producing country-wise requirements of the sustainability practices.

H1: There are significant differences between the destination market-wise requirements and the producing country-wise requirements of the sustainability practices, and the destination market-wise requirements are greater than those of the producing country-wise requirements.

To test the above hypotheses, the Mann-Whitney test is used for five dimensions separately. The results of the dimension index are reported in Table-10 and analyses thereof are presented in the following paragraphs.

Environment: - Table-10 shows that in the case of environment there is a difference between the mean rank of PC (195.48) and the mean rank of DM (191.52) but this difference is not significant as P value(.728) is greater than .05. So, in the case of the environment, the null hypothesis is accepted. This is to say that there is no significant difference between the destination market-wise requirements and the producing country-wise requirements of the sustainability practices.

Social: - As per Table- 10 for the social dimension, the mean rank of PC is 278.48 and the mean rank of DM is 108.52, implying some differences between them, and as P value(0) is less than .05 the observed difference is considered as significant. Hence, in case of social the null hypothesis is rejected, and the alternative hypothesis is accepted. Therefore, the observed difference between the two requirements is considered significant, but DM's observed mean rank value is not greater than that of PC. Hence, this part of the alternative hypothesis is not accepted.

Management: - Table-10 shows that for the dimension named management, the mean rank of PC (267.58) differs from the mean rank of DM (119.42) and this difference is significant because the P value(0) is less than .05. So, in the case of the management dimension, the null hypothesis is rejected and the alternative hypothesis is accepted. This necessarily implies that there are significant differences between the two sets of requirements namely the destination market and the producing country in respect of trade-related sustainability practices. However, the second part of the alternative hypothesis is not accepted as the observed mean rank value of DM is not greater than that of PC.

Quality: - In case of Quality also a difference (as per Table-10) between the mean rank of PC (129.58) and the mean rank of DM (257.42) is observed but the P value is 0 which is less than the theoretical value of .05. This observed significant difference tells us to reject the null hypothesis and to accept the alternative hypothesis. Hence, in respect of the quality dimension, there are significant differences in the requirements between the sustainability practices among the nations being considered as PC and DM. Interestingly, the second part of

the alternative hypothesis is also accepted because the mean rank of DM is greater than the mean rank of PC. Therefore, the higher mean rank of DM than that of PC prompts the researcher to suspect that the quality dimension may be used by the nations to use as a trade barrier in case of consumer products. The actual trade practices may be verified to confirm the actual position in this respect. As this does not fall under the defined scope of this study, the issue is left for future research.

Ethics: - According to Table-10, in the case of ethics, there is a difference between the mean rank of PC (264.14) and the mean rank of DM (122.86). This difference is significant because the test statistic- P value(0) is less than 0.05. Thus, the null hypothesis is rejected and the alternative hypothesis is accepted but the second part of the alternative hypothesis is rejected as the mean rank of DM is not greater than the mean rank of PC.

Table-10
Nonparametric Test (Mann-Whitney Test)

Name of Dimension	Mean Rank		P value(<0.05)
	PC	DM	
Environment	195.48	191.52	0.728
Social	278.48	108.52	0.000
Management	267.58	119.42	0.000
Quality	129.58	257.42	0.000
Ethics	264.14	122.86	0.000

5. Conclusion

The existing study is trying to learn about the sustainable behavior of 193 nations concerning their trade participation in consumer products in general. The sustainability behavior of the states has, therefore, been the main point of discussion. This behavior which is revealed through the selection of the voluntary requirements relating to trades may differ based on the purpose for which this selection is done. A country's behavior as a producing country and as the destination market may not be equal for obvious trade-related reasons. However, a strict requirement of compliance to the desired practices of the importing countries may act as hurdle for other countries which are unable to afford to the requirements. Keeping this possibility in mind, an attempt has been made to put the observed behavior of nations into a test process to check if there is any possibility of using the stated requirements as barriers to trades.

Finally, it is seen that in the case of the selected sector (consumer product), for both PC and DM sustainability-related performances of the nations are low. However, the present analyses, based on the dimension-specific indices also indicate the existence of variations among the nations in this regard. This, in turn, indicates the presence of diversity in sustainability practices among the countries. After discussion, we can see that in the case of this sector, for both PC and DM good level of diversity is present.

After dimension-wise analyses, null hypothesis is rejected, and the alternative hypothesis is accepted for the dimensions of social, management, quality, and ethics. Therefore, there is a significant difference between the destination market-wise requirements and the producing country-wise requirements of the sustainability practices for each of these four dimensions but only for the quality dimension, the mean rank value of DM is greater than the mean rank value of PC. Hence, only for the quality dimension, both the parts of the alternative hypothesis are accepted.

Consequently, therefore, the present study arrives at the conclusion that the countries may use the quality dimension as a barrier to trade. This is to say that in order to restrict some countries or alternatively to offer some benefits to select nations over others, qualitative conditions may be employed by the countries in respect of international trade. In order to examine such possibilities, further investigations may be undertaken. As it is beyond the scope of the present study no attempt has been made here in this regard to resolve the issue.

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An Examination of the Indian Private and Public Life Insurance Companies Performance: A Study from the Standpoint of Premium Collection

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Abstract

The life insurance business in India has gone through a series of reforms, including the privatization of the sector, resulting in increased competition and premium collection. To assess the performance of Indian life insurance companies, data from 2013-14 to 2020-21 was analyzed using quantitative research methods. Descriptive statistical analysis, principal component analysis, and two-sample t-tests with equal variance are used to examine and compare the premium collection of public and private insurance companies, identify the most competent private insurance company, and investigate the impact of the COVID-19 pandemic on policy sales and premium collection. The results showed that public insurance companies outperformed private insurance companies in terms of premium collection, and no significant difference was observed in the premium collection or policy sales between the pre-and post-pandemic periods.

Key Words: Life Insurance, Premium, Pre-and Post Pandemic

1.Introduction

Any country's economic growth is significantly influenced by the insurance sector. The primary role of any insurance product is to protect the insurer from any unexpected loss. Besides that insurance industry act as a medium to promote saving and contributes to developing the capital market in the country. With the establishment of the Insurance Regulatory and Development Authority of India (IRDAI), India began reforms in the insurance industry. The act was introduced to regulate the insurance market in the best interest of the nation and society. Besides that, the act also aims to protect the interest of insurance policyholders. The Malhotra Committee's (2000) report advocated for private firms to enter the life insurance industry. With time, more private life insurance firms began conducting business in India. The life insurance sector reforms have increased the competition manifold. At present, there is only one public life insurance company.

In light of this, it is important to understand how both private and public life insurance businesses are faring in this fiercely competitive market. The purpose of the current research paper is to compare the performance of private and public sector life insurance organizations from the perspective of insurance premiums collection. In addition, the study will look at how the pandemic has affected the expansion of both commercial and public life insurance firms. The study is significant because it will aid in determining how private and public insurance companies are faring in the post-liberalized age.

1.1 Research Objectives

1. To compare the average premium collection between private and public insurance companies in India.
2. To identify the most competent private insurance company in terms of premium collection using principal component analysis.

3. To examine the number of life insurance policies sold during pre and post-pandemic periods.
4. To compare the change in the premium collection between pre and post-pandemic periods in the life insurance sector.

2. Literature Review

In this section, we aim to provide a review of relevant literature that examines the performance of the Indian life insurance industry in terms of premium collection.

Following the liberalization period, the life insurance market in India became highly competitive. Kumari (2002) conducted a descriptive study using data from 2001 to 2010 and acknowledged that after the privatization of the insurance business, the performance of the sector had significantly improved. The findings revealed a positive relationship between premium collection and the growth and expansion of the insurance business. Additionally, research conducted by Krishnamurthy et al. (2005), Bajpai and Mazhar (2019), and Singh and Ali (2020) confirmed that the Indian life insurance business is performing well and steadily growing in terms of premium collection. Bedi and Singh (2011) observed that the Indian life insurance industry had overcome several obstacles to achieve its current status, and that privatization had resulted in a manifold increase in premium collection, leading to the growth and expansion of the business. Bawa and Chattha (2013) measured the financial performance of the Indian life insurance industry using various ratios and linear regression and found that the profitability of the sector is positively impacted by the liquidity and size of the business, but negatively impacted by the capital and the amount of insurance premium collected. Ansari and Fola (2014) used the CARMEL model to assess the performance of insurance companies and found that significant differences exist between private and public sector life insurance businesses in terms of premium collection. Vijay (2019) employed an output maximization model and found that private-sector insurance companies performed better than public-sector companies due to a lower number of average claims. Chandrapal (2019) used MANOVA to examine the performance of the Indian life insurance industry and found that

liberalization had a positive impact on the industry's performance, resulting in a significant increase in premium collection. The study by Parvathi and Lalitha (2021) revealed that the life insurance business in India experienced a surge in sales during the pandemic, with a significant increase in premium collection and the sale of life insurance products. Similarly, Tripathi and Dixit (2021) found that the pandemic had a positive impact on the life insurance business, leading to a significant increase in the number of policies sold.

2.1 Hypotheses

The researcher is guided by the following alternative hypotheses:

H1: The sales of policies during the pre and post-pandemic period differ significantly.

H2: The premium collection during the pre-and post-COVID periods shows a significant difference.

3. Research Methodology

The research methodology used in the study is a quantitative research approach with a descriptive research design. The data was obtained from the website of the IRDAI, covering the period from 2013-14 to 2020-21 and including one public insurance company and twenty-three private insurance companies. Secondary data analysis was conducted using mean, principal component analysis, and a two-sample t-test with equal variances assumed. To determine the number of life insurance policies sold before and after the pandemic, the study used the average number of policies sold in 2017-18 and 2018-19 and between 2019-20 and 2020-21, respectively. The study utilized Excel and SPSS software for data analysis.

4. Analysis and Findings

The secondary data collected from the IRDAI website is analyzed here to draw some meaningful conclusions.

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Table 1: Life insurance Premium Collection Figures in Rs. Crore.

	Insurer	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Public	Life Insurance Corporation of India	236,942.30	239,667.65	266,444.21	300,487.36	318,223.21	337,505.07	379,389.60	403,286.55
Private	Aditya Birla Sun Life Insurance Company Ltd.	4,833.05	5,233.22	5,579.71	5,723.96	5,903.00	7,511.26	8,009.97	9,775.22
	Aegon Life Insurance Company Ltd.	453.00	559.20	501.60	450.72	531.21	568.88	575.74	526.07
	Ageas Federal Life Insurance Company Ltd.	826.25	1,069.62	1,239.67	1,565.19	1,783.24	1,932.52	1,842.51	1,958.64
	Aviva Life Insurance Company India Ltd.	1,878.10	1,796.25	1,493.15	1,336.51	1,344.22	1,264.94	1,193.64	1,165.25
	Bajaj Allianz Life Insurance Company Ltd.	5,843.14	6,017.30	5,897.31	6,183.32	7,578.37	8,857.16	9,752.53	12,024.84
	Bharti AXA Life Insurance Company Ltd.	872.65	1,053.32	1,208.33	1,396.50	1,684.39	2,075.50	2,187.26	2,280.82
	Canara HSBC OBC Life Insurance Company Ltd.	1,823.42	1,657.02	2,059.96	2,294.71	2,781.06	3,490.74	3,942.82	5,116.03
	Edelweiss Tokio Life Insurance Company Ltd.	110.90	193.08	310.07	441.33	638.26	919.31	1,048.48	1,248.24
	Exide Life Insurance Company Ltd.	1,830.67	2,027.48	2,046.99	2,408.58	2,531.89	2,886.20	3,219.59	3,324.75
	Future General India Life Insurance Company Ltd.	634.16	604.25	592.50	739.85	992.29	1,243.16	1,480.25	1,322.19
	HDFC Life Insurance Company Ltd.	12,062.90	14,829.90	16,312.98	19,445.49	23,564.41	29,186.02	32,706.89	38,583.49
	ICICI Prudential Life Insurance Company Ltd.	12,428.65	15,306.62	19,164.39	22,354.00	27,068.77	30,929.77	33,430.70	35,732.82
	IndiaFirst Life Insurance Company Ltd.	2,143.36	2,034.11	1,967.40	2,265.17	2,309.01	3,212.55	3,360.44	4,055.50
	Kotak Mahindra Life Insurance Ltd.	2,700.79	3,038.05	3,971.68	5,139.55	6,598.67	8,168.29	10,340.08	11,100.22
	MaxLife Insurance Company Ltd.	7,278.54	8,171.62	9,216.16	10,780.40	12,500.89	14,575.23	16,183.65	19,017.90
	PNB Metlife India Insurance Company Ltd.	2,240.59	2,461.19	2,827.83	3,236.08	3,953.51	4,777.20	5,506.96	6,032.82
	Pramerica Life Insurance Company Ltd.	305.86	735.10	920.21	1,142.10	1,844.46	1,816.86	1,228.06	993.60

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	Reliance Nippon Life Insurance Company Ltd.	4,283.40	4,621.08	4,398.12	4,026.82	4,069.37	4,357.93	4,440.94	4,736.45
	Sahara India Life Insurance Company Ltd.	204.63	166.86	157.05	153.94	112.03	100.71	87.43	73.20
	SBI Life Insurance Company Ltd.	10,738.60	12,867.11	15,825.36	21,015.13	25,354.19	32,989.42	40,634.73	50,254.17
	Shriram Life Insurance Company Ltd.	594.24	734.66	1,022.11	1,207.94	1,497.04	1,699.46	1,729.05	2,018.53
	Star Union Dai-ichi Life Insurance Company Ltd.	948.75	1,134.68	1,307.47	1,510.88	1,783.01	1,994.07	2,310.36	2,998.62
	TATA AIA Life Insurance Company Ltd.	2,323.70	2,122.66	2,478.96	3,171.08	4,162.95	6,069.76	8,308.51	11,105.09
	Private Sector Total	77,359.36	88,434.36	100,499.03	117,989.25	140,586.23	170,626.96	193,520.59	225,444.48

Source: IRDAI Website

Table 1 presents the life insurance premium collection data for both public and private insurance companies. Despite the significant increase in the number of private life insurance companies, their total premium collection falls significantly short when compared to public life insurance companies. The public life insurance business has a total premium collection of Rs. 2,481,945.95 Crore, while the private life insurance business has a total premium collection of Rs. 1,114,460.26 Crore. This demonstrates that the growth and expansion of public life insurance businesses is superior to that of private life insurance businesses, as higher premium collection results in faster growth and development. The average premium collection of the public sector undertaking, Life Insurance Company (LIC), is Rs. 310243.24 Crore, while the average premium collection of the 23 private insurance companies is Rs. 6056.85 Crore, indicating that the public life insurance business is performing remarkably well in terms of premium collection. A principal component analysis using varimax rotation with Kaser normalization was conducted to identify the top-performing private-sector insurance companies. Based on the component matrix in Table 2, it was found that Edelweiss Tokio Life Insurance Company Ltd, HDFC Life Insurance Company Ltd, PNB Metlife India Insurance Company Ltd, Max Life Insurance Company Ltd, and Kotak Mahindra Life Insurance Ltd scored a value of .051. This score indicates that these five private insurance companies are performing equally well with regard to premium collection, while the remaining private insurance companies have scored lower than 0.051 in the component matrix. Therefore, it can be concluded that these five private life insurance companies are among the most successful in terms of premium collection.

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Table 2: Extract of Component Matrix Result

Private Life Insurance Company	Component Matrix Score
Edelweiss Tokio Life Insurance Company Ltd.	.051
HDFC Life Insurance Company Ltd.	.051
PNB Metlife India Insurance Company Ltd.	.051
MaxLife Insurance Company Ltd.	.051
Kotak Mahindra Life Insurance Ltd.	.051

Source: Prepared by the Researcher

Life Insurance Policy Sell in the Pre and Post-Pandemic Era: Table 3 displays the average number of life insurance policies sold by the insurer in the periods before and after the COVID-19 pandemic.

TABLE 3: Average Number of Life Insurance Policies Sell (Number of policies '000s)

Insurance Companies	Pre-Pandemic	Post-Pandemic
Life Insurance Corporation of India	1,785	1,658
Aditya Birla Sunlife Insurance Company Ltd.	1,574	4,798
Aegon Life Insurance Company Ltd.	640	72
Ageas Federal Life Insurance Company Ltd.	47,156	11,061
Aviva Life Insurance Company India Ltd.	1,138	1,207
Bajaj Allianz Life Insurance Company Ltd.	1,498	3,535
Bharti AXA Life Insurance Company Ltd.	917	865
Canara HSBC OBC Life Insurance Company Ltd.	15,233	13,877
Edelweiss Tokio Life Insurance Company Ltd.	3,679	2,458
Exide Life Insurance Company Ltd.	671	377
Future Generali India Life Insurance Company Ltd.	1,418	1,177
HDFC Life Insurance Company Ltd.	7,005	3,747
ICICI Prudential Life Insurance Company Ltd.	11,797	4,151
IndiaFirst Life Insurance Company Ltd.	10,625	6,423
Kotak Mahindra Life Insurance Ltd.	2,211	1,465
MaxLife Insurance Company Ltd.	15,408	11,914
PNB Metlife India Insurance Company Ltd.	11,425	8,124
Pramerica Life Insurance Company Ltd.	1,621	193
Reliance Nippon Life Insurance Company Ltd.	634	710
SBI Life Insurance Company Ltd.	11,296	12,714
Shriram Life Insurance Company Ltd.	23,723	25,507
Star Union Dai-ichi Life Insurance Company Ltd.	14,675	15,650

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TATA AIA Life Insurance Company Ltd.	12,690	19,652
Life Insurance Corporation of India	1,785	1,658
Aditya Birla Sunlife Insurance Company Ltd.	1,574	4,798

Source: Prepared by the Researcher

TABLE 4: t-TEST: Two-Samples Assuming Equal Variances

	<i>Pre-Pandemic</i>	<i>Post Pandemic</i>
Mean	8644.298642	6579.818659
Variance	113968962.4	49715904.18
Observations	23	23
Pooled Variance	81842433.3	
Hypothesized Mean Difference	0	
Df	44	
t Stat	0.774	
P(T<=t) one-tail	0.222	
t Critical one-tail	1.680	
P(T<=t) two-tail	0.443	
t Critical two-tail	2.015	

The results of the statistical analysis presented in Table 4 show that there is no significant difference in the number of insurance policy sales between the pre-covid (M = 8644, SD = 10676) and post-covid (M = 6579, SD = 7051) eras. In addition, $t(44) = 0.774$, $p = .443$ (Table 4). This indicates that the pandemic has had no unfavorable influence on the insurance business.

Source: Prepared by the Researcher

TABLE 5: t-TEST-Two-Sample Assuming Equal Variances

	<i>Pre-Pandemic</i>	<i>Post-Pandemic</i>
Mean	21172.17	25034.19
Variance	4634532303.82	6238146856
Observations	24	24
Pooled Variance	5436339580	
Hypothesized Mean Difference	0	
Df	46	
t Stat	-0.181	
P(T<=t) one-tail	0.428	
t Critical one-tail	1.679	
P(T<=t) two-tail	0.857	
t Critical two-tail	2.013	

Table 5 illustrates the result of t-test in regard to the premium collection between the pre-pandemic and post-pandemic periods. The findings indicate that there is no significant difference in the premium income between pre-pandemic (M=21172, SD=68077) and post

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Source:Prepared by the Researcher

pandemic ($M = 25034$, $SD=78981$) and the, $t(46) = -0.181$, $p = .857$. The p value is 0.857 thus, the null hypothesis is not rejected, which means that there is no statistically significant difference in the premium collection between pre and post-pandemic eras. Therefore, it can be concluded that the outbreaks of pandemics have no negative impact on insurance companies' premium collection.

5. Conclusion

The life insurance business has undergone significant changes post-liberalization. The reforms in the insurance sector have led to increased competition among companies in both the public and private sectors. The results of the study indicate that public-sector insurance companies have better premium collections than private-sector companies. The principal component analysis identified five private sector companies that performed well in terms of premium collection. The t-test results showed that the pandemic had no negative impact on insurance companies' premium collection and policy sales, as there was no significant difference observed in the pre and post-pandemic periods. The overall conclusion is that the life insurance sector is performing well in the post-liberalized era.

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Factors Affecting Farmer's Financial Literacy: Insights from West Bengal, India

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Abstract

The article intends to evaluate the Financial Literacy (FL) of farmers and its determinants in the context of West Bengal, India. Data on 672 farmers were gathered from Financial Inclusion Insight database (5th round). Appropriate statistical tools and techniques were used to address the objectives of the study. Results showed that the level of FL of the farmers of West Bengal was poor. Farmer's FL score in West Bengal was noticed to be only 39.75%. The mean FL score of farmers from the agriculturally advanced districts (43.20%) was found to be greater as compared to the farmers from the agriculturally backward districts (36.29%). Assessment of the determinants of such FL suggests that gender, educational attainment, financial inclusion, and agricultural prosperity of the district significantly explain the FL level of farmers of West Bengal.

Keywords: Financial Literacy, Farmers, Financial Inclusion, West Bengal, India

Introduction:

Money management has become extremely challenging in the current knowledge economy due to the growing complexity and presence of a vast array of financial products, especially for poor people (Garg and Singh,2018).FinancialLiteracy (FL) amongst individuals is essential for accomplishing and maintaining financial well-being(Shim et al.,2009; Philippas and Avdoulas,2020). Individuals must acquire adequate financial skills to increase their capacity to make critical financial decisions effectively. FL encompasses obtaining, analyzing, and using financial information to make the appropriate economic decisions such as financial planning, debt management, wealth creation, etc(Lusardi and Mitchell,2014;Maji and Laha,2022a).FL enables people to manage their money effectively (Sundarasan et al.,2016), undertake the right investment choices (Krische,2019), encourage saving behavior (Gaisina and Kaidarova,2017), and benefit from newly launched financial products. Individuals with higher FL can minimize financial risk through portfolio diversification (Abreu and Mendes,2010).With comprehension of fundamental economic concepts such as compounding, inflation, risk diversification etc., individualscan handle personal financein a befitting manner (Lusardi and Mitchell,2014;Hossain and Maji,2021). Individuals with higher FLcan better perceive the value of information which increases their capacity for thinking rationality.Adequate FL empowers individuals to save money for retirement (Sekita,2011; Van Rooij.,2011) as well as set aside money for emergency purposes (Fan and Zhang,2021). Wachira and Kihui (2012) noticed that households with greater FL are more likely to look for information on financial services that are appropriate for their requirements. Financially literate households with higher cognitive ability can manage day-to-day financial matters effectively. FLis also expected to significantly reduce the poverty of individualsin society as a whole (Koomson et al.,2022).

Remund(2010) defines FLas“the ability to use knowledge and skills to manage financial resources effectively for a lifetime of financial well-being”.Similarly, Lusardi (2008a) defines, FLas the “knowledge of basic financial concepts, such as the working of interest compounding, the difference between nominal and real values, and the basics of risk

diversification". People's capacity for saving, investing, planning, managing, and budgeting are just a few of the variables that gets positively influenced by their level of FL (Tokar Asaad, 2015; Grohmann, 2018). FL is positively linked with timely repayment of credit-card bills (Norvilitis, 2006; Mottola, 2013) and refinance of mortgages with declining interest rates (Hogarth and Hilgert, 2002). Individuals with higher FL can earn a higher return from their investments (Jappelli and Padula, 2013) and less prone to utilize the high cost financial services. The level of FL of an individual can be measured through how well he/she can manage their resources over the course of their lives. Because of its significance, the issue of FL has been able to draw the attention of a variety of stakeholders, including researchers, governments, financial marketers, employers, bankers, and other organizations (Maji and Laha, 2023a). Its importance has grown as a result of the changing political, economic, and demographic factors, dynamism of the complex financial system and the newly emerging financial services vis-a-vis products. Globalization and the development of digital technology have amplified the intricacy and accessibility of different financial products (Prasad et al., 2018; Maji and Laha, 2022b). Individuals now a day have to assume increased responsibility of their financial choices, such as saving and investing for furthering education, children's education, and retirement. A considerable percentage of the wealth gap may be explained by FL (Lusardi and Mitchell, 2014). Adequate FL can help individuals with lower incomes to improve their overall financial condition (Boisclair et al., 2017). People who lack adequate FL are expected to make wrong estimation of their actual retirement needs. Increasing financial and health knowledge are important steps in lowering older people's economic vulnerability (Lusardi, 2008). High societal costs might also emerge from the paucity of financial knowledge. Above all, FL plays a pivotal part in achieving sustainable financial inclusion in the economy as a whole.

Agriculture is one of the major economic activities amongst the people in India. The majority of the rural population (more than 50% of the workforce) in India depends on agriculture as a primary source of occupation (GOI, 2021). Agricultural sector is important to any economy as it ensures food security and generates huge employment opportunities (Cervantes-Godoy and Dewbre, 2010; Beckman and Countryman, 2021; Manida and Nedumaran, 2020). More than 18% of the GDP comes from the agricultural sector in India (GOI, 2021). However, wellbeing of the farmers to a great extent depends upon their FL. Farmers with low FL are

contemplated to borrow from informal sources at interest rates which is much higher than the market rate of interest, end up not using this borrowed money skilfully and ultimately falling into indebtedness (Gaurav and Singh, 2012; Datta et al., 2018). FL positively influences crop insurance adoption by farmers (Biswal and Bahinipati, 2022). FL significantly augments the financial return to the farmer (Mwambia, 2014). In this prelude, the article tries to highlight the FL of farmers of West Bengal (India) and its determinants.

Brief Review of Literature:

Although there are scanty studies in this direction, the review of the available research studies are briefly presented in this section. Ravikumar et al., (2013) noticed that age, years of schooling, agricultural experience, farm income and land ownership, positively affected the FL of jasmine farmers in India. Twumasiet al., (2021) found that age, economic condition, gender and risk aptitude significantly determine the farmers' FL of Ghana. Widhiyaanto et al. (2018) highlights that education and training in financial affairs were positively associated with the FL of the Indonesian farmers, on the contrary, age and distance to the capital were adversely implicating the FL of the farmers. Safitri (2021) noticed that years of schooling significantly increased the FL of Indonesian farmers. Similarly, Akoto et al. (2017) also suggests that age, education, and regional variation were significantly affecting the FL of coca farmers of Ghana. Gaurav and Singh (2012) revealed that age, agricultural land ownership and years of schooling were noticed to significantly increase the cognitive ability of the cotton farmers. In addition, numerical ability, higher education, risk aptitude, and agricultural land ownership significantly step up debt literacy among the Indian cotton farmers (Gaurav and Singh, 2012). In the same line, Aggarwal et al. (2014) showed that years of schooling, income, and land holding size were the significant antecedents of the FL of farmers in Punjab in India. Maji and Laha (2023a) noticed the prevalence of poor FL amongst Indian farmers. Marital condition, economic status, education, gender and farm ownership were noticed to be significantly increasing the FL of the Indian farmers (Maji and Laha, 2023a). Paukmongkol (2017) tried to determine the financial knowledge, financial behavior, and financial attitude among the Thai farmers and found moderate level of FL among Thai farmers. Sanglay et al. (2021) also showed that age, income, and educational attainments were noticed to be positively associated FL of the rice farmers of Philippines.

A careful review of the existing literature advocates that very few empirical studies on the FL of farmers are available in the world including India. Existing studies in Indian context are region and agricultural commodities specific. Moreover, there are no studies on the FL of the farmers in the backdrop of West Bengal. Thus, taking into account the lack of studies in the extant literature and the ever-increasing substance of the topic of FL among the farmers, the present study will endeavour to unveil the state of FL amongst the farmers in West Bengal, India. Efforts will also be made to unfold the different factors affecting such FL.

Data Sources and Methodology:

For achieving the objectives of the study, secondary data on FL, socio-economic and demographic characteristics of the farmers of West Bengal were collected from the Financial Inclusion Insight database. The present study uses data from 5th round of 2017. In 5th round survey in India, 47132 individuals were surveyed out of which 11081 and 672 were farmers in India and West Bengal respectively. Therefore, the study used data on 672 farmers from West Bengal to attain the objectives of the study.

For deeper insights, the districts of West Bengal were clustered into two categories such as agriculturally advanced districts and agriculturally backward districts. Such clustering was made on the basis of total paddy yield of each of the districts as per the last available district level yield. The data on district level paddy yield was collected from the last agricultural survey carried out in 2016 by the Government of West Bengal which closely matches with the FL related data of 2017 used in the study¹. FL of the farmers was ascertained using Big 5 FL questions on numerical ability, compounding, inflation, and risk diversification as proposed by Lusardi and Mitchell (2008). Use of the Big 5 questions in assessing the FL is very popular amongst the researchers across the globe. Each farmer gets one mark for each of the right answers to the Big 5 FL questionnaire. Thus, the range of FL score lies between 0 (all wrong) and 5 (all correct). Farmers scoring up to 40% were denoted as a farmer with poor FL, respondent scoring 60% were denoted as a farmer with moderate FL, and farmers scoring 80% or above were designated as farmers possessing a high FL.

¹The advanced districts were Burdwan, South 24 Parganas, Purba Medinipur, Paschim Medinipur, Bankura, Murshidabad, and Birbhum., and the remaining of the districts were classified as backward districts. Districts with above average yield of paddy were classified as advance districts and vice-versa.

Basic statistical techniques including the frequency distribution and measures of central tendency were used for data analysis. The existence of statistically notable disparity in the FL in terms of their socioeconomic and demographic characteristics was investigated using the F-test and the t-test. In order to investigate into the determinants of FL among the farmers, Ordinary Least Square (OLS) method was used. The empirical model used in the study is presented below.

$$\begin{aligned} \text{FINANCIAL LITERACY SCORE}_i &= \alpha_0 + \alpha_1 \times \text{FEMALE} + \alpha_2 \times \text{FARMWORKER} + \alpha_3 \times \text{FAMILY SIZE} + \alpha_4 \\ &\times \text{AGE 25} - 34 + \alpha_5 \times \text{AGE 35} - 44 + \alpha_6 \times \text{AGE 45} - 54 + \alpha_7 \times \text{AGE 54} \\ &- \text{OVER} + \alpha_8 \times \text{FINANCIAL EXCLUSION} + \alpha_9 \times \text{ABOVE POVERTY LINE} \\ &+ \alpha_{10} \times \text{ADVANCED DISTRICT} + \alpha_{11} \times \text{PRIMARY EDUCATION} + \alpha_{12} \\ &\times \text{SECONDARY EDUCATION} + \alpha_{13} \times \text{HIGHER EDUCATION} + \alpha_{14} \\ &\times \text{MARRIED} + \epsilon_i \end{aligned}$$

α_0 is the intercept, α_i are the regression co-efficients and ϵ_i is the error term.

FEMALE is a dummy variable where female is denoted as 1 else 0.

FARMWORKER is a dummy variable where farm worker is denoted as 1 else 0.

FAMILY SIZE indicates the number of family member of the farmer respondent.

AGE 25 – 34, *AGE 35 – 44*, *AGE 45 – 54*, *AGE 54 – OVER* are different age group dummy variables (for example if a farmer is 30 years old then corresponding “*AGE 25 – 34*” variable will be denoted as 1 else 0)

MARRIED is a dummy variable, if farmer married is denoted as 1, else 0.

FINANCIAL EXCLUSION is a dummy variable, if the respondent does not have a bank account is denoted as 1 else 0.

ABOVE POVERTY LINE is a dummy variable, if the respondent belongs to above poverty line strata is denoted as 1 else 0.

ADVANCED DISTRICT is a dummy variable, if the respondent belongs to agriculturally developed district is denoted as 1 else 0.

PRIMARY EDUCATION, *SECONDARY EDUCATION*, *HIGHER EDUCATION* are educational attainment dummy variables (for example if the respondent is primary educated then corresponding “*PRIMARY EDUCATION*” variable will be denoted as 1 else 0)

Analysis and Findings:

FL among Farmers in West Bengal:

Table 1

FL level among farmers in West Bengal

FL Levels	West Bengal	Districts	
		Advanced	Backward
Low	61.46%	59.58%	63.92%
Medium	13.84%	12.07%	16.15%
High	24.70%	28.35%	19.93%
Average FL Score	39.75%	43.20%	36.29%
Source: Author's own calculation			

Extant literature suggests that the FL amongst the people across the globe is noticed to be poor. The majority of the farmers (61.46%) in West Bengal also exhibited a poor FL in line with the FL trend across the world. 13.84% of the farmers have given three correct answers against the Big 5 FL questions, exhibiting moderate FL. 24.70% of the farmers were denoted as farmers with high FL as they could give four or more right responses. The average FL score of the farmers in West Bengal was 39.75% implying low level of FL. Table 1, exhibit that 63.92%, 16.15% and 19.93% of farmers in the backward districts have poor, medium and high FL levels respectively. In the case of the agriculturally advanced districts, 59.58% of the farmers possessed low level of FL. 12.07% and 28.35% of the farmers possessed medium and high FL levels respectively. The mean FL scores of the farmers pertaining to the agriculturally advanced and backward districts were noted to be 43.20% and 36.29%, respectively.

Socio-Economic and Demographic Characteristics and FL of the Farmers:

Assessment of the demographic data reveals that the most (78.22%) of the respondents were male, implying high participation of males in agricultural activity in West Bengal. The FL score of male farmers was 44.65% and the same of the female farmers was 23.77% which implies the prevalence of strong gender gap in FL amongst the farmers in West Bengal. Most of the farmers (86.76%) in the sample were married. The FL score of married farmers was 41.20% in contrast with the mean FL of 33.70% of farmers other than married farmers. 80.36% of the farmers were noticed to be farm workers, and balance was farm owners. The farm workers scored merely 37.77% whereas farm owners could score 50.15%. Such a difference in their FL score was found to be statistically notable.

Table 2

Demographic and Socio-Economic Attribute wise Variation in FL amongst the Farmers

Criteria	Attributes	Percentage	Average FL score	t / F Statistic
Gender	Male	78.72%	44.65%	t value: 6.7405
	Female	21.28%	23.77%	p-value: 0.000
Age cohort	15-24	9.08%	36.39%	F Value: 0.33 p-value: 0.8589
	25-34	19.94%	41.04%	
	35-44	24.55%	41.81%	
	45-54	21.43%	40.13%	
	55-over	25%	39.40%	
Marital status	Married	86.76%	41.20%	t value: -1.944
	Others	13.24%	33.70%	p-value: 0.0522
Farmer status	Farm Owner	19.64%	50.15%	t value: -3.7935
	Farm worker	80.36%	37.77%	p-value: 0.0002
Education	No formal education	41.07%	32.31%	F Value:12.55 p-value: 0.000
	Primary education	45.09%	42.77%	
	Secondary education	11.76%	53.92%	
	Higher education	2.08%	62.85%	
Financial condition	APL	4.61%	45.16%	t value: 0.8321
	BPL	95.39%	39.96%	p-value: 0.4057
Financial Inclusion	Financial included	83.48%	41.88%	t value: -2.9037
	Financial excluded	16.52%	31.71%	p-value: 0.0038
Agricultural	Advanced	56.70%	43.20%	t value: -12.007

yield	district			p-value: 0.0088
	Backward district	43.30%	36.28%	
Source: Author's own calculation				

95.39% of the sample farmers were found to be falling under below poverty line category with a FL score of only 39.96%. The average FL score of above poverty line farmers was noticed to be 45.16%. However, such a difference in FL score amongst the APL and BPL farmers was not noticed to be statistically notable. In the context of this study, people from various age groups were found to be equally engaged in agricultural activity in West Bengal. Of the total, 9.05% were from the age group of 15 and 24 (exhibiting average FL score of 36.39%), 19.94% from the age group of 25 and 34 (exhibiting average FL score of 41.04%), 25.55% were from the age group of 35 and 44 (exhibiting average FL score of 41.81%), 21.43% were from the age group of 45 and 54 (exhibiting average FL score of 40.13%), and the remaining 25% were from the age group of 55 and above (exhibiting average FL score of 39.40%). The differences in FL score amongst various age cohorts were also not statistically significant. The analysis of the data showed that 41.07% of the farmers have no formal educational background, 45.09% have primary educational background, 11.76% have secondary educational background, and only 2.08% have a higher education. The average FL score of farmers with no education, primary level education, secondary level education and higher education were 32.31%, 42.77%, 53.92% and 62.85% respectively. The difference in FL as per educational attainments was statistically notable at 1% level.

Factors affecting FL of Farmers in West Bengal:

Table 3

Determinants of FL among the Farmers in West Bengal

Variables	Coefficient	t-value	p-value
Female	-16.72	-5.18	0.000
Farm worker	-5.17	-1.57	0.117
Family size	.0795	0.82	0.410

Age cohort			
25-34	1.6592	0.31	0.754
35-44	2.4751	0.46	0.645
45-54	-.29105	-.05	0.958
55-over	.08075	0.15	0.884
Married	4.2955	1.05	0.293
Education			
Primary	7.3464	2.53	0.012
Secondary	16.2055	3.66	0.000
higher	26.6534	2.90	0.004
Advanced district	4.3867	1.70	0.090
Above Poverty Line	-.13096	-0.02	0.983
Financially Excluded	-7.9432	-2.27	0.023
Constant	36.029	4.49	0.000
LR χ^2	0.1207	P value	0.000
Source: Author's own calculation			

Table 3 presents the outcome of the OLS to unfold the antecedents of such FL amongst the farmers. Existing scholarship suggests that there exists sharp gender-gap in FL across all occupation across all economies. The sign of the variable female was found to be negative but statistically notable in the estimation. The result clearly indicates that there is a significant gender divide in FL among farmers in West Bengal in line with the existing theoretical conviction (Lusardi et al.,2010; Lusardi and Mitchell,2014; Agarwalla et al., 2015; Hasler and Lusardi 2017; Hossain and Maji,2021). Women lag far behind in financial planning than man which in turn make them less ready for retirement (Lusardi and Mitchell,2008). Women have lower FL levels as well as lower financial confidence (Bucher-Koenen et al., 2016). Women are reported to struggle more than males to complete financial calculations, and they also lack awareness of basic concepts in finance and thereby have poor knowledge, obstructing them from making appropriate financial choices and decisions (Sekita, 2011). Arora (2016) noticed the poor awareness about financial planning tools among women. Traditionally held role that male are in charge of making financial decisions may be one of

the reasons of such gender divide especially in developing economies like India and especially in case of poor households (Hsu,2016).

Agricultural advancement favourably affects the FL of the farmers. Maji and Laha (2023a) noticed that farmers from agriculturally productive Indian states have higher FL rate as compared to farmers from agriculturally backward states. Normally, farmers from the agriculturally developed area have higher education and skill and their income opportunity is also higher which leads to increased FL. Regional variation in the FL scores were also noticed by Fornero and Monticone (2011), Beckmann (2013), Bumcrot et al. (2013). Farmers belonging to the agriculturally advance districts exhibited greater FL in this study which conforms to the findings of Maji and Laha (2023a).

Education perhaps is believed to be most significant predictors of FL. The coefficient associated with three educational attainment related variables were found to be positive, gradually stepping up with increasing educational attainments and statistically notable at 1% significance level. This result is consistent with Lusardi and Mitchell (2014); Lusardi et al. (2010), Atkinson and Messy (2012), Scheresberg (2013), Brown and Graf (2013) and Maji and Laha (2023a). Education significantly increases the cognitive ability, which directly has a favourable impact on the FL levels. Education also affects FL positively through income effect (Maji and Laha, 2023b). Stopler and Walter, (2017) also noticed that the majority of people with the highest educational level achieve high FL scores.

The outcome of the study exhibits that financially included farmers have greater FL than the financially excluded farmers which is consistent with outcome of the study carried out by Atkinson and Messy (2012). Maji and Laha (2022a) noticed that the FL rate of financially included farmers was greater than that of financially excluded farmers. Choi (2009) suggested that even after adjusting for the demographic and socioeconomic characteristics of students, owning a bank account significantly increase the FL. Clark et al., (2018) in an experimental study on adolescent girls in Ghana and discovered that saving money account in a bank significantly improved their economic behaviour. Such increase in FL due to financial inclusion occurs mainly because of the experiential learning by participating in the banking and financial activities. Visiting the bank branches, ATMs, interactions with banking correspondents, engaging into banking activities enables the farmers to improve their FL

thorough practical learning. Rest of the variables were not found to be statistically notable in the study.

Conclusion and Policy Suggestions:

The pertinence of FL in clinching individual financial wellbeing is well documented in the extant scholarship. FL plays an instrumental part in promoting financial resilience amongst the individuals. Such micro impact also leads macro transformations in long run. Financially resilient individuals make the financial system financially resilient. The role of agricultural sector to the economy in aggregate is extremely important as this sector ensures food security in an economy and creates huge employment opportunity directly or indirectly. However, the growth and sustenance of this sector also depends on the financial health of persons engaged in this primary sector apart from other factors. On the other hand financial health and wellbeing of farmers is often conditioned upon their FL. In this context and considering the gap in the extant literature, this article strives to explore the FL and its determinants of the farmers in India with special reference to West Bengal. The outcome of the study revealed that the level of FL of the farmers of West Bengal was poor. However, the FL of the farmers of the agriculturally advanced districts (in terms of yield) was found to be greater as compared to the farmers from the agriculturally backward districts. Evaluation of the determinants suggests that gender, educational attainment, financial inclusion and agricultural prosperity of the district significantly explain the FL level of farmers in West Bengal.

Considering the outcome of the study, Government (both Central and State) should constantly evaluate and focus on improvements to FL amongst farmers in rural areas in order to boost the region's viability and contribute to our nation's long-term economic growth. The Government as well as RBI should take active steps so that the financially excluded population comes under a formal financial system and banks must continuously organize various financial training workshops for the farmers in rural areas. National Centre for Financial Education² is playing crucial role in this direction. However, it needs to strengthen and broaden its outreach to the remotest places in order to improve the FL of the marginalized sections of the society including farmers across India.

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² A Not for Profit Company created by Reserve Bank of India, Securities and Exchange Board of India, Insurance Regulatory and Development Authority of India and Pension Fund Regulatory and Development Authority, under Financial Stability and Development Council (FSDC), Ministry of Finance, Government of India.

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Sustainable Economic Development through Sustainable Tourism in Purulia District: A Critical Appraisal of Common Peoples' Need

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Abstract

Purulia district is the utmost backward and neglected district of West Bengal in terms of developmental activities particularly in the field of tourism. This district has huge potential it is a storehouse of indigenous human and natural resources. The district is blessed by several minerals, vast forest cover and indigenous cultural heritage. Tourism can be popularly developed based on these aboriginals which improve the environmental, economic and socio-cultural aspects of any region. A sustainable balance may be guaranteed through enhancement of employment and income opportunities without disturbing environment and local culture. Purulia district of West Bengal has the moral strength and desire to welcome tourists through hospitality services have been considered to explore the tourism development opportunities. The other objective is to analyze the economic upshot of tourism, including the status of sustainable tourism development of the district. This type of economically backward, but culturally enriched regions can also be developed through the promotion of sustainable tourism. The study is based on primary data generated through a primary survey from a target group with the help of a structured questionnaire. The secondary data have been collected mainly annual reports of the tourism department, Government of West Bengal. This study concludes that it is more advantageous to build a community-based sustainable tourism when local indigenous people participate in tourism operations. The usufructs may even be distributed among the local people and with this the standard of living may be augmented. Infrastructural development needs to be functioned to develop a sustainable tourism.

Key Words:*community-based sustainable tourism, indigenous people, infrastructural development, hospitality services, usufructs.*

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1. Introduction:

Tourism is an important economic contributor for any country. The Indian economy is also blessed with this sector of the economy. Tourism includes a unit which provides facilities, fostering of existing culture, nourishment of adventure and wildlife experience to tourists. Tourism has the potentiality to generate employment, improve the standard of living as a means of socio-economic development. Development of tourism in a region promotes sustainable economic progress, income generation, employment opportunities, conservation and protection of the local environment with emphasis on upliftment of living standard of the local communities. Several researchers show in their study that eco-tourism, which is one of the forms of sustainable tourism activity accelerate preservation and management of the natural environment and strengthening the capacity of all stakeholders of fragile area. In the Indian context, sustainable tourism development had taken place by considering various sensitive issues related to socio-cultural facets of the society. Government of India constituted a framework in its Tenth Five Year Plan with the assistance of the United Nations for the promotion of endogenous tourism. This study reveals that the promotion of eco-tourism helps to endorse cultural and craft-based tourism activities for supportable livelihoods and integrated rural development through capacity building of the low-income village communities. This district is the most backward one and faces lots of problems associated with infrastructure and human development due to poor soil fertility and dry climate. Agriculture is the main economic activity of the district where almost 70 percent population is engaged as cultivators or agricultural labourers. But agricultural practices do not play the major role in the livelihood of the local people as the red lateritic soil, low moisture holding capacity and low rainfall obstructs agricultural productivity immensely. The district is blessed with considerable amount of dense forest covers comprising Sal, Teak and other valuable timber producing trees. Local people are not getting basic facilities, i.e., education and health services even today, so the district is lagging behind in social and human development aspect. Moreover, the Government does not take enough initiatives to improve the infrastructural facilities in this area. If the eco-tourism facilities are established near the forest patches, then the marginal communities, especially the poor tribal people may

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be showered with the benefits of sustainable development. The standard of living in these marginal communities may be augmented by the usufructs earned from the tourism activities. Government of West Bengal has already established some eco-tourism spots surrounding Ayodhya hill, Joypur, Maithan, Duarsini, Kokrojhar hills, etc. in the district which helps the upliftment of economic standard of the local people. In this context West Bengal Forest Development Corporation (WBFDC) plays a significant role towards the growth of nature-based tourism in this area. The contributions of sustainable tourism may be observed not only in the field of financial growth, but also in terms of job creation and job retention, new business opportunities, community diversification as well as protection of rural culture and heritage with increase arts and crafts sale. Simultaneously, it will also support to preserve the landscape, improve milieu of the locality. Therefore, a structured and well-planned development project of creation of tourism industry in a backward region is very necessary to nurture a region economically and socially and government should profoundly look into this matter if they want to promote the livelihood pattern of the marginal communities.

2. Objectives:

This paper deals with the economic importance of sustainable tourism development by highlighting its strength and weakness in overall growth. It also shows that there are plenty of opportunities to invest in the infrastructural development, education and hospitality services in the district of Purulia by the government or other agencies as there is enormous scope of the development of the tourism business. The present paper embraces the following objectives-

- to discover the tourism scenario of Purulia district of West Bengal
- to analyze the scope of employment and earnings in the district
- to identify the possibilities of developing sustainable tourism in this district.

3. Study Area:

Purulia, the westernmost district of West Bengal is situated in the tropical climate region and shares the boundary with the State of Jharkhand and three districts of the State *i.e.*, Paschim Medinipur, Bankura and Burdhaman. Being the second highest (18.3 %) tribal populated district of the West Bengal Purulia district has its very own indigenous culture and a strong historical background with very unique physical tract.

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4. Literature Review:

Kangas (1995) contends that the sustainable tourism provides the opportunities of learning the mechanism of environmental management which may reduce environmental depletion.

Ross and Wall (1999) established that the community-based participation management system can minimize the possibilities of ecological damage and the usufructs earned from tourism activity may enhance the income of the local communities.

Williams (2001) described that the cultural values of any historical place in any remote area may be popularized by developing tourism activities using their inherent art and culture by involving the local people.

According to World Eco-tourism Summit Final Report (2002) eco-tourism activity can expand the local economy through various economic activities by the local community which protect the local culture as well.

Christ (2003) explains that through eco-tourism socio-cultural, political and environmental sustainability can be secured.

5. Data Base and Methodology:

The study is supported by both primary and secondary data that have been gathered from diverse sources. A structured questionnaire that was administered to the local villagers living close to the tourist attractions was used to gather primary data. Hotels and other hospitality service providers were also interrogated to collect information about number of persons deputed in the hotel to serve the tourists. Secondary data and information have been collected from various published records of the Department of Tourism and Directorate of Forest, Government of West Bengal and books, journals and other electronic media.

15 private hotels, 20 Tour Guides and 50 Households were interrogated to extract the information about employment generation through the promotion of eco-tourism in Purulia district. Data so collected from both sources were analyzed using simple statistical technique. Total Direct Employment (TDE) has been calculated after Ajala (2008) from the data collected from the hotels and other service providers. Simple cartographic techniques have been applied to display the information collected from the local villagers. This district has

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been considered as a study area to assess the opportunities of developing sustainable tourism industry.

6. Results and Discussion:

Purulia district is a land of “*Chhau*”. Here the innocent local people are nurturing the hand full natural resources as their own worldly goods. 70 percent of the district’s population is engaged in cultivation, but in spite of that cultivation is not a subsistence activity here. So it is the necessity rather than conjure to find out alternative sources of economy for the survival of local people. There is a wide possibility of building up the tourism industry in this district based on its unutilized natural resources which may augment the standard of living of the local inhabitants.

6.1. *Tourism scenario of Purulia district in West Bengal*

Purulia district has three tourism circuits, namely northern, central and southern circuit. The various popular tourism spots of these three tourism circuits are shown in table no. 1, table no. 2 and table no. 3 respectively.

Table no. 1 Important Tourist Spots of Northern Part of Purulia District

Tourism Circuit	Tourist Spot	Attraction	Characteristic
Northern Circuit	Murradih Irrigation Dam	It is situated in the foothills of Gurungu hill and famous for migratory birds watching.	Eco-tourism Spot
	Gar Panchakot	A famous historical place situated at the foothill Panchet hill. Remnants of a fort built by the king of Panchakot in 1600 A.D. with terra cotta arts.	Historical Tourist Spot
	PanchetPahar and Eco-tourism Centre-Baghmara	This place is well known for the picturesque panoramic view of forest and Panchet hill developed by West Bengal Forest Development Corporation Limited.	Eco-tourism Spot
	JaichandiPahar	Very popular trekking as well as picnic spot which was selected by famous Satyajit Roy for his milestone film ‘HirokRajarDeshey’.	Geomorphosite Tourist Spot
	Kashipur Rajbari	It was the dwelling place of Panchakot Royal family ruling for more than 800 years.	Historical Tourist Spot

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	TelkupiDeul	This deul (6th Century Jain Temple) was the capital of TailaKampa kingdom which is sub-merged in the Damodar Reservoir. Enthusiasts adventure lovers and archaeologist may visit this place by boat which is an exciting proposition.	Archaeological Tourist Spot
	Banda	This is the famous historical place preserved by ASI which carries the legacy of solitary of the 6th century stone temple in 'Rekha' style. Nature lover tourists can amidst deep palash forest when palash blooms.	Archaeological Tourist Spot
	Bero hills	Very popular trekking as well as picnic spot where mountaineering training imparted by various organizations.	Geomorphosite Tourist Spot

Source: Department of Tourism, Purulia District, 2019

Table no. 2 Popular Tourist Destinations of Central Tourist Circuit of Purulia District

Tourism Circuit	Tourist Spot	Attraction	Characteristic
Central Tourism Circuit	Purulia Town	Saheb Bandh or Nibaronsayor is the main attraction of this town which holds season birds in its large water body at the heart of the town.	Historical Tourist Spot
	Ajodhya	It is the most popular tourist destination of the district, which is situated 42 kms away from the town with 2133ft altitude.	Geomorphosite Tourist Spot
	Bamni Falls	This waterfall is the symbol of unblemished purity of nature of Ajodhya hill.	Geomorphosite Tourist Spot
	Durga Bera	It is the 40ft deep artificial water bodies and the paradise of birds.	
	Hilltop, Saharjuri, Turga falls	Scope to explore the ample virgin forest and nature at its best.	Geomorphosite Tourist Spot
	Matha Buru	Centering Matha Buru, 153 sq km forest is famous for adventure activity, jungle trekking, rock climbing.	Geomorphosite Tourist Spot
	Charida Village	A craft village located at the foothills of Ajodhya is famous for traditional mask making generally used for 'Chhou Dance'.	Cottage Industry
	Khairabera	An irrigation dam admits hills and forest suitable for picnic and film making.	Eco-tourism Spot

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	Murguma Dam	A large water body with ample forest area on the foothills of Ajodhya famous for adventure activities like trekking in the jungle, scope for film shooting.	Eco-tourism Spot
	Kuki Dam	A vast water body created on the river-Rupai is an excellent option for weekend tours and film shooting.	Eco-tourism Spot

Source: Department of Tourism, Purulia District, 2019

Table no. 3 Tourist Destinations of Southern Part of Purulia District

Tourism Circuit	Tourist Spot	Attraction	Characteristic
Southern Tourism Circuit	BhaloPahar	A semi-arid region with thin forest belt is a beautiful place to stay in nature by the wanderlust tourist.	Geomorphosite Tourist Spot
	Doladanga	Situated on the bank of Kansabati Reservoir at Manbazar, on the other side of Mukutmanipur, is the ideal place for picnickers. The main attraction of this spot is the reservoir and the dense forest.	Eco-tourism Spot
	Duarsini Eco-tourism Centre	Duarsini, the forest and a small rivulet like 'Satgudung' clustered developed by West Bengal Forest Development Corporation Limited has an ample of taking a safari through dense forest.	Eco-tourism Spot
	Kuilapal/ Nanna Forest	A natural forest with long Sal trees, Kuilapal is a blissful place for wanderlust tourist.	Eco-tourism Spot
	Boronti	Boronti is a small, quiet and scenic place. It is the place where one can take a break from monotonous daily life and rejuvenate.	Eco-tourism Spot

Source: Department of Tourism, Purulia District, 2019

6.2. Analyze the scope of employment and earnings in the district

Eco-tourism activity is very potential for direct employment generation in any region in a sustainable manner. This activity offers various services such as hospitality services, tour operators, tour guide, transport services, exhibition of local souvenir etc. to the tourist who wants to enjoy the nature. In Purulia district more than 70 Private Hotels, four Yuba Awas, 11 Forest Rest Houses are there which delivers hospitality services to all kinds of tourists. As

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the hotel services play an important role in the tourism industry and generate direct employment, so it is considered as the backbone of this industry.

The Total Direct Employment (TDE) has been calculated using the following formula-

$$\text{Total Direct Employment (TDE) of a tourist spot} = f(a \times n_{(H)} + b \times n_{(SS)} + T_g + T_o + \dots + n)$$

Where TDE = Total Direct Employment in a particular tourist spot.

a = measure of the average number of employees/ hotels

$n_{(H)}$ = number of hotels in the location under consideration

b = measure of the average number of employees/ souvenir shop

$n_{(SS)}$ = number of souvenir shop within the tourist spot

T_g = number of tour guides

T_o = number of tour operators

+ + n = additional services generated by direct employment

It is observed from the study that the Purulia district is currently generating approximately 2810 direct employment. The Total Direct Employment is generated through seven means as formulated by Ajala(2008). He assessed the income potentiality of tourism development in Ethiopia through Total Direct Employment (TDE) calculation. In this particular study a modified form of this formula has been used to calculate the Total Direct Employment of Purulia district, shown in table no.4.

Table No. 4: Number of Hotels, Tour Guides and Tour Operators of Purulia District

Sl. No.	Locality/ Tourist Spot	No. of Private Hotels	Average No. of Employees per Hotel	No. of Souvenir Shop near Tourist Spot	Average No. of Employees per Souvenir Shop	No. of Unregistered Tour Operators	No. of Unauthorized Tour Guide
1	Purulia Town	38	4	15	2	12	10
2	Raghunathpur Town	12	4	11	2	8	6
3	Balarampur Town	3	4	12	2	6	5

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4	Bagmundi Town	7	3	7	2	3	5
5	Manbazar Town	5	4	14	2	5	6
6	Tulin	1	3	3	2	1	2
7	Duarsini	1	3	5	2	1	4
8	Murguma	1	3	2	2	1	3
9	Jhalda	1	4	9	2	4	5
10	Panchokot	2	4	3	2	2	3
	Total	71	36	81	2	49	43

Source: Computed by the Author from Primary Data, 2019

$$TDE_{(TS)} = f(a \times n_{(H)} + b \times n_{(SS)} + T_g + T_o + \dots + n)$$

$$TDE_{(TS)} = f(36 \times 71) + (2 \times 81) + 49 + 43 + \dots + n)$$

$$TDE_{(TS)} = f(2556) + (162) + 49 + 43 + \dots + n)$$

$$TDE_{(TS)} = 2810 \text{ people}$$

The majority of the local people opined that development of eco-tourism may promote the new tourism business in this district which is shown in figure no. 1. In this aspect commercial tourism may be converted into eco-tourism. Local Government may take initiatives to build up sustainable tourism industry. Most of the local people are in favour of forming tourism industry shown in figure 2. Promotion of eco-tourism in a sustainable form may help to generate employment as well as income for the local communities. A very few percentages of people suggested that tourism activities the hospitality services where young generation may get involved with these activities. Eco-tourism activities may create more job opportunities in the district as dealt by the local villagers which is shown in figure no 3. With the development of tourism industry job opportunity may be created in the form of tour guide, hotel management, creation of handicraft goods and in the transport sector. Rural people can be employed in hospitality services, transport services, small scale business and also restoration of handicrafts. As a result, poor local people may earn Rs. 200 to Rs. 300 per day (shown in fig. 4), which indicates that the tribal people of this district may be engaged with tourism activities. The villagers may be able to attain better sustenance and schooling for their children. A large number of families may be benefited. In addition to that the local area

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will be developed and the accessibility throughout the district may be improved (shown in fig. 5).

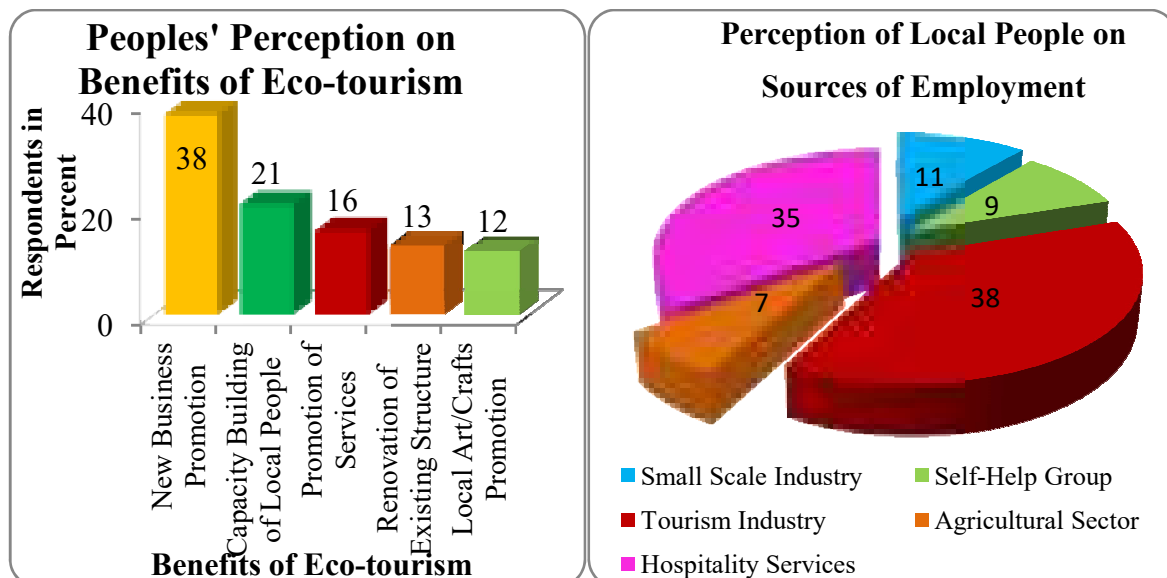


Fig No. 1

Source: Primary Data, 2019

Fig No. 2

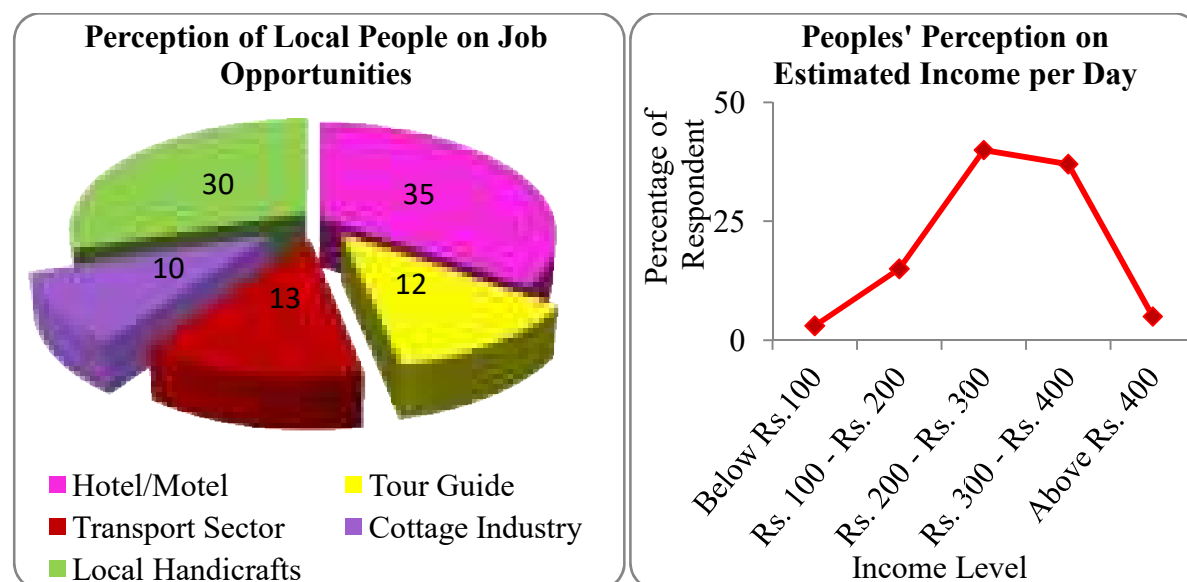


Fig No. 3

Source: Primary Data, 2019

Fig No. 4

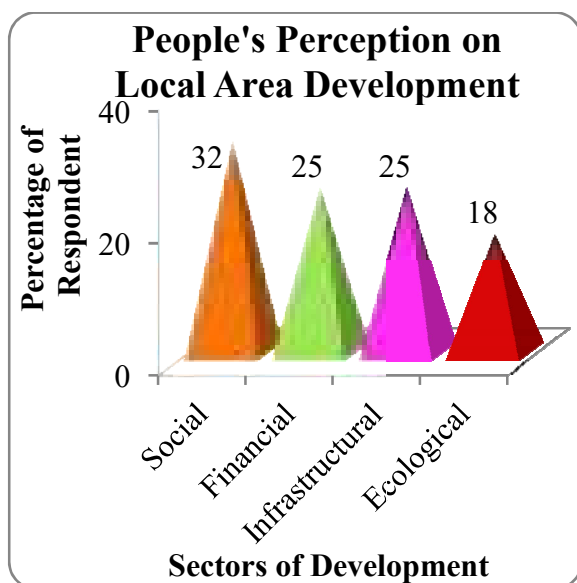


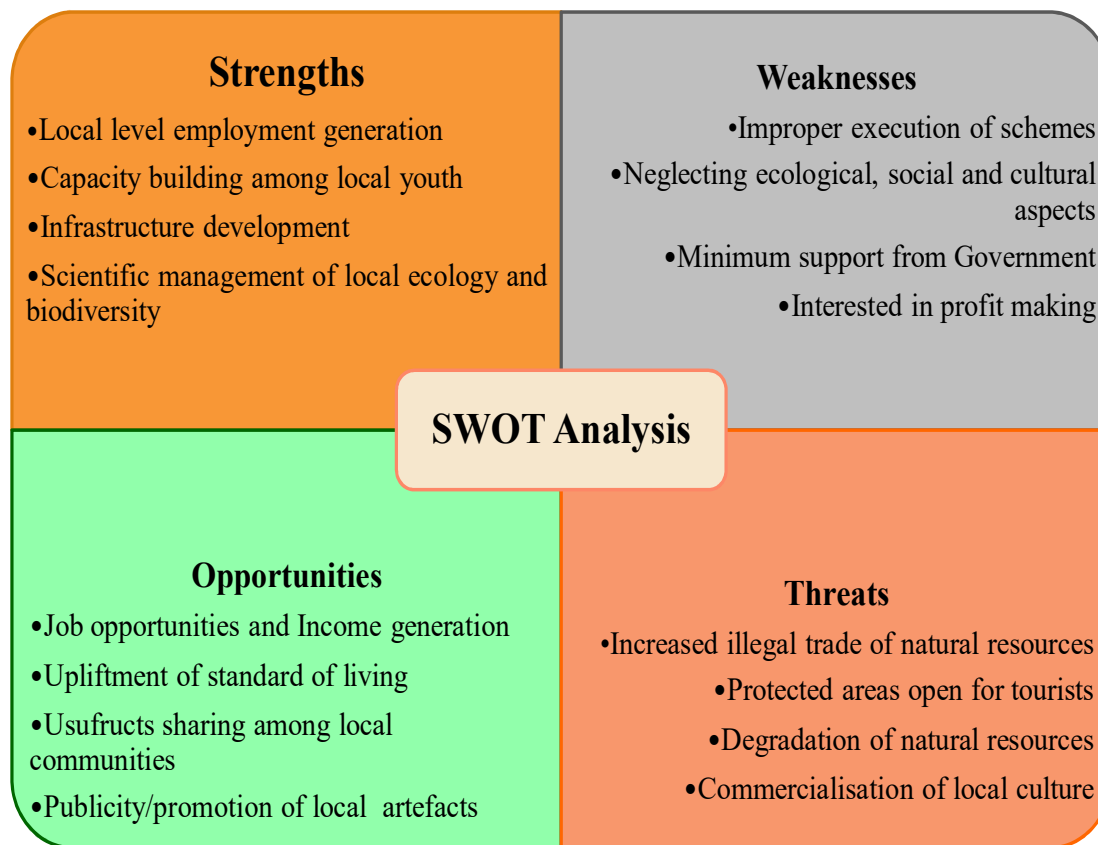
Fig No. 5 Source: Primary Data, 2019

They are hopeful about long waited infrastructural development and aspire for high standard of living along with ecological and financial benefits.

6.3. Identify the possibilities of developing sustainable eco-tourism in the district

The impact of sustainable eco-tourism development may be addressed through SWOT analysis which reveals the strength, weakness, opportunities and threats mostly concerned with all classes of the local community more particularly on primitive class people (shown in fig. 6).

Analysis of Strengths, Weaknesses, Opportunities and Threats of Promotion of Eco-tourism



Fig

No. 6 Source: Prepared by the Author

6.3.1. Strengths:

The district may be showered with various opportunities for the promotion of eco-tourism activity. Adopting the sustainable tourism activity through eco-tourism assures the sustainable use of natural resources and awareness may be generated among the local poor communities about the principles of sustainability. Promotion and marketing of various handicrafts products are possible through this initiative, which boosts up the self confidence among the local artisan. Sustainable utilization of natural environmental contributes harmony in social and economic spheres in the rural areas of the district.

6.3.2. Weaknesses

Physical communication is a big problem in this district. Nearly half of the village opined that they could not enjoy the facilities of pure drinking water, electricity, telephone and all-

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weather roads. The government has not taken proper initiatives and has not made any constructive plan under the umbrella of tourism industry so far, which is needed to be overcome soon. The transport system and easier communication process are another drawback of this district.

6.3.3. Opportunities

The main obstacles are the need to protect the environment and natural resources, the need for education, for tourists and locals have a proper understanding of each other, and the need to create a democratic movement that enables people at all levels to take part in the development of the tourism industry. Hotels, motels and cottages may be built up from where the Government may collect taxes in addition to generating employment opportunities. It might aid in stopping the movement of people from rural to urban areas. Development of rural tourism in Purulia has a bright future because it not only showcases the region's natural beauty but also its unique local cultures, traditions, and cuisine. Every little hamlet has a special cultural tale to tell, distinctive handicrafts to display, unique traditions, customs, rituals and traditional foods to serve to the visitors. It is not worthwhile for commercialization of rural tourism.

6.3.4. Threats

The commercial tourism sector so developed, sometimes does not think about nature and environment which may cause the degradation of natural resources. Protection for tourist is an important criterion for developing sustainable tourism which is a main threat of this district. Increasing illegal trade in various forms may stop the development process. Lack of proper planning and sanction of fund is another threat of the district.

7. Conclusion

The study shows that the development of eco-tourism augments employment and income to the economically backward district like Purulia. Eco-tourism will become a crucial tool for the development of sustainable tourism, acting to reduce poverty, create jobs, restore the environment, uplift distant places and promote the cultural heritage of indigenous people. It can stop rural residents from moving to cities for their survival. To frame out a sustainable

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eco-tourism, both short- and long-term planning as well as its proper implementation are necessary. To achieve a sustainable economic development, it is imperative that the government should promote eco-tourism.

Eco-tourism can provide several opportunities and benefits to the local marginal person who lives near the forest fringes of Purulia district. Local people may get job opportunities and their day-to-day life may be changed because they may earn a hand full amount to nourish their families. Their self-confidence may rise up through income generation and their social status may also ascend. Sustainable eco-tourism may also create awareness on the conservation of forest resources and their age-old native culture may be projected to the modern society.

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**Efficiency Measurement using CAMEL Ratios and Non -Parametric DEA:
A Study on Selected Public and Private Sector Indian Banks in Pre-merger
Regime**

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Abstract

One of the major escalating sectors in the Indian financial system is banking. In the era of modernisation of technology, the Indian public sector banks have been facing many hardy challenges by the banks under private ownership and management. Hence the work and practice of both the banks working under private and public ownership needs to be evaluated by proper research tools and techniques. This study primarily focuses on the measurement of different aspects of technical and scale efficiency of Indian commercial banks in pre-merger regime. For this study, we have selected thirty-six Indian commercial banks (DMUs) which include twenty one nationalised banks working under public sectors (PUB) and rest fifteen banks those under private ownership (PRB). Twenty CAMEL ratios of selected Indian banks were initially used over the period 2010 to 2020 as multiple IOVs based on fundamentals of intermediation approach of banking services. These variables are further reduced by dimension reduction technique-Factor analysis. Thereafter the study deals with ranking of 21 public sector banks (DMUs) with the application of DEA (Stage –I). In the next section, the non-parametric DEA (Stage-II) is applied for the ranking of 36 Indian commercial banks. The ranking results of DEA (Stage –I and II) helps to understand how the performance of PRBs have been influenced by the PUBs in the pre-merger regime. The result of the study divulges that the PRBs – namely, HDFC, J&K, and Yes bank are more efficient in scale size than the three PUBs – viz., SBI, Corporation Bank, and Vijaya bank. Hence the three aforementioned PRBs beat those PUBs in terms of their technical and economic scale-size efficiency.

Keywords: PUBs, PRBs, CRS, VRS, IOVs, DMUs, DEA,

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I. Introduction

Many path breaking reform measures have been witnessed by the Indian economic environment during the last few years. The banking sector of India, the largest player in Indian economic environment, has also been undergoing metamorphic changes. It is gradually moving towards adopting the best practices in corporate governance and risk management. In order to manage its risk and return, the merger and acquisition (M&A) has been adopted in the banking sector in India. The basic aim of M&A in banks is to improve their efficiency in scale size. Considering this view, we have tried to bring a light on the technical and scale-size efficiency of Indian commercial banks by employing the DEA. We are desirous to understand and comprehend the efficiencies of the selected commercial banks in India before and after the M&A policy reforms made by the Central government of our country. This study has made an endeavour to exhibit the successfulness of M&A policy in improving the scale efficiency of commercial banks in India. While analysing the past studies related to the testing of technical efficiency through DEA, we have observed that limited attention has been given by the researchers to the method of selection of IOVs in DEA framework. Hence, this study focuses on the techniques of variable selection for the measurement of efficiencies of DMUs (Commercial banks in India). In contrast to the subjective selection of variables by many researchers, we have used intermediation approach of banking services at the time of initial selection of IOVs. In the year 1980, CAMEL (Now CAMELS) ratios were first introduced by USSA for assessment of financial performance of banking institutions. The CAMEL rating system initially consists of five factors. These are Adequacy of Capital, Quality of Assets, Efficiency of Management, Measurement of Earning capacity and Liquidity Measurement as a snapshot of the operating and management efficiency of banking institutions. In this paper twenty financial ratios suggested by 5-factor CAMEL model are used as financial indicators. These financial indicators are used as IOVs in measurement of the technical as well as scale-size efficiency of the thirty six DMUs by applying BCC and CRR model of DEA. In the M&A scheme, less efficient banks are merged with the relatively efficient banks to improve the economies to scale. Thus, in the present scenario M&A of different Indian banks, we have tried to analyse their two types of efficiency—the technical and scale-size by applying BCC and CCR model of DEA. All technically efficient DMUs may not be scale efficient. Thus scale efficient DMUs are identified by CCR model of DEA. The efficiency of both Public Sector Banks (PUBs) and Private Sector Banks (PRBs) are measured and compared to comprehend the influence of performance of PRBs over PUBs in India in terms of achievement of efficiency in scale size.

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Apart from the introduction, the remaining part of the study deals with the review of past literature, identification of research gap, framing of objectives of the study. It describes the research methodology followed by designing research framework. The study also explains the fundamental aspects of intermediation approach. After defining the sample variables, it presents the empirical study and analysis. In the terminal section the paper reveals the conclusion and identifies the future scope of studies.

2. Review of literature

This section of the paper deals with two aspects; one the past literature on the IOVs selection and the other on application of DEA in measuring scale efficiency of banking institutions. Let us mention some past studies on selection of IOVs in the framework of DEA. Many researchers noticed that the process of IOV selection is a critical issue in DEA. Fundamentally there are four methods of input-output variables selection of banking institutions. These are Intermediary approach, Production approach, User cost approach, and Value-added approach (*Heinz Ahn and Minh Hanh Le, 2014*). The production approach of input-output selection was introduced by Beston in 1965. This approach assumes that banks are service-producing firms and it wants to minimize the cost of service operation to maximize. In this approach the cost of non-financial physical resources like labour, building, and other fixed assets are taken as input variables and the banking functions relating to demand deposit, time deposit, loans and other banking services that create the cost of operation, are taken as output variables. This approach has been criticized on the ground that it fails to express the intermediation function of banking firms. It also ignores interest expenses which constitute a considerable part of the total cost of operation of banking services. Therefore, this approach fails to examine and evaluate the profitability of the banking firm in a true sense (*Heinz Ahn and Minh Hanh Le, 2014*). The user cost approach was associated with the model framed by the work of *Hancock (1985, 1986 and 1991)*. This approach focused on the pricing of banking institution based on user cost. Here, assets and liabilities with positive and negative user cost are taken as input and output variables respectively. Calculating the user cost of balance sheet items is a critical task (*Heinz Ahn and Minh Hanh Le 2014*). The value-added approach was initiated by Berger et al in 1987. In this approach, financial and non-financial resources are taken as IVs and different types of deposits and loans are taken as OV. The approach of intermediation had been explained by the intermediary functions

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played by banking firms. Banking services provided to depositors and those to lenders are taken as input variables and output variables respectively. This approach though neglects risk factors in the intermediation process emphasized more on interest-related intermediary activities of the banks (Heinz Ahn and Minh Hanh Le, 2014). It becomes easy to calculate input cost and output compared to other approaches. Production, value-added, and user cost approaches have many limitations and are also difficult to apply. Kundu and Banerjee in their paper mentioned that the intermediation approach is a widely used method for initial selection of Oils in DEA methodology.

In the next part we are mentioning some studies dealing with measurement of scale efficiency of banking institutions. Banks play a special role in the economy by channelizing the funds from the depositors to the lenders. Many research studies have been conducted for measuring the efficiency of banks of different nations by adopting nonparametric DEA methodology. *Nikita Agarwal et. al. (2014)* applied DEA for evaluating the efficiency of commercial banks in India. They analysed the efficiency of eighteen DMUs (PUBs and PRBs in India) by using CAMEL ratios from 2004 to 2013. They suggested that the performance of Indian PRBs is better than that of PUBs. *Abhatia & M. Mahendru (2015)* studied technical efficiency, determinants of efficiency, and the statistical difference in the efficiency of PUBs in India for eleven years ended on 2011-12 through CAMEL Model. In their study, they conducted Paired t-test in evaluating the performance of PUBs in pre and post reformatory period. Their study has also disclosed that CAMEL parameters have a significant impact on the technical efficiency of PUBs. *Parvesh Kumar Aspal and Sanjeev Dhawan (2016)* analyzed the financial performance of Indian banks through CAMEL ratios. Their results revealed that though CAMEL ratios are powerful financial indicator but they could not be able to predict the credit risks of the banking institutions. *T. Subramanyam (2016)* observed that using a large number of IOVs reduced the decisive power of DEA to evaluate the scale-size efficiency of profit-seeking and non-profit-seeking DMUS. Thus he tried to reduce the number of IOVs before application of DEA. The study of *R. I. Singh & S. Kaur (2016)* evaluated the relative efficiency of Indian PUBs and PRBs by applying DEA. Their study revealed that the efficiency of PRBs is better than the efficiency of PUBs in India. They concluded that HDFC, Federal Bank, Yes Bank, and other private banks achieved 100% scale-size efficiency in each of ten years ended on 2014 whereas the United Bank of India, State

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Bank of Hyderabad, Central Bank of India, and other PUBs could not able to achieve 100% efficiency even in any of the year. *T.Koltai & J. Uzonyi-Kecskés, (2017)*, in their research study used linear programming for measuring scores of scale –size efficiency of the DMUs. The measured efficiency scores are used to identify IOVs in DEA. The study of *A.Balcerzak et al. (2017)* applied CCR model of DEA to measure the efficiency of selected DMUs. They also differentiated the efficiency of the banks in Euro and Non-Euro zone. They also analyzed the reasons of inefficient performance of the banks and offered a suggestion to remove them. *K. Jayarani & V. Prakash (2018)*, in their research study applied DEA to measure three types of efficiency of DMUs, namely cost, revenue, and profit-efficiency over a period of 2015-16. They concluded that cost-efficient banks used less costly input for making themselves efficient. Revenue-efficient banks maximized the output for making themselves revenue-efficient. Profit-efficient banks achieved their efficiency by using the optimal combination of inputs and outputs. *A. G. Quaranta, A. Raffoni, & F. Visani (2018)* applied a multi-dimensional technique to know the level of efficiency of 23 branches of Regional banks in India. They did three types analysis. Firstly they analysed the efficiency of DMUs by ratio method. They did collinearity analysis to reduce the unnecessary information. Lastly clustering analysis is applied by them to categorize the bank branch in different efficiency classes. *I.Henriquesaet al. (2018)* applied CCR and BCC model of DEA to analyze the technical, pure and scale-size efficiency of thirty seven banks in Brazil over a period of 2012 to 2016. They used intermediation approach to select input and output variables. They found that the inefficiency of banks depends more on the scale of operations than that of the technical and administrative issues. *Mohammad Reza Ghaeli (2019)* applied an input-oriented CCR model of DEA to find out the scale efficiency of five Canadian banks and six big banks of United States. They concluded that efficiency of US banks is better than Canadian banks.

3. Research Gap

While analysing the past studies, it has been observed that most of the research studies have applied DEA for measuring the scale -size efficiency of banking institutions in India. We have noticed that very few researchers have given emphasis on the methods of selection of IOVs. Thus, we have decided to select IOVs initially by applying intermediation approach. Then we have applied DEA methodology in an extended form. A very limited

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number of researches deal with comparative analysis of technical as well as scale-size efficiency of banking institutions in India. Here in lies the research gap.

4. Research Objectives

Considering several research gaps as stated above, our paper is devoted to the fulfillment of the following objectives:

- To focus on the intermediation approach and factor analysis which serves as the basis for an appropriate selection of input-output variable out of multiple variables
- To rank the selected Indian banks using DEA.
- To compare the technical as well as scale-size efficiency of selected PUBs and PRBs in our country.
- To understand the influence efficiency of PRBs over the PUBs in India before the M&A scheme.

5. Research Framework

The present study has considered 36 Indian commercial banks(DMUs), out of which, 21 are public sectors banks and 15 are private sectors banks. Twenty financial ratios of those DMUs as suggested by the CAMEL model over a period 2010 to 2020 (i.e., a period of 11 years) have been taken from the PROWESS database which have been initially used as multiple IOVs in the groundwork of DEA for measuring the technical aswell as scale-size efficiency of the selected banks [Annexure- I]. Considering the above data set, we have framed the overall structure of empirical study in several sections:

Section A: Selection of input-output variables by using Factor Analysis with due consideration of the intermediation approach

Section B: Measurement of technical as well as scale –size efficiency of the PUBs in India following BCC and CCR model of DEA(Stage –I) and to rank them accordingly.

Section C: Ranking of Indian banks(both PUBs and PRBs in Inida) according to their technical and scale efficiency by following the BCC model and CCR model respectively(DEA-Stage II)

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.Section D: Comprehending the influence of Indian private sectors banks over the efficiency of Indian public sector banks.

6. Research Methodology

Twenty CAMEL ratios of 36 DMUs are used as financial indicators to select IOVs for measuring scale –size efficiencies of the Indian banks. Mean ratios are calculated and summarised in ANNEXURE -I. Considering the fundamentals of the intermediation approach used by Heinz Ahn and Minh Hanh Le (2014) average CAMEL ratios are initially considered as IOVs. Then we have derived the correlation matrix and determinants of the IOVs to check whether multicollinearity lies between these variables. Finally, factor analysis is applied for reduction of dimension of multiple IOVs of the DMUs. DEA was developed by Charnes et al. in 1978 . The LP technique is applied for measuring efficiency of DMU. Golany and Roll (1989) prescribed an universal rule for number of DMUs. He established that the number of DMUs should be at least 2(number of input + number of output) in the data set.. In the present study, the rule of thumb proposed by the author has been followed. As an outset, the data set is normalized by dividing each value of IOVs by the mean of their specific factors. Still, we have found that some negative and zero integer in the data set. Considering the positivity requirement of DEA a sufficiently large positive constant number is added to the existing data set for making the data set free from the problem of "translation variance" (Bowlin, 1998). The BCC (Input orientation) model is then applied to the normalized data set to identify technically efficient Indian banks. Technically efficient banks may or may not be scale-efficient. Scale efficiency is measured using the CCR model of DEA. In the next portion of our study, CCR model is applied to the same data set to identify the scale-efficient Indian banks. In the terminal section of our study, we have conducted the DEA in the same manner on 21 public sector Indian banks to comprehend the influence of PRBs on the efficiency of PUBs in India.

7. Fundamentals of Intermediation Approach

Bank is an apex institution in financial system of India .It provides a variety of services to their customers out of funds borrowed from their lenders. In the financial system, there are two types of financial units- Depositors- those having surplus funds, and Lenders- who need

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to borrow funds. Banks act as an intermediary between depositors and lenders that receive funds as deposits from the depositors and provide such funds as borrowings to the lenders. As an intermediary banks pay for services taken from depositors and provide services to debtors and lenders in exchange for service charges. In our study, variables that focus on services to depositors are taken as input variables and that of services to debtors and lenders are taken as output variables.

8. Description of Sample Variables

Initially the following CAMEL ratios are taken either as an input or output for measuring technical efficiency of Indian banks:

Input Variables						
Sl. No.	Abbreviation	Abbreviation used in Factor Analysis	Financial Ratios	Formula	Focused on	Fundamental of IOV Selection
1	C1	V1	Debt Equity	Total Debt / Share Holder Fund	Service Cost to depositors.	Banks use debts and equity in their capital structure that acts as input in producing services
2	A1	V2	Ratio of NPA(Gross) to Loans and Advance	Gross NPA / Net Total Loans	Service Cost to depositors.	A Bank always tries to minimize NPA. It is an input variable.
3	A2	V3	Ratio of Investment and Tangible Assets	Investment / Tangible Assets	Service Cost to depositors.	If this ratio increases profitability (output) will increase the bank always try to minimize the ratio. So, it is an input here.
4	M1	V4	Ratio of Expenditure to Income	Expenditure / Income	Service Cost to depositors.	A Bank always tries to minimize expenses. As per this, it is an input variable.
5	M2	V5	Ratio of Advances to Deposit	Advance / Deposit	Service Cost to depositors.	Advance is related to lenders and debtors. So, it is an output. Output from the fundamental study.
6	L1	V6	Ratio of Cash to Deposit	Cash / Deposit	Service Cost to depositors.	As per the intermediation approach, it is Output variables.
7	L2	V7	Ratio of Investment to Deposit Ratio	Investment / Deposit	Service Cost to depositors.	This ratio helps in increasing profitability (output) So, it is an input here.
8	L3	V8	Ratio of Interest Expended to Interest Earned	Interest Expenses / Interest Income	Service Cost to depositors.	Interest expended should be reduced to maximize the profit. Rather this interest is a cost to the depositor. So, it is an input.

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Output Variables						
Sl. No.	Abbreviation	Abbreviation used in Factor Analysis	Financial Ratios	Formula	Focused on	Fundamental of IOV Selection
1	C2	V1	Ratio of Advances and Assets	Advance / Assets	Service Charge from Lenders.	Loans and advances are elements that help in earning revenue from operation
2	C3	V2	Return on Assets	Net Income / Assets	Service Charge from Lenders.	Assets are employed for earning return and thus ROA is acting as an output variable.
3	C4	V3	Ratio of Interest Income and Total Assets	Income earned from interest / Average Assets value	Service Charge from Lenders.	Interest is the basic source of revenue of banks and hence is considered here as an output variable.
4	C5	V4	Ratio of Net Interest Income to Assets	Net Interest / Total Assets value	Service Charge from Lenders.	Interest is the basic source of revenue of banks and hence considered here as output variable.
5	M3	V5	Ratio of Turnover to Assets	Income from operative activities / Assets value	Service Charge from Lenders.	Operating income is related to service charge from lenders and debtors. So, it is an output.
6	M4	V6	Profit per Employee (PPE)	Total Income / Total No. of Employee	Service Charge from Lenders.	Profit per employee should be maximized. So, it is an output variable.
7	M5	V7	Business Per Employee (BPE)	Operating Income / Total No. of Employee	Service Charge from Lenders.	Business per employee will help in maximizing output. It is an indication towards the generation of advance to lenders. So, it is an output.
8	E1	V8	Net Profit Margin	Operating Expenses / Net Income	Service Charge from Lenders.	Net profit is an outcome and hence it is an output..
9	E2	V9	Return on Equity	Net Income / Share Holder Fund	Service Charge from Lenders.	Maximization of ROE is the primary goal and it is an output.
10	E3	V10	Net Interest Margin	Income from interest / Financial Assets (average)	Service Charge from Lenders.	Net interest is the net operating income of the bank that is to be maximized and hence it is an output.
11	E4	V11	Ratio of Interest Income to Total Income	Income from interest / Operating Income	Service Charge from Lenders.	Net interest is the net operating income of the bank that is to be maximized and hence it is an output.
12	E5	V12	Average stock Market Return	Price / Book Value per Share	Service Charge from Lenders.	Return is an output variable.

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9. Empirical Study, Analysis and Findings

In the first section (Section A as described research framework) IOVs are reduced by factor analysis. Initially, 8 variables (V1 to V8) are used for input selection. Result of factor analysis shows that 3 of them (namely V2, V5, and V6) lie in one factor (Factor score 1) and the other 5 variables (V1, V3, V4, V7, and V8) are found in another two factors (Factor scores 2 & 3). Now we have considered the correlation matrix of 3-factor scores and observed that the factor scores are independent ($P > 0.05$). The experiments and results in this regard are shown in **Annexure- II**. Thus, the following three factor scores are taken as inputs, and we have named the scores factors below:

Input Variables			
	Underlying Variables	Name of the variables	Naming of the factor scores
Factor Score 1	A1 (V2)	Ratio of NPA(Gross) to Loans and Advance	Advance and Deposit related Candidate
	M2 (V5)	Ratio of Advances to Deposit	
	L1 (V6)	Ratio of Cash to Deposit	
Factor Score 2	A2 (V3)	Ratio of Investment and Tangible Assets	Investment related Candidate
	L2 (V7)	Ratio of Investment to Deposit Ratio	
Factor Score 3	L3 (V8)	Ratio of Interest Expanded to Interest Earned	Debt and Expenditure related Candidate
	C1 (V1)	Debt Equity	
	M1 (V4)	Ratio of Expenditure to Income	

Similarly, 12 variables (V1 to V12) are initially used for the selection of output. The result shows that 6 variables (V4, V5, V6, V10, V11, V12) are located in Factor score 1. Two variables (V1 and V7) are comprised in Factor score 2 and another two variables (V2 and V9) are found in factor score 3. Rest two variables (V3 and V8) constitute factor score 4. We observe that these factor scores are highly correlated and hence these four-factor scores are considered as output variables. The empirical results of the selection of output variables are shown in **Annexure -III**. The following chart shows the names of four-factor scores that are taken as output variables:

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Output Variables

	Underlying Variables	Name of the variables	Naming of the factor scores
Factor Score 1	V4	Ratio of Net Interest Income to Assets	Interest related factors
	V5	Ratio o Turnover to Assets	
	V6	PPE	
	V10	Net Interest Margin	
	V11	Ratio of Interest Income to Total Income	
	V12	Average stock Market Return	
Factor Score 2	V1	Ratio o Advances to Assets	Business yield factors
	V7	BPE	
Factor Score 3	V2	Return on Assets	Return related factors
	V9	Return on Equity	
Factor Score 4	V3	Ratio of Interest Income to Total Assets	Profitability factors
	V8	Net Profit Margin (%)	

In Section –B as mentioned in research framework, we have conducted DEA(Stage-I)taking normalised values of three-factor scores as input variables and four-factor scores as output variables. As an outset, this section of our study has taken 21 Public sector Indian banks (DMUs) out of 36 such banks which have been considered at the initial stage of our research study. BCC Model (input orientation) is then aplllied for identifying the technical- efficient DMUs using DEA software. According to the BCC Model, the DMUs having score of efficiency equal to one, are technically efficient DMUs. The DMUs having scores of efficiency less than one, are relatively inefficient with respect to others. According to the CCR Model, the DMUs having efficiency equal to 1 are scale-efficient and the DMUs with less than 1 efficiency score are deemed to be relatively scale-inefficient with respect to others.

The experiments and results (**Table- I**) in this regard reveals that 13 PUBs ,namely Allahabad Bank, Andhra Bank, Corporation Bank, IDBI Bank Ltd, Indian Bank, Indian Overseas Bank, Punjab & Sind Bank, PNB, SBI, UCO Bank, Union Bank of India, UBI andVijaya Bankare found as scale efficient.

In the third section of our study (Section –C as mentioned in research framework) the same non-parametric technique of raking on 36 banks (PUBs and PRBs) is conducted through DEA.(Stage-II)The result reveals that 13 Indian banks namely HDFC Bank , J & K Bank , Yes Bank , Allahabad Bank, Andhra Bank, IDBI Bank, Indian Bank, Indian Overseas Bank, P &S Bank, PNB,UCO Bank, Union Bank of India and UBI are found as scale efficient. The experimental results in this connection

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are summarised in **Table -II**. The rationale behind the application of DEA initially on the PUBs and then on all banks (PRBs and PUBs) is to determine the influence of PRBs over the PUBs or vice-versa. The list of names of scale efficient banks as identified under two separate stages of DEA are listed below:

EFFICIENT PUBLIC SECTOR BANKS in Stage -I DEA.	EFFICIENT PRIVATE & PUBLIC SECTOR BANK in Stage -II DEA.
1. Allahabad Bank	1. HDFC Bank Ltd
2. Andhra Bank	2. Jammu & Kashmir Bank Ltd
3. Corporation Bank	3. YES Bank Ltd
4. IDBI Bank Ltd	4. Allahabad Bank
5. Indian Bank	5. Andhra Bank
6. Indian Overseas Bank	6. IDBI Bank Ltd
7. Punjab & Sind Bank	7. Indian Bank
8. Punjab National	8. Indian Overseas Bank
9. BankState Bank of India	9. Punjab & Sind Bank
10. UCO Bank	10. Punjab National Bank
11. Union Bank of India	11. UCO Bank
12. United Bank of India	12. Union Bank of India
13. Vijaya Bank	13. United Bank of India

While measuring the scale-size efficiency of all banks (both PRBs and PUBs), it is observed that three PUBs namely, Corporation Bank, SBI, and Vijaya Bank are not found as scale efficient due to the inclusion of more scale efficient PRBs (HDFC Bank, Jammu & Kashmir Bank Ltd, and YES Bank Ltd). It reveals that PRBs are more efficient than of relatively less efficient above-mentioned three PUBs.

10. Conclusion & Future Scope

We may infer that technically and scale size-efficient DMUs (Indian banks) have tried to minimise the use of inputs with the given amount of output. Out of Twenty IOVs suggested by CAMEL, reduction of dimension of variables is made by factor analysis. It shows three Input factor scores namely- Advance and Deposit Related Candidate, Investment Related Candidate, and Debt/Expenditure related candidate and four output factor scores namely, interest related factors, business yield factors, return related factors and profit ability factors.

Ranking results of DEA (Stage I) revealed that thirteen public sector banks are scale efficient. Here Allahabad Bank, Andhra Bank and Corporation Bank are found in the topmost level of the ranking hierarchy. Ten public sector banks that are already found efficient in DEA (Stage -I) are also found as

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scale efficient again in DEA(Stage –II) along with another three private sector scale efficient banks namely HDFC, J&K, and YES bank. Moreover, three public sector banks namely SBI, Corporation Bank, and Vijaya bank have failed to get a place in the list of scale efficient banks in stage II DEA. This is because of the influence of more efficient HDFC, J&K, and Yes bank over them. Thus, the performance of public sector Indian banks has been influenced by relatively more efficient private sector Indian banks in the pre-merger regime of bank reforms. We acknowledge that the study has revealed the result of DEA ranking on DEA, particularly in the areas of Peer bank analysis with peer count. The inclusion of Maximum Productive Scale Size (MPSS), etc., are still unaccomplished here. CAMEL ratios are used as financial indicator of the banking industry. There are some other business indicators like stock prices, market risk(beta), cost of capital, capital structure that have not been considered in the present study. Thus, the scope still remains to incorporate these left out areas in the future analysis.

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Annexure: I : Sample Variables (Average CAMEL Ratios- Both Input and Output)

INPUT VARIABLE										
Sl. No.	DMUs	Bank's Name	V1	V2	V3	V4	V5	V6	V7	V8
			C1	A1	A2	M1	M2	L1	L2	L3
1	DMU1	Axis Bank Ltd.	1.726	2.343	0.0088	44.258	85.123	1.382	0.01205	60.54
2	DMU2	City Union Bank Ltd.	0.178	1.856	0	40.726	72.371	1.106	0	66.61
3	DMU3	DCB Bank Ltd.	0.914	3.785	0	68.275	89.162	1.123	0	65.29

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4	DMU4	Dhanlaxmi Bank Ltd.	0.974	4.125	0	87.3	71.14	1.334	0	73.2
5	DMU5	Federal Bank Ltd.	0.613	2.763	0.1587	47.322	75.095	0.742	0.1989	63.91
6	DMU6	HDFC Bank Ltd.	0.972	1.11	0.0104	48.038	80.302	1.207	0.01411	52.16
7	DMU7	ICICI Bank Ltd.	2.212	4.848	0.0235	48.008	106.83	1.489	0.08794	61.62
8	DMU8	IndusInd Bank Ltd.	1.61	1.094	0.0008	48.893	87.366	0.762	0.03989	63.97
9	DMU9	Jammu & Kashmir Bank Ltd.	0.396	4.904	0.1446	44.581	71.78	0.411	0.22285	60.58
10	DMU10	Karnataka Bank Ltd.	0.377	3.556	0.0089	53.332	65.878	0.719	0.01009	74.15
11	DMU11	Karur Vysya Bank Ltd.	0.532	2.424	0	46.506	74.377	1.063	0	67.89
12	DMU12	Kotak Mahindra Bank Ltd.	1.634	1.941	0.5805	51.622	125.38	0.81	1.40839	49.93
13	DMU13	Lakshmi Vilas Bank Ltd.	0.622	4.226	0	63.127	80.268	1.226	0	74.7
14	DMU14	South Indian Bank Ltd.	0.509	2.116	0	51.134	74.497	0.562	0	70.84
15	DMU15	YES BANK Ltd.	2.586	0.707	0	40.51	85.504	0.295	0	69.12
16	DMU16	Allahabad Bank	0.982	6.277	0.124	47.851	73.715	0.303	0.14536	68.89
17	DMU17	Andhra Bank	1.178	6.016	0.0464	45.718	75.292	0.545	0.09321	67.62
18	DMU18	Bank of Baroda	0.946	4.761	0.1117	47.005	80.479	0.549	0.15069	65.29
19	DMU19	Bank of India	1.313	6.62	0.2001	49.187	80.643	0.437	0.26352	69.57
20	DMU20	Bank of Maharashtra	1.169	6.91	0.0925	55.125	72.807	0.584	0.10837	69.14
21	DMU21	Canara Bank	0.869	4.831	0.1666	47.73	72.918	0.374	0.20553	73.55
22	DMU22	Central Bank of India	0.858	8.484	0.1683	61.669	70.573	0.637	0.1993	73.07
23	DMU23	Corporation Bank	1.293	5.563	0.0025	41.847	76.296	0.622	0.00341	74.25
24	DMU24	Dena Bank	0.686	7.578	0.0275	57.143	74.716	0.516	0.03339	72.61
25	DMU25	IDBI Bank Ltd.	2.958	9.006	0.0092	44.367	91.684	0.662	0.0146	79.32
26	DMU26	Indian Bank	0.387	3.888	0.0991	44.143	72.678	0.272	0.11766	65.4
27	DMU27	Indian Overseas Bank	1.373	10.36	0.0504	54.68	73.215	0.618	0.05949	72.21
28	DMU28	Oriental Bank of Commerce	0.625	6.411	0.093	49.838	71.442	0.34	0.10658	72.63
29	DMU29	Punjab & Sind Bank	0.749	4.778	0.0008	55.317	73.847	0.282	0.00096	74.15
30	DMU30	Punjab National Bank	1.365	7.065	0.2186	47.678	76.133	0.485	0.28557	64.26
31	DMU31	State Bank of India	1.56	5.221	0.0799	51.753	81.006	0.746	0.10673	63.86
32	DMU32	Syndicate Bank Ltd.	1.473	4.646	0.3269	53.067	87.999	0.328	0.4403	70.31
33	DMU33	UCO Bank	1.074	9.227	0.0707	49.567	75.655	0.282	0.094	73.06
34	DMU34	Union Bank of India	1.389	6.054	0.0448	49.102	77.298	0.29	0.05309	69.95
35	DMU35	United Bank of India	0.616	9.332	0	65.669	64.532	0.433	0	74.66
36	DMU36	Vijaya Bank	0.905	3.79	0.0024	55.857	67.922	0.374	0.00273	74.1

OUTPUT VARIABLES														
Sl. No.	DMU s	Bank's Name	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12
			C2	C3	C4	C5	M3	M4	M5	E1	E2	E3	E4	E5
1	DMU 1	Axis Bank Ltd.	60.521	1.302	7.254	2.852	4.72	114.58	425.09	444.123	14.31	3.266	154.42	228.92
2	DMU 2	City Union Bank Ltd.	65.666	1.55	9.006	2.991	4.364	80.784	249.27	121.282	17.59	3.374	214.54	182.3
3	DMU 3	DCB Bank Ltd.	62.649	0.564	8.5	2.944	4.186	62.678	210.78	255.696	5.079	3.435	204.33	145.31

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4	DMU 4	Dhanlaxmi Bank Ltd.	56.62 8	- 0.36	8.35 2	2.21	3.37 3	- 26.45 4	147.5 6	1689. 05	-7	2.43	274.7 8	85.93 7
5	DMU 5	Federal Bank Ltd.	63.12 5	1.05 6	8.32	2.99 1	3.91	47.25 5	188.8 9	199.1 75	11.0 6	3.21 2	217.4	125.6 8
6	DMU 6	HDFC Bank Ltd.	61.42 4	1.77 9	8.14 6	3.88 4	5.46 4	73.45 4	215.2 6	167.7 95	17.1 3	4.55 5	150.0 4	396.1 3
7	DMU 7	ICICI Bank Ltd.	51.55 6	1.18 2	6.30 4	2.40 3	4.42 2	93.80 5	349.9 9	270.0 7	10.7 9	3.02 8	137.9	177.6
8	DMU 8	IndusInd Bank Ltd.	60.40 3	1.52	8.55 5	2.98 5	4.99	84.97 5	310.9 6	196.0 62	14.8 2	3.46 9	180.0 6	330.3 5
9	DMU 9	Jammu & Kashmir Bank Ltd.	56.99 7	0.86 8	7.74 6	2.94 2	3.88 1	41.46 3	240.6 9	208.9 71	10.2 3	3.50 5	215.1 8	90.56 5
10	DMU 10	Karnataka Bank Ltd.	59.73 2	0.77 5	8.27 3	2.13 7	3.48 7	46.53 1	210.2 4	252.6 83	10.2 7	2.36 7	256.9 4	83.51 2
11	DMU 11	Karur Vysya Bank Ltd.	65.33 9	1.12 6	8.85 6	2.82 5	4.11 2	68.72 9	285.6 3	241.2 41	14.3 9	3.11 5	225.7 1	139.4 7
12	DMU 12	Kotak Mahindra Bank Ltd.	58.63 8	2.13	8.74 3	4.37 4	6.61 4	90.75 6	300	182.8 24	13.4 5	5.10 8	134.2 9	346.4 3
13	DMU 13	Lakshmi Vilas Bank Ltd.	64.37 6	0.15	8.69 8	2.19	3.32 9	19.34 9	200.7 3	300.7 38	5.49 7	2.53 5	270.8 1	122.6 2
14	DMU 14	South Indian Bank Ltd.	64.20 9	0.79 4	8.24 7	2.39 6	3.31 5	52.17 4	248.0 9	271.9 75	12.5 9	2.71 6	260.3 2	97.40 2
15	DMU 15	YES BANK Ltd.	57.23 1	1.51 9	7.88 9	2.40 9	3.95 4	166.3 8	510.3 4	138.1 77	19.2 5	2.93 6	203.4 9	253.9 4
16	DMU 16	Allahabad Bank	62.32 5	-0	7.67 1	2.38 3	3.46 1	68.25 8	202.1 8	- 41.41 7	4.76 2	2.57 8	227.3 9	57.79 8
17	DMU 17	Andhra Bank	63.91 2	0.37 6	8.13 1	2.61 7	3.70 5	79.99	230.1 2	372.5 75	8.26 8	2.88 8	229.4 7	65.68 4
18	DMU 18	Bank of Baroda	60.70 1	0.62	6.33	2.19 6	3.24 3	51.41 1	191.2	180.8 19	10.3 7	2.44 5	201.9 1	97.1
19	DMU 19	Bank of India	61.70 1	0.20 6	6.70 5	2.03 8	2.96	42.95 3	183.7 2	42.21 12	5.04 7	2.26 1	231.0 3	70.99 4
20	DMU 20	Bank of Maharashtra	61.48 3	- 0.06	7.64 9	2.35 9	3.25 3	62.58	211.3 3	399.0 19	4.38 4	2.60 7	242.6 3	55.98 5
21	DMU 21	Canara Bank	60.68 2	0.50 2	7.40 8	1.94 1	3.02 7	50.76 1	177.2	256.5 65	8.30 4	2.15 7	255.2 6	69.2
22	DMU 22	Central Bank of India	57.52 5	- 0.21	7.67 8	2.07 1	3.01 4	48.73 8	374.2 6	127.7 22	-0.5	2.28 8	277.1 3	75.05 8
23	DMU 23	Corporation Bank	59.64 9	0.10 8	7.6	1.93 3	3.01 6	55.32 1	165.9 3	117.4 16	6.64 6	2.13	267.7	68.96 9
24	DMU 24	Dena Bank	60.58 9	0.08 8	7.60 9	2.07 3	2.89 7	- 4.093	229.8 7	96.88 73	5.36 6	2.26 3	276.8 7	53.77 5
25	DMU 25	IDBI Bank Ltd.	58.06	- 0.47	7.31	1.51 4	2.68 8	- 23.30 8	475.2 7	114.8 04	- 1.06	1.70 6	297.4 5	62.95 4
26	DMU 26	Indian Bank	63.21 5	0.93 3	7.80 2	2.69 1	3.76 8	55.94 1	160.4 5	286.1 74	11.5 7	2.97 3	218.9 2	69.18 2
27	DMU 27	Indian Overseas Bank	61.16 5	- 0.28	7.87 3	2.16 9	3.26 7	- 35.33	246.5 6	80.51 42	- 2.69	2.38 3	256.0 5	54.87 9
28	DMU 28	Oriental Bank of Commerce	62.15 8	0.19 7	7.95 7	2.16 8	3.04	12.02 3	305.5	1070. 69	1.98 4	2.36 6	273.1 5	57.87 3
29	DMU 29	Punjab & Sind Bank	61.96 7	0.36 2	8.09 4	2.06 9	2.72 9	21.42 1	251.4 6	291.3 22	7.47	2.27 1	308.9 7	37.09 3
30	DMU 30	Punjab National Bank	61.87 1	0.40 7	7.34 2	2.63 2	3.73 8	44.81 1	159.4 8	133.0 61	7.81 4	2.9	200.7 3	92.26 4
31	DMU 31	State Bank of India	60.96 4	0.56 6	7.18 6	2.59 9	3.75 3	10.23 6	171.4 3	- 5776. 6	9.36 9	2.93 3	196.4 6	121.7 5
32	DMU 32	Syndicate Bank Ltd.	66.74 3	0.29 5	7.39 8	2.2	2.99 7	28.88 6	297.4 6	166.3 45	8.13 6	2.38 3	251.4 2	57.31 6
33	DMU 33	UCO Bank	58.46 9	- 0.16	7.32 3	1.97 5	2.64 7	- 21.31 3	231.6 5	160.1 87	1.95 1	2.32 2	283.0 6	61.57 2
34	DMU 34	Union Bank of India	64.21 7	0.41 8	7.51 2	2.24 9	3.29 2	50.81 3	155.3 6	264.3 37	8.48 7	2.47 6	232.5 6	74.45 1

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35	DMU 35	United Bank of India	54.30 4	-0.1	7.2	1.83 9	3.04 7	- 16.98 2	220	243.8 81	0.52 1	2.03 1	248.6 9	52.35 6
36	DMU 36	Vijaya Bank	61.35	0.49 6	7.84 6	2.00 5	2.82 5	39.68	241.4 4	352.2 95	8.52 6	2.26 3	300.8 8	64.37

Annexure- II :Results of Factor Analysis for Input Variable Selection

Correlation Matrix ^a						
		VAR00001	VAR00003	VAR00004	VAR00007	VAR00008
Correlation	VAR00001	1.000	.091	-.219	.143	-.071
	VAR00003	.091	1.000	-.096	.950	-.429
	VAR00004	-.219	-.096	1.000	-.071	.273
	VAR00007	.143	.950	-.071	1.000	-.514
	VAR00008	-.071	-.429	.273	-.514	1.000

a. Determinant = .055

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.369	47.370	47.370	2.369	47.370	47.370
2	1.175	23.509	70.879	1.175	23.509	70.879
3	.862	17.244	88.123			
4	.552	11.046	99.169			
5	.042	.831	100.000			

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Annexure: III Results of Factor Analysis for Output Variable Selection

Correlation Matrix ^a							
		VAR00001	VAR00004	VAR00005	VAR00006	VAR00007	VAR00010
Correlation	VAR00001	1.000	.144	-.056	.061	-.308	.054
	VAR00004	.144	1.000	.935	.509	-.006	.990
	VAR00005	-.056	.935	1.000	.590	.170	.952
	VAR00006	.061	.509	.590	1.000	.351	.539
	VAR00007	-.308	-.006	.170	.351	1.000	.059
	VAR00010	.054	.990	.952	.539	.059	1.000
	VAR00011	.139	-.774	-.866	-.646	-.121	-.803
	VAR00012	-.108	.796	.896	.596	.328	.838

Correlation Matrix ^a			
		VAR00011	VAR00012
Correlation	VAR00001	.139	-.108
	VAR00004	-.774	.796
	VAR00005	-.866	.896
	VAR00006	-.646	.596
	VAR00007	-.121	.328
	VAR00010	-.803	.838
	VAR00011	1.000	-.765
	VAR00012	-.765	1.000

a. Determinant = 8.91E-006

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.919	61.482	61.482	4.919	61.482	61.482
2	1.405	17.557	79.040	1.405	17.557	79.040
3	.850	10.620	89.660			
4	.473	5.907	95.567			

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5	.167	2.092	97.659			
6	.152	1.900	99.559			
7	.031	.390	99.949			
8	.004	.051	100.000			

Correlation Matrix ^a					
		VAR00002	VAR00003	VAR00008	VAR00009
Correlation	VAR00002	1.000	.325	-.055	.906
	VAR00003	.325	1.000	.204	.217
	VAR00008	-.055	.204	1.000	-.148
	VAR00009	.906	.217	-.148	1.000
a. Determinant = .140					

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.051	51.263	51.263	2.051	51.263	51.263
2	1.186	29.652	80.915	1.186	29.652	80.915
3	.678	16.962	97.877			
4	.085	2.123	100.000			

Table I : Results of DEA (Stage –I)

Indian Public Sector Banks						
Company	CRS	VRS	Scale Efficiency	Scale Type	Super Efficiency CRS	Super Efficiency VRS
Allahabad Bank	1	1	1		1.0345	1.0372
Andhra Bank	1	1	1		1.2903	Inf
Bank of Baroda	0.7863	0.7911	0.99396969	DRS	0.7863	0.7911
Bank of India	0.6715	0.7603	0.88322677	IRS	0.6715	0.7603
Bank of Maharashtra	0.8222	0.8237	0.99821361	IRS	0.8222	0.8237
Canara Bank	0.8811	0.8965	0.98284292	DRS	0.8811	0.8965
Central Bank of India	0.9871	1	0.9871	DRS	0.9871	Inf
Corporation Bank	1	1	1		1.5022	1.5554

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Dena Bank	0.8123	0.818	0.99305036	IRS	0.8123	0.818
IDBI Bank Ltd.	1	1	1		Inf	Inf
Indian Bank	1	1	1		1.1164	Inf
Indian Overseas Bank	1	1	1		1.1236	1.1673
Oriental Bank of Commerce	0.9177	1	0.9177	DRS	0.9177	Inf
Punjab & Sind Bank	1	1	1		1.0264	Inf
Punjab National Bank	1	1	1		1.1735	Inf
State Bank of India	1	1	1		1.4032	Inf
Syndicate Bank Ltd.	0.628	0.6485	0.96832588	IRS	0.628	0.6485
UCO Bank	1	1	1		1.2482	1.2817
Union Bank of India	1	1	1		1.0891	1.1344
United Bank of India	1	1	1		Inf	Inf
Vijaya Bank	1	1	1		1.081	Inf

Table II : Results o DEA (Stage II)

Indian Public & Private sector banks						
Company	CRS	VRS	Scale Efficiency	Scale Type	Super Efficiency CRS	Super Efficiency VRS
Axis Bank Ltd.	0.7336	0.7363	0.996333	DRS	0.7336	0.7363
City Union Bank Ltd.	0.8245	1	0.8245	DRS	0.8245	Inf
DCB Bank Ltd.	0.67	0.7933	0.8445733	DRS	0.67	0.7933
Dhanlaxmi Bank Ltd.	0.5769	1	0.5769	DRS	0.5769	Inf
Federal Bank Ltd.	0.7121	0.8162	0.8724577	DRS	0.7121	0.8162
HDFC Bank Ltd.	1	1	1		1.0487	3.1709
ICICI Bank Ltd.	0.5279	0.5285	0.9988647	DRS	0.5279	0.5285
IndusInd Bank Ltd.	0.9138	1	0.9138	DRS	0.9138	2.7019
Jammu & Kashmir Bank Ltd.	1	1	1		1.0963	1.3161
Karnataka Bank Ltd.	0.8956	0.9977	0.8976646	DRS	0.8956	0.9977
Karur Vysya Bank Ltd.	0.7531	0.9962	0.7559727	DRS	0.7531	0.9962
Kotak Mahindra Bank Ltd.	0.8511	1	0.8511	DRS	0.8511	Inf
Lakshmi Vilas Bank Ltd.	0.6597	1	0.6597	DRS	0.6597	1.1418
South Indian Bank Ltd.	0.7857	0.8652	0.9081137	DRS	0.7857	0.8652
YES BANK Ltd.	1	1	1		Inf	Inf
Allahabad Bank	1	1	1		1.0337	1.0372
Andhra Bank	1	1	1		1.0397	1.1539
Bank of Baroda	0.5909	0.6662	0.8869709	IRS	0.5909	0.6662
Bank of India	0.6313	0.7438	0.8487497	IRS	0.6313	0.7438
Bank of Maharashtra	0.8046	0.808	0.9957921	IRS	0.8046	0.808

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Canara Bank	0.7789	0.7849	0.9923557	IRS	0.7789	0.7849
Central Bank of India	0.8366	1	0.8366	DRS	0.8366	1.4146
Corporation Bank	0.8856	0.8917	0.9931591	DRS	0.8856	0.8917
Dena Bank	0.7819	0.7842	0.9970671	DRS	0.7819	0.7842
IDBI Bank Ltd.	1	1	1		Inf	Inf
Indian Bank	1	1	1		1.0734	1.1522
Indian Overseas Bank	1	1	1		1.1204	1.1673
Oriental Bank of Commerce	0.9066	1	0.9066	DRS	0.9066	2.3843
Punjab & Sind Bank	1	1	1		1.0264	1.1813
Punjab National Bank	1	1	1		1.0812	1.1112
State Bank of India	0.7954	0.8019	0.9918943	IRS	0.7954	0.8019
Syndicate Bank Ltd.	0.568	0.579	0.9810017	IRS	0.568	0.579
UCO Bank	1	1	1		1.2377	1.2788
Union Bank of India	1	1	1		1.0228	1.0294
United Bank of India	1	1	1		Inf	Inf
Vijaya Bank	0.9827	0.9855	0.9971588	IRS	0.9827	0.9855

An Event Study Analysis of the Impact of Bonus Share Announcement on NSE Nifty 200 stocks

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Abstract

In this study, price response to bonus share announcements during the period January 1, 2006, to September 30, 2022, by Nifty 200 stocks listed on the National Stock Exchange are examined, during an event period of 15 days before and after the announcements. During this time, 45 pure events have been analyzed using the traditional event research method (Brown & Warner, 1980, 1985) and the widely used market model assessment of expected returns. The impact of bonus share announcements on securities prices has been the subject of several research papers in both established and developing markets. (Fama et al., 1969a), (Ball et al., 1977), (Liljeblom, 1989), (McNichols & Dravid, 1990), (Obaidullah, 1992), (Anderson et al., 2001), (Mehta et al., 2014), (Marisetty et al., 2020) have contributed significantly on the impact of bonus share announcements. According to the analysis, stock values significantly changed around the time of occurrence. Announcements of stock dividends were generally met with an increase in stock prices. For the Nifty 200 indexed firms, the mean Average Abnormal Return (AAR) on the event day is 1.07 percent, which is quite substantial. The analysis also reveals that over the event period, from t-15 days to the event day, the cumulative AAR (CAAR) for Nifty 200 indexed businesses was 4.46 percent. The data also reveals a constant leak of information before the public release date and a little increase in CAAR following the official announcement of bonus shares, which indicates a semi-strong efficiency of the Indian stock market.

Keywords: Event Study, Bonus Share, Market Model, Semi-strong, Abnormal Return

1. Introduction

Bonus shares are allotments of fully paid-up shares to existing shareholders free of cost in the same ratio as their previous holding. A firm with substantial reserves may choose to capitalize some of these reserves by issuing free bonus shares to current shareholders. Sometimes when it is not prudent to distribute the earnings and reserves in cash, companies may opt to offer bonus shares to existing equity shareholders. Because bonus shares are created by converting retained earnings or other free reserves into equity share capital, they do not generate cash for the company. It denotes the absence of a financial inflow (Hanif & Mukherjee, 2019).

Bonus issues increase the number of securities held by each stockholder but have no impact on the shareholder's proportional ownership of shares, capital structure, or earning power. The only change brought about by the bonus share is that it increases the number of securities; thus, the share price should ideally fall in the same ratio. The worth of all shares, or the worth of each investor's holdings, should stay constant. Although the face value of the securities held by the investors increases proportionately. (Miller & Modigliani, 1961) established that stock dividends had little effect on shareholder wealth. (Sloan, 1987) found no correlation between bonus issues and shareholders' wealth in the Australian market.

Researchers have been debating for years whether bonus share announcements (BSA) affect stock prices. Empirical studies of both advanced and emerging stock markets have found that the market typically responds positively to the BSA with a few exceptions. The number of BSAs by Indian companies has significantly increased in the last two years. Where on average there were only 68 events of BSAs each year between 2005 to 2020, there have

been 101 events and 105 events of BSAs during the years 2021 and 2022 (up to September) respectively. In the past 15 years,BSA events of more than 100 were observed only in the year 2010. This phenomenon has been the motivating factor behind this study. The objective of this paper is to draw appropriate statistical inferences about the market response to BSAs by the top 200 companies according to market capitalization traded on the National Stock Exchange (NSE) in India which constitutes the index NSE Nifty 200 as of the 30th September 2022 based on the event study method developed by Fama et al. (1969b); Brown & Warner (1980, 1985).

The NSE, India's first dematerialized computerized exchange, was established in 1992. Anybody with the required qualification, experience, and finance can engage in trading at the NSE rather than limiting it to a restricted number of brokers. With its advanced trading system, the NSE enables investors from across the nation to transact with ease. A consumer in a distant location may now easily access securities information. The paper-based settlement was phased out in favor of digital settlement which occurred timely.

The NSE introduced the NIFTY 50 on 22nd April 1996, with 3rd November 1995 as the base date. The NIFTY 50 index is a diverse 50-company index that accounts for 13 sectors of the economy and reflects general market conditions. Since then, the NSE has launched over 100 share indices and various customized indices that act as a reference for assessing the success of equity portfolios or investments made through mutual funds.

The NIFTY 200 Index, which began trading on July 19, 2011, and has a base date of January 1, 2004, is made up of 200 tradable equities listed on the NSE. The Nifty 200 Index's goal is to capture market activity and acts as a reference for the behavior and success of large and medium market capitalization companies. The Nifty 100 and Nifty Midcap 100's constituent

parts are combined to form the Nifty 200 index. Approximately 86.7% of all the securities traded on the NSE's free float market capitalization as of March 29, 2019, are represented by the Nifty 200 Index (National Stock Exchange of India, 2021). Considering its weightage on the NSE it becomes quite imperative to draw appropriate statistical inferences about the stock price reaction to BSAs by Nifty 200 index companies.

2. Literature Review

2.1 Review of Literature about BSA

For a long time, researchers from both developed and emerging markets have been drawn to the BSA. While (Fama et al., 1969a); (Grinblatt et al., 1984) studied the developed market like the US, (Ball et al., 1977); (Balachandran et al., 2005) studied the Australian market. (Anderson et al., 2001) studied the Stock market in New Zealand while (Bechmann & Raaballe, 2005) studied the Denmark stock market. Among the emerging economies, Ramachandran (1985); Rao (1994); (Mishra, 2005) studied the Indian stock market while (Barnes & Ma, 2003) examined the Chinese securities market. (Pathirawasam, 2009) studied the Sri Lankan securities market whereas (Ahsan et al., 2013) study was based on the Bangladesh stock market.

When it comes to the share market's reaction to the BSA, the response is varied. According to empirical studies, when a stock dividend is announced, the market generally responds in positive ways. For example, (Peterson, 1971), (Woolridge, 1983), (Ramachandran, 1985), (Liljeblom, 1989), (McNichols & Dravid, 1990), (Obaidullah, 1992), (Anderson et al., 2001), (Balachandran et al., 2005), (Mehta et al., 2014), (Marisetty et al., 2020), etc. have established that the share market reacts favorably to BSA. However,

(Malhotra et al., 2007) have shown that the share market responds negatively to BSA. Further, (Papaioannou et al., 2000);(Alex, 2017), etc., obtained statistically insignificant excess returns around the event of BSA.

(Fama et al., 1969a) observed that when stock splits, including stock dividends, are analyzed together, the three or four months of the period leading up to the split depict substantial positive excess returns. (Balachandran et al., 2005) examined the response of the Australian share market to pure as well as contaminated events of BSAs by Australian public companies for the period between 1991 to 2003 and discovered statistically significant favorable excess returns associated with both types of events.

Numerous research on the association between BSA and equity share price have been conducted in the Indian stock market over the previous four decades. The first and main investigation in this area was undertaken by (Ramachandran, 1985). (Mishra, 2005) observed considerable favorable excess returns on and during a five-day interval before the BSA, casting doubt on the semi-strong efficiency of India's share market. (Marisetty et al., 2020) examined the Indian stock market's reaction around 240 events of BSA by BSE 500 Index securities traded on the BSE from 2000 to 2019 and discovered that the average abnormal return (AAR), as well as cumulative average abnormal return (CAAR), are favorable on the BSA day.

(Malhotra et al., 2007) examined the securities response and liquidity variations caused by BSA by Chemical securities traded on the BSE between January 2000 to January 2006. The study found that, contrary to earlier research, BSAs issued by chemical firms in India, were related to large negative AAR. (Alex, 2017) studied the impact of BSA by listed

Indian companies during the year 2015 and observed a statistically insignificant relation between these returns and the event.

Despite much literature available in the research literature on the relationship between BSA and equity share price, it is difficult to find any study that investigated the effect on the equity price of NSE Nifty 200 Index companies declaring a bonus issue. This event study has been conducted to draw appropriate statistical inferences in the context of the top 200 companies in terms of market capitalization represented by the Nifty 200 index.

2.2 Review of Literature about Event Study(EST) method

Because the degree of aberrant performance around an event provides a gauge of the unexpected influence of this sort of occurrence on the assets of various parties involved, EST is quite useful in business settings. Because of this, ESTs that concentrate on the effects of announcements throughout a condensed time frame around an event provide data that may be utilized to better evaluate management policy choices. The basic EST approach was created by (Fama et al., 1969b), and it comprises separating an investment's periodic return into anticipated and unanticipated elements by assessing how sensitive it is to changes in a market index. The last element sometimes known as the share's anomalous return is what traditional event analysis focuses on most. EST looks for substantial deviations from zero in the sampled companies' AAR for an event period and/or the total AAR around the event period (Ataullah et al., 2011). The definition of an event also entails deciding on the event date and the event period. For EST, knowing the precise event date is necessary. If used on ambiguous occurrences, EST may produce hazy results. According to (Brown & Warner, 1985), using daily and precise dates of occurrences increased the statistical power of EST. On the other hand, (Glascock et al.,

1987) issued a warning about information leakage much before the dates of the actual events. Despite this caution, it was proven by (Glascock et al., 1987) that predictions made with certain event dates are significantly more accurate than those made with uncertain event dates.

By choosing a pre-event window and a post-event window that were each 90 days long, (Glascock et al., 1987) examined the impact of bond rating updates on securities performance. In contrast, the estimation window of 254 days included days 157 to 31 pre-event and days 31 to 157 post-event. (GOH & EDERINGTON, 1993) studied the impact of bond rating downgrades on securities performance by choosing the study window 30 days before and after the event. (Elayan et al., 2003) used a 51-day investigation window and a 152-day estimation window, which resulted in a window of 177 days before the event and 25 days after the event. (Cheng et al., 2007) specified an estimation window of 120 days and an investigation period of just 11 days, which included the event day and 5 days before and following it. (Pandey & Kumari, 2021) specified a 90-day estimating window and an 11-day investigation window, which included the event day and 5 days before and following it.

3. Data and Method

3.1 Data: A total of 45 events of BSA between 1st Jan 2006 to 30th September 2022 by 200 companies forming the NSE 200 index as on 30th September 2022 have been analyzed in this event study. Out of 200 companies, data from only 35 companies were finally selected in the sample. BSA events contaminated by any other announcement have been ignored. In this

investigation, secondary data have been employed. Data about the BSA and other announcements were gathered from moneycontrol.com. The NSE 200 index price and stock prices data have been gathered from the website of yahoo finance.

3.2 Methodology: The conventional EST approach (Brown & Warner, 1980, 1985) has been utilized, along with the commonly used market model assessment of predicted returns. The date on which the board meeting takes place to propose bonus issues has been treated as event day (t_0 day) for each sample stock. To determine the alpha and beta values, a 250-day estimation window (beginning from $t-265$ days and ending on $t-16$ days) has been utilized to regress the stock logarithmic returns with NSE 200 index logarithmic returns. The event investigation period of 31 days [$t-15$ to $t+15$] has been used. These alpha and beta values have been utilized in eq. 1 to determine expected returns during the investigation window:

$$AR_{Stock} = LR_{Stock} - (\alpha + \beta \cdot LR_{INDEX}) \quad eq. 1$$

where, AR_{Stock} is the abnormal return of the sample firm on day t ; LR_{Stock} is the log return of the sample stock on day t ; α and β are the coefficient and gradient of the Ordinary Least Square equation; and LR_{INDEX} is the log return of the respective reference index on day t .

The ARs calculated as per eq. 1 has been aggregated over time to calculate the cumulative abnormal returns (CAR) as per eq. 2:

$$CAR_{Stock} = \sum_{i=1}^N AR_{Stock} \quad eq. 2$$

where, CAR_{Stock} is the CAR for the sample stock 'i' on day t; N is the number of days in the event window, for example, for an event window [-15,+15], N=31; and AR_{Stock} as per eq. 1.

The AAR then has been calculated by combining the abnormal returns across stocks as per eq. 3:

$$AAR_{Stock} = \frac{1}{n} \sum_{i=1}^n AR_{Stock} \quad eq.3$$

where, AAR_{Stock} is the AAR for the sample firm 'i' on day t; n is the number of firms; and AR_{Stock} is as per eq. 1.

The AAR calculated as per eq. 3 has been aggregated over time to arrive at the CAAR for all the stocks as per eq. 4:

$$CAAR_{Stock} = \sum_{i=1}^N AAR_{Stock} \quad eq.4$$

where, $CAAR_{Stock}$ is the CAAR for all the sample stocks on day t; N is the number of days in the event window, for example, for an event window [-15,+15], N=31; and AAR_{Stock} as per eq. 3.

After that, the test statistic has been calculated as per eq. 5 and 6:

$$AAR_t = \frac{AAR_{Stock}}{AgSD} \quad eq.5$$

$$CAAR_t = \frac{CAAR_{Stock}}{AgSD * \sqrt{Nt + 1}} \quad eq.6$$

where, AAR_t is the test statistics for the AAR on day t;

$AgSD = \sqrt{\frac{\sum_{i=1}^N eSD_{i,e}^2}{n^2}}$ where, $eSD_{i,e}$ is the estimation period standard deviation of the sample stock 'i'; n is the sample size.

$CAAR_t$ is the t-statistics for CAARs and $Nt+1$ is the absolute value of event day t plus 1 (e.g. for event day t=5, the absolute value is 5, and $Nt+1 = 6$)

The study's research hypothesis will be put to the test using the t-values derived from the aforementioned computations. The relevant anomalous return is statistically significant if the absolute value of the t-test statistic is larger than the critical values. If the AARs and CAARs are substantial and positive, it implies that the market responded favorably.

3.3: Hypothesis: The AAR and CAAR during the event of BSA are not different from zero is taken as the null hypothesis.

The Null hypotheses are as follows:

H01 = Bonus issues events have no significant effect on abnormal returns of Nifty 200 index firms listed on NSE.

H02 = Bonus issues events have no significant effect on cumulative abnormal returns of Nifty 200 index firms listed on NSE.

4. Analysis and result

There was a total of 1195 events of BSAs between 1st Jan 2006 to 30th September 2022 as per information available on moneycontrol.com for all the firms listed on either the Bombay Stock Exchange (BSE) or NSE. Out of these 1195 events of BSA, there were 132 events of BSAs between 1st Jan 2006 to 30th September 2022 by Nifty 200 index companies. There were many events of stock splits, rights issues, and dividend announcements by Nifty 200 index companies during the period under study. If any such announcement falls between 30 trading days prior and 15 trading days after BSA event day, such BSA events have been classified as contaminated BSA events and others as pure BSA events. The contaminated BSA events have been excluded from the study because when the BSA event is contaminated with any other corporate events, the exact impact of BSA on the stock price can not be quantified. If such a contaminated BSA event is included in the analysis, it may lead to an incorrect decision of accepting or rejecting the null hypothesis. After excluding such contaminated BSA events final sample consisted of 45 events of BSAs by 35 companies of the Nifty 200 index. The final sample has been presented in table 1 below:

Table1: Pure BSA events between 1st January 2006 to 30th September 2022

S. No.	COMPANY	Bonus Ratio	Announcement day
1	Cipla	03:02	11-02-2006
2	Manappuram Fin	01:01	15-01-2007
3	Sun TV Network	01:01	24-04-2007
4	UPL	01:01	24-07-2008
5	Jindal Steel	05:01	29-07-2009

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6	IOC	01:01	13-09-2009
7	Pidilite Ind	01:01	28-01-2010
8	Manappuram Fin	01:01	18-03-2010
9	Bajaj Auto	01:01	22-07-2010
10	Info Edge	01:01	12-08-2010
11	Hind Zinc	01:01	19-01-2011
12	Cummins	02:05	04-08-2011
13	Container Corp	01:02	25-07-2013
14	Tech Mahindra	01:01	30-01-2015
15	Bharat Elec	02:01	24-07-2015
16	Colgate	01:01	30-07-2015
17	Divis Labs	01:01	08-08-2015
18	Power Finance	01:01	14-07-2016
19	HPCL	02:01	20-07-2016
20	Bajaj Finance	01:01	26-07-2016
21	REC	01:01	11-08-2016
22	IOC	01:01	29-08-2016
23	Oil India	01:03	28-11-2016
24	Wipro	01:01	25-04-2017
25	Reliance	01:01	21-07-2017
26	Tata Elxsi	01:01	27-07-2017
27	Bharat Elec	01:10	10-08-2017
28	Bharat Forge	01:01	10-08-2017
29	BHEL	01:02	10-08-2017
30	M&M	01:01	10-11-2017
31	GAIL	01:03	12-02-2018
32	Infosys	01:01	13-07-2018
33	Britannia	01:01	06-08-2018
34	Container Corp	01:04	20-12-2018
35	Varun Beverages	01:02	17-06-2019
36	Astral Ltd	01:04	02-08-2019
37	Astral Ltd	01:03	03-02-2021
38	Varun Beverages	01:02	03-05-2021
39	SRF	04:01	31-08-2021
40	IEX	02:01	21-10-2021
41	Varun Beverages	01:02	28-04-2022
42	REC	01:03	30-06-2022
43	GAIL	01:02	27-07-2022
44	Bajaj Finserv	01:01	28-07-2022
45	Bharat Elec	02:01	04-08-2022

4.1 Test Statistics for the event period

The AAR and CAAR for the 15daysprior to the BSA event are shown in Table 2, while the AAR and CAAR for the 15-day post-event period are shown in Table 3. According to the empirical findings, there were 8 positive average abnormal returns after the incident and 9 positive average abnormal returns before it. A favorable abnormal return was also experienced on the BSA day. Only one significant AAR is seen in the post-event period, against four substantial AARs in the pre-event period. The AAR on the day of BSA is significantly positive.

Table 2: AAR, CAAR, and critical value for 15 days before the BSA event

Pre-event Period						
DAY	AAR	T-VALUE	Significance	CAAR	T-VALUE	Significance
t-15	0.440052	1.502243	NS	0.440052	0.375561	NS
t-14	-0.43286	-1.47769	NS	0.007191	0.006339	NS
t-13	-4.5E-05	-0.00015	NS	0.007146	0.00652	NS
t-12	-0.10832	-0.36976	NS	-0.10117	-0.09579	NS
t-11	-0.02782	-0.09497	NS	-0.12899	-0.12712	NS
t-10	-0.07107	-0.24262	NS	-0.20006	-0.20592	NS
t-9	0.338182	1.154483	NS	0.138124	0.14911	NS
t-8	0.398919	1.361825	NS	0.537043	0.611117	NS
t-7	0.214217	0.73129	NS	0.75126	0.906738	NS
t-6	0.596841	2.037489	**	1.348101	1.739442	*
t-5	0.337432	1.151923	NS	1.685533	2.349082	**
t-4	0.560609	1.913801	*	2.246142	3.429169	***
t-3	0.650934	2.22215	**	2.897076	4.945002	***
t-2	0.551392	1.882337	*	3.448469	6.796764	***
t-1	-0.05526	-0.18864	NS	3.393209	8.190911	***
t	1.067388	3.643835	***	4.460597	15.22753	***

Notes: *, **, and *** indicate values significant at 10%, 5%, and 1%, respectively.

The CAAR is positive everyday between t-6 to t day before the BSA and positive every day after the BSA. The CAAR is significant for 6 days prior to the BSA and everyday after the BSA. The CAAR is significantly positive on the event day as well.

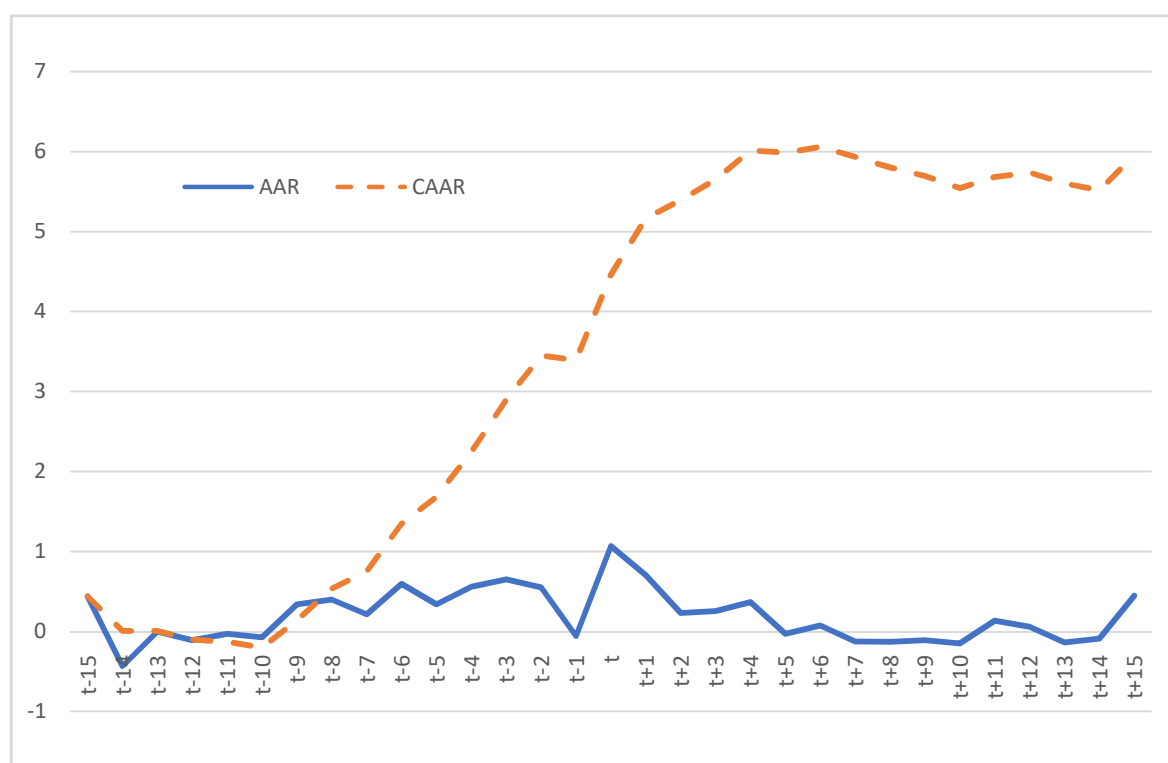
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Table 3: AAR, CAAR, and critical value for 15 days after the BSA event

Post-event Period						
DAY	AAR	T-VALUE	Significance	CAAR	T-VALUE	Significance
t	1.067388	3.643835	***	4.460597	15.22753	***
t+1	0.703602	2.401949	**	5.164199	12.46593	***
t+2	0.229703	0.784156	NS	5.393902	10.63112	***
t+3	0.25525	0.871371	NS	5.649152	9.642504	***
t+4	0.365347	1.247218	NS	6.014499	9.18229	***
t+5	-0.02986	-0.10194	NS	5.984638	8.340629	***
t+6	0.073921	0.252352	NS	6.058559	7.817302	***
t+7	-0.12551	-0.42848	NS	5.933045	7.160926	***
t+8	-0.13072	-0.44625	NS	5.802326	6.602637	***
t+9	-0.10814	-0.36917	NS	5.694185	6.14707	***
t+10	-0.15019	-0.5127	NS	5.544	5.706416	***
t+11	0.136554	0.466165	NS	5.680554	5.598048	***
t+12	0.058913	0.201117	NS	5.739467	5.43421	***
t+13	-0.13651	-0.466	NS	5.602961	5.111992	***
t+14	-0.08842	-0.30184	NS	5.514545	4.86072	***
t+15	0.445413	1.520546	NS	5.959958	5.086508	***

Notes: *, **, and *** indicate values significant at 10%, 5%, and 1%, respectively.

The AARs are significantly favorable at 10% on the t-4 day and t-2 day and AAR is significantly positive at 5% on the t-6 day, t-3 day, and t+1 day. The AAR is significantly positive at 1% significance level on the event day. The CAARs are significantly positive at 10% significance level on the t-6 day and CAAR is significantly positive at 5% on the t-5 day. The CAAR is significantly positive 1% significance level everyday from t-4 day to t+15 day.



Source: Plotted using findings of the analysis in MS-Excel

Figure 1: Trend line of AAR and CAAR from t-15 day to t+15 day

On and around the event day, average abnormal returns that are more substantial suggest that the news affected the stock market. The effect is beneficial since the returns are favorable. The AAR and CAAR during the 31-day event period are graphically shown in Figure 1. From the t-9 day, the trend line of the CAAR graph could be observed moving upward. Additionally, the increased trend supports the statistical conclusion that the BSA has had a major positive influence.

The result will seem to be more promising if the same event data is analyzed over a shorter event window. The table implies that AARs are favourable on 11 days out of 13 days between t-6 day to t+6 day. The AARs are significantly positive on 5 days between t-5 day to t+5 day. Similarly, the CAARs are positive on all 13 days between t-6 day to t+6 day and it is significantly positive forevery day between t-6 to t+6 day.

The null hypothesis of zero abnormal return can be rejected considering the findings of this study. As a result, it is possible to conclude that the event bonus issue has a favorable and significant influence on returns near the announcement date. The analysis discovers a steady leaking of knowledge before the public release date, with a modest increase in CAAR. It might thus be argued that the market's slow leakage of knowledge resulted in manipulative trading in chosen scripts, leading to price increases prior to the BSA date. Thus, the rise in script prices at the announcement dates was modest.

5. Conclusion

AAR is positive and the T value for AAR is substantial on the event (t) day as well as 6 out of 9 days between t-6 day to t+2 day. Hence, we reject the null hypothesis H01 and infer that BSAs have a significantly favorable effect on the AAR of Nifty 200 index companies listed on NSE. CAAR is positive and the T value for CAAR is substantial on the event (t) day as well as on all 22 days from t-6 day to t+15 day. Hence, we can reject the null hypothesis H02 and confirm that bonus issue events have a significantly favorable effect on the CAAR of Nifty 200 index companies listed on NSE. The analysis discovers a steady leaking of knowledge before the public release date, with a modest increase in CAAR. It might thus be argued that the market's slow leakage of knowledge resulted in speculative trading in chosen scripts, leading to price increases prior to the official BSA date. Such a phenomenon is also evidence of a semi-strong form of efficiency of stock exchanges in India. Such a finding of the favorable impact of BSA by Nifty 200 index companies on and around the event day is consistent with the results of the majority of the earlier literature in this area. At the same

time, the semi-strong kind of efficiency of the stock market in India is demonstrated by the information's gradual leaking prior to the event day is also in line with the findings of earlier studies (Khanal & Mishra, 2017; Mishra, 2005)

6. Implication and Limitations

Very few EST literature are available that analyses the impact of BSAs by a particular segment of the Indian stock market based on market capitalization. This study intends to contribute to the body of knowledge on EST approaches. Further, this study also intends to segregate the impact of BSAs according to market capitalization so that appropriate policy decisions can be taken by such companies as well as an investment decision by existing and potential investors. There might be some limitations to this study as BSAs between 2006 and 2022 by companies constituting the Nifty 200 index as on 30th September 2022 have been considered. The composition of the index is periodically revised by the NSE. In the future, the impact of BSAs may be analyzed after taking into consideration the periodical revision of the index.

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