A Study of the Impact of Capital Adequacy Requirements on off Balance Sheet Activities of Indian Banks

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Abstract

The purpose of this research paper is to study the impact of capital adequacy requirements and important determinants on off balance sheet activities of banks in India using the financial data from 1999-2000 to 2008-2009. The data analysis for this paper has been done with the help of multiple regressions using SPSS software. The model framework of this paper considers Off Balance Sheet Activities (OBS) as dependent variable and Capital to Risk Weighted Assets Ratio (CRAR), Non Performing Assets to Net Advances Ratio (NPA), Non-Interest Income (NII), Size as measured by natural log of assets (SIZE), Loan Ratio (LR), Gross Domestic Product (GDP), Index of Industrial Production (IIP), Net Interest Margin (NIM), Liquid Assets to Total Assets (LATA), Growth Rate of Total Equity Capital (EQUITY), and Inflation (INFL) as independent variables. Findings of this paper revealed that in case of SBI & its Associate Banks: EQUITY has significant positive whereas IIP has significant negative impact on OBS; Nationalized Banks: LR has significant positive whereas LATA has significant negative impact on OBS; Indian Private Banks: GDP has significant positive whereas IIP has significant negative impact on OBS; Foreign Private Banks: GDP has significant positive whereas SIZE, LR and IIP have significant negative impact on OBS; Public Sector Banks (taking SBI & its Associate Banks and Nationalized Banks together): LR has significant positive whereas LATA has significant negative impact on OBS; Private Sector Banks (taking Indian and Foreign Banks together): GDP and LATA have significant positive whereas CRAR, NII, SIZE, LR and IIP have significant negative impact on OBS.

KeyWords: Capital to Risk Weighted Assets Ratio (CRAR), OFF- Balance sheet Activities, NPA, NIM

INTRODUCTION

Financial systems have experienced dramatic change over the last two decades. The sharp acceleration in the pace of innovation has significantly altered the traditional face of the international financial system. These developments have been mainly due to interaction of the combination of factors. The revolution in the information technology and an associated increase in the competition at both the national and international levels, has led to a continuing erosion of dividing lines, as the major intermediaries have been global in their geographical coverage and universal in their financial function, encompassing banking, securities market activities and increasingly, insurance (Ghosh and Nachane, 2002) .

Financial Sector Reforms set in motion in 1991 have greatly changed the face of Indian Banking Sector. Banking Industry has moved gradually from a regulated environment to a deregulated Market Economy. Liberalization has pushed banks into new areas of competition. The banks are presently encountered with Omni present factors of various types of financial and non financial risk in every kind of activities that they undertake. If handled properly, they results as an opportunity for Bankers. Risk management has thus become a part and parcel of the strategic planning process of the bankers (Vyas et al., 2008).

The past couple of decades, financial institution have sharply expanded their Off Balance Sheet Activities. This trend has been fostered by stepped up pace of financial innovation. Financial innovation involves more

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than development and diversification of new borrowing sources. It also affects the entire range of financial intermediation, both domestic and international. In fact the increase in the variety of financial services and the product offered by the financial intermediaries has impacted not just the assets and liabilities side of Balance Sheet but also the Off Balance Sheet Items as well.

The structure of the balance sheet of commercial banks has experienced an enormous change with the introduction of off-balance sheet activities in the banking operation. Factors that contributed to the growth of off-balance sheet activities over the past decade include strong competition in the established markets and deregulation of the international financial markets, which contributed to the growth of new financial instruments in risk management. Besides, technological advancement also served as a factor that affected the growth of off-balance sheet activities. In addition, the growing volatility in the financial markets as well as low margins from the on-balance sheet business also served as other factors that encouraged the commercial banks to engage in off-balance sheet activities since, investors demand high returns on their investment in the commercial banks.

It is argued that off-balance sheet activities play an important role in helping the banks to hedge their long-term financial assets in the on-balance sheet and increasing the bank's profitability, while keeping the details of these earnings off from the balance sheet of the commercial banks. This enables the banks to extend their leverage against their capital adequacy requirements and maximize the return on invested capital (Karim and Gee, 2007).

An important dimension of this financial innovation process has been upsurge in the Off Balance Sheet Activities of Banks. Such activities, though not entirely new from historical perspective, have expanded considerably in the range and scope in recent years (Jagtiani et al., 1995).

There are various other factors that affect the Off Balance Sheet Activities of the Indian Banks such as Non Performing Assets (NPA), Non Interest Income (NII), and Net Interest Margin (NIM) and so on. Several

empirical studies conducted pertaining to Off Balance Sheet Activities in the US context as well as Indian context also.

In the post nationalization era, no new private sector banks were allowed to set up. However, in 1993, in recognition of the need to introduce greater competition which could lead to higher productivity and efficiency of Banking System, new private sector banks were allowed to be set up in the Indian banking system. Now a day, due to increase in competition banks are looking for new channel of income. The new channel of income which is developing in today's banking sector is mainly off Balance Sheet Activities.

Financial deals and arrangements that can have a material effect on a company but are structured in such a way that they do not show up on a company's balance sheet and do not affect a company's borrowing capacity. Off-balance sheet activities took on huge importance in 2001 when the off-balance sheet deals that Enron Corp. had engaged in came to light. Because the details about off-balance sheet activities are unknown to investors, the off-balance sheet transactions can hide a significant amount of liability.

This study mainly focuses on impact of capital adequacy requirements and important determinants on off balance sheet activities of banks in India in SBI & its Associate Banks, Nationalized Banks, Indian Private Banks and Foreign Banks operating in India.

This study has a great significance in today's scenario. As it helps to know what all are the factors that affect the off balance sheet activities of which banks and how.

LITERATURE REVIEW

Off Balance Sheet Activities created concern among accountants, regulators, investors and depositors. One reason for the concern is the lack of knowledge concerning the impact of these activities on the different aspects of banking. The amounts of OBSA's are significant and growing at a fast rate which caused researchers to conduct studies to investigate their impact on several aspects of the bank's financial position. A number of studies have examined the issues of why banks are engaged in Off Balance Sheet Activities and

what are all factor that affect OBS Activities. Even though the literature on OBS activities is extensive, empirical research with respect to Indian banks is scarce. In one of the earliest studies, Nachane and Ghosh (2002) observed that higher levels of capital and liquid assets lowered the incentive of banks to engage in OBS activities. However, the paper considered a limited time span and importantly, it confined itself only to public sector banks, which limited the empirical appeal of the model. The purpose of this paper is to fill this void by empirically investigating OBS activities of the banking sector in India, both over a longer time span and across the banking system in its entirety.

A second group of studies has examined the relationship between bank OBS activities and risk. Thus, Hassan (1993) examined the relationship between off balance sheet activities and market risk of large commercial banks of the United States. He found that off balance activities contribute to the overall diversification of the bank portfolio risk by reducing the total risk. Nevertheless, off balance sheet activities do not influence the systematic risk of banks and this may be due to the reason that off balance activities are not a concern of well diversified stockholder. This study employs Ronn-Verma option pricing methodology to calculate implied asset risk, and examine the risk-behavior of OBS activities. Calmes and Theoret (2009) revisited the impact of off-balance-sheet (OBS) activities on banks risk-return trade-off. Recent studies (e.g., Stiroh and Rumble 2006) suggested that increasing OBS activities do not necessarily yield straightforward diversification benefits for banks. However, introducing a risk premium in the standard banks returns models, and resorting to an ARCH-M procedure, Canadian data suggested that banks risk-return trade-off displays a structural break around 1997. In the second sub period of the sample (1997-2007), it was found that the noninterest income generated by OBS activities no longer impacts banks returns negatively. While during the first period (1988-1996) the volatility variable is not significant in any returns equations, a risk premium eventually emerged, pricing the risk associated to OBS activities risks.

Several authors as like Guevare (2001) focused on an activity that has received little attention in the banking

literature, namely Off-Balance Sheet (OBS) activities. The main purpose of the paper is to test the sensitivity of profit efficiency measures when the OBS activities are included in the output definition. An important increase in the efficiency scores is be found when the definition of production is extended. Furthermore, the measures of efficiency are calculated taking into account the different specialization of the institutions by grouping them in clusters. Vyas et al. (2008) investigated the impact of capital adequacy norms on performance of Scheduled Commercial Banks (excluding Regional Rural Banks). The performance of the banks was measured in terms of Return on Assets (ROA) of Public Sector Banks and Indian Private Banks with foreign banks operating in India. Foreign Bank group was taken as a Benchmark as this group was having highest average ROA. They have used 3 models for the study i.e. Model 1 considers only quantitative variables. Model 2 compared the Mean Return on Assets of Public Sector Banks and Indian Private Sector Banks with foreign Banks operating in India. Model 3 considered both quantitative as well as qualitative variables. The result indicated that the Capital Adequacy Ratio increases the profitability of Scheduled Commercial Bank in India. This provided the support to the argument that well capitalized Banks face lower cost of going bankrupt, which reduced their cost of funding. Lamberte et al. (1990) attempted to shed light on the major Off-Balance Sheet activities of commercial banks in the Philippines. Due to data limitations, the paper focused on the trust and funds management accounts, which have grown rapidly in recent years. The implications of the fiduciary facilities on several areas and the implications of the fiduciary functions on the tenability of some supervisory requirements are also investigated. Bauman and Mark (2003) reported the results of a study of the financial reporting effects of off-balance-sheet activities concealed by the equity method of accounting. The study examined footnote disclosures relating to equity method investees, offered suggestions for improving the usefulness of those disclosures, and estimated the valuation effects of information in the disclosures. An important empirical finding is that the market places significant negative values on investor-guaranteed off-balance-sheet obligations.

Sinha (2006) carried on study for commercial banks operated in India, off balance sheet activities have become important in the reform years because of the following reasons:

- A) the Deregulation of the banking sector entry and relaxation of branch licensing policy resulted in substantial decline in banking sector spread(in terms of total assets) compelling the commercial banks to look for some other source of income.
- b) Introduction of Assets classification, income recognition and capital Adequacy norms made lending a relatively risky proposition. The paper seeks to compare the Indian commercial banks (the reform period) in respect of their ability to generate income out of off balance sheet activities by using the Data Envelopment Approach. Further, the study seeks to find out, in the context of a panel data framework, the impact of operating efficiency, capital adequacy and NPA incidence on the (off balance sheet) risk taking behavior of the Indian commercial banks. The result obtained from the non-parametric exercise shows that the public sector commercial banks are lagging behind the private sector commercial banks in terms of off balance sheet activities. This is one area where banks must pay attention to improve their financial health.

There are several factors which affect the off balance sheet activities of banks, thus, the investigation carried out by Nachane and Ghosh (2002) showed the factors influencing the OBS activities of public sector banks For the purpose of their analysis, Nachane and Ghosh used data panel for the period 1995-96 to 1990-00. The dependent variable considered for the analysis is the value of outstanding derivatives divided by total assets (OBS). The explanatory variables are SIZE, CRAR, NIM, ASSETG, EQUITY, NNPA, PROV, and LIQUID. Both fixed effects model and random effects model have been used for estimation purposes. The outcome of the study revealed that SIZE, CRAR, NIM, ASSETG and PROV are negatively related with off balance sheet activities. Of these variables, size was found to be the most important determinant of OBS activity. This paper extends the work of Nachane and Ghosh in several aspects. Nachane and Ghosh (2007) traced the determinants of off-balance sheet activities in

the Indian banking sector. Using data for the period 1996 to 2004, the study found that not only regulatory factors, but also market forces captured by banks-specific characteristics and macro-economic conditions are at work in the diffusion pattern of off-balance sheet (OBS) activities. From the regulatory standpoint, while capital adequacy is dominant in the case of public sector banks, non-performing assets seem to be a prime concern for foreign banks, in addition to public sector banks. Among others, at the bank-specific level, size is an important consideration for public sector and foreign banks, while profits are a prime mover only for new private banks. Finally, the macro-economic environment seems to have played an important role in affecting OBS diffusion, more so for public sector and new private banks.

Thus the changing nature of banks activities has recently received growing attention from researchers. However, large numbers of studies are using both econometric and non-parametric models, have examined banks' cost and profit efficiency and productivity.

The researchers have studied the impact of various factors like CRAR, SIZE, NII, NIM, ASSETG, LIQUID on the Off Balance Sheet Activities of Banks. But their other factors also which affects the Off Balance Sheet Activities of the Banks. Many researchers have taken either Public Sector Banks or Private Sector Banks, but overall impact of OBS Activities on Indian Banks has not been considered. No study in India has shown the impact of OBS Activities together on Public Sector Banks and Private Sector Banks.

The paper attempts to bridge this gap in literature by focusing on overall Indian Banking Sector .i.e. Public Sector Banks and Private Sector Banks. The study considers not only Bank Specific factors such as CRAR, NII, NIM, NPA, LOAN RATIO, and SIZE but also macro economic factors such as GDP, IIP and INFLATION.

DATA

Data has been collected from "Statistical Tables Relating to Banks in India" and "Report on Trend and Progress of Banking in India" Published by Reserve Bank of India

and available on www.rbi.org. The study has covered the financial data for the period from 1999-00 to 2008-09.

The study includes data related with scheduled commercial banks (excluding regional rural banks). These banks have been classified into two large groups viz. Public Sector Banks (having two sub groups viz. SBI & its Associate Banks and Nationalized Banks) and Private Sector Banks (having two sub groups viz. Indian Private Banks and Foreign Private Banks) [Refer Appendix 1]

VARIABLES

The model framework used in this study is as under:

$$\text{OBS} = \beta_0 + \beta_1 \text{CRAR} + \beta_2 \text{NPA} + \beta_3 \text{NII} + \beta_4 \text{SIZE} + \beta_5 \text{LR} + \beta_6 \text{GDP} + \beta_7 \text{IIP} + \beta_8 \text{NIM} + \beta_9 \text{LATA} + \beta_{10} \text{EQUITY} + \beta_{11} \text{INFL}$$

The above model framework considers Off Balance Sheet Activities (OBS) as dependent variable and Capital to Risk Weighted Assets Ratio (CRAR), Non Performing Assets to Net Advances Ratio (NPA), Non-Interest Income (NII), Size as measured by natural log of assets (SIZE), Loan Ratio (LR), Gross Domestic Product (GDP), Index of Industrial Production (IIP), Net Interest Margin (NIM), Liquid Assets to Total Assets (LATA), Growth Rate of Total Equity Capital (EQUITY), and Inflation (INFL) as independent variables. A brief description of these variables is as under:-

1. Off Balance Sheet Activities (OBS):

The business activities of a savings association generally do not involve booking assets (loans) and taking deposits. Off-balance sheet activities normally generate fees, but produce liabilities or assets that are deferred or contingent and thus, under GAAP, do not appear on the institution's balance sheet until or unless they become actual assets or liabilities with a value or cost that can be determined. Examples include guarantees substituting the institution's own credit for a third party such as in standby letters of credit; interest rate swaps; foreign exchange forward options; repurchase agreements; loan commitments; and recourse associated with sales of assets. It can be calculated with the help of following formula:

$$\text{OBS} = \frac{\text{Contingent Liabilities}}{\text{Total Liabilities}} \times 100$$

2. Capital to Risk Weighted Assets Ratio (CRAR):

This ratio for banking organization is an important issue that has received a considerable attention in finance. It can be defined as a measure of a bank risk exposure. CRAR is used as an important measure of safety and soundness of the banks. 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 (Vyas et al., 2008). The impact of CRAR on Off Balance sheet Activities of bank can be well calculated as:

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

3. Non Performing Assets to Net Advances Ratio (NPA):

A strong banking sector is important for flourishing economy. The failure of the banking sector may have an adverse impact on other sectors. Non-performing assets are one of the major concerns for banks in India. NPAs reflect the performance of banks. A high level of NPAs suggests high probability of a large number of credit defaults that affect the profitability and net-worth of banks and also erodes the value of the asset. The NPA growth involves the necessity of provisions, which reduces the overall profits and shareholder value. It can be measured with the help of following formula i.e.

$$\text{NPA} = \frac{\text{Net NPA}}{\text{Net Advances}} \times 100$$

4. Non-Interest Income (NII):

Non Interest Income derived from fee-based banking services, such as corporate cash management, check collection, and consumer annual fees on credit cards, and also monthly service charges on deposit accounts. Also included are many new activities, such as fees from participations in mutual fund commissions, investment advisor fees in merger and acquisition activities, and securities underwriting fees. It is measured with the following formula:

$$\text{Non Interest Income} = \frac{\text{Other income}}{\text{Total Assets}} \times 100$$

5. Size as measured by natural log of assets (SIZE):

The anticipated effect of bank size has double effects and the net effect of these two determines the net impact of firm size on OBS activities. On the one hand, a bank has to be of a certain size to get involved in OBS activities and derive the benefit of the economies of scale. Large banks may be the only banks that have highly qualified risk management and specialized staff. Likewise, sophisticated clients who are more likely to engage in OBS activities may not consider the small banks as a transaction vehicle since they believe that large banks are too big to fail. This is buttressed by perception that as bank gets bigger, it becomes likely more risk-diversified which suppress the incentives to engage in OBS (Ahmed & Kabir 2009) It can be measured by:

$$\text{SIZE} = \text{Natural log of Total assets of a bank}$$

6. Loan Ratio (LR):

Loan Ratio is the loans divided by total assets. An increase in the Loan Ratio may imply a higher risk profile for the bank's balance sheet and vice versa. It is measured with the following formula:

$$\text{Loan Ratio} = \frac{\text{Loans and Advances}}{\text{Total Assets}} \times 100$$

7. Gross Domestic Product (GDP):

Gross Domestic Product Growth rate is the indicator of economic development of the country, as the GDP is growing all the sector of economy will definitely move up, so it will be one of major variable which affect the profitability of banks. GDP at factor cost is taken for the study.

8. Index of Industrial Production (IIP):

Index of Industrial Production in simplest terms is an index which details out the growth of various sectors in an economy; it is an abstract number, the magnitude of which represents the status of production in the industrial sector for a given period of time as compared to a reference period of time.

9. Net Interest Margin (NIM):

It 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. It is similar to the gross margin of non-financial companies. It is usually expressed as a percentage of what the financial institution earns on loans in a time period and other assets minus the interest paid on borrowed funds divided by the average amount of the assets on which it earned income in that time period (the average earning assets).

In general, the higher the net interest margin, the higher are banks profit margins and more stable is the banking structure. It can be calculated by:

$$\text{NIM} = \frac{\text{Total Interest Income} - \text{Total Interest Expenses}}{\text{Total Assets}} \times 100$$

10. Liquid Assets to Total Assets (LATA):

This ratio measures the percentage of total assets that are invested in liquid assets. Liquid assets often pay no interest or have a lower yield because there is a very little risk. Only enough funds to meet liquidity needs should be maintained in liquid assets. In this case, Liquid Assets is been calculated as "a sum of Cash in Hand, Balances with RBI, Balances with Banks in India, Money at Call and Short Notices and Balances with Banks outside India." (World Council of Credit Union, 2002). It is been calculated as:

$$\frac{\text{LiquidAssets}}{\text{TotalAssets}} \times 100$$

11. Growth Rate of Total Equity Capital (EQUITY):

Equity capital represents the customers' share of net margins. Capital credits are the margins (profits) that are left over after all operating expenses are deducted from revenue. Equity capital is used to partially finance long-term capital projects, and a minimum level is required by lenders. A higher level of equity capital can reduce the cost (interest rate) of borrowed money. It is been calculated as:

$$\text{Equity} = \frac{\text{Current Year E.C.} - \text{Previous Year E.C.}}{\text{previous year E.C.}} \times 100$$

12. Inflation (INFL):

In India inflation is calculated on Whole sale price index and In India Reserve bank is responsible to accelerate the banking sector, In case of inflation when the flow of money in the market is more or purchasing power of people were increasing with this commodity prices were going up.

HYPOTHESES

Based on the model framework the following hypotheses are set:-

H₀₁= There is no significant effect of CRAR on OBS.
H₀₂= There is no significant effect of NPA on OBS.
H₀₃= There is no significant effect of NII on OBS.
H₀₄= There is no significant effect of SIZE on OBS.
H₀₅= There is no significant effect of LR on OBS.
H₀₆= There is no significant effect of GDP on OBS.
H₀₇= There is no significant effect of IIP on OBS.
H₀₈= There is no significant effect of NIM on OBS.
H₀₉= There is no significant effect of LATA on OBS.
H₀₁₀= There is no significant effect of EQUITY on OBS.
H₀₁₁= There is no significant effect of INFL on OBS.

METHODOLOGY

The model framework in this study has been analyzed with the help of Multiple Regression that is concerned with describing and evaluating the relationship between a given variable(usually called dependent variable) and one or more other variables(usually called as independent variable). Following formula is applied for testing the hypothesis:-

$$t = \frac{\bar{x} - \mu_0}{s/\sqrt{n}},$$

Software Package for Social Sciences (SPSS) has been used for all essential statistical calculations.

ANALYSIS

The data analysis is done by applying model framework on four sub groups viz. SBI & its Associate Banks, Other Nationalized Banks, Indian Private Banks and Foreign Private Banks. The exercise is rehearsed on two large groups viz. Public Sector Banks taking all the banks of two sub groups viz. SBI & its Associate Banks and Nationalized Banks together) and Private Sector Banks (taking all the banks of two sub groups viz. Indian Private Banks and Foreign Private Banks together).

In the case of SBI & its Associate Banks EQUITY has significant positive impact on OBS whereas IIP has significant negative impact on OBS. A 1 unit change in EQUITY leads to 0.41 unit change in OBS whereas a 1 unit change in IIP leads to -1.73 units change in OBS. [Refer Appendix 2]

In the case of Other Nationalized Banks LR has significant positive impact on OBS whereas LATA has significant negative impact on OBS. A 1 unit change in LR leads to 1.06 units change in OBS whereas a 1 unit change in LATA leads to -1.03 unit change in OBS. [Refer Appendix 3]

In the case of Indian Private Banks GDP has significant positive impact on OBS whereas IIP has significant negative impact on OBS. A 1 unit change in GDP leads to 5.05 units change in OBS whereas a 1 unit change in IIP leads to -2.95 units change in OBS. [Refer Appendix 4]

In the case of Foreign Private Banks GDP has significant positive impact on OBS whereas SIZE, LR and IIP have significant negative impact on OBS. A 1 unit change in GDP leads to 306.94 units change in OBS whereas a 1 unit change in SIZE leads to -965.12 units change in OBS, a 1 unit change in LR leads to -25.24 units change in OBS and a 1 unit change in IIP leads to -171.67 units change in OBS. [Refer Appendix 5]

In the case of Public Sector Banks LR has significant positive impact on OBS whereas LATA has significant negative impact on OBS. A 1 unit change in LR leads to 1.03 units change in OBS whereas a 1 unit change in LATA leads to -1.00 unit change in OBS. [Refer Appendix 6]

In the case of Private Sector Banks LATA and GDP have significant positive impact on OBS whereas CRAR, NII, SIZE, LR and IIP have significant negative impact on OBS. A 1 unit change in LATA leads to 14.46 units change in OBS and a 1 unit change in GDP leads to 147.03 units change in OBS whereas a 1 unit change in CRAR leads to 6.47 units change in OBS, a 1 unit change in NII leads to -64.43 units change in OBS, a 1 unit change in SIZE leads to -740.50 units change in OBS, a 1 unit change in LR leads to -5.68 units change in OBS and a 1 unit change in IIP leads to -82.63 units change in OBS. [Refer Appendix 7]

CONCLUSION

The analysis shows that in the case of SBI & its Associate Banks EQUITY has significant positive impact on OBS whereas IIP has significant negative impact on OBS. In the case of Other Nationalized Banks LR has significant positive impact on OBS whereas LATA has significant negative impact on OBS. Like is in the case of Public Sector Banks. In the case of Indian Private Banks GDP has significant positive impact on OBS whereas IIP has significant negative impact on OBS. In the case of Foreign Private Banks GDP has significant positive impact on OBS whereas SIZE, LR and IIP have significant negative impact on OBS. In the case of Private Sector Banks LATA and GDP have significant positive impact on OBS whereas CRAR, NII, SIZE, LR and IIP have significant negative impact on OBS.

Conclusively the following findings are inferred:-

- NPA, NIM and INF have no significant impact in any of the cases.
- CRAR, NII, SIZE and IIP have only significant negative impact in one, one, two and four cases respectively.
- EQUITY and GDP have only significant positive impact in one and three cases respectively.
- LR has significant positive impact as well as significant negative impact in two cases each.
- LATA has significant positive impact in one case and significant negative impact in one case.

Thus it appears clear that:-

- NPA, NIM and INF have no significant impact on OBS.

- CRAR, NII, SIZE and IIP have significant negative impact on OBS.
- EQUITY and GDP have significant positive impact on OBS.
- LR and LATA have significant impact on OBS but their direction is negative in some cases and positive in some cases.

This gives a scope for further studies to research not only about the significance of NPA, NIM and INF but also about the direction of LR and LATA in determination of OBS. [Refer Appendix 8]

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Appendix 1: Group Wise Details of Banks Covered Under Study

Public Sector Banks		Private Sector Banks	
SBI and Its Associates	Nationalized Banks	Indian Private Banks	Foreign Banks
State Bank of Bikaner And Jaipur	Allahabad Bank	Axis Bank	ABN Amro Bank
State Bank of Hyderabad	Andhra Bank	Bank of Rajasthan	Abu Dhabi Commercial Bank
State Bank of India	Bank of Baroda	Catholic Syrian Bank	Bank Internasional Indonesia
State Bank of Indore	Bank of India	City Union Bank	Bank of America
State Bank of Mysore	Bank of Maharashtra	Development Credit Bank	Bank of Bahrain and Kuwait
State Bank of Patiala	Canara Bank	Dhanalakshmi Bank	Bank of Ceylon
State Bank of Travancore	Central Bank of India	Federal Bank	Bank of Nova Scotia
	Corporation Bank	HDFC Bank	Bank of Tokyo-Mitsubishi UFJ *
	Dena Bank	ICICI Bank	Barclays Bank
	IDBI Bank Ltd.	IndusInd Bank	BNP Paribas
	Indian Bank	Jammu & Kashmir Bank	Chinatrust Commercial bank

	Indian Overseas Bank	Karnataka Bank	Citibank
	Oriental Bank of Commerce	Karur Vysya Bank	Deutsche Bank
	Punjab&Sind Bank	Lakshmi Vilas Bank	Hongkong and
			Shanghai Banking Corpn.
	Punjab National Bank	Nainital Bank	JPMorgan Chase Bank
	Syndicate Bank	Ratnakar Bank	Krung Thai Bank Public Company
	Union Bank of India	SBI Commercial & International Bank	Mashreq Bank
	United Bank of India	South Indian Bank	Oman International Bank
	UCO Bank	Tamilnad Mercantile Bank	Societe Generale
	Vijaya Bank		Sonali Bank
			Standard Chartered Bank
			State Bank of Mauritius

Appendix 2: Statistical Tables for SBI & its Associate Banks

Table 2.1: Descriptive Statistics for SBI & its Associate Banks

	Mean	Std. Deviation	N
OBS	3.3908	12.31200	63
CRAR	.1870	.87082	63
NPA	-.7624	1.01930	63
NII	-.0689	.47290	63
SIZE	.1678	.05461	63
LR	2.3374	3.08152	63
GDP	7.1444	2.05813	63
IIP	7.2522	2.90791	63
NIM	-.0951	.37626	63
LATA	-.6838	2.51445	63
EQUITY	20.2756	11.02145	63
INF	5.0667	1.49968	63

Table 2.2: Estimates of Panel Data Linear Regression Model for SBI & its Associate Banks

Independent Variables	Coefficient	Std. Error	t-Statistic	P-Value	Null Hypothesis
(Constant)	-1.234	9.246	-.133	.894	
CRAR	-1.688	1.907	-.885	.380	Not Rejected
NPA	2.855	1.793	1.592	.117	Not Rejected
NIM	-.5.857	4.594	-1.275	.208	Not Rejected
NII	-.111	4.524	-.025	.981	Not Rejected
SIZE	-45.258	32.521	-1.392	.170	Not Rejected
LR	.582	.762	.763	.763	Not Rejected
LATA	-.476	.615	-.775	.442	Not Rejected
EQUITY	.410	.147	2.783*	.008	Rejected
GDP	.441	1.712	.258	.798	Not Rejected
IIP	-1.731	.776	-2.230*	.030	Rejected
INFLATION	2.676	1.639	1.633	.109	Not Rejected

Table 2.3: Model Summary for SBI & its Associate Banks

S.No.		
1	R ²	.400
2	Adj R ²	.271
3	Durbin Watson	1.922
4	n	63
5	d.f (n-k)	63-12 = 51
6	t (table value) at 5% level of significance	2.000
7	F-Statistic	3.093*
8	At P-Value	.003
9	F-Value (Table) at 5% level	1.95
10	Where d.f k-1	12-1 = 11
11	n-k	63-12 = 51
12	n-1	62
13	K	No. of Parameters (coefficients) estimated including intercept term
14	N	(Number of Observations)

* Significant at 5% Level

Appendix 3: Statistical Tables for Other Nationalized Banks

Table 3.1: Descriptive Statistics for Other Nationalized Banks

	Mean	Std. Deviation	N
OBS	1.3164	36.29414	180
CRAR	.2712	1.91702	180
NPA	-.7202	1.24337	180
NII	-.0156	.44054	180
SIZE	.1702	.28466	180
LR	2.3915	41.19245	180

GDP	7.1444	2.04743	180
IIP	7.2522	2.89279	180
NIM	-.0575	.44077	180
LATA	-1.1104	21.20781	180
EQUITY	23.7165	66.10600	180
INF	5.0667	1.49188	180

Table 3.2: Estimates of Panel Data Linear Regression Model for Other Nationalized Banks

Independent Variables	Coefficient B	Std. Error	t-Statistic	P-Value	Null Hypothesis
(Constant)	-3.787	6.477	-.585	.560	
CRAR	.111	.717	.155	.877	Not Rejected
NPA	1.784	1.110	1.607	.110	Not Rejected
NIM	3.109	3.898	.798	.426	Not Rejected
NII	1.384	3.451	.401	.689	Not Rejected
SIZE	-24.688	18.342	-1.346	.180	Not Rejected
LR	1.059	.133	7.988*	.000	Rejected
LATA	-1.032	.128	-8.036*	.000	Rejected
EQUITY	.002	.040	.047	.963	Not Rejected
GDP	.502	1.107	.453	.651	Not Rejected
IIP	-.645	.644	-1.000	.319	Not Rejected
INFLATION	1.604	1.239	1.295	.197	Not Rejected

Table 3.3: Model Summary for Other Nationalized Banks

S.No.		
1	R ²	.811
2	Adj R ²	.798
3	Durbin Watson	2.289
4	n	180
5	d.f (n-k)	168
6	t (table value) at 5% level of significance	1.98
7	F-Statistic	65.437*
8	At P-Value	.000
9	F-Value (Table) at 5% level	1.84
10	Where d.f k-1	12-1 = 11
11	n-k	180-12 = 168
12	n-1	180-1 = 179
13	K	No. of Parameters (coefficients) estimated including intercept term
14	N	(Number of Observations)

* Significant at 5% Level

Appendix 4: Statistical Tables for Indian Private Banks

Table 4.1: Descriptive Statistics for Indian Private Banks

	Mean	Std. Deviation	N
OBS	2.7743	31.97340	171
CRAR	.3174	3.05896	171
NPA	-.6089	1.95179	171
NII	-.0448	.71880	171
SIZE	.1578	.24452	171
LR	4.3863	40.07845	171
GDP	7.1444	2.04773	171
IIP	7.2522	2.89321	171
NIM	.0184	.45777	171
LATA	.1283	8.08202	171
EQUITY	28.2637	45.60979	171
INF	5.0667	1.49210	171

Table 4.2: Estimates of Panel Data Linear Regression Model for Indian Private Banks

Independent Variables	Coefficients B	Std. Error	t-Statistic	P- Value	Null Hypothesis
(Constant)	-24.015	11.603	-2.070	.040	
CRAR	-2.274	1.146	-1.985	.049	Not Rejected
NPA	1.489	1.253	1.185	.238	Not Rejected
NIM	1.056	5.313	.199	.843	Not Rejected
NII	4.340	3.449	1.253	.210	Not Rejected
SIZE	-28.332	21.680	-1.307	.193	Not Rejected
LR	.083	.152	.546	.586	Not Rejected
LATA	.070	.565	.124	.902	Not Rejected
EQUITY	.096	.097	.983	.327	Not Rejected
GDP	5.049	1.868	2.703*	.008	Rejected
IIP	-2.950	1.185	-2.490*	.014	Rejected
INFLATION	3.022	2.111	1.431	.154	Not Rejected

Table 4.3: Model Summary for Indian Private Banks:

S.No.		
1	R ²	.215
2	Adj R ²	.161
3	Durbin Watson	1.934
4	n	171
5	d.f (n-k)	171-12 = 159
6	t (table value) at 5%level of significance	1.98
7	F-Statistic	3.968*
8	At P-Value	.000
9	F-Value (Table) at 5% level	1.84
10	Where d.f k-1	12-1 = 11

11	n-k	171-12 = 159
12	n-1	170
13	K	No. of Parameters (coefficients) estimated including intercept term
14	N	(Number of Observations)

* Significant at 5% Level

Appendix 5: Statistical Tables for Foreign Private Banks

Table 5.1: Descriptive Statistics for Foreign Private Banks

	Mean	Std. Deviation	N
OBS	102.0444	1365.35206	198
CRAR	2.4095	25.54041	198
NPA	-.7505	14.77130	198
NII	.1017	2.18969	198
SIZE	.1191	.33088	198
LR	-.5100	8.99163	198
GDP	7.1444	2.04691	198
IIP	7.2522	2.89205	198
NIM	.0642	.99220	198
LATA	.3967	12.39369	198
EQUITY	24.0217	48.50164	198
INF	5.0667	1.49150	198

Table 5.2: Estimates of Panel Data Linear Regression Model for Foreign Private Banks

Independent Variables	Coefficients B	Std. Error	t-Statistic	P- Value	Null Hypothesis
(Constant)	-7.049	439.901	-.016	.987	
CRAR	-6.209	3.859	-1.611	.109	Not Rejected
NPA	2.954	6.444	.458	.647	Not Rejected
NIM	-108.400	93.946	-1.154	.250	Not Rejected
NII	-66.515	43.004	-1.547	.124	Not Rejected
SIZE	-965.124	319.034	3.025*	.003	Rejected
LR	-25.239	11.739	-2.150*	.033	Rejected
LATA	9.467	8.365	1.131	.259	Not Rejected
EQUITY	-.756	2.144	-.353	.725	Not Rejected
GDP	306.944	71.058	4.320*	.000	Rejected
IIP	-171.673	46.219	-3.714*	.000	Rejected
INFLATION	-136.464	81.783	-1.669	.097	Not Rejected

Table 5.3: Model Summary for Foreign Private Banks

S.No.		
1	R ²	.195
2	Adj R ²	.147
3	Durbin Watson	1.807
4	n	198

5	d.f (n-k)	198-12 = 186
6	t (table value) at 5% level of significance	1.98
7	F-Statistic	4.085*
8	At P-Value	.000
9	F-Value (Table) at 5% level	1.84
10	Where d.f k-1	12-1 = 11
11	n-k	198-12 = 186
12	n-1	197
13	K	No. of Parameters (coefficients) estimated including intercept term
14	N	(Number of Observations)

* Significant at 5% Level

Appendix 6: Statistical Tables for Public Sector Banks

Table 6.1: Descriptive Statistics for Public Sector Banks

	Mean	Std. Deviation	N
OBS	1.8542	31.84347	243
CRAR	.2493	1.70701	243
NPA	-.7312	1.18745	243
NII	-.0294	.44877	243
SIZE	.1695	.24637	243
LR	2.3775	35.46150	243
GDP	7.1444	2.04595	243
IIP	7.2522	2.89069	243
NIM	-.0672	.42456	243
LATA	-.9998	18.28488	243
EQUITY	22.8244	57.14684	243
INF	5.0667	1.49080	243

Table 6.2: Estimates of Panel Data Linear Regression Model for Public Sector Banks

Independent Variables	Coefficients B	Std. Error	t-Statistic	P-Value	Null Hypothesis
(Constant)	-2.729	5.199	-.525	.600	
CRAR	.181	.628	.288	.774	Not Rejected
NPA	1.646	.918	1.794	.074	Not Rejected
NIM	1.190	3.079	.386	.699	Not Rejected
NII	.985	2.754	.358	.721	Not Rejected
SIZE	-26.987	15.870	-1.701	.090	Not Rejected
LR	1.032	.117	8.833*	.000	Rejected
LATA	-1.004	.117	-8.601*	.000	Rejected
EQUITY	.001	.034	.029	.977	Not Rejected
GDP	.440	.901	.489	.625	Not Rejected
IIP	-.864	.516	-1.676	.095	Not Rejected
INFLATION	1.987	1.002	1.982	.049	Not Rejected

Table 6.3: Model Summary for Public Sector Banks

S. No.		
1	R ²	.785
2	Adj R ²	.774
3	Durbin Watson	2.275
4	n	243
5	d.f (n-k)	243-12 = 231
6	t (table value) at 5% level of significance	1.98
7	F-Statistic	76.527*
8	At P-Value	.000
9	F-Value (Table) at 5% level	1.84
10	Where d.f k-1	12-1 = 11
11	n-k	231
12	n-1	243-1 = 242
13	K	No. of Parameters (coefficients) estimated including intercept term
14	N	(Number of Observations)

* Significant at 5% Level

Appendix 7: Statistical Tables for Private Sector Banks

Table 7.1: Descriptive Statistics for Private Sector Banks

	Mean	Std. Deviation	N
OBS	56.0412	1000.43835	369
CRAR	1.4400	18.83120	369
NPA	-.6849	10.88891	369
NII	.0338	1.67654	369
SIZE	.1371	.29428	369
LR	1.7590	28.12990	369
GDP	7.1444	2.04450	369
IIP	7.2522	2.88866	369
NIM	.0430	.79015	369
LATA	.2723	10.60285	369
EQUITY	25.9875	47.16757	369
INF	5.0667	1.48975	369

Table 7.2: Estimates of Panel Data Linear Regression Model for Private Sector Banks

Independent Variables	Coefficients B	Std. Error	t-Statistic	P-Value	Null Hypothesis
(Constant)	69.130	241.416	.286	.775	
CRAR	-6.472	2.864	-2.260*	.024	Rejected
NPA	.531	4.760	.112	.911	Not Rejected
NIM	-107.656	64.343	-1.673	.095	Not Rejected
NII	-64.429	30.741	-2.096*	.037	Rejected

SIZE	-740.502	219.649	-3.371*	.001	Rejected
LR	-5.675	2.073	-2.738*	.006	Rejected
LATA	14.464	5.195	2.784*	.006	Rejected
EQUITY	.018	1.233	.015	.988	Not Rejected
GDP	147.025	38.750	3.794*	.000	Rejected
IIP	-82.625	25.262	-3.271*	.001	Rejected
INFLATION	-67.248	44.977	-1.495	.136	Not Rejected

Table 7.3: Model Summary for Private Sector Banks

S. No.		
1	R ²	.126
2	Adj R ²	.099
3	Durbin Watson	1.853
4	n	369
5	d.f (n-k)	369-12 = 357
6	t (table value) at 5% level of significance	1.98
7	F-Statistic	4.666*
8	At P-Value	.000
9	F-Value (Table) at 5% level	1.84
10	Where d.f k-1	12-1 = 11
11	n-k	369-12 = 357
12	n-1	369-1 = 368
13	K	No. of Parameters (coefficients) estimated including intercept term
14	N	(Number of Observations)

* Significant at 5% Level

Appendix 8: Impact of Various Factors on OBS for Different Group of Banks

Factors	SBI & Associate	Other Nationalized	Indian Private	Foreign Private	Public Sector	Private Sector
CRAR						Negative
NPA						
NII						Negative
SIZE				Negative		Negative
LR		Positive		Negative	Positive	Negative
GDP			Positive	Positive		Positive
IIP	Negative		Negative	Negative		Negative
NIM						
LATA		Negative			Negative	Positive
EQUITY	Positive					