

## Disbursement of Credit in Private Sector Banks in India A Panel Data Analysis

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### Abstract

*The proportion of credit facility extended by banks of any country is influential for economic growth and development. This paper has attempted to analyse the impact of significant macro and microeconomic variables on the proportion of credit disbursement granted by public sector banks in India during 2011-2019. In the study credit as percentage to total assets, which reflects the credit facilities available to the economy, has been taken as dependent variable. The set of explanatory variables like deposit ratio, liquidity ratio, bank size, growth rate, deposit rate and capital adequacy ratio is going to have a positive relation with credit facilities. On the contrary, inflation rate, the reserve ratio and capital ratio are expected to be inversely connected with the proportion of credit disbursement. It is expected that deposit rate is likely to increase credit facilities whereas NPA ratio will adversely affect the credit disbursement. It has been found that deposit ratio, capital ratio, nonperforming loan ratio, bank size, reserve ratio, and capital adequacy ratio emerge significantly to expand the disbursement of credit by the private sector banks. It is also noted that liquidity ratio, average annual interest rate on loan and deposit have no significant impact on credit facility. In contrast it has been observed that almost all the banks have less capacity to provide Loans & advances in comparison to Axis Bank. And all banks are statistically insignificant except Jammu & Kashmir Bank which is highly significant at 5% level of significance.*

**Keywords:** Disbursement of credit, private sector banks, nonperforming loan, total assets, deposit ratio.

**JEL Classification:** E51, E43, E58

### Introduction

It is well known fact that, a strong financial system is essential for flourishing any economy. The financial system can be structured as the financial markets and the financial institutions. Banking industry is considered as one of the most efficient, strongest and largest type of financial institutions. Banks always play an important role in the economic growth as well as development of any economy. Banking System is the backbone of any country. Economic growth of any country is directly related with the level of development of the financial system of that country. The development and growth can be regarded as *both sides of the same coin*. So, the evolution of the banking industry is *prerequisite* for the development of the country. Private Banks also play an important role through their proper credit disbursement system in different sectors and sub-sectors. One of the most important functions of bank is to disburse credit to various sectors such as agriculture, industry, personal loans,

housing loans, education loan etc. Due to this credit creation process, there also exist different *credit risks* in this financial system which may *lead non performing loans*. The relationship between credit disbursement and explanatory variables of selected private sector banks in India has been scrutinised here. To the best of our knowledge no work has so far been done in the study of the impact of both the *macro and microeconomic* variables on non-performing loan. Through this paper the study has tried to assess the impact of both the variables on the disbursement of credit extended by private sector banks. A sample of panel data of nine years from 2011 to 2019 for ten selected private sector banks has been measured in the study.

### **Rational behind the Study**

Disbursement of credit provided by banks to various sectors of the economy is one of the most significant sources for growth as well as development in any country. But efficient allocation of credit is much more essential at the same time as the capital accessibility is limited for growth and the loan amount granted by banks to the borrowers should be repaid back to the banks within due course of time. If the loan amount is not paid back within due time, then there may create the situation of *non-performing loan* and this fact will create barriers in the allocation of credit in future to the potential borrowers or investors. This will definitely decrease the level of revenue or profit of the banking industry. Hence the effect will be finally increasing in the sense that future investors will be excluded from access to borrowing facility resulting the loss of sufficient investment. Due to this lack of investment the adequate amount of income is not generating which again reduces the level of growth as well as development.

### **Theoretical Survey**

Guo and Stepanyan (2011) have analysed the change in the bank credit policy across the emerging economies over the past decade. The study has explained the credit granted to the private sector as the dependent variable while the independent variables included the foreign liabilities of banks, the volume of domestic deposits, the rate of inflation, the real GDP, the interest rate on deposits, the exchange rate, non-performing debt, and the money supply. The result also indicates that the domestic and foreign financing contribute directly to the growth of credit granted by banks. This study has also discussed about the relationship among economic growth, credit growth and inflation growth. It tells that the strong economic growth leads to an increase in growth of credit as well as the rate of inflation. Again, the growth in the volume of credit facility helps to strengthen the banking sector. Sharma and Gounder (2012) have evaluated the process of credit disbursement granted to the private sector in six economies in the South Pacific during the time period from 1982 to 2009. In this study credit disbursement has been used as a dependent variable, and the independent variables are the average interest rate on the loans, the inflation rate, the ratio of deposits to the GDP, the bank size, a dummy variable which reflects the existence of a financial market, and the Gross Domestic Product. The result indicates that there is negative impact of higher interest rate on loans and the higher inflation rate on the growth rate of credit facility. On the other hand, the deposits and assets have a positive impact on the credit facility. Rakshit, D. and Chakrabarti, S., (2012) focussed on the concept of credit disbursement in cooperative bank and the significant reasons behind an account becoming non-performing in cooperative banks. Kumar, M. and Singh, G., (2012) deal with the most crucial factors that contribute for the

credit disbursement problem and non performing loan problem from the point of view of Public Sector Banks and some others banks in India. The study also gives some measures required to manage these current situations. Pradhan, T.K.'s study (2012) focuses on the miss-management or diversion of credit disbursement, which is one of the major causes of non-performing loan. In this study the data are of primary type and data has been analyzed by percentage method. The data has been taken through a questionnaire. Rajput, N., Arora, A. P. and Kaur, B. (2012) deal with management of credit disbursement and focus also on the reasons of non-performing loans of the public sector banks under asset classification norms. Gupta, B.'s study (2012) has been focussed on SBI and its Associates and public sector banks, an effort has been made to analyze the concept, magnitude and different area of credit disbursement and also evaluate the operational performance in managing NPA. Selvarajana, B. and Vadivalagan, G. (2013) have explained the significance and the nature of credit disbursement in the Indian Bank, Tamil Nadu. The study has done on the priority sector loan. Ahmad, Z. et al., (2013) have analysed the necessity of credit granted by banks and causes for NPA. For this study secondary data have been collected for a period of five years and analysed by CAGR, average, ANOVA and ranking banks. Ranjan, R. and Dhal, S. C., (2013) have analysed an empirical approach to the analysis of Indian commercial banks' credit disbursement and also non-performing loans by regression analysis. The empirical analysis also explains different economic and financial factors which affects the credit most. Srinivas, K. T., (2013) explores in his study different important reasons for loans and advances becoming NPA in the banking Sector and gives some suitable measures to overcome this problem. Bansal, S. et al., (2013) have analysed the performance of Public Sector Banks and Private sector bank in India during the time period 2003-09. The study is based on secondary data. In this study it is also explained that how efficiently the Public Sector and Private Sector banks have been managing non performing loans. Kamra, S. D., (2013) focuses on the credit disbursement policy of public sector banks and also explains the position of nonperforming loans in some nationalised banks like Punjab National Bank (PNB), State Bank of India (SBI), and Central Bank of India (CBI). The study also evaluates various policies and measurements taken by banks to overcome the burden of non-performing assets and suggests some suitable measures for the speedy recovery of this situation. Bhatia, B. S. et al., (2013) have focussed on District Central Cooperative Bank of Punjab. The study has tried also to analyse the effect of some new product lines on loan and advances particularly non performing advances in cooperative banks. Joseph, A. L., (2014) deals with trends of credit disbursement in the banking industry. The study also explains about some internal, external and other factors that are the most responsible causes for increasing non performing loans in banking industry. Lastly the study focuses on some suitable suggestions to control the burden of loans and advances. Arora, N. and Ostwal, N., (2014) explores the comparison and classification of loan assets of private and public sector banks. The study has concluded that in this recent era the issue of credit disbursement has become a major concern for the banking industry. They have also observed that the financial companies and public sector banks have much higher non-performing loans as compared to Private sector banks. Dutta A., (2014) has examined the nature of credit disbursement in public and private sector banks in India and also analysed sector wise non-performing assets of the banks. Ibrahim, M. S. et al., (2014) deal with the concept of disbursement of credit, different types of assets, non performing assets, components of loan assets in private sector, public sector and other banks through a systematic approach with the help of secondary data. Yadav, S. (2014) has analysed the recent trends of credit disbursement and its preventative measures to remove the burden of bad loans in Indian banking industry. Tripathi, L. K. et al., (2014) have examined the impact of loan and advances given to the priority sectors, unsecured advances and advances given to some other sectors by banks like SBI group and other banks. The study by Sulagna Das et al.,

(2014) have been done on the State Bank of India and its associate to analyse the nature, type and impact of disbursement of credit. Kavitha, N. A. et al., (2016) have said in their study from the point of view of credit disbursement that the amount of credit is disbursed to different sectors and the burden of bad loans is comparatively larger in public sector banks as compared to private banks. Singh, V. R., (2016) has observed that disbursement of credit has always created a problem for the banks in India due to increase in non-performing loan amount at an alarming rate and the amount of non-performing loan of banks is still high as compared to the foreign banks. Kumari, B. And Biyani, S (2017) have said in their study about the nature and type of credit disbursement policy of public sector banks. They have also observed that the amount of non-performing asset in public sector bank is larger than that of private sector banks. This study also discovers its impact on the Indian economy. The time period of this study is taken from 2006 to 2015. To analyze the patterns of different ratios, ratio analysis method is used here to have proper findings after calculation. Miyan, M. (2017) has presented this paper to give the explanation about the study of the credit analysis in a comparative way between the Public Sector Banks and Private Sector Banks. For this analysis he has collected five years data i.e., from 2011-12 to 2015-16. In his study different parameters are used to measure the percentages of Gross NPA, Net NPA, return on assets, growth percentage of Net NPA and growth percentage of return on assets. It is concluded from the results and trends that the return on the assets is also in decreasing trend but this is also lower in amount in Public Sector Banks as compared to private banks.

### **Objectives**

The study has been organized in order to consider the following objectives:

First, whether the capital ratio, liquidity ratio, non-performing loan, affects the amount of credit disbursement directly or not.

Second, to determine whether the inflation rate as well as growth rate have direct impact on credit disbursement granted by banks or not.

Third, to explain the impact of non-performing asset on CFR along with all factors.

Fourth, to analyse the trend of all these factors.

Fifth, to establish an inter-bank comparison regarding these factors.

### **Research Gap:**

- The scope of study is very wide here. To fulfil the gap between previous studies done on this subject and my study, complete analysis of non-performing asset in different Banks of India has been done.
- The effort has been made to evaluate the impact of both the macroeconomic as well as microeconomic factors on non-performing assets

### Econometric Model, Methodology and Data

This article has been analyzed on the basis of panel data during a period nine years from 2011 to 2019 for ten private sector banks. Attempt has been made to explain the proportion of credit disbursement depends upon a set of explanatory variables like Deposit Ratio (DPR), Capital ratio (CAPR), Liquidity Ratio (LQDR), Non-Performing Loan (NPL), Bank Size (BANK\_SIZE), Interest Rate on Loan (LOANINT), Interest Rate on Deposit (DEPOSITINT), RESERVE\_RATIO, Inflation Rate (RATE\_INF), Annual Growth Rate (ANGR\_RATE) & Capital Adequacy Ratio (CAPADR).

The functional form can be explained as follows:

$CFR = f(DPR, CAPR, LQDR, NPL, BANK\_SIZE, LOANINT, DEPOSITINT, RESERVE\_RATIO, RATE\_INF, ANGR\_RATE, CAPADR,)$

**Credit Facility Ratio (CFR):** Credit Facilities / Total Assets. So, CFR indicates the proportion of the credit facilities to the total assets given by the bank. A credit facility is nothing but a type of advance made in a business or corporate finance context, including revolving credit, term loans, committed facilities, letters of credit, and most retail credit accounts.

**Deposit Ratio (DPR):** (Total Deposits / Total Assets) DPR represents the ratio of deposits to the total assets of any bank in that year. It is the most crucial variable that affects the level of the granted credit. If the amount of deposits in bank increases it offers more money to be lent. Thus, the high deposits have a direct effect on the rate of growth in the credit. And it indicates that the volume of lending is highly affected by the amount of deposits in banks. It is accepted that the effect of this variable is positive on the proportion of the credit facilities granted by banks.

**Capital Ratio (CAPR):** Capital / Total Assets: It is distinguished fact that the change in capital has a considerable impact on the volume of credit granted by banks. Banks with elevated capital are more capable than the banks with small capital to resist losses without decreasing the value of the assets. Banks always want to maintain a fixed capital asset ratio so that they can manage their assets more effectively and efficiently to diminish the losses resulting from the granting of credit. This variable can be considered as the ratio of total capital in a particular year and the total assets of the bank in that same year. It is also analysed that this variable has a direct effect on the credit facilities provided by banks because as amount of capital increases it will be easier for bank to resist the level of losses resulting from granting lending operations.

**Liquid Ratio or Quick Ratio (LQDR):** Another essential factor that affects the lending activity of banks is the amount of the liquid assets held by the bank. The higher the liquidity ratio the lower will be the proportion of loan amount granted by the banks. This liquidity ratio can be analysed by the sum of the cash and balances of the central banks, the balances and deposits of the banks and the banking institutions and the financial assets of the trade and dividing the result by the total assets. It is likely to have an adverse or negative impact of this variable on the proportion of credit facility.

**BANK\_SIZE:** Bank size is always represented by the total amount of Total Assets of Bank. It is distinguished fact that the banks with large size are usually more efficient and diversified because they have vast amount of funds and more accessibility to variety of borrowers. They also own adequate resources for the development of credit disbursement system and to assess the credit risks. With the help of this banks are able to have a greater power of credit disbursement. The size of the bank is assessed through the size of the bank's total assets in

the particular year of the study period. Thus, the variable is directly related with the disbursement of credit.

**Interest Rate on Loan (LOANINT):** It can be explained as the average annual interest rate on the loans and advances provided by banks. As it is known that there are different sources of income among which the interest rate on loans is one of the most essential factors that affects the credit facility directly. So, banks should be much more careful during the time of determining the interest rates on loan and advances as because low interest rates will impact the returns of the bank and this low rate will not be sufficient to cover the deposit cost, required expenses of banks and amount of losses. The impact of the interest rate may be positive or negative on the volume of credit facility.

**Interest Rate on Deposit (DEPOSITINT):** The term average annual interest rate on deposits in the banks is defined here as deposit interest rate. Deposits are the central sources of total funds of the banking industry. The interest rate paid by the bank on the deposits is one of the most significant components of the total funds. If the interest rate on deposits becomes higher it reflects the high cost of money in bank which leads to increasing the interest rates on loans, which in turn reduces the demand for bank loans for their higher interests. Guo and Stepanyan (2011) found that the high interest rate on deposit reduces the rate of growth in credit. It can be thus concluded that this variable has an adverse impact on the proportion of credit disbursement.

**Reserve Ratio (RESERVE\_RATIO):** Reserve rate can be explained as the rate at which banks should maintain their deposits. This rate is imposed by RBI on other commercial banks. If the value of reserve ratio becomes low, the deposit volume increases resulting the increase in the size of credit facility. So, it is evident that this variable has a negative impact on the proportion of credit disbursement.

**Inflation Rate (RATE\_INF):** It is observed that the inflation rate has an adverse impact on the rate of growth of credit facility as because the decrease in the volume of credit may be due to the high inflation rate.

**Growth Rate (ANGR\_RATE):** Growth rate implies the annual change in the GDP at constant prices. The economic growth is the fundamental factor that affects the bank's lending process. If the growth rate becomes higher it reflects increase in the demand for funding. The economic growth has been measured by the rate of change in the GDP at constant prices. It is also observed that this factor has a positive effect on the proportion of credit disbursement.

**Capital Adequacy Ratio (CAPDR):** This ratio can be explained as the ratio of capital (Tier-1+Tier-2) to risk weighted asset. It affects directly to credit facility, granted by banks. In the panel data the same cross-sectional unit can be surveyed over time. Thus, panel data have space as well as time dimension. This paper has been attempted to fit a simple model known as fixed effects (regression) model (FEM). The term fixed effects exist here due to intercepts which may vary across banks, each bank's intercept does not vary overtime. So, it is time invariant.

The model can be explained (where coefficient of the regressors do not vary over time) as follows:

$$CFR_{i,t} = \beta_0 + \beta_1 DPR_{i,t} + \beta_2 CAPR_{i,t} + \beta_3 LQDR_{i,t} + \beta_4 NPL_{i,t} + \beta_5 BANK\_SIZE_{i,t} + \beta_6 LOANINT_{i,t} + \beta_7 DEPOSITINT_{i,t} + \beta_8 RESERVE\_RATIO_t + \beta_9 RATE\_INF_t + \beta_{10} ANGR\_RATE_t + \beta_{11} CAPADR_{i,t} \dots \dots \dots (i)$$

[where  $i = 1(1)10$  &  $t = 1(1)9$ ]

An alternative to FEM model is Random Effect Model (REM). Here it is assumed that the intercept of an individual unit has been drawing randomly from a large population with a constant mean value. The FEM using dummy variables is known as the least-square dummy variable (LSDV) model. Hausman test has been done to choose between FEM & REM. LSDV Model can be written as follows:

$$Y = \beta_1 + \beta_2 X_{it} + U_{it} \dots \dots (ii)$$

Similarly, equation (ii) can be written alternatively as follows:

$$CFR_{i,t} = \alpha_1 + \beta_2 X_{2it} + \beta_3 X_{3it} + U_{it} + \sum \theta_i D_i \dots \dots (iii)$$

Here  $t=1(1)9$  and  $i=1(1)10$ ;  $D_i=1$  if  $i^{\text{th}}$  bank is considered

All the data have been collected from the secondary sources of RBI publications like "Annual Report on Trends and Progress of Banking in India", 'Annual Report of RBI', various publications of RBI like RBI bulletin, IBA bulletin, websites and different bank websites. Bar diagram, Radar etc. have been used to make virtual analysis of credit disbursement of private sectors banks. Present study also focuses some of the macroeconomic determinants of bank lending in India.

### Hypothesis

**Hypothesis -1:** DPR is expected to affect CFR positively. Thus, it is aimed to test the null hypothesis  $H_0: \beta_1 = 0$  against the alternative hypothesis,  $H_1: \beta_1 > 0$

**Hypothesis - 2:** CAPR is liable to affect Credit Facility inversely. So, it is imperative to test null hypothesis  $H_0: \beta_2 = 0$  against the alternative hypothesis,  $H_1: \beta_2 < 0$

**Hypothesis -3:** LQDR is accepted to have negative impact with credit disbursement. Thus, it is necessary to test null hypothesis  $H_0: \beta_3 = 0$  against the alternative hypothesis,  $H_1: \beta_3 < 0$

**Hypothesis -4:** NPL is likely to have negative impact with credit disbursement. So, it is imperative to test null hypothesis  $H_0: \beta_4 = 0$  against the alternative hypothesis,  $H_1: \beta_4 < 0$

**Hypothesis -5:** Bank\_Size is to be expected to affect CFR inversely. Thus, it is felt necessary to test null hypothesis  $H_0: \beta_5 = 0$  against the alternative hypothesis,  $H_1: \beta_5 < 0$

**Hypothesis -6:** LOANINT usually affect CFR directly. So, it is imperative to test null hypothesis  $H_0: \beta_6 = 0$  against the alternative hypothesis,  $H_1: \beta_6 > 0$

**Hypothesis -7:** DEPOSITINT is expected to increase with the increase in credit facility. So, it needs to test null hypothesis  $H_0: \beta_7 = 0$  against the alternative hypothesis,  $H_1: \beta_7 > 0$

**Hypothesis -8:** RESERVE\_RATIO is likely to affect Credit Disbursement adversely. Thus, it is aimed to test null hypothesis  $H_0: \beta_8 = 0$  against the alternative hypothesis,  $H_1: \beta_8 < 0$

**Hypothesis -9:** RATE\_INF is accepted as having indirect impact on CFR. Thus, it is also felt necessary to test null hypothesis  $H_0: \beta_9 = 0$  against the alternative hypothesis,  $H_1: \beta_9 < 0$

**Hypothesis -10:** ANGR\_RATE is to be expected to have an adverse impact on credit facility. So, it needs to test null hypothesis  $H_0: \beta_{10} = 0$  against the alternative hypothesis,  $H_1: \beta_{10} < 0$

**Hypothesis -11:** CAPADR is likely to increase with the increase in the amount of credit facility granted by banks. Thus, it is imperative to test null hypothesis  $H_0: \beta_{11} = 0$  against the alternative hypothesis,  $H_1: \beta_{11} > 0$

### Summary Statistics

Table 1A: Descriptive Statistics on Selected Macroeconomic Variables for Selected Private Sector Banks during 2011-2019.

	DEPOSIT (10,000 Crores)	CREDIT (10,000 Crores)	TOTAL ASSET (10,000 Crore)	Credit Asset Ratio	Deposit Asset Ratio	Capital Asset Ratio	Credit- Deposit Ratio	Liquid ity Ratio
Mean	16.16	13.97	22.93	60.53	76.08	33.34	81.5	23.86
Median	7.29	5.26	8.53	60.83	76.18	30.25	98	24.33
Maximum	49.68	41.42	66.60	65.59	88.17	90.52	66	30.79
Minimum	1.44	1.19	1.84	54.83	58.80	1.66	9.79	12.47
Std. Dev.	17.84	16.04	26.59	3.10	10.08	27.11	16.56	5.11
Coefficien t of Variation	110.38	114.79	115.96	5.12	13.25	81.32	2.42	21.43
Skewness	0.95	0.91	0.92	-0.25	-0.27	0.82	0.19	-0.91
Kurtosis	2.21	2.04	2.04	2.56	1.85	3.08	0.91	3.59
Jarque- Bera	1.76413	1.77232	1.78875	0.1883	0.6747	1.1226	8.07	1.5237 21
Probabilit y	0.413927	0.41224	0.40886	0.9102	0.71366	0.5705	0.09	0.4667 97
No. of Banks	10	10	10	10	10	10	10	10
Observatio n	90.00	90.00	90.00	90.00	90.00	90.00	90	90.00

From table 1A, it is evident that credit deposit ratio has the largest mean value (81.50) followed by deposit asset ratio (76.06) and credit asset ratio (60.53). Thus, it can be said that the mean value of credit asset ratio (60.53) is greater than that of capital asset ratio (33.34). It is also clear that though the mean value of credit asset ratio is larger than that of capital asset



ratio but the in case of coefficient of variation capital asset ratio has t lager variation, (81.32) than that of credit asset ratio (5.12). Similarly, though deposit is having more mean value (16.16) and standard deviation value (17.84) than credit (mean is 13.97 & S.D is 16.04). But the deposit is facing lower variation (110.38) as compared with credit (114.79). Both the variables are expressed in Rs (000 cr.). Again, capital asset ratio has the largest value of standard deviation (27.11) and total asset has the largest value of coefficient of variation (115.96) which means that the value is spread out over a wide range.

Continued to Table 1B

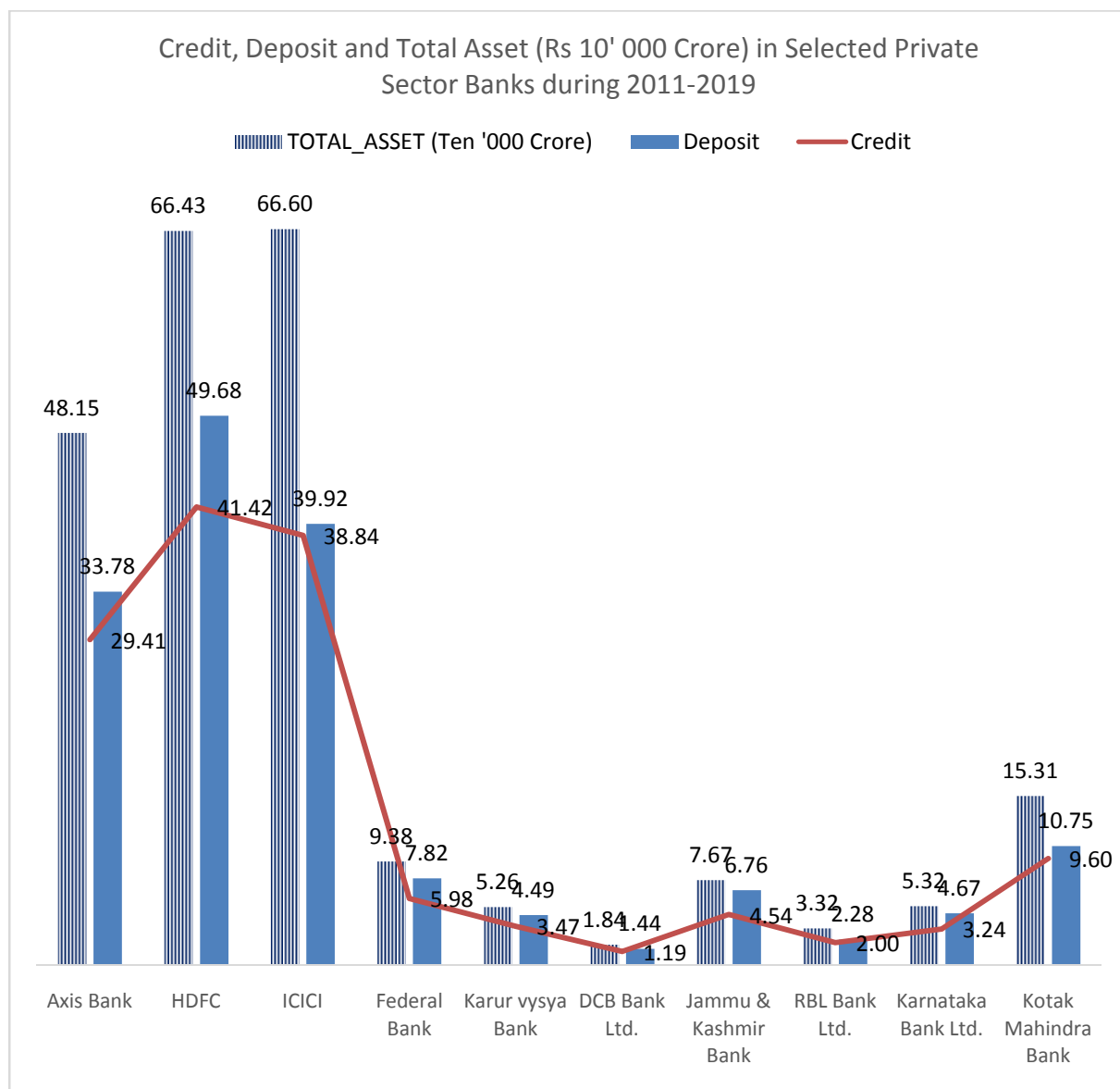
Table 1B: Descriptive Statistics

	Non-Performing Loan/Total Loan	BANK SIZE	Rate of Interest on Loan	Capital Adequacy Ratio	Rate of Interest on Deposit	Reserve Ratio	Rate of Inflation	ANGR _RATE
Mean	3.11	11.54	11.75	11.85	6.94	4.84	6.61	7.01
Median	2.94	11.31	11.92	11.92	6.94	4.87	6.61	7.01
Maximum	5.90	13.37	13.27	12.81	7.11	4.98	6.75	7.01
Minimum	0.99	9.69	7.85	10.93	6.61	4.71	6.45	7.01
Std. Dev.	1.68	1.31	1.61	0.58	0.16	0.09	0.10	0.00
Coefficient of Variation	54.01	11.35	13.67	4.87	2.31	1.78	1.47	0.00
Skewness	0.55	0.20	-1.45	-0.03	-0.64	-0.10	-0.11	NA
Kurtosis	2.37	1.79	4.53	2.20	2.73	2.00	1.84	NA
Jarque-Bera	0.674716	0.679541	4.493784	0.267034	0.718153	0.436423	0.57782	NA
Probability	0.713653	0.711934	0.105727	0.875013	0.698321	0.803955	0.749079	NA
No. of Banks	10	10	10	10	10	10	10	10
Observations	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00

\*Author's own computation based on secondary data

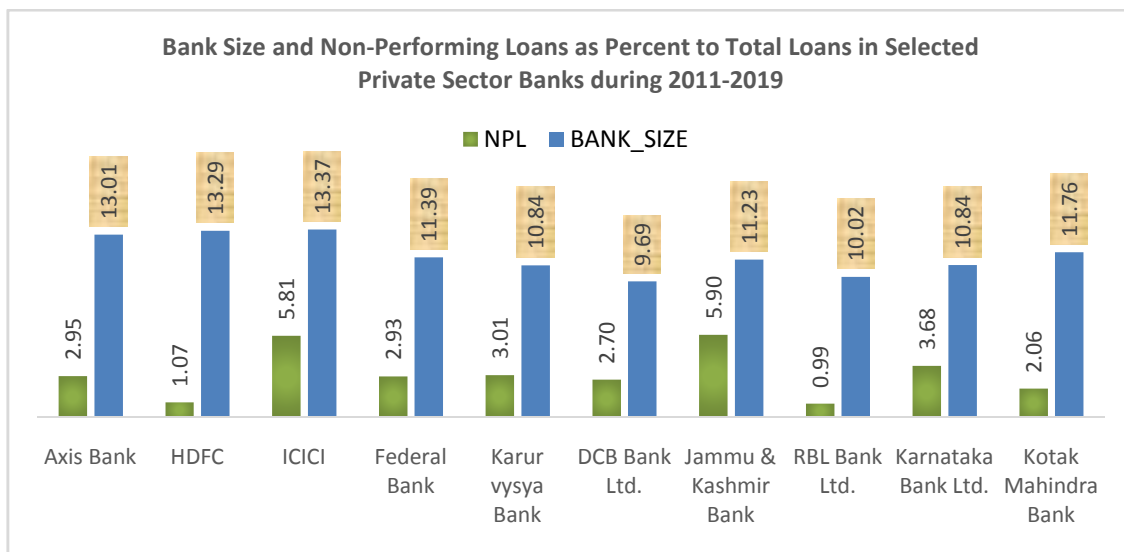
Similarly it can also be said from table 1B that among these variables Reserve Ratio has the lowest standard deviation (0.09) NPL ratio has the lowest mean value (3.11) but highest value of standard deviation (1.68) whereas the value of mean is largest for capital adequacy ratio (11.85) followed by interest rate on loan (11.75) and the bank size (11.54) . From the coefficient of variation it can be compared that there exists high degree of variation among all the variables, even if the value of means are different from one another.

**Chart 1: Diagrammatic Representation of Credit, Deposit and Total Asset in selected private sector banks**



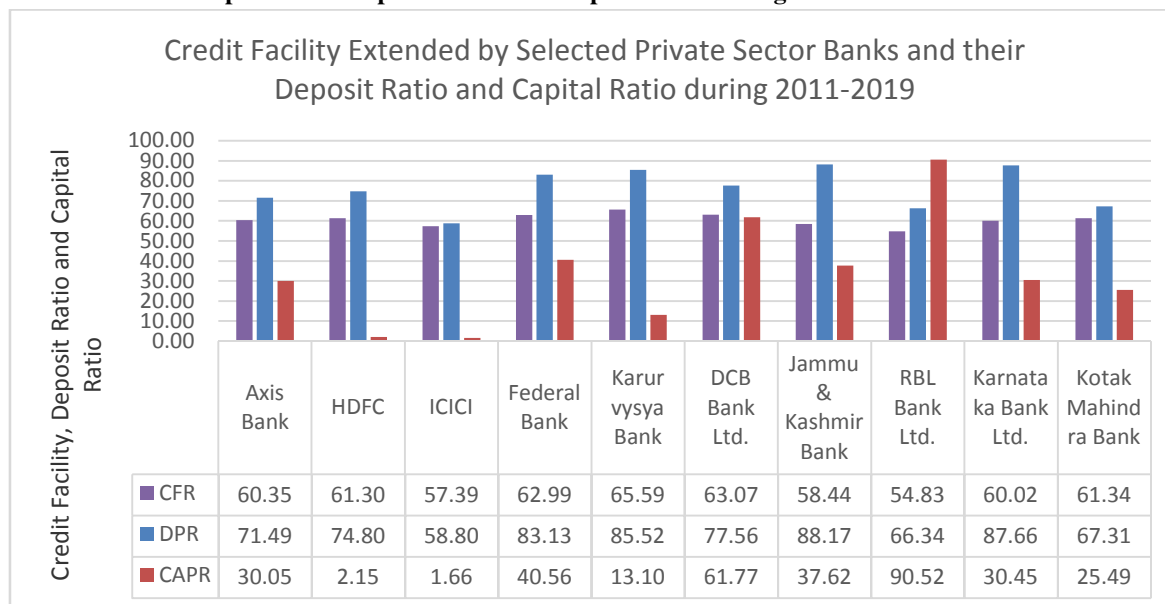
The above figure represents the value of Total Asset, Deposit and Credit in selected private sector banks for the period of nine years (2011- 2019). It can be observed that ICICI Bank has occupied the top position followed by HDFC Bank and Axis Bank in respect of Total Asset. On the other hand, HDFC has ranked in top position regarding Credit level as well as Deposit level followed by ICICI Bank and Axis Bank.

**Chart 2: Comparison between Bank Size and NPL Ratio in selected private sector banks**



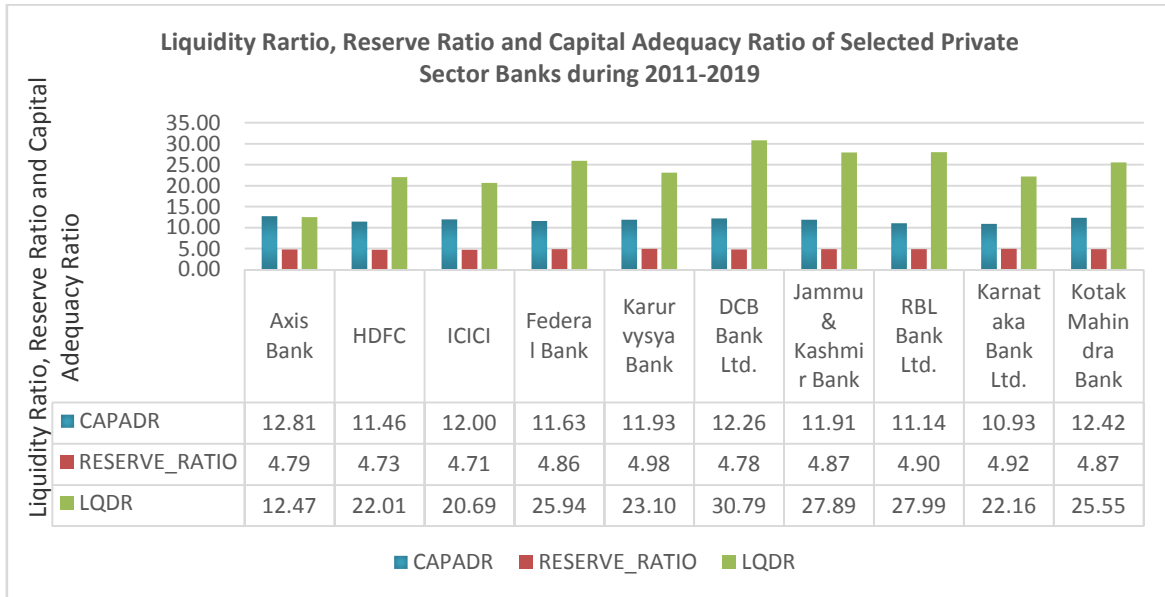
The status of Bank Size and Non-Performing Loan as Percent to Total Loan in selective Private Sector Banks during the period of nine years (2011-2019) has been shown with the help of the above diagrammatic representation. It can be observed that ICICI Bank has highest Size of Bank followed by HDFC Bank and Axis Bank. On the other hand, Jammu & Kashmir Bank has taken the top position regarding the ratio of nonperforming loan followed by ICICI Bank and Karnataka bank Ltd.

**Chart 3: Relationship between Deposit Ratio and Capital ratio during 2011-2019**



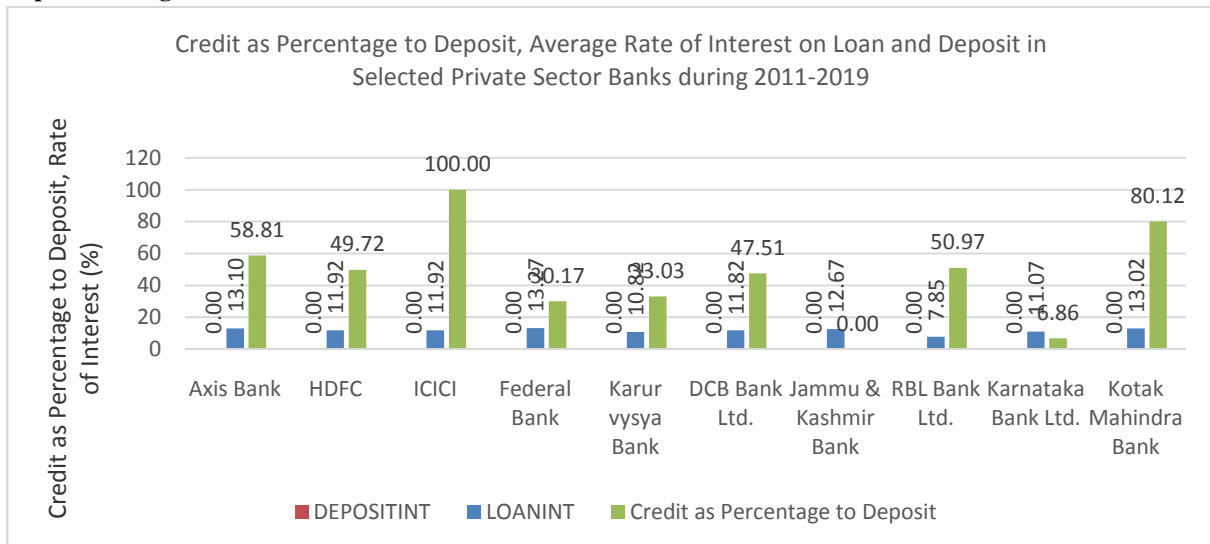
The above figure portrays different status of ratio of credit facility granted by Banks, deposit ratio and capital ratio of ten selective Private Sector Banks during the time period of nine years (2011-2019). It can be observed that RBL Bank has highest capital ratio as compared to others whereas the deposit ratio is largest in Jammu & Kashmir Bank followed by Karnataka Bank and Karur Vysya Bank. On the contrary, Karur Vysya Bank has got the top position in credit facility followed by DCB Bank, Federal Bank, Kotak Mahindra and HDFC bank.

**Chart 4: Comparison among liquidity ratio, Reserve Ratio and Capital Adequacy Ratio in selected private sector banks**



The status of Capital Adequacy Ratio, Reserve Ratio and Liquidity ratio in selective Private Sector Banks during the period of nine years (2011-2019) has been shown above with the help of the above bar diagram. It can be observed that Axis Bank has highest Capital Adequacy Ratio followed by Kotak Mahindra Bank and DCB Bank. In case of reserve ratio Karur Vysya Bank has taken the top position. On the other hand, DCB Bank has the largest Liquidity Ratio followed by RBL Bank and Jammu & Kashmir Bank. On the contrary, Axis bank has the lowest Liquidity Ratio.

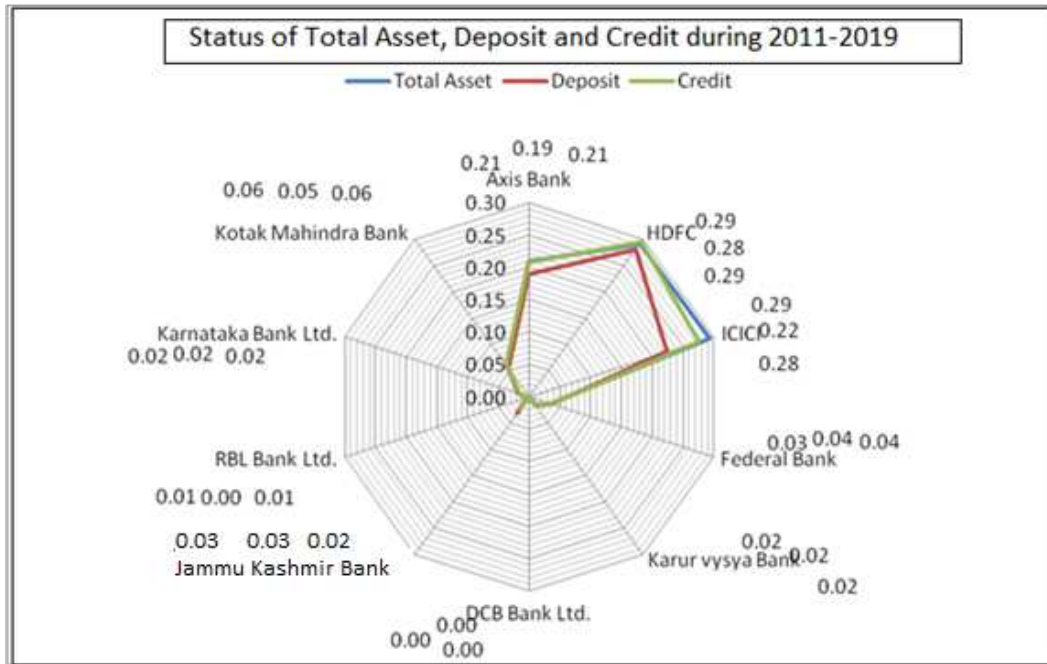
**Chart 5: Comparison among Interest Rate on Loan as well as Deposit and Credit as percentage to Deposit during 2011-2019**



The above figure represents the status of Credit as percentage to Deposit and Average Interest Rate on Loan and Deposit in selected private sector banks during the period of nine years (2011- 2019). It can be observed that ICICI Bank has occupied the top position in Credit Deposit Ratio whereas Karnataka Bank has taken the lowest position among all banks. On the other hand, Average Interest Rate on Deposit is same for all three banks namely HDFC Bank,

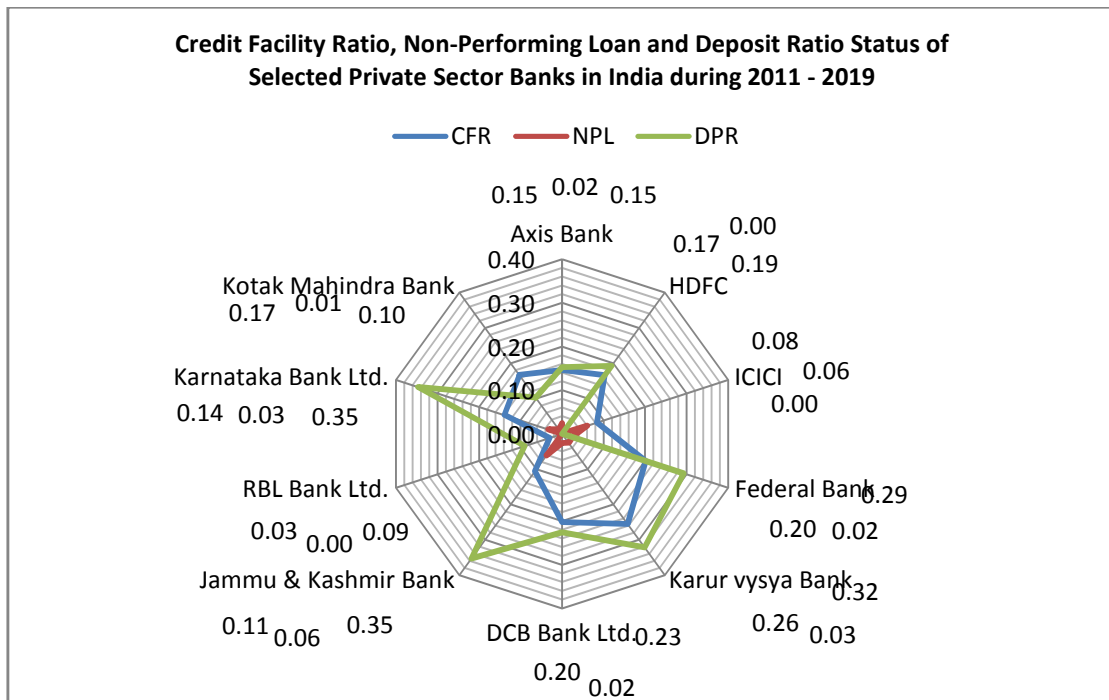
Karur Vysya Bank and Kotak Mahindra Bank. Again Loan Interest Rate is maximum in Federal Bank and minimum in RBL Bank Ltd.

Chart 6: Relationship between Total Asset, Deposit and Credit in selected private sector banks



Radar representation of different status of Credit, Deposit and Total Asset in selected private sector banks during the time period (2011 – 2019) has been observed in Chart 4. Highest Credit and Deposit are observed in HDFC Bank whereas lowest is in DCB Bank as their index values are 1 and 0 respectively. Similarly, ICICI Bank has minimum amount of Total Asset while maximum amount of Total Asset exists in Karnataka Bank Ltd.

Chart 7: Comparison among CFR, NPL and DPR during 2011-2019 in selected private sector banks



The status of Credit Facility Ratio and Deposit Ratio and Non-Performing Loan Ratio of Selected Private Sector Banks in India during 2011 – 2019 has been analysed by the above radar representation in the above chart- 7. Highest credit facility ratio and deposit ratio are observed in Karur Vysya Bank and Jammu & Kashmir Bank respectively whereas lowest index is in ICICI Bank for both the ratios. Similarly, both in ICICI and Jammu & Kashmir Bank we observe highest index of NPL ratio followed by Karnataka Bank Ltd. and Karur vysya Bank.

Chart 8: The status of CR, LR and CDR in selected private sector banks

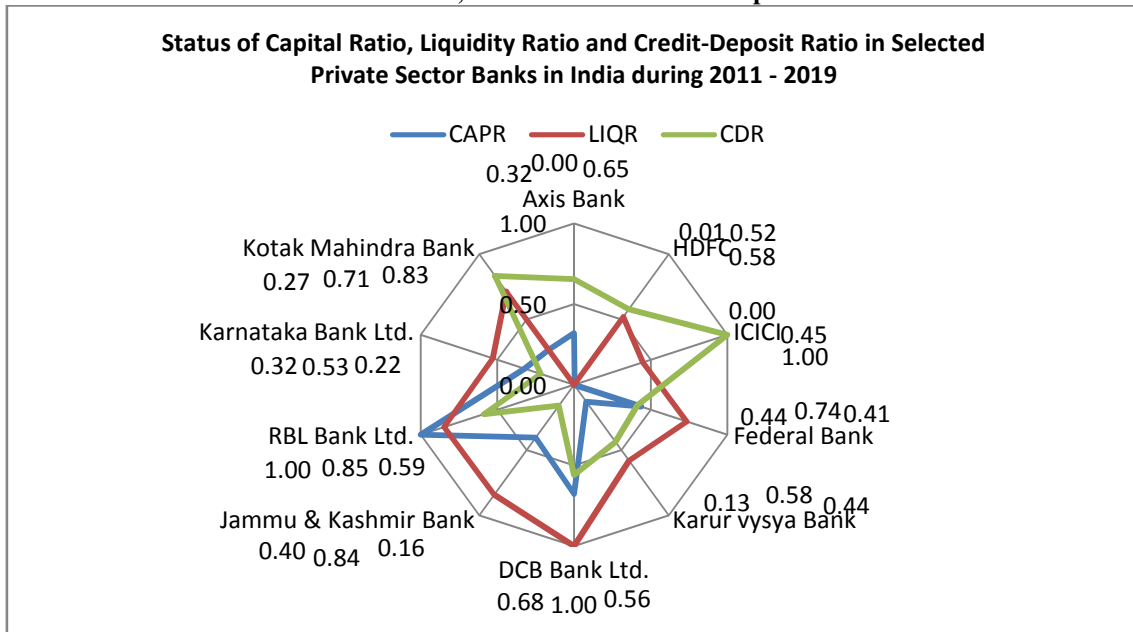
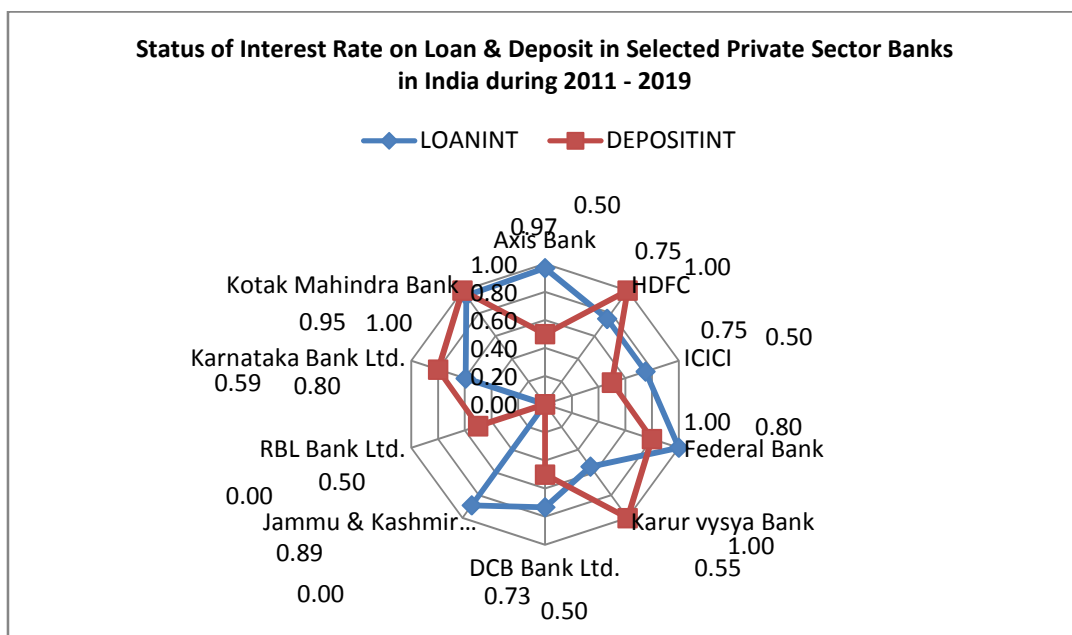


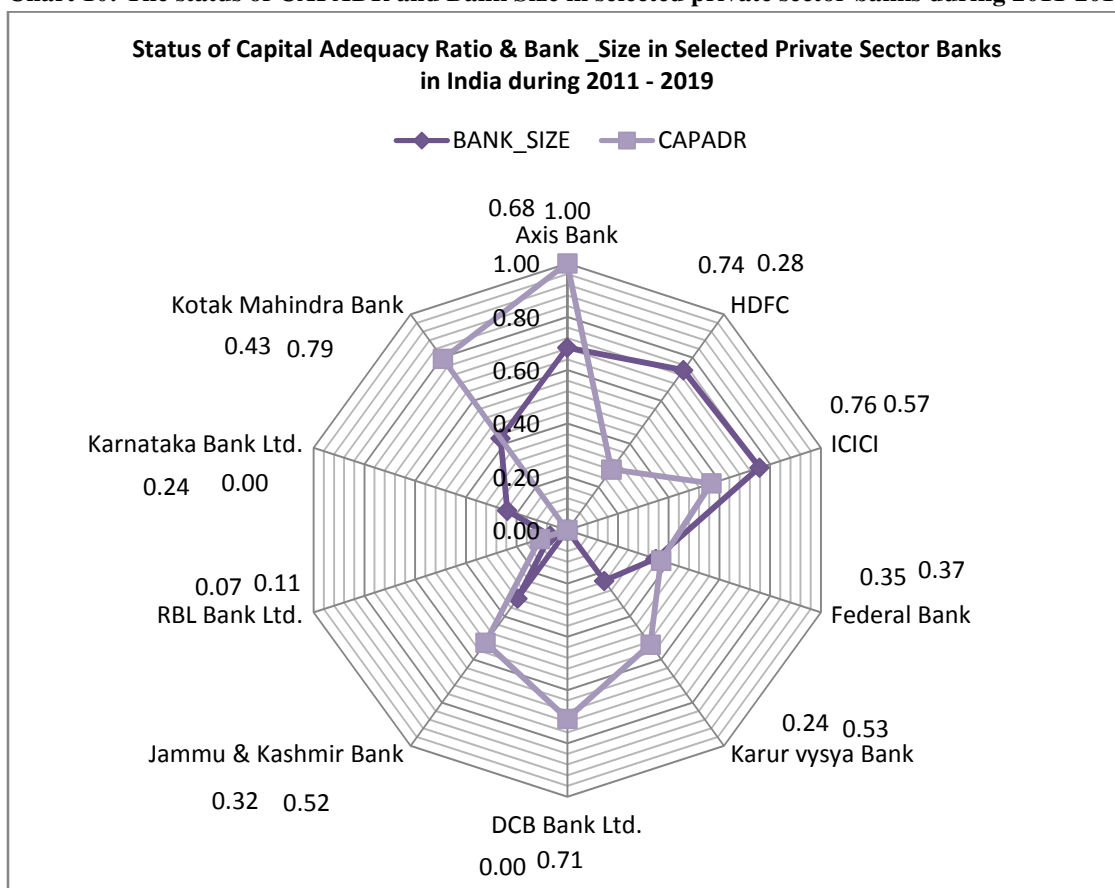
Chart-8 is the radar representation of status of credit deposit ratio, liquidity ratio and capital ratio. The radar shows the maximum value of capital ratio of DCB Bank followed by Federal Bank and Jammu & Kashmir Bank. On the other hand lowest liquidity ratio has been accounted for Axis Bank and highest ratio is for DCB Bank. In CDR ICICI Bank has taken the first rank followed by Axis Bank and RBL Bank.

Chart 9: Comparison among interest rate on loan and deposit during 2011-2019



Comparison between Loan Interest Rate and Interest Rate on Deposit among selected Private Sector Banks has been shown in Chart-9 through radar representation. Maximum index of Loan Interest Rate has been observed at Federal Bank followed by Axis Bank and Jammu & Kashmir Bank. Similarly minimum index is observed at RBL bank Limited. The value of Interest Rate on Deposit is less than 1 for all banks, except three banks – HDFC Bank, Karur Vysya Bank and Kotak Mahindra Bank. Minimum index has been registered for Jammu & Kashmir Bank

**Chart 10: The status of CAPADR and Bank Size in selected private sector banks during 2011-2019**



The status of Bank Size and Capital Adequacy Ratio of Selected Private Sector Banks in India during 2011 – 2019 has been analysed by the above radar representation in chart- 10. Highest capital adequacy ratio is registered in Axis Bank and lowest in Karnataka Bank Ltd. as their index values are 1 and 0 respectively. Bank Size is largest in ICICI Bank followed by HDFC Bank and Axis Bank, whereas lowest index of Bank size is observed in DCB Bank.

## Regression Analysis

**Table 2: Fixed Effect Regression Model of Determinants of Credits during 2011-2019 in Selected Private Sector Banks**

Fixed –Effects (within) Regression				Number of obs = 90		
Group variable: Private_Bank				Number of groups = 10		
R-sq:				Obs per group :		
within = 0.8093				min. = 9		
between = 0.0349				avg. = 9.0		
overall = 0.0148				max.= 9		
				F(12,68) = 24.05		
corr (u_i,xb) = -0.9288				Prob. > F = 0.0000		
CFR	Coef.	Std. Err.	T	P> t	[95% Conf. Interval]	
DPR	0.21135	0.07686	2.749804	0.008	0.057978	0.364722
CAPR	-0.04175	0.020134	-2.07365	0.0219	-0.10889	0.025389
LQDR	0.075417	0.081293	0.927723	0.357	-0.0868	0.237635
NPL	-0.01982	0.01106	-1.79194	0.0934	-0.34179	0.37143
BANK_SIZE	2.735807	1.2232	2.236598	0.01263	-7.56947	2.097856
LOANINT	-6.79822	12.22428	-0.55612	0.58	-31.1914	17.59495
DEPOSITINT	3.00169	2.669361	1.124498	0.265	-2.32494	8.328316
RESERVE_RATIO	-0.37606	0.158768	-2.36862	0.0003	-0.73894	1.491067
RATE_INF	-0.19265	0.229676	-0.8388	0.405	-0.26566	0.650964
AGR_RATE	0.059112	0.645093	0.091633	0.927	-1.22815	1.346374
CAR	0.299954	0.144664	2.073454	0.042	-0.58863	-0.01128
Time	1.163737	1.037037	1.122175	0.266	-0.90564	3.233113
_cons	130.0794	135.8757	0.957341	0.342	-141.056	401.2151
sigma_u = 13.539949						
sigma_e = 2.1212687						
rho = 0.97604333 (fraction of variance due to u_i)						
F test that all u_i = 0 : F (9,68) = 5.59				Prob > F (0.000)		

\*Author's own computation based on secondary data

With the help of the above table-2 we may clarify the relationship between the macroeconomic variables with the ratio of credit facility.

We have analysed total eleven explanatory variables. Out of them six are found statistically significant among which capital ratio, nonperforming loan ratio, bank\_size and capital adequacy ratio are statistically significant at 5% level. On the other hand, both the deposit ratio and reserve ratio are statistically significant at 1% level of significance.



Deposit Ratio (DPR) has direct effect on Credit Facility Ratio (CFR) with a positive coefficient measuring 0.211. This represents that if deposit amount in bank increases the credit facility also increases. The variable is found as statistically significant at 1% level of significance.

The ratio of capital to total asset (CAPR) is adversely related with CFR with a negative coefficient measuring -0.041. This indicates that if the amount of capital increases in the bank, then it will reduce the credit facility. This variable is found as statistically significant at 5% level.

Though the Liquidity Ratio is expected to have a negative impact with credit disbursement but we find here the positive coefficient measuring 0.075. This relationship indicates that the decrease in the proportion of Liquidity ratio leads to a rise in the strength banking industry and hence the volume of credit granted. This represents that high liquidity ratio reduces the proportion of loan and advances granted by banks and vice-versa. This variable is found as statistically insignificant.

The Non-Performing Loan (NPL) has indirect effect with credit disbursement with the negative coefficient measuring -0.0198. This relationship indicates that the decrease in the proportion of non-performing loan leads to a rise in the strength banking industry and hence the volume of credit granted. The variable is found as highly significant at 5% level.

It is distinguished fact that Bank\_ Size is the essential part on which the bank's lending activity depends mostly. It is an independent variable also as the significance of its impact on the credit facility granted by the banks is highly considerable. It is expected that this variable has a positive impact on the dependent variable (CFR) with a positive coefficient measuring 2.735. This variable is statistically significant at 5% level.

The effect of Loan Interest Rate (LOAN INT.) may have positive or negative impact on the volume of bank credit because the increase in the interest rate may encourage banks to provide much more loans but at the same time it may lead reduced demand for borrowers due to high interest rate. This variable is related with CFR with positive coefficient measuring -6.798. It is found as statistically insignificant.

Although the Interest Rate on Deposit (DEPOSIT INT.) is expected to have indirect effect on credit facility but we find here a positive coefficient measuring 3.001. This indicates that high interest rate on deposit leads to increasing rate of interest on loans which in turn reduces demand for bank credit due to high rate of interest. The variable is found as statically insignificant.

RBI has imposed Reserve Ratio (RR) on commercial banks which has unfavourable effect on the proportion of credit facility with a negative coefficient measuring -0.376. It indicates that the lower the reserve ratio, the more deposit volume can be granted by banks for lending. This macroeconomic variable has been found as statically significant at 1% level.

The Rate of Inflation (RATE\_INF) has indirect effect on the proportion of credit facility granted by banks with a negative coefficient measuring -0.192. This represents that volume of credit facility declines due to the high rate of inflation. This variable is statistically insignificant.

The economic Annual Growth Rate (ANGR\_RATE) is one of the crucial factors that affect the volume of credit facility directly with positive coefficient measuring 0.0591. This indicates that due to the increase in growth rate volume of credit facility granted by banks also increases. The variable is statistically insignificant.

Capital Adequacy Ratio (CAPADR) has a direct effect on the proportion of credit facility granted by banks with a positive coefficient measuring 0.299. This variable is statistically significant at 5% level.

**Table 3: Random Effect Regression Model of Determinants of Credits during 2011-2019 in Selected Private Sector Banks**

Random effects GLS regression					Number of obs = 90	
Group Variable : Private _ Bank					Number of groups = 10	
R-sq:					Obs per group :	
within = 0.7650					min. = 9	
between = 0.8036					avg. = 9.0	
overall = 0.7765					max.= 9	
					Wald chi2 (12) = 267.56	
corr (u_i,x) = 0 (assumed)					Prob. > chi2 = 0.0000	
CFR	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
DPR	0.02529	0.04310	0.59000	0.55700	-0.05919	0.10977
CAPR	-0.04492	0.01847	-2.43000	0.01500	-0.08112	-0.00872
LQDR	0.00964	0.04785	0.20000	0.84000	-0.08414	0.10342
NPL	-0.18862	0.13571	-1.39000	0.16500	-0.45461	0.07736
BANK_SIZE	-1.40749	0.45360	-3.10000	0.00200	-2.29652	-0.51845
LOANINT	0.96220	0.23920	4.02000	0.00000	0.49338	1.43103
DEPOSITINT	6.41380	1.72602	3.72000	0.00000	3.03088	9.79673
RESERVE_RATIO	0.93639	0.59168	1.58000	0.11400	-0.22329	2.09607
RATE_INF	0.23022	0.18855	1.22000	0.22200	-0.13934	0.59977
AGR_RATE	-0.11612	0.36123	-0.32000	0.74800	-0.82411	0.59187
CAR	-0.20168	0.11024	-1.83000	0.06700	-0.41774	0.01438
Time	2.39363	0.38381	6.24000	0.00000	1.64136	3.14589
_cons	6.84899	17.79353	0.38000	0.70000	-28.02570	41.72368
sigma_u = 0						
sigma_e = 2.1212687						
rho = 0 (fraction of variance due to u_i)						

\*Author's own computation based on secondary data

**Table 4: Hausman's Test for Choice between Fixed Effect and Random Effect Regression Model**

	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	Fem	Rem	Difference	S.E.
DPR	0.21135	0.025292	0.186058	0.063636
CAPR	-0.04175	-0.044918	0.003168	0.028122
LQDR	0.075417	0.00964	0.065777	0.06572
NPL	-0.019819	-0.188625	0.168806	0.116276
BANK_SIZE	2.735807	-1.407485	4.143292	2.379471
LOANINT	-6.798217	0.962204	-7.76042	12.22194
DEPOSITINT	3.00169	6.413802	-3.41211	2.036261
RESERVE_RATIO	-0.376062	0.936392	-1.31245	.
RATE_INF	-0.192653	0.230217	-0.42287	0.131144
AGR_RATE	0.059112	-0.11612	0.175231	0.534472
CAR	0.299954	-0.20168	0.501634	0.093678
Time	1.163737	2.393625	-1.22989	0.963396

b = consistent under  $H_0$  and  $H_a$ ; obtained from xtreg

B = inconsistent under  $H_a$ , efficient under  $H_0$ ; obtained from xtreg

Test:  $H_0$ : difference in coefficients not systematic

chi2 (12) = (b-B)' [(V\_b-V\_B)^(-1)] (b-B) = 22.12

Prob>chi2 = 0.0362

(V\_b-V\_B is not positive definite)

\*Author's own computation based on secondary data

In the above Table 4 the Hausman test has been done to come to a decision for making the choice between FEM and REM. Here we want to estimate null hypothesis against the alternative hypothesis as follows:

$H_0$ : The appropriate model is REM

$H_1$ : The appropriate model is FEM

From the above table it can be concluded that the empirical value of Chi2 is significant at 5% level. So we reject the null hypothesis and accept the alternative one. Hence in this study we accept the model as Fixed Effect Model (FEM).

**Table 5: LSDV Model of Determinants of Credits in Selected Private Sector Banks\***

Source	SS	Df	MS	Number of obs =90		
Model	2075.43962	21	98.83046	F (21,68) = 21.96		
Residual	305.985104	68	4.499781	Prob >F = 0.000		
Total	2381.42473	89	26.75758	R-squared = 0.8715		
Root MSE = 2.1213				Adj R-squared = 0.8318		
CFR	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
DPR	0.21135	0.07686	2.74980	0.00800	0.05798	0.36472
CAPR	-0.04175	0.02013	-2.07365	0.02190	-0.10889	0.02539
LQDR	0.07542	0.08129	0.92772	0.35700	-0.08680	0.23764
NPL	-0.01982	0.01106	-1.79194	0.09340	-0.34179	0.37143
BANK_SIZE	2.73581	1.22320	2.23660	0.01263	-7.56947	2.09786
LOANINT	-6.79822	12.22428	-0.55612	0.58000	-31.19138	17.59495
DEPOSITINT	3.00169	2.66936	1.12450	0.26500	-2.32494	8.32832
RESERVE_RATIO	-0.37606	0.15877	-2.36862	0.00030	-0.73894	1.49107
RATE_INF	-0.19265	0.22968	-0.83880	0.40500	-0.26566	0.65096
AGR_RATE	0.05911	0.64509	0.09163	0.92700	-1.22815	1.34637
CAR	0.29995	0.14466	2.07345	0.04200	-0.58863	-0.01128
Time	1.16374	1.03704	1.12218	0.26600	-0.90564	3.23311
Private_Bank						
DCB Bank Ltd.	-14.79085	16.19822	-0.91000	0.36400	-47.11388	17.53219
Federal Bank	-3.92817	4.58316	-0.86000	0.39400	-13.07372	5.21737
HDFC	-7.88814	14.50913	-0.54000	0.58800	-36.84067	21.06438
ICICI	-7.30465	14.68698	-0.50000	0.62100	-36.61205	22.00276
Jammu & Kashmir Bank	-13.49930	6.20256	-2.18000	0.03300	-25.87632	-1.12228
Karnataka Bank Ltd.	-25.39349	24.99358	-1.02000	0.31300	-75.26741	24.48042
Karur vysya Bank	-22.01066	28.26506	-0.78000	0.43900	-78.41270	34.39138
Kotak Mahindra Bank	-2.07242	3.58196	-0.58000	0.56500	-9.22011	5.07528
RBL Bank Ltd.	-44.55207	63.50213	-0.70000	0.48500	-171.26860	82.16445
_cons	144.22340	152.12510	0.95000	0.34600	-159.33760	447.78440

\*Author's own computation based on secondary data

With the help of the above LSDV model as shown in the Table-5 we have made an appropriate comparison among different private sector banks in respect of Axis Bank. By observing all the values, we may conclude that all the banks have less capacity to provide Loans & advances in comparison to Axis Bank. Hence Axis bank is *most efficient* among all. Although all the banks are statistically insignificant but Jammu & Kashmir Bank is highly significant at 5% level of significance.

## Conclusion and Policy Prescription

In recent era different steps have been taken by the government for recovery and reducing the level of NPAs in banking industry. The one-time settlement scheme i.e., compromise scheme, Debt Recovery Tribunals, Lok Adalats, Securitization and reconstruction of financial assets and enforcement of Security Interest Act 2002, Corporate Reconstruction Companies, Credit information on the defaulters and role of credit information bureaus are the different steps taken by the government. The Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest Act, 2002, have been also a crucial step for banks to recover the loan and lowering the NPA's. By evaluating the above study, it can be concluded that *disbursement of credit* granted by banks is most crucial factor of funding for Indian economy. Based on the above results of the analysis of our study model it can be observed that capital ratio, nonperforming loan ratio, bank\_size and capital adequacy ratio are statistically significant at 5% level and both the deposit ratio and reserve ratio are statistically significant at 1% level of significance. On the contrary, liquidity ratio, interest rate on deposit and loan, inflation rate, annual growth rate is found as statistically insignificant. Moreover, deposit ratio, bank\_size, annual growth rate and capital adequacy ratio have positive impact on the proportion of credit facility. Following are some recommendations for suggesting the economic growth as well as development of banking industry....

- Private Sector Bank should avoid exceptionally the granting of credit facility without proper KYC.
- Banks should have to pay much more concentration to the NPL ratio through the strong credit policy.
- Govt. should take various awareness programmes regarding proper disbursement of credit policy.
- Last but not the least, we should highlight on the efforts of RBI in increasing the minimum requirement of size of bank capital granted for larger volume of disbursement of credit.

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