The Impact of Portfolio Risk on Performance of Scheduled Commercial Banks in India

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Banks in their role as financial intermediaries take considerable financial risks. But the global financial meltdown has changed the banking scenario. Banks are taking utmost care in lending and investment in securities to maintain liquidity and manage the risk in assets portfolio. This paper investigates the impact of portfolio risk and other bank-level factors on the performance of scheduled commercial banks in India through a panel data study during the period 1997-2009. The results suggest that there is a significant impact of portfolio risk on the performance of banks. It means banks which are having more risk in their assets portfolio are enjoying high Return on Assets (ROA). Similarly, Capital to Risk-Weighted Assets Ratio (CRAR), Non-Interest Income (NII), and Net Interest Margin (NIM) make a significant contribution in improving the profitability of banks.

Introduction

Banking is a dynamic industry. Banks have to grow in the present competitive environment to retain their existing market share. Growth has to be supplemented by risk-based credit decisions and also by risk-based pricing. Banks have to be put under risk-based internal audit especially when risk-based supervision is undertaken by the regulator. Banks are known for taking risk to expand the business. The basic business concept is embedded in the axiom 'no risk, no profit'. However, the statement, 'higher the risk, higher the profit', may not hold good all the time. Since risk taking is a part of the banker's business, it will be prudent to identify or at least try to identify and understand the risks that exist in every transaction. Any practicing banker will know, the risks when translated into reality will straightaway hit the profit and loss account on the debit side. There is, unfortunately, no provision to shift the securities from one category to another on a daily basis. Any risk cannot be mitigated or managed without its identification and measurement. Portfolio risk is measured by Risk-Weighted Assets (RWA) in the total assets of the bank. However, higher portfolio risk has a negative impact on the capital and solvency position of the bank.

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Capital adequacy is an indicator of the financial health of the banking system. It is measured by the Capital to Risk-Weighted Assets Ratio (CRAR), defined as the ratio of a bank's capital to its total RWA. Financial regulators generally impose a capital adequacy norm on their banking and financial systems in order to provide a buffer to absorb unforeseen losses due to risky investments. A well adhered to capital adequacy regime does play an important role in minimizing the cascading effects of banking and financial sector crises. The management of portfolio risk has become important because capital adequacy requirements of the banks depend upon the proportion of portfolio risk in the asset portfolio. The higher the portfolio risk, the higher is the capital required in business. Therefore, the banks which have effective risk management system will survive in the market in the long run. The effective management of credit and market risks is a critical component of comprehensive risk management essential for long-term success of a banking institution. The present study deals with the risk taking behavior of scheduled commercial banks on performance.

The rest of the paper is organized as follows. The next section examines the available literature in this regard followed by the objectives and methodology of the study. Further, the paper states the model framework and description of variables. The estimation of the model, data analyses and interpretation of results are described subsequently followed by a conclusion.

Review of Literature

The study by Dermirguc-Kunt and Huizinga (1999) examined the determinants of bank profitability for 80 countries using bank-level data for the period 1988-1995 with about 7,900 individual commercial bank observations. Bank profitability was measured through Net Interest Margin (NIM) and profit before tax. A number of independent variables were considered for the impact study like bank-level factors, macroeconomic factors, taxation, deposit insurance, financial structure and legal and institutional factors. The study found a positive relationship between bank profitability and capitalization and negative relationship between reserves and profitability. In another study, Bashir (2001) examined the determinants of Islamic banks' performance across eight Middle East countries between 1993 and 1998. The data used in this study were a cross-country bank-level data, compiled from income statements and balance sheets of 14 Islamic banks each year during the period 1993-1998 in eight countries. A variety of internal and external banking characteristics were used to predict profitability and efficiency. In general, the analysis of determinants of Islamic banks' profitability confirmed the previous findings. Controlling for macroeconomic environment, financial market structure and taxation, the results indicated that high leverage and large loans to asset ratios lead to higher profitability. The results also indicated that foreign-owned banks are more profitable than their domestic counterparts. Everything remaining equal, there was evidence that implicit and explicit taxes affect the bank performance measures negatively. Furthermore, favorable macroeconomic conditions had an impact on the performance measures positively. The results also showed that capital had a strong positive and significant relationship with profitability. Abreu and Mendes (2002) examined the determinants of bank interest margins and profitability for four European countries (Portugal, Spain, France and Germany) for the period 1986-1999. NIM, Return on Assets (ROA) and return on equity were taken as performance measures. It was

found that well capitalized banks face lower expected bankruptcy costs and thus lower funding costs and this resulted in better profitability. The loan to assets ratio had a positive impact on interest margins and profitability. This suggested that banks maintained low levels of non-performing loans, thereby increasing profits and margins.

Stiroh (2002) assessed the potential benefits from the diversification of activities and increasing reliance on Non-Interest Income (NII) in the UK banking industry. The data set consisted of 14,523 banks in the year 1980, 12,370 banks in 1990 and 8,388 in 2000. The results suggested that NII, particularly, trading revenue, was associated with higher risk and lower risk-adjusted profits. The results also showed a few obvious diversification benefits from ongoing shift towards NII. Service charges and fees were highly correlated with net interest income.

Jiang *et al*. (2003) have attempted to quantify the factors affecting the profitability of 14 banks in Hong Kong for the period 1997-2002. The profitability was measured through ROA. The study found that pressures on bank profitability from their more traditional business have intensified, causing them to diversify into NII generating business to remain competitive. The study also found that equity capital ratio was not significantly related to bank profitability.

Athanasoglou *et al*. (2005) have examined the effect of bank-specific, industry-specific and macroeconomic determinants of bank profitability of 21 Greek commercial banks for the period 1995-2001. The performance was measured by ROA. The coefficient of capital variable was positive and highly significant, reflecting the sound financial condition of Greek banks. The results suggested that banks with sound position were able to pursue business opportunities more effectively and had more time and flexibility to deal with problems arising from unexpected losses and thus achieving increased profitability. The effect of size did not provide evidence of economies of scale in banking.

Kosmidou *et al*. (2005) investigated the impact of banks' characteristics, macroeconomic conditions and financial market structure on banks' NIM and Return on Average Assets (ROAA) in the UK commercial banking industry over the period 1995-2002. The panel data set consisted of 32 UK commercial banks for the above period which accounted for 224 observations. The results showed that capital strength was one of main determinants of UK banks' performance providing support to the argument that well capitalized banks face lower cost of going bankrupt, which reduces their cost of funding or that they have lower needs for external funding which results in higher profitability. The relation between size and performance was significant only in the case of NIM. However, in other study, Murthy (2007) examined the trends and patterns in profitability in the six Gulf Cooperation Council Countries (UAE, Bahrain, Kuwait, Saudi Arabia and Oman and Qatar) using data of 78 banks spread over the years 2002 to 2006. The results found that four key determinants are: (1) cost to income ratio, (2) NIM, (3) loan loss reserves; and (4) liquidity to deposits ratio. However, equity to assets ratio (capital ratio) is not a key determinant of profitability. Naceur and Kandil (2008) studied the effects of capital regulations on banks' performance in Egypt using two performance measures: cost of intermediation (NIM) and profitability. Profitability was measured by ROA and return on equity. The sample contained 28 banks for the period 1989-2004. Increase in bank size and capital adequacy ratio contributed positively to banks' profitability. The reduction in economic activity

had counter effects on banks' profitability. The results supported that capital regulations improved the performance of banking sector in Egypt.

It is observed that all the studies mainly examined the impact of capital adequacy requirements and other bank-level factors like NII and NIM on the performance of banks. However, besides these factors, there can be a factor portfolio risk which is not considered in the earlier studies. Therefore, this has been considered in the present study to understand its impact on the performance of banks.

Objectives and Methodology

The study examines the impact of portfolio risk and other bank-level factors, CRAR, NII and NIM on the performance of scheduled commercial banks.

Data Source

Data has been collected from various sources like "Statistical Tables Relating to Banks in India" published by Reserve Bank of India for the years 1996-97 to 2008-09, *Report on Trend and Progress of Banking in India* published by Reserve Bank of India for the years 1996-97 to 2008-09. Data on bank-group-wise RWA for the years 1996-97 to 2008-09 have been provided on request by Off-Site Monitoring and Surveillance (OSMOS) Division of Reserve Bank of India, Mumbai.

Scope of the Study (Scheduled Commercial Bank-Groups in India)

Scheduled commercial banks in India have been divided into the following groups:

a. State Bank of India and its associates (SBI Group)

b. Nationalized banks

c. Foreign banks operating in India

d. Indian private banks

Model Framework and Description of Variables

Model Framework

Generally, it is considered that those who take more risk, earn more returns, but this may not be the case always. In banks, after the implementation of Basel norms, different class of assets carry different risk weights and hence risk of banks may increase or decrease depending upon their assets portfolio. This panel study considers four models to study the impact of portfolio risk on the performance of scheduled commercial banks. Model 1 considers portfolio risk (*PRISK*), *CRAR*, *NII* and *NIM* as explanatory variables. Model 2 considers both quantitative (as used in model 1) as well as qualitative variables as explanatory (independent) variables. Two dummy variables $DPSB_1$ (dummy public sector banks) and $DIPVTB_2$ (dummy Indian private banks) have been taken to capture the ownership effect. In both the models, ROA has been taken as a dependent variable to assess the performance of banks.

Model 3 considers both quantitative (as used in model 1) as well as qualitative variables as explanatory (independent) variables with time effect.

Model 4 considers both quantitative (as used in model 1) as well as qualitative variables as explanatory (independent) variables with bank group effect.

Model 1: Quantitative Variables Considered as Explanatory Variables
Panel Data Linear Regression Model **(Slope Coefficients and Intercept are Constant Across Bank Groups)**

$ROA_{i,t}$	$= \beta_0 + \beta_1 PRISK_{1i,t} + \beta_2 CRAR_{2i,t} + \beta_3 NII_{3i,t} + \beta_4 NIM_{4i,t} + \mu_{i,t}$
β_0	= Intercept
$\beta_1, \beta_2, \beta_3, \beta_4$	= Slope coefficients of $PRISK$, $CRAR$, NII and NIM, respectively
i	= Cross-sectional units, i.e., bank groups, public sector banks (SBI group, nationalized banks), foreign banks, and Indian private banks
$\mu_{i,t}$	= Error term
t	= Time period (13 years) (1997 to 2009)
$PRISK$	= Portfolio risk
$CRAR$	= Capital to risk-weighted assets ratio
NII	= Non-interest income
NIM	= Net interest margin
ROA	= Return on assets

Model 2: Quantitative Variables and Qualitative (Dummy) Variables **Considered as Explanatory Variables**
Fixed Effect Regression Model (FERM) or Least-Square Dummy Variable (LSDV) Model **(Slope Coefficients are Constant but Intercept Varies Across Bank Ownership Groups)**

$ROA_{i,t}$	$= \alpha_0 + \alpha_1 DPSB_{1i,t} + \alpha_2 DIPVTB_{2i,t} + \beta_1 PRISK_{1i,t} + \beta_2 CRAR_{2i,t} + \beta_3 NII_{3i,t} + \beta_4 NIM_{4i,t} + \mu_{i,t}$
α_0	= Intercept of foreign banks, comparison category, having the highest level of ROA
α_1, α_2	= Differential intercept coefficients of public sector banks and Indian private banks, respectively
$\beta_1, \beta_2, \beta_3, \beta_4$ =	Slope coefficients of $PRISK$, $CRAR$, NII and NIM, respectively
$PRISK$	= Portfolio risk
$CRAR$	= Capital to risk-weighted assets ratio
NII	= Non-interest income
NIM	= Net interest margin
i	= Bank groups, public sector banks (SBI group, nationalized banks), foreign banks, and Indian private banks
t	= Time period (13 years) (1997-2009)
$DPSB_1$	= 1, if the observation belongs to public sector banks, otherwise 0
$DIPVTB_2$	= 1, if the observation belongs to Indian private banks, otherwise 0

Model 3: Quantitative Variables and Qualitative (Dummy) Variables Considered as Explanatory Variables (With Time Effect)

FERM or LSDV Model
(Slope Coefficients are Constant but Intercept Varies Over Time)

$$ROA_{i,t} = \alpha_0 + \alpha_1 D97_{t...} + \alpha_{12} D08_t + \beta_1 PRISK_{1i,t} + \beta_2 CRAR_{2i,t} + \beta_3 NII_{3i,t} + \beta_4 NIM_{4i,t} + \mu_{i,t}$$

α_0	=	Intercept of year 2009 as the base year
$\alpha_1, \ldots, \alpha_{12}$	=	Differential intercept coefficients of years from 1997 to 2008, respectively
$\beta_1, \beta_2, \beta_3, \beta_4$	=	Slope coefficients of *PRISK*, *CRAR*, *NII* and *NIM,* respectively
PRISK	=	Portfolio risk
CRAR	=	Capital to risk-weighted assets ratio
NII	=	Non-interest income
NIM	=	Net interest margin
i	=	Bank groups, public sector banks (SBI group, nationalized banks), foreign banks, and Indian private banks
t	=	Time period (13 years) (1997 to 2009)

Model 4: Quantitative Variables and Qualitative (Dummy) Variables Considered as Explanatory Variables (With Bank Group Effect)

FERM or LSDV Model
(Slope Coefficients are Constant but Intercept Varies Across Bank Groups)

$$ROA_{i,t} = \alpha_0 + \alpha_1 DSBI_{1i,t} + \alpha_2 DNB_{2i,t} + \alpha_3 DIPVTB_{3i,t} + \beta_1 PRISK_{1i,t} + \beta_2 CRAR_{2i,t} + \beta_3 NII_{3i,t} + \beta_4 NIM_{4i,t} + \mu_{i,t}$$

α_0	=	Intercept of foreign banks, comparison category, having the highest level of ROA
$\alpha_1, \alpha_2, \alpha_3$	=	Differential intercept coefficients of SBI group, nationalized banks group and Indian private banks group, respectively
$\beta_1, \beta_2, \beta_3, \beta_4$	=	Slope coefficients of *PRISK*, *CRAR*, *NII* and *NIM,* respectively
PRISK	=	Portfolio risk
CRAR	=	Capital to risk-weighted assets ratio
NII	=	Non-interest income
NIM	=	Net interest margin
i	=	Bank groups, public sector banks (SBI group, nationalized banks), foreign banks, and Indian private banks
t	=	Time period (13 years) (1997 to 2009)
$DSBI_1$	=	1, if the observation belongs to SBI group, otherwise 0
DNB_2	=	1, if the observation belongs to nationalized banks group, otherwise 0
$DIPVTB_3$	=	1, if the observation belongs to Indian private banks group, otherwise 0

Description of Variables

Performance

The performance of banks is measured through *ROA*. It reflects the ability of the bank to generate profit from the bank's assets (Naceur and Kandil, 2006). *ROA* emerges as the key ratio for the evaluation of bank profitability. *ROA* is defined as the net profit divided by total assets. It measures the ability of the management to convert the assets of the bank into net earnings (Sarkar *et al.*, 1998).

Portfolio Risk

Portfolio risk is defined as:

$$PRISK = \frac{Risk\text{-}Weighted\ Assets}{Total\ Assets} \times 100$$

Risk-Weighted Assets: *RWA* refers to a concept developed by the Basel Committee for Banking Supervision (BCBS) for the capital adequacy ratio. *RWA* are the total of all assets held by the bank which are weighted for credit risk and investments for market risk also according to a formula determined by the regulator (usually the country's Central Bank). Most central banks follow the Bank of International Settlements (BIS) guidelines in setting formulae for asset risk weights. Assets like cash and coins usually have zero risk weight, while loans might have a risk weight of 100%. On- and off-balance sheet items are weighted for risk, with off-balance-sheet items converted to balance sheet equivalents (using credit-conversion factors) before being allocated a risk weight.

Hence, the 'portfolio risk' will reflect the *RWA* involved in the total assets of the banks. Higher the *RWA* in the assets portfolio, higher the risk.

Capital to Risk-Weighted Assets Ratio (CRAR)

In India, as per Basel norms issued in April 1992, all the scheduled commercial banks were required to maintain a *CRAR* of 8% w.e.f. March 31, 1995 (9% from March 31, 2000); otherwise the bank will be treated as undercapitalized.

$$CRAR = \frac{Capital}{Risk\text{-}Weighted\ Assets} \times 100$$

Higher the *CRAR*, lower the need to external funding and therefore higher profitability. It is also seen that well-capitalized banks face lower costs of going bankrupt and then cost of funding is reduced.

Non-Interest Income (NII)

NII includes commission, exchange and brokerage, net profit (loss) on sale and revaluation of investments, net profit on sale of land, building and other assets and net profit (loss) on exchange transaction and other miscellaneous incomes, etc.

In recent years, the pressures on bank profitability from their more traditional lending business have intensified, causing them to diversify into *NII* generating business to remain competitive (Jiang *et al*., 2003).

$$Ratio\ of\ Non\text{-}Interest\ Income\ to\ Total\ Income = \frac{Non\text{-}Interest\ Income}{Total\ Income} \times 100$$

Net Interest Margin (NIM)

It creates a wedge between returns to savers and investors and reflects the cost of bank intermediation services and the efficiency of the banking sector. In general, higher the *NIM*, higher are the banks' profit margins and more stable is the banking sector. However, a higher *NIM* could reflect riskier lending practices associated with substantial loan loss provisions and could be an indication of inefficiency in the banking sector (Jiang *et al*., 2003).

$$Ratio\ of\ Net\ Interest\ Margin\ to\ Total\ Assets = \frac{Net\ Interest\ Margin}{Total\ Assets} \times 100$$

Null Hypotheses

Model 1:

H_{01}: *There is no significant impact of portfolio risk, CRAR, NII and NIM on ROA of scheduled commercial banks.*

Model 2:

$H_{02(1)}$: *There is no significant impact of portfolio risk, CRAR, NII and NIM on ROA of scheduled commercial banks.*

$H_{02(2)}$: *There is no significant difference in performance of public sector banks and Indian private banks with foreign banks operating in India.*

Model 3:

$H_{03(1)}$: *There is no significant impact of portfolio risk, CRAR, NII and NIM on ROA of scheduled commercial banks.*

$H_{03(2)}$: *There is no significant difference in performance of scheduled commercial banks over the time period considered in the study.*

Model 4:

$H_{04(1)}$: *There is no significant impact of portfolio risk, CRAR, NII and NIM on ROA of scheduled commercial banks.*

$H_{04(2)}$: *There is no significant difference in performance of banks across bank groups considered in the study.*

Data Analysis, Estimation of the Model and Interpretation of the Results

Table 1 provides the comparative picture of portfolio risk and other variables of four bank-groups and all scheduled commercial banks. The mean portfolio risk of foreign banks is the highest during the period of study.

Table 1: Mean and Standard Deviation of Variables (Relationship Between *ROA* and Portfolio Risk/Other Variables) (1997-2009)

Bank Group / Variables	SBI Group		Nationalized Banks		Foreign Banks		Indian Private Banks		All	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
ROA	0.83	0.15	0.71	0.26	1.37	0.30	0.90	0.15	0.95	0.33
PRISK	50.13	10.68	51.29	8.83	81.01	12.38	63.99	10.72	61.60	16.32
CRAR	12.58	0.94	11.43	1.27	13.33	1.88	12.52	0.87	12.47	1.44
NII	15.21	2.25	12.99	2.92	25.55	4.93	17.68	3.45	17.86	5.88
NIM	2.81	0.35	2.73	0.26	3.63	0.26	2.29	0.33	2.87	0.57

Table 2: Estimates of Panel Data Linear Regression Model (Relationship Between *ROA* and Portfolio Risk/Other Variables) Dependent Variable: *ROA*

Independent Variables	Coefficient	Std. Error	*t*-Statistic	*p*-Value	Null Hypothesis [H_{01}]
Intercept	–0.935	0.197	–4.749	0.000	–
PRISK	0.004	0.002	2.438*	0.019	Rejected
CRAR	0.068	0.016	4.299*	0.000	Rejected
NII	0.027	0.005	4.969*	0.000	Rejected
NIM	0.102	0.040	2.582*	0.013	Rejected

R^2 = 0.835

Adjusted R^2 = 0.821

Durbin-Watson Statistic = 1.789

n = 52

df = $n - k$ = 52 – 5 = 47

t (Table Value) at 5% level of significance = 2.000

F-Statistic (4, 47) = 59.566*

Table 2 (Cont.)

At *p*-Value	=	0.000
F-Value (Table) at 5% level =		2.61
Where df *k* – 1	= 5 – 1 =	04
n – *k*	= 52 – 5 =	47
n – 1	= 52 – 1 =	51
k	=	Number of parameters (coefficients) estimated including intercept term
n	=	Number of observations
Note: * Significant at 5% Level.		

Interpretation of the Results

In Model 1, the results of which are shown in Table 2, there is a significant impact of portfolio risk at 5% level of significance on the profitability of scheduled commercial banks. Therefore, the banks which are having more risk in their assets portfolio are enjoying more profits. The other variables (*CRAR*, *NII* and *NIM*) which have significant positive impact on the performance of banks also contribute to the profitability of banks.

CRAR has a positive significant coefficient which suggests impact on profitability of scheduled commercial banks. The results indicate that well capitalized banks achieve higher profits due to lower cost of funding. The results are consistent with earlier studies (Kosmidou, 2005; and Naceur and Kandil, 2006).

The variable *NII* has a positive and significant coefficient which clearly points out that the income of scheduled commercial banks in India can be improved by diversifying into new product lines which releases pressure on bank profitability from traditional lines of business in competitive environment. The results are consistent with the study (Jiang *et al*., 2003).

NIM also has a positive and significant impact in maintaining the profitability of scheduled commercial banks in India. This reflects an improvement in assets-liability management of the banks and in particular, the investment of excess liquidity in higher yielding securities (Jiang *et al*., 2003). The scheduled commercial banks' *NIM* is coming down in this market-driven environment and in the coming years the banks have to pay attention to other sources of income to cover up this shortfall.

Interpretation of the Results

In Model 2, the results of which are shown in Table 3, when, besides the causal quantitative variables, two dummy variables *DPSB* (dummy public sector banks) and *DIPVTB* (dummy Indian private banks) are also considered to capture the ownership effect, the results suggest that there is no significant difference in the profitability of public sector banks and Indian private sector banks with foreign banks operating in India. However, there is significant impact

Table 3: Estimates of LSDV Regression Model (Relationship Between *ROA* and Portfolio Risk/Other Variables) [With Ownership Effect]
Dependent Variable: *ROA*

Independent Variables	Coefficient	Std. Error	t-Statistic	p-Value	Null Hypothesis [$H_{02(1)}$ and $H_{02(2)}$]
Intercept	−1.207	0.370	−3.261	0.002	–
DPSB	0.108	0.117	0.918	0.363	Not Rejected
DIPVTB	0.096	0.125	0.763	0.449	Not Rejected
PRISK	0.005	0.002	2.524*	0.015	Rejected
CRAR	0.067	0.016	4.158*	0.000	Rejected
NII	0.030	0.006	4.743*	0.000	Rejected
NIM	0.139	0.069	2.023*	0.049	Rejected

R^2	=	0.838		
Adjusted R^2	=	0.817		
Durbin-Watson Statistic	=	1.770		
n	=	52		
df	=	$n - k$	= 52 – 7	= 45
t (Table Value) at 5% level of significance	=	2.000		
F-Statistic (6,45)	=	38.878*		
At *p*-Value	=	0.000		
F-Value (Table) at 5% level	=	2.34		
Where df $k - 1$	=	7 – 1	= 06	
$n - k$	=	52 – 7	= 45	
$n - 1$	=	52 – 1	= 51	
k	=	Number of parameters (coefficients) estimated including intercept term		
n	=	Number of observations		

Note: * Significant at 5% Level.

of portfolio risk on the performance of banks. It means the banks which are having more risky assets in their portfolio are getting good returns on their assets. The other variables (*CRAR*, *NII* and *NIM*) show a significant positive impact on the profitability of banks which suggest that banks can improve the level of their earnings if they concentrate on increasing the capital adequacy ratio which results in lower need to external funding. It is also seen that well capitalized banks face lower costs of going bankrupt and then cost of funding is reduced. *NII* also contributes to the profitability of banks significantly besides the regular income from advances and investments.

Table 4: Estimates of LSDV Regression Model
(Relationship Between *ROA* and Portfolio Risk/Other Variables)
[With Time Effect] Dependent Variable: *ROA*

Independent Variables	Coefficient	Std. Error	*t*-Statistic	*P*-Value	Null Hypothesis [$H_{03(1)}$ and $H_{03(2)}$]
Intercept	–0.705	0.244	–2.895	0.006	–
PRISK	0.002	0.003	0.728	0.471	Not Rejected
CRAR	0.058	0.016	3.545*	0.001	Rejected
NII	0.028	0.009	3.123*	0.004	Rejected
NIM	0.124	0.047	2.664*	0.012	Rejected
Dummy 1997	–0.068	0.110	–0.622	0.538	Not Rejected
Dummy 1998	–0.028	0.111	–0.253	0.802	Not Rejected
Dummy 1999	–0.213	0.108	–1.972	0.057	Not Rejected
Dummy 2000	–0.028	0.108	–0.260	0.796	Not Rejected
Dummy 2001	–0.227	0.108	–2.111*	0.042	Rejected
Dummy 2002	–0.119	0.112	–1.062	0.296	Not Rejected
Dummy 2003	–0.001	0.117	–0.012	0.991	Not Rejected
Dummy 2004	–0.013	0.136	–0.096	0.924	Not Rejected
Dummy 2005	–0.170	0.106	–1.610	0.116	Not Rejected
Dummy 2006	–0.069	0.098	–0.707	0.484	Not Rejected
Dummy 2007	0.015	0.101	0.152	0.880	Not Rejected
Dummy 2008	0.046	0.096	0.482	0.633	Not Rejected

R^2 = 0.892
Adjusted R^2 = 0.842
Durbin-Watson Statistic = 1.439
n = 52
df = $n - k$ = 52 – 17 = 35
t (Table Value) at 5% level = 2.021
of significance
F-Statistic (16,35) = 18.004*
At p-Value = 0.000
F-Value (Table) at 5% level = 1.92
Where df $k - 1$ = 17 – 1 = 16
$n - k$ = 52 – 17 = 35
$n - 1$ = 52 – 1 = 51
k = Number of parameters (coefficients) estimated including intercept term
n = Number of observations

Note: * Significant at 5% Level.

Interpretation of the Results

In Model 3, the results of which are shown in Table 4, when, besides the causal quantitative variables, 12 dummy variables are also considered to capture the time effect, the results suggest that there is no significant difference in the profitability of banks in all the years from 1997 to 2008 with the base year 2009 except for 2001. Similarly, there is no significant impact of portfolio risk on the performance of banks. It means the banks which are having more risky assets in their portfolio are not getting good returns on their assets. The other variables (*CRAR*, *NII* and *NIM*) show a significant positive impact on the profitability of banks.

Independent Variables	Coefficient	Std. Error	*t*-Statistic	*p*-Value	Null Hypothesis [$H_{04(1)}$ and $H_{04(2)}$]
Table 5: Estimates of LSDV Regression Model (Relationship Between *ROA* and Portfolio Risk/Other Variables) [With Bank Group Effect] Dependent Variable: *ROA*					
Intercept	–1.262	0.383	–3.299	0.002	–
PRISK	0.005	0.002	2.415*	0.020	Rejected
CRAR	0.070	0.017	4.153*	0.000	Rejected
NII	0.030	0.006	4.750*	0.000	Rejected
NIM	0.143	0.070	2.055*	0.046	Rejected
Dummy SBI	0.098	0.119	0.826	0.413	Not Rejected
Dummy NB	0.137	0.127	1.080	0.286	Not Rejected
Dummy IPVTB	0.106	0.127	0.830	0.411	Not Rejected

R^2 = 0.840
Adjusted R^2 = 0.814
Durbin-Watson Statistic = 1.797
n = 52
df = $n – k$ = 52 – 8 = 44
t (Table Value) at 5% level
of significance = 2.021
F-Statistic (7, 44) = 32.938*
At p-Value = 0.000
F-Value (Table) at 5% level = 2.25
Where df $k – 1$ = 8 – 1 = 07
$n – k$ = 52 – 8 = 44
$n – 1$ = 52 – 1 = 51
k = Number of parameters (coefficients) estimated including intercept term
n = Number of observations

Note: * Significant at 5% Level.
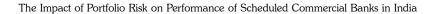
Interpretation of the Results

In Model 4, the results of which are shown in Table 5, when, besides the causal quantitative variables, three dummy variables—dummy SBI, dummy national bank and dummy *IPVTB*—are also considered to capture the bank effect, the results suggest that there is no significant difference in the profitability of SBI group, nationalized bank group and Indian private sector bank group with foreign banks group operating in India. However, there is significant impact of portfolio risk on the performance of banks. It means the banks which are having more risky assets in their portfolio are getting good returns on their assets. The other variables (*CRAR*, *NII* and *NIM*) show a significant positive impact on the profitability of banks.

Conclusion

The international financial community has witnessed several significant developments in the area of risk management and banking supervision over the last two decades. In 1988, BCBS introduced risk-based capital adequacy norms through Basel I accord (BCBS 1988). Basel I mainly incorporated credit risk in calculating the capital adequacy norms of banks. It recommended a bank's regulatory capital at 8% of its *RWA*, where assets were risk-weighted according to their credit risk. In India, RBI prescribed 9% *CRAR*. Basel II norms have been implemented w.e.f. March 31, 2008 by international active banks and other banks are in the process of implementation w.e.f. March 31, 2009. The present study shows that portfolio risk plays an important role in earning higher returns to the banks. The capital adequacy contributes in improving the profitability of banks as the costs of funding of the banks are reduced. The customers of the bank are ready to offer their deposits even at lesser rate of interest with banks having higher capital adequacy ratio. The banks have to play the role of supermarkets to satisfy all the financial needs of the customers. In this way they can earn non-risky *NII* besides earning their regular income as interest from loans and investments which will ultimately increase the *ROA* of the banks to remain competitive in the market.

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