

## **An Empirical Study on the impact of Operational Diversification on a Bank's Financial Performance**

Arunava Praharaj<sup>1</sup>  
Sibaram Chatterjee<sup>2</sup>

### **Abstract**

The banking industry is seeing intense competition as a result of financial sector reforms. Many banks have deliberately diversified their businesses to lower operational risks in response to the growing competitions in the Indian banking sectors. Operational diversification refers to the strategy of generating revenue from multiple sources rather than relying on a single source of income. Keeping in view, the present study aims to investigate how operational diversification affects the stability of the financial performance of Indian banks. The present paper uses Entropy Index for measuring the operational diversification indices of the banks. Four commercial banks, UCO, BOI, AXIX and HDFC have been selected for collecting relevant data for the period 2003-04 to 2022-23. The present study observes that operational diversification has a significant impact on variation in financial performance. The study also confirms that the banks with lesser size, suffer from the problem of greater fluctuations in financial performance and vice versa.

**KEYWORDS: Entropy Index, Operational Diversification, Financial Performance**

---

<sup>1</sup>Assistant Professor, Department of Commerce, Subarnarekha Mahavidyalaya, Jhargram, West Bengal,  
Email [arunava9733@gmail.com](mailto:arunava9733@gmail.com).

<sup>2</sup>Associate Professor, Department of Commerce, Pingla Thana Mahavidyalaya, Paschim Medinipur, West Bengal,  
Email [sibaramchatterjee@gmail.com](mailto:sibaramchatterjee@gmail.com).

## **1. Introduction**

The primary goal of the banking sector reforms was to increase the banks' operational effectiveness in order to raise their overall productivity and profitability. But the early 1990s financial sector changes created intense rivalry in the banking industry. A bank's over-reliance on traditional commercial operations can be dangerous, as demonstrated by the emerging market nations' mid-1990s financial crisis. One of the main causes of bank hardship following financial deregulation is improper loan portfolio diversification. One ideal form for a financial institution is the universal banking model, which enables banks to integrate a variety of financial services like investment, commercial, and insurance banking. The rules pertaining to banking and securities businesses have been generally open, which has enabled these diversifications of activity and blurred lines between various financial firms. It is anticipated that diversification of operations would assist the banks in gaining economies of scope by spreading fixed costs, providing a financial supermarket to clients who require numerous products, and utilizing managerial talents and competences across services.

Adding a variety of investments to a portfolio is known as diversification, which is a risk management technique. An endeavor is made to reduce exposure to any one asset or risk by maintaining a mix of unique assets in a diversified portfolio. Risk mitigation is the main goal of diversity. But diversification is not without its problems. Maintaining a portfolio with numerous holdings can be time-consuming and costly due to the additional transaction costs and brokerage commissions incurred when purchasing and selling multiple holdings. Essentially, spreading out is a strategy that works with diversification to reduce both risk and reward.

An organization that spreads its operations or business activities into new markets or industries is said to be pursuing operational diversification. Experimenting with different business ventures that might or might not be connected to the company's core skills or current product and service offerings is what defines this kind of diversification. By being involved in several markets or businesses, the objective is to diversify risk and improve overall stability. A thriving business can be revitalized with a well-executed diversification plan. Furthermore, it can boost the prosperity of businesses that are already profitable. Operational diversification reduces exposure to market and business segment risks by diversifying into other markets or sectors; offers a more consistent source of income by allowing success in one market to counterbalance swings in another.

## **2. Literature Review**

In the article Sahoo, D. (2012) investigated how the operational diversification strategy affected the banks' financial performance stability. Through the use of panel data regression techniques, the study finds that banks that have diversified their activities to a greater extent experience more volatility in their financial performance. This phenomenon may be attributed to the banks' inability to determine the appropriate regions of diversification and how much is optimal. Bapat, D. and Sagar, M. (2016) examined the effects of size and ownership changes on bank performance, diversification, and other areas. When comparing public sector banks with private sector banks, they found a noteworthy variation in the diversification measures. When comparing the diversity metric for most years based on bank size, no discernible changes were found to be significant. We discovered a negative correlation with return on assets and a positive correlation between non-performing assets (NPA) and return on assets (ROA).

Vyas, D. and Raju, G. R. (2018) identified the factors that influence the Indian banking sector's operational efficiency. The variables employment in the banking sector, investments in the banking sector, bank deposits, world gold prices, and Brent crude oil prices were utilized in the analysis of the data using fixed effects and random effects. The operational efficiency of Indian banks is significantly positively correlated with global macroeconomic variables such as the price of gold, while the price of Brent crude oil has a negative correlation but no meaningful effect on the operational efficiency of Indian banks. The Random Effects Model is shown to be a good strategy for estimating this model when compared to the two estimations. Nisar, S., Peng, K., Wang, S. and Ashraf, B. (2018) established that the entire revenue diversification into non-interest income positively affects the banks' stability and profitability. The influence of various non-interest income-generating activities on bank performance and stability was also noted. For example, fees and commission income had a negative effect on profitability and stability, whereas other non-interest income had a beneficial effect. According to their findings, banks that diversify into particular categories of non-interest income-generating industries can reap the benefits of revenue diversification.

Ndungu, J. G. and Muturi, W. (2019) explored the impact of product, geographic, and income diversification on the financial performance of banks. They discovered that while product diversification had a negative effect, income and geographic diversification had a positive effect. The report suggested that managers at commercial banks prioritize developing and implementing diversification strategies inside their organizations. The impact of functional, regional, and loan portfolio diversification on the stability of commercial banks in India was investigated concurrently by Chandramohan, K., Lunawat, D., and Lunawat, A. (2022). The effect of diversity on bank stability was calculated using the Generalized Method of Moments (GMM) model. This strategy is justified for two reasons. Firstly, it includes the stability and persistence of risk, which have been overlooked in the literature on diversification up to this point. It also

addresses the endogeneity issues between stability and diversification. They discovered that diversification enhances bank stability in all three dimensions-functional, geographic, and loan-portfolio diversification.

Thakur, N. and Arora, S. (2023) investigated the factors influencing income diversification for both non-interest and interest income as well as non-traditional income sources in their paper. Tobit regression model using panel data was employed because to the limited nature of the dependent variables, which are proxies for income diversification. The results showed that costs-income ratios, bank sizes, technology improvements, return on assets, market competitiveness, and economic inflation all had a favorable impact on income diversification.

### **3. Methodological Treatment**

#### **Models for Measuring Operational Diversification Indices:**

A multifaceted approach to operations is implied by operational diversity. The banks use the diversification approach to lower risks. In order to increase their firm, they also diversify their operations, especially in cases when there is little chance of expansion in their current field. By introducing new services to their portfolio, or expanding the scope of their current offerings, they can achieve this growth. Additional reasons for the banks' diversification efforts could be strengthening their capital basis, acquiring market dominance, optimizing value, etc.

This study measures the operational diversification indices using the Entropy Index (EN\_DIV), which was recommended by Hart (1971). Relative and absolute diversification indices are two metrics used to measure the two degrees of diversification.

The Entropy index of absolute diversification is measured as follows:

$$EN\_ADIV_{it} = \sum_{j=1}^m S_{jt} \cdot \ln\left(\frac{1}{S_{jt}}\right)$$

The Entropy index measures relative diversification of operation of a bank with m operation as follows:

$$EN\_RDIV_{it} = \frac{EN\_ADIV_{it}}{\ln(m)}$$

### **4. Data Sources**

We have gathered secondary data from the annual reports of the individual banks that are being examined in this study in order to examine the effect of operational diversification on the stability of financial performance of Indian banks. The current study has chosen four commercial banks from two categories: public banks (HDFC and AXIX) and nationalized banks (UCO and BOI). From 2003–2004 to 2022–2023, that is the only time frame for the study. Balanced panel data for 4 banks from 2003–04 to 2022–23 is then included in this analysis. There are 4 observations for each year, totaling 80 (20 × 4) observations.

## **5. Regression Model for Estimation of Variations in Financial Performance**

A number of other factors, including the bank's size and relative position in the industry, its other operational strategies, such as efforts to advertise and promote services, its level of financial performance, etc., may also contribute to fluctuations in financial performance in addition to variations in the extent of operational diversification. This section aims to quantify the effect of operational diversification on the variations in the financial performance of Indian banks during the research period. Finding the key variables that have a substantial impact on the stability of the financial performance of the institutions under investigation, either positively or negatively, is the main goal of this examination.

### **Multivariate Profitability Analysis**

#### **A. Specification of the Function**

The study assumes that variations in financial performance of a bank (VFP) depends on its market share (MS), bank size (BS), extent of operational diversification (OD), the return of assets (RA) and the net interest margin (NIM)

$$\text{i.e., } VFP_{it} = f(\text{MS}_{it}, \text{BS}_{it}, \text{OD}_{it}, \text{RA}_{it}, \text{NIM}_{it}),$$

The linear regression equation based on the above function can be written as :

$$VFP_{it} = + MS_{it} + BS_{it} + OD_{it} + RA_{it} + NIM_{it} \dots \dots \dots \text{Equation no. (i)}$$

#### **B. Hypothetical impact of Factors influencing fluctuation in financial performance**

**Market Share (MS<sub>it</sub>):** Increased market share is anticipated to strengthen a bank's standing in the industry and, as a result, stabilize its financial results. Stated differently, it is expected that banks having a larger market share will see less variability in their financial results.

**Bank Size (BS<sub>it</sub>):** A bank's size affects the stability of its financial performance in two different ways. Larger banks can reap the rewards of economies of scale and stabilize their financial performance, on the one hand. However, larger banks may have X-inefficiency, which could negatively impact the stability of their financial performance. Thus, the way in which these various pressures interact determines the nature of the influence that a bank's size has on the stability of its financial performance.

**Operational Diversification (OD<sub>it</sub>):** A bank's efficiency in terms of expenses and profit is increased through operational diversification. It is anticipated that risk sharing and increased productivity as a result of operational diversification will assist banks in stabilizing their financial performance. There are additional incentives for very large, highly financed, and efficient banks to diversify. They outperform each other or the specialized ones; they make less money through traditional kinds of intermediation. Gains from diversification are more than outweighed by the expense of being exposed to additional non-interest income,

particularly when trading income volatility. Banking institutions can gain from diversification as long as they select the appropriate niche and thoroughly research it based on their unique traits, competencies, and risk tolerance. It's also feasible though, that the banks' profits become more erratic as they shift their product mixes away from conventional intermediation operations and toward fee-based ones. The bank's financial stability may suffer as a result of this profit fluctuation. Therefore, the degree to which diversification affects the fluctuation in the bank's financial performance is contingent upon the relative potency of these two disparate factors.

**Return on Assets (RA<sub>it</sub>):** Generally, higher level of return on assets is likely to make performance of a bank more stable. Hence, lesser volatility in financial performance of a bank is expected when its return on assets is higher. Return on assets compares the value of a business's assets with the profits it produces over a set period of time. Return on assets is a tool used by managers and financial analysts to determine how effectively a company is using its resources to make a profit.

**Net Interest Margin (NIM<sub>it</sub>):** It is the ratio between net interest income and total income of the bank. Net interest margin (NIM) reveals the amount of money that a bank is earning in interest on loans compared to the amount it is paying in interest on deposits. NIM is one indicator of a bank's profitability and growth. It reveals how much the bank is earning in interest on its loans compared to how much it is paying out in interest on deposits.

### C. Measurement of Variables

Three years' moving average is taken for each of the independent variables in order to control for any measurement mistakes, control for any simultaneity in the anticipated relationships, and control for the adjustment process. As a result, starting year is used to quantify all independent variables, which are all based on the simple average of the three years prior.

**Variation in Financial Performance (VFP<sub>it</sub>):** With the year under reference at the center, the variation in financial performance is expressed in terms of the standard deviation of its financial performance over a period of five years. One of the key determinants of financial performance is return on assets, or RA. Therefore, the following metrics are used to measure the variance in return on assets (VRA):

$$VRA_{it} = \delta(RA_{i, t-2}, RA_{i, t-1}, RA_{it}, RA_{i, t+1}, RA_{i, t+2})$$

**Market Share (MS<sub>it</sub>):** Market share of bank i in year t (MS<sub>it</sub>) is measured as the ratio of its income (I<sub>i</sub>) to total income of all the banks in the sector,

$$i.e., MS_{it} = \left[ \frac{I_{it}}{\sum_{i=1}^n I_{it}} + \frac{I_{i,t-1}}{\sum_{i=1}^n I_{i,t-1}} + \frac{I_{i,t-2}}{\sum_{i=1}^n I_{i,t-2}} \right] / 3,$$

where  $I_{it}$  stands for income of banks in the industry.

Bank Size (BS<sub>it</sub>): The bank size in year t (BS<sub>it</sub>) is measured as the natural logarithm of its total assets (TA), i.e.,

$$BS_{it} = \frac{\ln(TA_{it}) + \ln(TA_{i,t-1}) + \ln(TA_{i,t-2})}{3}$$

Operational Diversification (OD<sub>it</sub>): In this study, Entropy's Index has been used to measure operational diversification and relative measures of diversification have been used for regression purpose.

Relative Diversification – Entropy's Index

$$EN\_RDIV_{it} = \frac{[EN\_RDIV_{it} + EN\_RDIV_{i,t-1} + EN\_RDIV_{i,t-2}]}{3}$$

Return on Assets (RA<sub>it</sub>): The Return on assets (RA) is used for the measurement of level of performance of the bank. The returns on assets of the i-th bank in the year t (RA<sub>it</sub>) is measured as the ratio of net profit (NP<sub>i</sub>) of the bank to its total assets (TA<sub>i</sub>), i.e.,

$$TA_{it} = [NP_{it}/TA_{it} + NP_{i,t-1}/TA_{i,t-1} + NP_{i,t-2}/TA_{i,t-2}] / 3$$

Net Interest Margin (NIM): It is the ratio between net interest income and total income of the bank.

$$NIM_{it} = [NII_{it}/TI_{it} + NII_{i,t-1}/TI_{i,t-1} + NII_{i,t-2}/TI_{i,t-2}] / 3$$

#### **D. Estimation Techniques**

The equation specified above has been estimated by applying panel data estimation technique for a set of 4 banks, operating in India over the period from 2003-04 to 2022-23. Use of panel data not only helps in raising the sample size and hence the degree of freedom considerably increases, it also incorporates the dynamics of banks' behaviour in the market place. In panel data estimation, three models, namely the pooled regression model (OLS), fixed effects model (FEM) and random effect model (REM) are estimated for each analysis, i.e. multivariate profitability analysis and explaining efficiency variation. The choice amongst the pooled regression model, the FEM and the REM is very important as it largely influences the conclusions on the individual coefficients. Three statistical tests, viz., the restricted F-test, the Breusch and Pagan (1980) Lagrange Multiplier test, and the Hausman (1978) test are carried out to select the appropriate model. The restricted F-test is applied to make a choice between the pooled regression model and the FEM. If the computed F-value is greater than the critical F-value, choice of the FEM is made over the pooled regression model. On the other hand, the Breusch and Pagan Lagrange Multiplier test is carried out to make a choice between the pooled regression model and the REM. The test is based on the null hypothesis that the variance of the random disturbance term is zero and it uses a test statistic that follows z distribution. Rejection of null hypothesis suggests that there are random effects in the relationships. Finally, if both the FEM and the REM

are selected over the pooled regression model following the restricted F test and the Breusch and Pagan Lagrange Multiplier test respectively, the Hausman test is applied to make choice between the FEM and the REM. The test is based on the null hypothesis that the estimators of the FEM and the REM do not differ significantly and uses a test statistic that has an asymptotic distribution. If the null hypothesis is not rejected, the REM is better suited as compared to the FEM. The severity of the problem of multicollinearity across the independent variables is also examined in terms of the variance inflation factors.

**6.Explaining the Estimation of Variations in Financial Performance : Multiple Regression Results**

The descriptive statistics of the variables used in the regression model for explaining variations in financial performance across the sample banks and over time, are presented in Table 1.

**Table 1: Descriptive Statistics**

	VRA <sub>it</sub>	EN_RDV <sub>it</sub>	MS <sub>it</sub>	BS <sub>it</sub>	RA <sub>it</sub>	NIM <sub>it</sub>
<b>Max</b>	0.0230	0.1510	1.4628	6.1740	0.0170	0.1471
<b>Min</b>	0.0004	0.0683	0.1903	4.5521	-0.0083	0.0740
<b>Mean</b>	0.0060	0.1196	0.7500	5.4081	0.0063	0.1195
<b>S.D.</b>	0.0052	0.0202	0.2871	0.3825	0.0070	0.0191
<b>N</b>	64	64	64	64	64	64

Source: Computed by the authors

**Variations in Profitability with Entropy’s Relative Diversification Index:** Table 2 shows the regression results for variations in profitability with Entropy’s Relative Diversification Index. The F-statistics of the pooled regression model, the fixed-effect model, and the Wald-statistic of the random effect model are statistically significant.

**Table 2: Regression Results for Variations in Profitability with Entropy’s Relative Diversification Index**

Ordinary Least Square Model			Fixed Effect Model		Random Effect Model	
Variables	Coefficient	t-stat	Coefficient	t-stat	Coefficient	Z-stat
<b>Intercept</b>	-0.003	-0.570	-0.006	-0.95	-0.003	-0.57
<b>EN_RDV<sub>it</sub></b>	0.093	2.580***	0.045	1.35	0.093	2.58***
<b>MS<sub>it</sub></b>	-0.002	-1.70*	-0.003	-2.32**	-0.002	-1.70*
<b>BSZ<sub>it</sub></b>	0.003	3.11***	0.003	2.99***	0.003	3.11***
<b>RA<sub>it</sub></b>	-0.577	-10.96***	-0.702	-11.78***	-0.577	-10.96***
<b>NIM<sub>it</sub></b>	-0.095	-2.25**	-0.001	-0.03	-0.095	-2.25**
<b>F-Stat</b>		83.21***	<b>F-Stat</b>	77.40***	<b>Wald</b>	416.07***
<b>R<sup>2</sup></b>		0.878	<b>R<sup>2</sup> within</b>	0.876	<b>R<sup>2</sup> within</b>	0.860
<b>Adj. R<sup>2</sup></b>		0.867	<b>R<sup>2</sup> between</b>	0.866	<b>R<sup>2</sup> between</b>	0.946
			<b>R<sup>2</sup> overall</b>	0.860	<b>R<sup>2</sup> overall</b>	0.878
<b>No. of Obs.</b>		64	<b>No. of Obs.</b>	64	<b>No. of Obs.</b>	64

Source: Computed by the authors

\*\*\* indicates 1% level of significance, \*\* indicates 5% level of significance & \* indicates 10% level of significance

**Table 3: Tests for Selection of Appropriate Model for Explaining Variations in Profitability with Entropy’s Relative Diversification Index**

Purpose	Null Hypothesis	Test Statistics
Selection between Pooled regression Model and Fixed Effects Model (restricted F test)	All = 0	$F(3, 55) = 7.40^{***}$
Selection between Pooled regression Model and Random Effects Model (Breusch-Pagan Lagrange Multiplier test)	$\text{Var}(u) = 0$	$\chi^2_{(1)} = 6.52^{***}$
Selection between Fixed Effects Model and Random Effects Model (Hausman Test)	Difference in co-efficient is not systematic	$\chi^2_{(5)} = 92.65^{***}$

*Source: Computed by the authors*

In order to select the appropriate model for explaining variation in financial performances, the restricted F-test, the Lagrange Multiplier test and the Hausman test are carried out and the value of the test statistics along with respective hypothesis are presented in Table 3. It is found that all the three test statistics are statistically significant. Statistically significance of the test statistics in Hausman test (significant at 10% level) suggests for choice of the FEM over the REM. Hence, when we consider Entropy’s Relative Diversification Index as independent variable, the regression results of the FEM are used for statistical inference and further analysis of the individual coefficients.

The study observes that operational diversification of the bank based on Entropy’s Relative Diversification Index has a positive impact on variation in financial performance, not statistically significant. This implies that variation in financial performance does not differ significantly across the bank depending on their operational diversification. Operational diversification does not have any significant impact on the stability of the financial performance of the bank. The study also confirms that market size has a statistically negative impact on the fluctuation in financial performance. This means that variation in financial performance is negatively and statistically significant and influenced by the market share of the bank. This implies that banks with greater market size are likely to have greater stability in their financial performance. So in order to minimize fluctuation in financial performance the banks have to capture larger market share by providing loan at a great concessional rate, providing services at door steps, etc.

From the study it also observes that the bank size is statistically significant with positive effect, which implies that impact of bank size on the variation in financial performance in a positive way. This suggests that the banks that have greater size suffer from the problem of greater fluctuation in financial performance and vice versa. The variable return on assets has impacted negatively and statistically significant, which implies that the banks having higher level of return on assets face lesser fluctuation in financial performance which leads to make performance more stable.

---

The study also makes an attempt to find out the impact of net interest margin on variation on financial performance. The study finds that net interest margin has a negative impact on variation in financial performance but not statistically significant.

## **7. Summary and Conclusions**

The early 1990s saw significant changes to the financial sector, which increased competition in the banking industry. A bank's over-reliance on traditional commercial operations can be dangerous, as demonstrated by the emerging market nations' mid-1990s financial crisis. Many banks have deliberately pursued the path of diversifying their businesses to lower their operational risks in response to the growing competition in the Indian banking sector and the entry of local and foreign private banks thereafter. This viewpoint informs the current study's attempt to investigate how operational diversification affects the stability of Indian banks' financial performance. The goal of the study is to identify the key variables that have a major impact on a bank's fluctuations in financial performance. This article measures operational diversification using the Entropy Index (EN\_RDIV) and confirms the results. For this investigation, four commercial banks have been chosen and the study period is 20 years from 2003-04 to 2022-23. Consequently, yearly observations for four banks from 2003-04 to 2022-23, i.e. four for each year, and a total of 80 (20 x 4) observations, make up the balanced panel data used in this study. According to the study, banks with larger branches experience more financial performance variations, and vice versa. The goal of the study is to identify the key variables that have a major impact on a bank's fluctuations in financial performance. Therefore, more research in this area is needed. According to this study, operational diversification under the Entropy Index (EN\_RDV) influences profitability fluctuations in a way that is both beneficial and statistically insignificant. It suggests that depending on the operational diversification of the banks, variances in financial performance do not differ greatly amongst them. The stabilization of a bank's financial performance is not greatly enhanced by operational diversification.

## **References:**

1. Charnes, A., Cooper W.W. and Rhodes E. 1978. "Measuring the Efficiency of Decision Making Units." *European Journal of Operation Research*, 2, pp. 429-444.
2. Hausman, J. 1978. Specification Tests in Econometrics. *Econometrica*, 46(6), pp. 1251-72.
3. Breusch, T., and Pagan, A. 1980. "The Lagrange Multiplier test and its Applications to Model Specification in Econometrics." *Review of Economic Studies*, 47(1), pp. 239-253.
4. Sherman, H.D. and F. Gold. 1985. "Bank Branch Operating Efficiency: Evaluation with DEA." *Journal of Banking and Finance*, 9(2), pp. 297-315.

5. Kwast, M. L. 1989. "The impact of Underwriting and Dealing on Bank Return and Risks." *Journal of Banking and Finance*, 13, pp. 101-125.
6. Narasimham Committee Report (1991), Report of the Committee on the financial Sector Reforms, Government of India.
7. Koushik, S. 1995. "Social Objectives and Profitability of Indian Banks." Thesis submitted to UBS, Punjab University, Chandigarh, pp. 190-242.
8. Second Narasimham Committee.1997. Committee on Banking Sector Reform, Gazette of India Extraordinary Notification, Part-II, Sec 3(ii), Ministry of Finance, Govt. of India.
9. Landi A. and Venturelli V. 2000. "The Diversification Strategy of European Banks: Determinants and Effects on Efficiency and Profitability." Retrieved from [www.papers.ssrn.com](http://www.papers.ssrn.com).
10. Stone, M.R. 2000. "The corporate sector dynamics of systemic financial crises." IMF working paper-114.
11. Sathye, M. 2001. "X-efficiency in Australian banking: an empirical investigation." *Journal of Banking and Finance*, 25, pp. 613-630.
12. Stiroh, K.J. and Rumble, A. 2003. "The Dark side of Diversification: The case of U.S. Financial Holding Companies." Working Paper.
13. Sturm, J.E. and Williams, B. 2004. "Foreign bank entry, deregulation and bank efficiency: Lessons from the Australian experience, *Journal of Banking and Finance*, 28, pp. 1775-1799.
14. Acharya, V.V., Hasan, I. and Saunders, A. 2006. "Should Banks be Diversified? Evidence from Individual Bank Loan Portfolios." *Journal of Business*, 79(3), pp. 1355-1412.
15. Stiroh, J., 2006. "A portfolio view of banking with interest and non-interest activities." *Journal of Money, Credit and Banking*, 38(5), pp. 1351-1361.
16. Das, Abhiman & Ghosh, Saibal. 2006. "Financial Deregulation and Efficiency: An empirical analysis of Indian Banking during the Post-Reform Period." *Review of Financial Economics*, 15, pp. 193-221.
17. Kumar, Sharad and Sreeramula, M. 2007. "Employees' Productivity and Cost – A Comparative Study of Banks in India During 1997 to 2008." Reserve Bank of India, Occasional Papers (winter), 28(3), pp. 35-50.
18. Mittal, Manish and Dhade, Aruna. 2007. "Profitability and Productivity in Indian Banks: A Comparative Study." *AIMS International*, 1(2), pp. 137-152.
19. Baele, L., de, J. O., & Vennet, R. V. 2007. Does the Stock Market Value Bank Diversification? *Journal of Banking and Finance*.
20. Lepetit, L., E. Nys., P. Rous and A. Tarazi. 2007. "Bank income structure and risk: An empirical analysis of European banks." *Journal of Banking and Finance*, 32, pp. 1452-1467.
21. Gujarathi, D. N. and Sangeetha. 2009. *Basic Econometrics*. Tata McGraw Hill., New Delhi.
22. Arora, S. & Kaur, S. 2009, "Internal Determinants for Diversification in Banks in India an Empirical Analysis", *International Research Journal of Finance and Economics*, 24, 177-185.

- 
23. Ibrahim, M. Syed. 2010. "Performance Evaluation of Regional Rural banks in India." *International Business Research*, 3(4), pp. 203-211, retrieved from [www.ccsenet.org/ibr](http://www.ccsenet.org/ibr).
  24. Altunbas, Y. M.-I. 2011. *Bank Risk During the Financial Crisis - Do Business Models Matter?* ECB Working Paper Series, No. 1394, European Central Bank, Frankfurt.
  25. Bapat, D. 2012. Efficiency for Indian public sector and private sector banks: Assessment of impact of global financial crisis. *International Journal of Business Performance Management*, 13 (3 /4), 330-40.
  26. Bebczuk, R., & Galindo, A. 2011. Financial crisis and sectoral diversification of Argentine banks. *Applied Financial Economics*
  27. Mishra, P. and Sahoo, D. 2012. "Operational Diversification and Stability of Financial Performance in Indian Banking Sector: A Panel Data Investigation." *Research Journal of Finance and Accounting*, 3(3), pp.70-87. [www.iiste.org](http://www.iiste.org).
  28. Chatterjee, S. 2015. "Don't put all your money in one pocket: Diversification and Stability of Financial Performance in Indian Banking Sector". *Financial Sector Reforms in Developing Economies*. Edited volume, VU, pp 17-28.
  29. Bandelj, A. 2016. Should banks be geographically diversified? Empirical evidence from crosscountry diversification of European Banks. *The European Journal of Finance*.
  30. Bapat, D., & Sagar, M. 2016. Examining Relationship of Income Diversification, Asset Quality with Bank Profitability: Implication for Indian Banks. *IMJ*.

\*\*\*\*\*