



Impact of Risk Parameters on Financial Performance: A Study of Public Sector Banks of India

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Abstract

The study examines the relationship between risk parameters and financial performance. The study involved twenty one selected public sector banks of India. Data were obtained from the reliable data source of selected public sector banks. The data were subjected to statistical analysis. The cause and effect relationship was checked by regression model using E-Views 9. Since, the time series data was employed, stationarity of the data was checked in order to avoid spurious regression. The Augmented Dickey – Fuller test was used for unit root testing to check the stationarity. The result of the study revealed that non-interest earning and risk parameters have a significant effect on financial performance.

Key Words: Non-Interest Earning, Risk Parameters, Financial Performance, Regression, Unit root, Public Sector bank, India.

Introduction and Conceptual Framework

Non- interest income is the income generating from the non-traditional activities of banks. Revenue base of Indian Banking Industry is shifting from traditional activities like loan making to non-traditional activities that generate service charges, trading revenue, fee income, and other types of noninterest income. The financial crisis caused by trading practices of investment banks in the U S in year 2007-08 has revealed the weakness of business models of many banks. Due to their heavy reliance on non-interest income, Investment banks were hit by the crisis that exposed them to more income fluctuations than retail oriented banks that use customer deposit as primary source of funding and provide traditional banking services like lending.

Higher operating leverage is the major difference between interest income and non-interest income from non-traditional activities as banks are exposed to higher fixed income. But non-interest income is usually more volatile than interest income because due to information costs it is more difficult for borrowers to switch their lending relationship.

The most important issues in banking industry are performance and risk issues. When future is unknown, there is risk. Hence, one who can secure a future for themselves and their organizations are those who can increase their knowledge with proper planning and analysis. So today when risk management is studied, the goal is not to eliminate the risk, but is to identify and determine its due costs.

The proposed study is based on the phenomenon of risk. As risk management is focused to not only the eliminating the risk but it is actually based on identification of risk at any level. Financial organizations can face both type of risk, systematic and unsystematic.

Where the systematic risk are categorized on the basis of three system-wide factors; market risk, interest risk and purchasing power risk. On the other hand unsystematic risk covers business risk and financial risk. Here capital adequacy ratio, non interest earning ratio, net interest margin are taken to represent the systematic risk as independent variables and cost to income ratio representing the unsystematic risk.

Financial performance is a subjective measure of how well a organization can use assets from its primary mode of business and generate revenues. This term is also used as a general measure of a organization's overall financial health over a given period of time, and can be used to compare similar organizations across the same industry or to compare industries or sectors in aggregation.

There are many different ways to measure financial performance, but all measures should be taken in aggregation. Line items such as revenue from operations, operating income or cash flow from operations can be used, as well as total unit sales. Furthermore, the analyst or investor may wish to look deeper into financial statements and seek out the return on assets specifically.

Description of Variables

Non-Interest Earning Ratio: Non-interest earning ratio can be measured as non-interest earning divided by total earnings. It is calculated as:

$$\text{NIER} = \text{NIE} / \text{Total Earnings}$$

Capital Adequacy Ratio: Capital Adequacy Ratio (CAR) is a measure of the amount of bank's capital expressed as a percentage of its risk weighted credit exposure.

Cost to Income Ratio: It shows a company's costs in relation to its income. To get the ratio, divide the operating costs (administrative and fixed costs, such as salaries and property expenses, but not bad debts that have been written off) by operating income.

Net Interest Margin: Net interest margin (NIM) is a measure of the difference between the interest income generated by banks or other financial institutions and the amount of interest paid out to their lenders (for example, deposits), relative to the amount of their (interest-earning) assets.

Return on Assets: The return on assets (ROA) is a ratio that measures company earnings before interest & taxes (EBIT) against its total net assets. The ratio is considered an indicator of how efficient a company is using its assets to generate before contractual obligation must be paid.

Return on assets gives a sign of the capital strength of the banking industry, which will depend on the industry; banks that require large initial investment will generally have lower return on assets.

Literature Review

Limei et.al. (2017), investigated the relationship between noninterest income ratio and the performance of banks and the influence of noninterest income ratio on its performance. This paper analyzed that the operating expenses emanating from noninterest income business are much higher than the interest income business and interest income rises from loan business. NIR can be negatively correlated with bank performance and suggested that the increase of noninterest income may improve the performance. They concluded that the higher the noninterest rate is, the lower the performance of commercial bank will be.

Singh et.al. (2016), aimed to understand the contribution of non-interest income and the risks associated with it. This study indicates that both interest and non-interest income have consistent growth while growth of non-interest income is more than the growth of interest income and the risks associated with non-interest income can be summed up by the increasing contribution towards Revenue. The Profitability Ratios suggested that, volatility of non-interest income has not affected Public Sector Banks but affected the profitability ratios of Private Banks and Foreign Banks. The study revealed that private banks can have more risk appetite than the public sector banks and foreign banks have some part of their income as profit from exchange. The results indicated that non-interest income is positively influenced by return on equity, profit per employee, loan quality, and personalized customer service offered to bank customers.

Mndeme (2015), investigated impact of noninterest income on bank performance in Tanzanian. The study indicated that interest income found to have positive impact on risk adjusted return to equity with the same intensity to that of non-interest income as there existed perfect negative correlation between these two income sources. He concluded that increase in noninterest income has negative impact on bank performance across all banks and result supported that diversification is better for the bank performance than giving focus to the non-interest income.

Damankah, Anku-Tsede and Amankwaa (2014), showed a positive relationship between prime rate and inflation. The outcome showed a negative relationship between NII and bank size, is indicated that smaller banks are generating more non-interest revenue. This study suggested that banks involved in higher levels of non-traditional activities have higher risk exposures from their conventional banking business and the relationship between liquidity and NII was positive and

significant. It was found that interest income (INI), exposure to risk (ExpR), and liquidity (LIQ) are main driving factors in non-interest earning activities and banks with higher anticipated loan losses and high liquidity, smaller banks with lower levels of deposits are mostly engaged in non-interest earning activities.

Karakaya (2012), examined bank profitability determinants and relationship between non-interest income and bank performance in Turkey. The paper studied that small banks have higher capital adequacy, adopted tighter loan policy and their expenses is less. It shows that a positive correlation existed between banks' overheads and their sizes. They found that non-interest income margin of banks are increasing and bank performance is affected by non-interest income. The study revealed that banks have larger size gained higher profits, increased equity capital profitability and non-interest margin. The study also established that non-interest income is the main factor having effect on equity capital profitability.

Li (2014), investigated the impact of non-interest income on efficiency of banks in china. The study observed that technical and pure technical efficiency increases due to inclusion of non-interest income. The proportion of non-interest income to operating revenue resulted in U-shaped relationship between bank efficiency and non-interest income. He concluded that inclusion of non-interest income output showed increase during the sample period but does not result in significant increase of bank efficiency with the time.

Trivedi (2015), analyzed the impact of new business lines and income streams on banks' stability and profitability. They studied that banks have been active in generating a certain amount of income from fee-based services and observed that variability in diversification between banks is higher but lower in risk adjust performance. Control variables are introduced which can have impact on performance and impact of diversification is positive on profitability but negative on risk adjust measures. On the other hand profitability may not be a driving force behind strategic shifts in banks.

Williams and Prather (2010), examined the impact on bank risk between margin income and fee-based income in Australia. This paper revealed that fee-based income is riskier than marginal income and suggested that banks' shareholders will be benefited from increased non-interest income through diversification but shareholders should monitor exposure of non-interest income to certify they do not over exposed. Diversification of banks reduces the systematic risk possibility but increased disclosure of banks non-interest income resulted in understanding of bank risk determinants.

Muriithi, Waweru and Muturi (2016), reviewed the effect of credit risk on financial performance of commercial banks in Kenya and observed that credit risk components are significant in clarifying variations in return on equity. Both in short run and long run bank increased credit risk have negative impact on banks' financial performance and reduce profits. The study concluded that banks with high asset quality and low non-performing loan are more profitable and reducing capital by increasing loan loss provision that affects the profitability.

Asfaw and Veni (2015), examined the link between the banks specific factors in Ethiopian private commercial banks and indicated the effectiveness of credit risk management system based on the level of risk factors associated with borrowers. Variables have negative correlation with credit risk ratio but deposit rate has positive correlation with credit risk. Study revealed that due to credit risk culture credit growth had negative impact on loan problems and bank profitability indicator had negative relationship with credit problem while bank size also has negative correlation with credit risk.

Poudel (2012) studied various parameters pertinent to credit risk management that affect banks' financial performance. It has been analyzed that all the risk management indicators have direct relationship with performance and there is no any relationship between cost per loan assets and performance. It suggested that In order to reduce risk on loans and achieve maximum performance the banks need to allocate more funds to default rate management and try to maintain just optimum level of capital adequacy. He concluded that success of bank performance depends on risk management and default rate management is the single most important predictor of the bank performance among the risk management indicators.

Haque and Wani (2015) studied the relationship between financial risk and financial performance of Commercial banks in India and also measure the impact of financial risks on the financial performance of commercial banks in India. It has been analyzed that both public and private sector banks are exposed to the vagaries of financial risk and solvency risk from all the variables, have positive relationship with the profitability of commercial banks. They suggested that to enhance operational efficiency and profitability commercial banks should install the latest advances in their systems, processes, strategies, internal controls and transparency in services and operations and banks should also rebuild the conventional risk management system. It has been found by the study, interest rate risk, liquidity risk, credit risk, capital risk and solvency risk possess the power of bringing change of 84 percent in profitability of the banks, out of which solvency risk alone has the power to change about 52.4 percent in profitability.

Kohler (2013) analyzed the impact of banks' non-interest income share on risk in the German banking sector. He suggested that banks are more stable if they have a more diversified income structure and depend neither heavily on interest nor on non-interest income. He concluded that trading income which is significantly more volatile than fee and commission income, in contrast, has no significant effect on bank stability and he also indicate that the impact of non-interest income on risk significantly depends on the activities used to generate non-interest income.

Sun and Chang (2010) investigate the role of risk in determining the cost efficiency of international banks in eight emerging Asian countries. It has been found that banks operating in a high exchange rate volatility environment are more efficient than those operating in low exchange rate volatility, the exchange rate volatility has negative effect on the inefficiency effect and they found an optimal level of interest rate volatility for making decisions. They concluded that each risk measure presents a dissimilar effect on banks' efficiency and more detailed facts about how these risk measures influence both the level and variability of the inefficiency effect across countries and over time.

Hoseininassab, et.al. (2013) study recognized the importance of efficiency and risk as two fundamental important categories in banking industry and also identifies the impact of credit, operational, market and liquidity risks on banking system efficiency. It has been found that impact of risk factor on financial status of banks and financial institutes is undeniable and for this reason it potentially can affect on financial decisions. It has been suggested that more number of input and output are used and the impact of different risk parameters on efficiency in a more expanded time period are studied for more accurate efficiency evaluation. They concluded that financial security costs, facing liquidity risk make banks to receive higher costs than common market rates to provide financial security and Debt to other banks can be mentioned as one of the variable that affects the liquidity of banks.

Altunbas, Manganeli and Marques-Ibanez (2011) study was designed to evaluate macro-financial models linking financial stability and the performance of the economy and early warning systems and systemic risk indicators and also assessing contagion risks. It has been considered that higher level of Tier I capital ex-ante generally decreases the likelihood of bank distress during the crisis and relying on a more solid funding structure reduces bank risk during times of crisis. It has found that in terms of the asset structure, both bank size and the ratio of loans to total assets are positively related to our measures of bank risk, while securitization is negatively related. They have suggested that regulators would require to intensify supervisory interference. The study recommend a better understanding of the risk-taking incentives, in particular by those banks experiencing rapid increases in their stock market valuations.

Objective of the study

- To check the impact of risk parameters on financial performance.
- To calculate non-interest earning ratio.
- To open new avenues for further researches.

Research Methodology

The study is causal in nature. It is aimed to find out the impact of risk parameters on ROA. The study is done to analysis the relationship in Indian context. Data of capital adequacy ratio, cost to income ratio, net interest margin and non-interest earning ratio were taken to define the risk parameters, while the ROA was taken as a parameter of financial performance. The data have taken for the previous 5 years (2012 to 2016). All the Public Sector Banks were taken as the population of the study and sampling frame was 21 Public Sector Banks in India. Sample elements were taken Capital Adequacy Ratio, Cost to Income Ratio, Net-Interest Margin, Non-Interest Earning Ratio and ROA.

Result & Discussion:

Unit Root Test

Since time series data was employed, it is important to test for the stationarity of the variables in order to avoid spurious regression. The Augmented Dickey – Fuller test was used for unit root testing. The results of the unit root test for the variables are presented below:

Table 1: Unit Root Test results

Variable	ADF-statistic	Critical value	Probability value	Level of significance	Order of integration
NIER	-4.510687	-3.491345 -2.888157 -2.581041	0.0003	1% 5% 10%	Level
CAR	-8.032016	-3.491345 -2.888157 -2.581041	0.0000	1% 5% 10%	Level
CIR	-4.648011	-3.494378 -2.889474 -2.581741	0.0002	1% 5% 10%	Level
NIM	-4.257695	-3.491345 -2.888157 -2.581041	0.0009	1% 5% 10%	Level
ROA	-3.824871	-3.494378 -2.889474 -2.581741	0.0037	1% 5% 10%	Level

The Unit Root tests showed that all variables stationary at level Order of integration. Augmented Dickey- Fuller unit root test statistics are greater than their critical values considered at 1% level of significance was considered.

Correlogram Residual Test of Stationarity:

Chart 1: Correlogram Test

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
		1	0.212	0.212	5.0769	0.024
		2	0.207	0.170	9.9837	0.007
		3	0.082	0.010	10.751	0.013
		4	0.031	-0.022	10.860	0.028
		5	-0.016	-0.036	10.891	0.054
		6	0.051	0.062	11.198	0.082
		7	0.089	0.087	12.137	0.096
		8	0.019	-0.030	12.181	0.143
		9	0.039	0.003	12.366	0.193
		10	-0.046	-0.066	12.623	0.246
		11	-0.048	-0.034	12.905	0.300
		12	-0.066	-0.030	13.459	0.337
		13	-0.070	-0.044	14.076	0.369
		14	-0.040	-0.005	14.277	0.429
		15	-0.031	-0.007	14.402	0.495
		16	0.093	0.119	15.528	0.486
		17	-0.039	-0.063	15.725	0.543
		18	0.027	0.012	15.821	0.605
		19	0.122	0.152	17.833	0.534
		20	0.177	0.159	22.129	0.334
		21	0.065	-0.027	22.722	0.359
		22	0.047	-0.058	23.030	0.400
		23	-0.004	-0.055	23.032	0.459
		24	-0.107	-0.099	24.681	0.423
		25	-0.075	-0.055	25.502	0.435
		26	-0.028	0.002	25.621	0.484
		27	-0.052	-0.060	26.021	0.517
		28	0.003	0.020	26.022	0.572
		29	-0.009	0.016	26.035	0.624
		30	-0.045	-0.010	26.349	0.657
		31	-0.127	-0.081	28.878	0.576
		32	-0.055	0.023	29.363	0.601
		33	-0.136	-0.036	32.322	0.501
		34	0.010	0.081	32.339	0.549
		35	0.018	0.002	32.391	0.595
		36	0.118	0.078	34.705	0.530

Correlogram residual test was applied on the variables, NIER, CAR, CIR, NIM (independent) &ROA (dependent) of our proposed research. The assumption of this test is that all the spikes must be restricted within the fitted (regression / estimated or predicted) line and actual line. Thus, there is no autocorrelation in the data and it explained the stationarity of the data.

Statistically, stationarity is checked by measuring the last P value of the Q-Statistics.the assumption of this test is, the corresponding p value of Q- Statistics must be greater than the standard value (0.05).Here, in the above table, last P value of the Q-Statistics (**0.530**) is more than the standard value (0.05), hence these results recommend that the data is stationary.

Regression Analysis:

H₀ – There is no significant effect of risk parameters on ROA.

Table 2
REGRESSION ANALYSIS

VARIABLE	COEFFICIENT	STD.ERROR	T STATISTIC	PROB.
C	-0.395368	0.183262	-2.157395	0.0333
CAR	0.050854	0.014071	3.614095	0.0005
CIR	-0.074900	0.002996	-24.99869	0.0000
NIM	0.691867	0.036942	18.72859	0.0000
NIER	0.097509	0.009359	10.41837	0.0000

The outcome of regression model has shown that the Prob. value of t-statistic of independent variables; capital adequacy ratio (0.0005), cost to income ratio (0.0000), non-interest margin (0.0000) and non-interest earning ratio (0.0000) are less than 0.05 so, there is a significant effect of CAR, CIR, NIM, NIER on ROA.

$$y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + e$$

$$ROA = -0.395368 + 0.050854 (CAR) + (-0.074900) (CIR) + 0.691867 (NIM) + 0.097509 (NIER) + e$$

Table 3
MODEL SUMMARY

R-squared	Adjusted squared	R-	Durbin-Watson statistic	F-statistic	Prob.(F-statistic)
0.900745	0.896964		1.575539	238.2214	0.000000

The above table (Table-3) defines the results of regression analysis. The coefficient of determination 0.896964 means that 89.69 % of the variation in ROA is being explained by the independent variables capital adequacy ratio, cost to income ratio, net-interest margin and non-interest earning ratio. Durbin-Watson statistic (1.575) is close to idle value 2, thus there is no autocorrelation among the variables. Value of F-statistic 238.2214 is significant at 0.0000% which is less than 5% reveals, model is good fit.

Regression's Assumption Tests:

Breusch-Godfrey serial correlation LM test:

H_0 - residuals are not serially correlated.

Table 4
Model Summary

F-statistic	1.720551	Probability	0.1367
Obs*R-squared	8.713434	Probability	0.1211

From the above table it is resulted that P-value (0.1211) of Observed R-square is more than standard value (0.05) so, null hypotheses is not rejected. It means the residuals are not serially correlated.

Heteroskedasticity test

H_0 - residuals are not Heteroskedastic .

Table 5

F-statistic	1.753363	Probability	0.0576
Obs*R-squared	22.58674	Probability	0.0673

From the above table it is resulted that P-value (**0.0673**) of **Observed R-square** is more than standard value (**0.05**) so, null hypotheses is not rejected. It means the residuals are not Heteroskedastic.

ARCH LM test

H_0 - there is no ARCH effect in the series.

Table 6

F-statistic	0.018195	Probability	0.8930
Obs*R-squared	0.018532	Probability	0.8917

From the above table it is resulted that P-value (**0.8917**) of **Observed R-square** is more than standard value (**0.05**) so, null hypotheses is not rejected. It means there is no ARCH effect in the series.

Limitations and Suggestion

The purposed research is focused on cause and effect relationship between risk parameters (non-interest earning ratio, capital adequacy ratio, cost to income ratio, net interest margin) and financial performance indicators i.e. return on assets (ROA). It is suggested that the relationship can be tested by taking some other financial performance indicator like ROE, Earning per share, Profit before Tax and return on capital employed etc.

Capital adequacy ratio, cost to income ratio, net interest margin, non-interest earning ratio is considered as independent variable to investigate the impact on dependent variables (ROA). It is suggested that same study can be carried by taking some other dominating variables like Inflation, Interest rate and exchange rate etc.

This study is focused only on the Public Sector banks so it is suggested that it may performed on private sector banks. Further studies can be conducted on comparative basis between Public sector banks and Private sector banks.

Conclusion

The proposed study was aimed to analyse the impact of risk parameters on financial performance. The result revealed that there is a significant effect of capital adequacy ratio, cost to income ratio, net interest margin and non-interest earning ratio on return on assets (ROA).

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