International Journal of Commerce and Management Research
ISSN: 2455-1627, Impact Factor: RJIF 5.22
www.managejournal.com
Volume 3; Issue 6; June 2017; Page No. 120-124

Impact of terrestrial diversification on profitability of Indian banks

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Abstract
Diversification is one of the important subject of the finance literature. This strategy is also crucial for a bank as a financial institution. This paper examines the effect of terrestrial diversification on the performance of Indian banks and tries to show how the diversification affects banks' performance and profitability. The study asks whether diversification via sectoral and Geographical credits helps banks. This paper analyzes the impact of terrestrial diversification on bank value by employing a data set comprising the banks across the country, originating from both Public and Private Sector. Terrestrial diversification is expected to bring positive results by way of reduced risks and increased returns for the Indian banks. Against the backdrop of existing literature which renders diverse views about the diversification benefits, the present study examines the manner and the extent to which banks are terrestrially diversified in the case of both public and private sector banks and analyzes its impact on the performance measured in terms of returns. The study uses a panel dataset of 40 observations for the period 1994-2015. In order to examine the impact of terrestrial diversification on bank's risk and returns, a Least Square Dummy Variable (LSDV) regression model is used. The results indicate that public sector banks are more diversified than private sector banks and the Terrestrial diversification has a negative impact on the returns of the banks.

Keywords: terrestrial diversification, bank performance, ROA, ROE

Introduction

The Indian banking sector has undergone rapid transformations following the waves of reforms mainly post the 1990s. The overall orientation of the banks has changed enormously due to technological upgradation, competition and liberalization. As a consequent factor, like many countries of the world, there has been an increased trend towards income and Terrestrial diversification. The standard theory on Terrestrial diversification is laid on the fundamental argument that banks should concentrate only on those areas/regions in which they have inceptions by creating awareness among the customers of that particular regions about their products and services. But at present all the categories of banks are making efforts to spread their products and services to all parts of the country by setting up their branches in different regions, and by doing so they are in a position to call themselves a national player rather than a regional player. The Reserve Bank of India (RBI) has laid down some guidelines regarding the opening up of a new bank branch in rural, urban, semi-urban and metropolitan regions of the country. The opening of new branches and shifting of existing branches of banks is governed by the provisions of Section 23 of the Banking Regulation Act, 1949. In terms of these provisions, banks cannot, without the prior approval of the RBI, set up any branch. Domestic scheduled commercial banks (other than regional rural banks) are presently permitted to open branches without prior approval from RBI. For the purpose of ensuring more uniform spatial distribution, banks are encouraged to open branches in under banked centers, more precisely, in underbanked districts of underbanked states. According to Policy in place for opening branches in a financial year

i) Atleast 25% of the total number of branches should be in unbanked rural centers
ii) Total number of branches opened in Tier 1 centers cannot exceed the total number of branches opened in Tier 2 to Tier 6 centers and all centers in North eastern States and Sikkim

By applying the above rule a bank is free to set up its branches across the Country. However, Terrestrial diversification may not be a successful strategy to improve returns and reduce risk as it may result in increased cost and cross-selling.

Diversification theory

Conceptually, Diversification is a business strategy which allows an entity to enter a new field of business with the underlying objective of reducing risk and improving returns. If implemented successfully, such a strategy is expected to act as a cushion to protect the organization from uncertainties following the conventional wisdom of Don't put your all eggs into one basket'. When banks get larger by merging with another bank in the same geographic location or some other location with nearly coincident fluctuations in economic activity, such an increase in scale is expected to lower average costs and may provide diversification across products. However, it will not provide any benefits incurred by geographic diversification. Indeed, geographic diversification benefits are associated to new investment opportunities in locations with different economic environments and non-synchronized fluctuations in economic activity. Terrestrially focused banks are much more exposed to changes in local economic conditions even when they hold a more diversified loan portfolio across a larger number of local consumers. Thus, scale is about spreading the costs of producing assets over fixed factors of production while geographic diversification is about spreading assets over locations with different patterns of returns. To look into geographic diversification, banks can be considered as a portfolio of loans and improved opportunities to diversify as an upward shift in the risk-return tradeoff facing

a bank. However, an improvement in the risk-return tradeoff will not necessarily lead to lower risk; depending on their preferences, some banks may respond to the improved returns to risk taking by increasing risk, albeit with even greater returns. Whether overall risk goes up or down after diversification increases depend, in the end, on a bank's appetite for risk. But whatever the actual portfolio choice along the improved risk-return tradeoff, risk-adjusted returns (i.e., returns per unit of risk) should be higher at more diversified banks.

Literature Review

Different aspects of diversification have been studies by researchers from different countries. There exists no consensus amongst researchers about the effect of terrestrial diversification on the profitability of the banks. This section is devoted on reviewing some of those studies pertaining to diversification

Acharya *et al*. (2002) [1], performed one of the first and important study about diversification on banks' credit portfolio. They analysed Italian banks and found that both industrial and sectoral diversification reduces bank returns while producing riskier loans. However Hayden *et al*. (2007), investigated German banks and found that diversification tends to be associated with reductions in bank returns, even after controlling for risk. Only in a few cases (e.g., high-risk banks and industrial diversification) did they reach statistically significant positive relationships between diversification and bank returns. Kamp *et al*. (2004), analysed whether German banks diversify their loan portfolios or focus on certain industries and founded that a majority of banks significantly increased loan portfolio diversification. Goetz (2012), studies how a bank's diversification affects its own risk taking behavior and the risk taking of competing, nondiversified banks. These findings indicated that a bank's diversification also impacts the risk taking of competitors, even if these banks are not diversifying their activities. Fang *et al*. (2011) [7], resulted that asset diversification is associated positively and loan diversification negatively with bank performance. Results of the studies provided from E.U. banks and U.S. experience (Stiroh 2004a,b; Stiroh and Rumble 2006) contradict to each other in terms of diversification. The study made for Italian banks resulted that income diversification increases risk-adjusted returns and found that there are limits to diversification gains as banks get larger (Chiorazzo *et al*., 2008). On the other hand for U.S. banks Morgan and Stolyk (2003) [9], suggested that diversification increases the lending capacity of banks and the banking system, but it does not increase the profits of individual banks or reduce the risk in their portfolio. D'Souza and Lai (2003), measured the efficiency of Canada's Big Five chartered banks and found that banks systematically underperform over time. Düllmann *et al*. (2010) [4], examined if monitoring abilities of German cooperative banks and savings banks increase with their specialization on certain industry sectors and they observed that sectoral specialization generally entails better monitoring quality, particularly in the case of the cooperative banks. Tabak *et al*. (2010), assessed whether banks operating within the Brazilian banking system concentrate or diversify their credit portfolio and how this choice impacts their performance and risk and they founded that Brazilian Banks' loan portfolios are more concentrated than hose of developed countries like Germany, Italy and the U.S. Bebczuk and Galindo (2008), analysed sectoral diversification of Argentine banks and suggested that larger banks benefit more from diversification than smaller ones and that the benefits of diversification are greater during the downside of the business cycle. Some other studies on diversification exist. Cabiles (2012), found that securitization activity is positively related to loan portfolio diversification or that securitization can make a bank's loan portfolios more diversified. Higgins and Mason (2005), demonstrated the potential to eliminate a significant amount of risk in a diversified financial institution. Berry-Stölzle *et al*. (2011), analyzed variations in line-of-business diversification status and extent among property–liability insurers. Their results showed that the extent of diversification is not driven by risk pooling considerations; insurers operating in more volatile business lines do not diversify more. Arora and Kaur (2009) [2], analyzed the significance of internal determinants for diversification of banks in India. Bandyopadhyay (2010) [3], analyzed the credit portfolio composition of a large and medium sized leading public sector bank in India also. and acquisitions and being closed, it is failed to reach some of bank data in 2007-2011. In this manner the study is analysed on 40 banks' data. In the present study, ROA (Return on Assets) and ROE (Return on Equity) are used as measure of performance and Regression Analysis is used as a measure of diversification of banks.

Research Design

On the basis of the literature reviewed, this paper attempts to identify and measure the degree and impact of Terrestrial on the performance of the banks. The present paper is divided into two parts: the first section deals with measuring the degree of terrestrial diversification of banks in India and the second part deals with measuring the impact of terrestrial diversification on banks financial performance.

Objectives

The major objectives of this paper are:

- To identify and measure the degree of terrestrial diversification of banks operating in India during 1995-2015 and compare the same between public sector and private sector banks operating in India; and
- To identify the impact of terrestrial diversification on Banks performance measured in terms of both returns and risk-adjusted returns of the banks

Hypothesis

H_{o1}: There exists no significant difference in terms of Terrestrial diversification between Public sector banks and Private sector banks.

H_{o2}: Terrestrial diversification has no significant impact on Returns on Assets (RoA) of the banks

H_{o3}: Terrestrial diversification has no significant impact on Returns on Equity (RoE) of the banks

Data and Methodology

The data related to Bank branches and other variables has been mainly obtained from RBI website. The study comprises of 20 year period i.e. from 1995 to 2015, covering 25 public sector banks and 15 private sector Banks.

Following Acharya *et al*. (2004), Terrestrial diversification

index (Ter_div) has been calculated. The index is specified as below:

$$Ter\_div = 1 - \{\sum_{i=0}^{n} D_1^2 + \sum_{i=0}^{n} D_2^2 + \sum_{i=0}^{n} D_3^2 + \sum_{i=0}^{n} D_4^2 + \sum_{i=0}^{n} D_5^2 + \sum_{i=0}^{n} D_6^2\}$$

Where,

Ter_div = Terrestrial Diversification Index; 'i' stands for bank and 'n' stands for number of banks

D_1 = [BCR/BAR], D_2 = [BER/BAR], D_3 = [BNER/BAR]
D_4 = [BNR/BAR], D_5 = [BSR/BAR] and D_6 = [BWR/BAR]

Where,

BCR = Total number of branches of a bank in the Central Region
BER = Total number of branches of a bank in the Eastern Region
BNER = Total number of branches of a bank in the Northeastern Region
BNR = Total number of branches of a bank in the Northern Region
BSR = Total number of branches of a bank in the Southern Region
BWR = Total number of branches of a bank in the Western Region
BAR = Total number of branches of a bank in all Regions

RBI has divided the whole country into 6 different regions in which all commercial banks are functioning. The index is computed as per above specifications.

Financial Performance measures

For the study two financial performance measures are employed i.e. ROA and ROE.

To examine the impact of terrestrial diversification on banks Profitability, a Least Square Dummy variable (LSDV) regression model is used with group dummies for Public (PSB) and Private sector banks (PVB) and year dummy, where dummy variable equal to one for PSB's and Zero for PVB's. The slope coefficient is assumed to be constant but intercept varies for bank and time. The dummy variable is Zero for a time period of 1995-2003 and equal to 1 for remaining period till 2015. The following empirical model is developed to measure the impact of terrestrial diversification on Banks profitability, where ROA & ROE are used as dependent Variable and TER-DIV, Size of the Bank, Leverage Ratio(LEV), Bank (λ), Year (TM) as group dummy are used as Explanatory variables.

$$ROA_{i,t} = \alpha + \beta_1(TER\_DIV_{i,t}) + \beta_2(SIZE_{i,t}) + \beta_3(LEV_{i,t}) + \sum_{k=1}^{2}(\beta_k \lambda_{i,t}) + \sum_{s=1}^{20}(\beta_s TM_{i,t}) + €_{i,t}$$

$$ROE_{i,t} = \alpha + \beta_1(TER\_DIV_{i,t}) + \beta_2(SIZE_{i,t}) + \beta_3(LEV_{i,t}) + \sum_{k=1}^{2}(\beta_k \lambda_{i,t}) + \sum_{s=1}^{20}(\beta_s TM_{i,t}) + €_{i,t}$$

Results and Discussion

The variables that have been used in the present study along with the summary statistics are exhibited in Table 1.

Table 1: Summary Statistics

Variables (N=40)	Public sector Banks			Private Sector banks		
	Mean	SD	CV	Mean	SD	CV
CR	5083	598	123	346	45	292
ER	4709	564	126	135	14	228
NER	713	115	169	32	4	255
NR	3978	428	113	1080	146	304
SR	6297	612	102	432	41	214
WR	3981	368	97	210	21	217
ROA	0.80	0.24	30.47	0.73	17.22	0.71
ROE	15.52	4.24	27.30	13.12	21.19	13.80
TER_DIV	0.6	0.15	25.85	0.38	0.18	48.51

Note: CR= Central region, ER= Eastern region, NER= North Eastern region, NR= Northern region, SR= Southern region, WR= Western region

On an average it is found that PSB's have larger number of branches in all the six regions as compared to their private counter parts. Maximum number of branches are in southern region followed by central region. PVB's have very less number of branches in North eastern region.

On an average PSB's reflect higher returns and mean TER_DIV reflects that PSB's are more diversified than PVB's. In order to check the significance of difference in the mean values of these variables between the two categories of banks, t-test is applied and the results so obtained are presented in Table 2. All the variables demonstrate statistically significant results.

Table 2: t-test results

Variables	t Values	Sig. (2-tailed)
CR	3.36	0.003
ER	3.24	0.015
NER	2.55	0.001
NR	3.66	0.000
SR	3.95	0.000
WR	4.21	0.000
ROA	21.02	0.001
ROE	23.33	0.000
TER_DIV	33.72	0.000

In order to examine whether any significant difference exist in degree of diversification between PSB's and PVB's, t-test was done. The result so obtained in presented in table 3.

Table 3: t-test of TER-DIV

	Public sector Banks	Private Sector banks
Mean	0.59	0.39
Variance	0.006	0.036
Observations	20	20
Df	19	19
t-test	4.863	
T critical one-tail	1.729	

The calculated value of t - 4.863 is greater than the critical value of t – 1.729. This means that there exists significant difference, so null hypothesis 1 is rejected.

Impact of Terrestrial Diversification on Profitability

To identify the impact of Terrestrial Diversification on financial performance of banks it is necessary to identify the relationship between dependent and explanatory variables. Table 4 represents the correlation analysis between these variables. The result indicates a negative correlation between diversification Index and Returns of the banks, but this is not the case with SIZE and LEV ratio of the banks in which a positive correlation exists at 0.05 significance level.

Table 4: Correlation Matrix between Dependent and Explanatory variables

Variables	ROA	ROE	TER_DIV	SIZE	LEV
ROA	1	0.676	-0.362	-0.061	0.089
ROE	0.676	1	-0.197	-0.059	-0.265
TER_DIV	-0.362	-0.197	1	0.584	0.428
SIZE	-0.061	-0.059	0.584	1	0.71
LEV	0.089	-0.265	0.428	0.771	1

Table 5 reports the result of regression. It is observed that TER_DIV has a negative coefficient in all cases. Thus it indicates that diversification has a negative impact on all types of returns of the banks. This is also found to be statistically insignificant in all cases. On the contrary SIZE bears a positive correlationship with all types of returns as indicated, and except ROA, this is found to be statistically insignificant in all cases. Thus it cannot be stated that large-sized banks have a positive impact on all the types of returns.

The coefficient of LEV and YEAR indicates a negative impact on ROA & ROE. Thus it can be said that terrestrial diversification has a significant negative impact on financial performance indicators. Hence all null hypotheses have been rejected and it can be said that geographical diversification has negative impact on all types of returns of the banks.

Table 5: Regression Results

Regressor	ROA		ROE	
	Coefficient	Significance	Coefficient	Significance
TER_DIV	-0.209(0.236)	0.182	-0.188(-4.263)	0.092
SIZE	0.840 (0.075)	0.040	1.008 (2.841)	0.340
LEV	-0.262 (2.728)	0.290	-1.047(1.728)	0.050
BANK	-0.931 (0.122)	0.000	-0.321 (-2.433)	0.002
YEAR	-0.117 (0.110)	0.588	-0.197 (-1.510)	0.293
Constant	1.412 (1.712)	0.416	1.172 (0.312)	0.001
R2	0.667		0.649	

Conclusion

This study is primarily concerned with terrestrial diversification of commercial banks in India and tries to investigate the manner in which diversifying into different regions can impact the financial performance of the banks. With a sample of 40 commercial banks for a period of 20 years, the study identifies the benefits of Terrestrial diversification existent in Indian Banking Industry. The study reflects a constant and a stable trend in diversification Index for all Public sector banks which indicates that with the increase in number of branches of all PSB's, the proportion of increase in the number of branches of banks in all the region has also enlarged in a similar manner where a mixed trend of increase and decrease in diversification index has been reflected by all commercial banks during the whole period of study.

Public Sector banks are found to be more diversified than Private sector banks – the reason may be attributed to the size, Total assets, long existence and promotion policy of the banks. The rapidly changing business environment within which the bank has to function requires it to reorient itself to the changing needs. Diversification, both income-wise and geographical-wise has become the need of the hour.

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