An Empirical Analysis of Capital Adequacy in the Indian Private Sector Banks

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Abstract

Capital adequacy has an important bearing on the performance of banks. The present study investigates the determinants of capital adequacy ratio in Indian Private Sector Banks. The study examines whether specific bank performance factors particularly Loan, Asset Quality, Management Efficiency, Liquidity and Sensitivity have an impact on capital adequacy requirements among private sector banks of India. The study highlighted the impact of some risks such as credit (loan), liquidity and sensitivity on the capital adequacy of Indian Private Sector Banks. The secondary data from the annual reports of relevant banks for a period of 5 years (2008-2012) have been analyzed, which is the most recent data available on banking sector immediate after 2007 global financial crisis. Multiple linear regression analysis is applied to explain the effect of explanatory variables; Lending (Total Advances to Assets Ratio), Asset Quality (Net NPA to Net Advances Ratio), Management Efficiency (Expenditure to Income Ratio), Liquidity (Liquid Asset to Total Asset Ratio) and Sensitivity (GAP = Risk Sensitive Assets - Risk Sensitive Liabilities) on the dependent variable Capital Adequacy Ratio (CAR). The results highlighted that capital adequacy ratio is negatively correlated with proxy variables of lending (loans), asset quality and management efficiency. However, liquidity and sensitivity are positively correlated. The regression results have revealed that Loans, Management Efficiency, Liquidity and Sensitivity have statistically significant influence on the capital adequacy of private sector banks. However, the independent variable asset quality has negligible influence on capital adequacy of Indian private sector banks. Moreover the study reveals that the Indian private sector banks maintain a higher level of capital requirement than prescribed by Reserve Bank of India. Finally in the study it is also found that Indian private sector banks have excessive funds to meet their obligation and have opportunity to give more advances to public by protecting owner's stake.

1. Introduction

The importance of the banking sector is premised on the basis that banks are considered to be the foremost channel of savings and allocations of credits in an economy (Ariccia and Marquez, 2004). The banking sector facilitates the vital financial intermediation function by transferring the deposits into productive investments (King and Levine, 1993). The banking system of an economy is the fuel injection system which stimulates the economic competence by mobilizing savings to investment channels. It serves as a bridge between savers and borrowers and to execute all tasks concerned with the profitable and secure channeling of funds. Patrick (1996) remarked that financial sector precedes the role of transferring the resources from traditional, low growth sector to high growth sector and stimulate an entrepreneurship response in the high growth sector. The function of the financial system is to mobilize and channelize the funds to the real sectors of the economy. An efficient financial system is considered as a necessary and sufficient condition for rapid growth and economic development for every modern economy (Ebong, 2005). Beyond the intermediation function, the financial performance of the financial institutions and banks has significant implications for economic growth of an economy. Sound financial performance rewards the stakeholders for their investment and encourages additional investment. On the other hand, poor banking performance may result in banks' failure and collapse which have negative ramification on the economic growth of the economy. Due to the nature of banking and the crucial role of banks in capital formation, banks should be more closely gazed at in the economy. Oloo (2011) emphasized that where the financial sector is dominated by commercial banks, any breakdown has an enormous implications on the economic growth of an economy. This is due to the fact that any bankruptcy in the banking sector has a contagion effect that can lead to overall financial crisis and economic tribulations.

The importance of banks is more pronounced in developing countries because financial markets are usually underdeveloped, and banks are considered the merely major source of finance for the majority of firms and are usually the main depository of economic savings (Arun and Turner, 2004). The recent worldwide financial crisis of 2007-2009 also confirmed the significance of bank performance in national as well as in international economies. There is an urgent need to keep the performance of banks under close watch and supervision at all times. Because of banks significant influence on the economy, immense stress has been given on the regulation and supervision of the banking sector (Barth et al. 2006). The poor performance of the banking sector has been attributed to several problems; such as inadequate capital, high non-performing assets etc which had gone ahead to frequent distress in the banking sector and collapse of some banks (Obadan, 2004). The global financial crisis has generally influenced the financial position and performance of the global banking industry. As a result, many banks became bankrupt and unable to meet their capital standards and also unable to absorb possible future losses on assets. In recent years, banking crisis has become increasingly common and increasingly expensive to deal with. Prudential regulation of banks is supposed to prevent or at least to reduce the frequency of such crises (Morgan, 1984). This failure of managing capital standards has received a great deal of attention from regulators and researchers to maintain the capital adequacy requirements. Over the past years, the bank regulators have introduced a number of measures to link the regulation and supervision of commercial banks to the level of risk and financial viability. The regulators have augmented bank supervision through maintaining an adequate and sufficient level of capital adequacy.

It is mandatory for commercial banks to maintain an adequate level of capital funds. The major function of bank capital is to provide resources to absorb possible losses on assets which may arise in the future. Regulators and bankers should be take broader view of the costs that are relevant and associated in setting the strategy for establishing an adequate level of capital requirements. From the bank stockholders' viewpoint, the function of capital is to earn a reasonable and satisfactory rate of return. Any feasible and practical standard for measuring capital adequacy should be expressed in terms of the function of bank capital (Stegall, 1966). Banks are required to maintain a significant and adequate level of capital adequacy to avoid bank failures and protect the interest of the stakeholders. The globally recognized and acceptable capital regulations were originated by the Basel Committee on Banking Supervision, which was established by the central bank governors of the Group of Ten countries in 1975. The committee framed the details of the agreed structure for measuring capital adequacy and the minimum standard.

In 1988 Basel Capital Accord propounded the definition of capital and distinguished it between core elements (Tier 1) capital and supplementary elements (Tier 2) capital. Basel Committee introduced capital adequacy regulation in 1988, which required globally active banks to maintain a minimum capital equal to 8% of risk adjusted assets, with capital consisting of Tier I capital (equity capital and disclosed reserves) and Tier II capital (long term debt, undisclosed reserves and hybrid instruments) that has been adopted by more than 100 countries (Jacobson at al., 2002). Financial institutions and banks must maintain a capital adequacy at specific minimum level in order to avoid risks and bankruptcy. The regulators of capital requirements seek to guarantee that risk exposure on financial institutions and banks are supported by an adequate amount of capital which bears unexpected losses arising in the future. This ensures banks further promote their cushion of assets that can be utilized for liquidation claims.

2. Review of Literature

The opinion regarding the adequate level of capital adequacy differs among experts, regulators and the bankers in banking and finance sector. On one side regulators emphasized on the safety of banks, they prefer more level of capital adequacy for the feasibility of insurance funds and stability of financial markets. A higher level of capital adequacy increases liquidity of bank and condense the possibility of bank failure. On the other side bankers normally favor to operate with lower level of capital adequacy. The smaller equity base, the greater will be the financial leverage and equity multiplier, which will converts a normal return on assets into a high return on equity (Koch, 2010). Hitherto, numerous studies gave emphasis on the importance of capital adequacy and there is an urgent need to review related studies with a view to gain further understanding of the subject.

Jeff (1990) revealed that capital adequacy was reflected in asset size as a proxy of a well-managed bank. Capital adequacy has considered the foremost benchmark and primary measure for safety and soundness for banks and financial institutions. Ebhodaghe (1991) highlighted that capital adequacy level is a situation where the banks' adjusted capital is adequate to take up all unexpected losses arising in the future and cover fixed assets. Moreover there should be a sufficient surplus for running of day to day operations and future expansion. Umoh (1991) argued that adequate capitalization is a significant variable in banking business. In addition to it,

insured banks must have sufficient capital that may afford a cushion to absorb possible future losses. There should be also sufficient funds for banks' operation and expansion, as well as ensure protection and safety for stakeholder and depositors deposits. Onoh (2002) revealed that adequate capital is considered as the proportion of capital that can efficiently protect operations of the banks from failure by absorbing losses. In addition, the level of capital has to be adjusted in the situation when it is expected that the total operational expenses and withdrawal requirements may increase. Tanaka (2002) investigated the effect of bank capital adequacy regulation on the monetary transmission mechanism. The finding suggested that using a general equilibrium frame-work, the study revealed that the monetary transmission mechanism is weakened if banks are poorly capitalized or if the capital adequacy requirement is inflexible. Chen (2003) analyzed the situation and regulation of the capital adequacy of state commercial banks in China. Capital enhancement is always preferred and the mainly practical method which is adopted is to use subordinated debt in order to increase the supplementary capital requirements.

There are several specific bank performance factors that have an influence on capital adequacy requirements of the banking system, particularly with reference to profitability, asset quality, management efficiency, earning quality, liquidity and sensitivity. The present study contributes evidence on the effect of Indian Private Sector Banks financing risks and performance on capital adequacy requirements. Reynolds et al. (2000) studied financial structure and bank performance using dependent variables (capital adequacy, liquidity, profitability, and loan preference) were regressed to structural variables (bank assets, net income, administrative expenses and time). Study found that profitability and loan preferences increases with size, but capital adequacy decreases with size, so large banks have smaller capital adequacy ratios, and profit is directly related to capital adequacy. Yu (2000) documented bank size; liquidity and profitability are the main determinants of bank capital ratio in Taiwan. The study found the relationship between the equity-to-asset ratio and the liquidity ratio is significantly positive for small banks, but significantly negative for medium size banks. Al-sbbagh (2004) investigated the determinants of the capital adequacy ratio (CAR) in Jordanian commercial banks. Study revealed that CAR was positively affected by return on assets, loan to assets ratio, risky assets ratio and dividends payout ratio while negatively influenced by deposits assets ratio, size of bank and loan provision ratio. Williams (2011) investigated the impact of banks characteristics, financial structure and macroeconomic indicators on banks Capital base in the Nigerian banking industry. The study revealed that economic indicators such as rate of inflation, real exchange rate, demand deposits, money supply, political instability, return on investment are most robust predictors of the determinants of capital adequacy in Nigeria. Similarly in a study by Buyuksalvarc and Abdioglu (2012) used profitability, deposits, size of banks and liquidity as bank specific factors to assess their impact on capital adequacy requirements.

Navapan and Tripe (2003) highlighted that return on equity is one way of measuring the banks' performance in comparison to other banks. Study asserted that there should be a negative relationship between a bank's ratio of capital to assets and its return on equity may seem to be self-evident as to not need empirical verification. The study found negative relationship between capital and profitability exists. Mathuva (2009) found that bank profitability is positively related to the core capital ratio and tier 1 risk based capital ratio. The study, using the return on assets and return on equity as proxies for bank profitability for the period 1998 to 2007, also

established that there exists negative relationship between the equity capital ratio and equity. Asarkaya and Ozcan (2007) analyzed the determinants of capital structure and identified the factors that explain why banks hold capital beyond the amount required by the regulation. The findings suggested that lagged capital, portfolio risk, economic growth, average capital level of the sector and return on equity are positively correlated with capital adequacy ratio and share of deposits are negatively correlated with capital adequacy ratio. Ho and Hsu (2010) investigated the relation between firms' financial structures and risky investment strategy in Taiwan's banking industry. The results found that the restrictions on capital adequacy ratio have influenced banks' risky investment strategies, as market share and leverage are positively related. Finally, the regression results found that financial structures for banking firms are positively related to the states of business cycle.

2.1 Need and importance of the study

In the light of the above discussion and review of literature the purpose of the present study is to investigate whether specific bank performance factors have an impact on the capital adequacy requirement and its effects on financial positions of Indian Private Sector banks. In this study the relationship between bank specific variables (Lending, Asset Quality, Management Efficiency, Liquidity and Sensitivity) and Capital Adequacy Ratio is analyzed.

3. Research Methodology

The nature of present study is of analytical type which seeks to investigate whether bank specific factors indicating performance have an impact on the capital adequacy requirement of banks. For the study 20 Indian private sector banks are selected as sample. The secondary data from the annual reports of relevant banks for a period of 5 years (2008-2012) have been taken, which is the most recent data available on banking sector immediate after 2007 global financial crisis.

In order to determine the effect of independent variables on dependent variable, multiple linear regression model is applied using SPSS. The bank specific variables included are Loan (Total Advances to Assets Ratio), Asset Quality (Net NPA to Net Advances Ratio), Management Efficiency (Expenditure to Income Ratio), Liquidity (Liquid Asset to Total Asset Ratio) and Sensitivity (GAP = Risk Sensitive Assets - Risk Sensitive Liabilities) and the dependent variable Capital Adequacy Ratio (CAR).

3.1 Model Specification

For analytical analysis the regression model is specified as:

$$C_{it} = \beta_0 + \beta_1\,(LO) + \beta_2\,(A) + \beta_3\,(M) + \beta_4\,(L) + \beta_5\,(S) + e_{it}$$

In the above equation β_0 is constant and β_i are the regression coefficient of the explanatory variables, while e_{it} is the residual error of regression.

3.2 Explanation of Variables and Hypotheses Formation

3.2.1 Dependent Variable

Capital Adequacy

Capital adequacy is considered as one of the prominent indicators of the financial health of banks. Capital adequacy is extremely helpful in preventing the bank from being bankrupt by protecting the stakeholder' confidence. Capital is considered to be a safeguard to protect stakeholder' interest and maintain the stability of banking system of an economy. It is an indicator which reflects the ability of a bank to bear unexpected losses arising in the future and bank leverage. Kosmidou (2009) revealed that capital adequacy is assumed as the sufficiency of the amount of equity to absorb any unexpected shocks that the bank may face.

Capital Adequacy reflects the overall financial position and ability of management to meet the requirement for additional capital of the banks. Capital Adequacy is defined as percentage ratio of a bank's primary capital to its assets (loans and investments), used as a measure of its financial strength and stability. According to the Capital Adequacy Standard set by Bank for International Settlements (BIS), banks must have a primary capital base equal at least to eight percent of their assets.

Capital Adequacy Ratio (CAR)

Capital adequacy ratio (CAR) is the ratio propounded by the regulatory authority in the banking sector to judge the health of the banking system and to ensure that banks can take up a reasonable level of losses arising from operational losses. Dang (2011) highlighted that the adequacy of capital is assessed on the basis of capital adequacy ratio. Capital adequacy ratio reveals the internal strength of the bank to bear up losses during the period of crisis.

The higher the CAR ratio, indicates stronger the bank and the more will be the protection of investors. This ratio ensures that banks are capable to fulfill the liabilities and other risk such as operational risk, credit risk and market risk. In India this ratio has been mandated by the Reserve Bank of India (RBI) to protect the interest of depositors and to maintain the confidence of the banking sector. The banks are required to maintain the capital adequacy ratio (CAR) as stipulated by the norms of RBI from time to time. The banks in India should have a CAR of 9% as per latest RBI norms. Sangmi and Tabassum (2010) opined that capital adequacy ratio is directly proportional to the resilience of the bank to crisis situations. It has also a direct effect on the profitability of banks by determining its expansion to risky but profitable ventures.

Capital Adequacy Ratio (CAR) = (Tier-I + Tier-II)/Risk Weighted Assets

Tier 1 capital is the core measure of a bank's financial strength from a regulator's point of view. It consists of the types of financial capital considered the most reliable and liquid. Examples of Tier 1 capital are Permanent shareholders' equity; perpetual non-cumulative preference shares, Disclosed reserves and Innovative capital instruments.

Tier 2 capital is a measure of a bank's financial strength with regard to the second most reliable forms of financial capital, from a regulator's point of view. It consists of Undisclosed reserves, Revaluation reserves of fixed assets and long-term holdings of equity securities, General provisions/general loan-loss reserves; Hybrid debt capital instruments (a range of instruments which combine characteristics of equity capital and debt) and subordinated debt.

3.2.2   Independent Variables

(I) Loans

Commercial banks accept deposits and also lend money to the people who require it for various purposes. Lending of funds to traders, businessmen and industrial enterprises is one of the important activities of commercial banks. The major part of the deposits received by banks is lent out, and a large part of their income is earned from interest on such lending. For the present study Loans and advances of the banks are determined by following ratio:

Advances to Assets Ratio:
The relationship between the total advances and total assets is represented by this ratio. This ratio is computed by dividing the total advances with total assets. This ratio represents a bank's aggressiveness in offering the loans which ultimately results in improved profitability. Higher ratio is assumed to be better as compared to lower one. Alam et al. (2011) argued that this ratio is used to recognize existing relationship among total advances of bank and its total assets and it can also be calculated by dividing net investment with total assets.

H_{01}: Loan (Advances to Assets Ratio) has no statistically significant effect on capital adequacy.

(II) Asset Quality
The quality of assets owned by bank represents its financial strength. The primary objective to appraise the quality of assets is to determine the component of non-performing assets in total assets. Baral (2005) and Rajender (2009) suggested that credit risk in the form of NPAs is one of the crucial factors that have an impact on the financial health of a bank and growing NPAs is a challenge to banks, which will adversely affect the performance of banks and credit risk . In the present study asset quality of the banks is determined by following ratio:

Net Non-performing Assets to Net Advances Ratio:
The assets quality of a bank is assessed by the percentage of net non-performing assets to net advances. Net NPAs are computed by deducting net of provisions on non-performing assets and interest in suspense account from gross NPAs.

H_{02}: Asset Quality (Net NPA to Net Advances Ratio) has no statistically significant effect on capital adequacy.

(III) Management Efficiency

Management efficiency ensures the growth and survival of any organization. Management efficiency of a bank means follow up of well defined norms, capability to plan and respond to

dynamic environment and administrative ability. Purohit et al. (2003) highlighted that the capacity of the management of a bank can be measured by using certain ratios of off-site evaluation of a bank. In the present study management efficiency of the banks is determined by following ratio:

Expenditure to Income Ratio

It is the ratio between operating expenses to total income. It connotes the capacity of the bank to cover up the operating expenses from the income earned by the bank. Lower ratio is better for the bank and vice versa. Athanasoglou et al. (2006) revealed that higher the operating profits to total income; means management is more efficient in terms of operational efficiency.

H_{03}: Management Efficiency (Expenditure to Income Ratio) has no statistically significant effect on capital adequacy.

(IV) Liquidity

Liquidity is remarkable aspect which determines the financial position of banks. Liquidity discloses the capability of a bank to discharge its obligations against depositors. The image of bank is greatly reflected by the risk of liquidity. Liquidity is a significant aspect which reflects bank's ability to meet its credit demand and cash flow requirements. Bank can obtain sufficient liquid funds if it has an adequate liquidity position. Rudolf (2009) emphasized that the liquidity expresses the degree to which a bank is capable of fulfilling its respective obligations. In the present study liquidity of the banks is determined by following ratio:

Liquid Assets to Total Assets Ratio:

Liquid Assets to Total Assets ratio measures the overall liquidity position of a bank. The liquid assets include cash in hand, money at call and short notice, balance with Reserve Bank of India and balance with other financial institutions/banks (India and Abroad).

H_{04}: Liquidity (Liquid Asset to Total Asset Ratio) has no statistically significant effect on capital adequacy.

(V) Sensitivity

Banks assess the sensitivity of market risk through fluctuations in interest rate, foreign exchange rates and equity prices. Market risk is the outcome of trading, non-trading and foreign exchange activities. Bank's earning capability is influenced through the variation in these variables and sensitivity to market risk determines how adversely the bank is affected by such variation. Grier (2007) highlighted the fact that changes in interest rate, equity price, exchange rate or commodity price can adversely affect the earning capability and capital of banks and financial institutions. Many financial institutions believe changes in interest rates leads to market risk. In the present study sensitivity of the banks is determined by GAP Analysis.

GAP Analysis is a measure used to assess a bank's earnings exposure to interest rate movements. GAP of a bank during a given period of time is the difference between the value of its assets that mature or reprice during that period and the value of its liabilities that mature or reprice during

that particular period of time. If such difference is large (either positive or negative), then net interest income will largely be effected by the interest rate changes. A balanced position will happen when the amount of repricing assets will exactly compensate by the repricing liabilities (ratio = 1). Ratio less than 1 denotes that bank's liabilities reprice quicker than assets (liability sensitive), while a ratio more than 1 denotes that the bank's assets reprice faster than liabilities (asset sensitive).

GAP = (Risk Sensitive Assets) - (Risk Sensitive Liabilities)

Risk Sensitive Assets=Net Advances+ Net investments + Money at Call.

Risk Sensitive Liabilities= Deposits + borrowings.

H_{05}: Sensitivity (GAP) has no statistically significant effect on capital adequacy.

4. Analysis and Discussion

The following table 1 shows the five year average values of selected ratios for different variables specified in the above model.

Table - 1

Bank	Capital Adequacy	Loans	Asset Quality	Management Efficiency	Liquidity	Sensitivity
Catholic Syrian Bank	11.25	58.58	1.68	92.23	9.46	95.87
City Union Bank	12.79	62.26	0.72	75.44	9.06	98.00
Dhanalakshmi Bank	11.77	58.76	0.71	92.64	9.34	94.35
Federal Bank	18.89	60.38	0.43	70.75	7.52	105.27
ING Vysya Bank	12.74	57.32	0.76	82.32	8.38	100.49
Jammu & Kashmir Bank	14.05	54.84	0.61	73.88	10.58	100.28
Karnataka Bank	12.84	54.58	1.40	83.58	6.56	100.87
Karur Vysya Bank	14.14	62.72	0.21	76.87	6.68	100.72
Lakshmi Vilas Bank	12.82	61.16	1.90	83.43	8.16	97.84
Nainital Bank	14.50	47.78	0	72.63	25.62	83.31
Ratnakar Bank	41.02	51.84	0.64	77.76	19.2	110.03
South Indian Bank	14.39	62.26	0.49	81.14	8.34	98.49
Tamilnad Mercantile Bank	15.36	63.16	0.33	74.69	7.00	103.71
Axis Bank	13.90	57.12	0.35	70.88	8.74	99.706
Development Credit Bank	14.04	56.80	1.84	88.65	8.46	100.10
HDFC Bank	15.89	54.74	0.35	70.39	10.2	107.054
ICICI Bank	17.58	54.16	1.52	74.88	8.86	105.464
Indusind Bank	13.86	57.68	0.89	81.87	8.42	98.17
Kotak Mahindra Bank	18.89	57.10	1.44	74.88	5.30	112.36
Yes Bank	17.04	56.10	0.11	76.19	7.16	104.986

4.1 Descriptive Statistics of Model's Variables

The research findings are based on descriptive statistics and multiple regression analysis in order to explain the basic characteristics of independent variables. The regression model is estimated using data of 20 private sector banks on yearly basis from 2007 - 2012. The proxy variables (independent variables) which have impact on the Capital adequacy ratio are Loans (Total Advances to Assets Ratio), Asset Quality (Net NPA to Net Advances Ratio), Management Efficiency (Expenditure to Income Ratio), Liquidity (Liquid Asset to Total Asset Ratio) and Sensitivity (GAP = Risk Sensitive Assets - Risk Sensitive Liabilities). The capital adequacy of the banks is measured by proxy variable Capital Adequacy Ratio and is taken as dependent variable in the regression model. Descriptive statistics of the data analyzed (sample means, maximum, minimum, standard deviation, skewness and kurtosis) are depicted in table 2.

Table - 2

Proxy Variables	Capital Adequacy	Loans	Asset Quality	Management Efficiency	Liquidity	Sensitivity
Mean	15.89	57.46	0.81	78.75	9.65	100.85
Maximum	41.03	63.16	1.91	92.64	25.62	112.36
Minimum	11.26	47.78	0.00	70.39	5.30	83.31
Std. Dev.	6.29	3.92	0.59	6.77	4.66	6.19
Skewness	3.65	-0.542	0.60	0.79	2.74	-0.75

We can conclude from the table that all the explanatory variables are preciously distributed. The proxy variables Loans and Sensitivity are negatively skewed. Other proxy variables Capital Adequacy, Asset Quality, Management Efficiency and Liquidity are positively skewed. The mean value of capital adequacy 15.89% provides the evidence that Indian private sector banks maintain higher level of capital requirement than prescribed by Reserve Bank of India of 9%. This gives them opportunity to give more advances to public. The average Loan rate which is measured by Total Advances to Assets Ratio is 57.46% which indicates that more than half of banks total assets are employed in advances, which means major sources of banks earning is income from interest. Meanwhile, a non performing asset has a mean value of 0.81 which is within the prescribed standards of Reserve Bank of India. With respect to management efficiency the proxy variable Income to Expenditure Ratio shows mean value of 78.75% which is quite high indicating that it has negative impact on profitability of banks. The proxy variable for liquidity has shown mean values of 9.65. Proxy variable used to measure sensitivity is GAP, the average difference between the value of banks's assets that mature or reprice and the value of its liabilities that mature or reprice. A balanced position will happen when the amount of repricing assets will exactly compensate by the repricing liabilities. The average GAP is 100.85 i.e. balanced.

4.2 Correlation Analysis

In order to determine the existence of multicolinearity problem, the simple correlation matrix among independent variables is analyzed and presented in the table (3). Cooper and Schindler (2003) argued that a multicolinearity problem exists when correlation scores are 0.8 or greater.

Table - 3

Proxy Variables	Capital Adequacy	Lending	Asset Quality	Management Efficiency	Liquidity	Sensitivity
Capital Adequacy	1.000					
Lending	- 0.358	1.000				
Asset Quality	- 0.130	0.530	1.000			
Management Efficiency	- 0.258	0.178	0.573*	1.000		
Liquidity	0.412*	-0.710*	-0.313	0.166	1.000	
Sensitivity	0.536*	0.122	0.119	-0.309	-0.460*	1.000

*Indicates correlation significant at level 5%

From the table 4 it can be concluded that none of the bank specific variable of private sector banks in India have high correlation or multicolinearlity, which is above the standard rule of thumb 80%. The results from correlation analysis depict that Capital Adequacy of private sector banks in India measured by Capital Adequacy ratio is negatively correlated with proxy variables of lending, asset quality and management efficiency. However, liquidity and sensitivity are positively correlated with capital adequacy ratio.

4.3 Findings of Regression Model

In order to examine the effect of independent variables on dependent variable (CAR) multiple regression is used and results are summarized in table (4).

Table - 4

Proxy Variables	Constant	Loans	Asset Quality	Management Efficiency	Liquidity	Sensitivity
β_i	-158.463* (0.000)	0.436* (0.046)	-0.808 (0.492)	0.254* (0.029)	1.543* (0.000)	1.141* (0.000)
t-values	-7.172	2.191	-0.705	2.431	7.938	10.569
R^2	0.914			Adj. R^2 0.883		
F-Test	29.60			Durbin Watson 2.34		

(*) indicates significant at 5% level.

As shown in the above table the results of regression analysis can also be depicted in the regression equation form based on regression coefficients.

C_{it} = 158.46 + 0.436LO - 0.808A + 0.254M + 1.543L + 1.141S

Coefficient effect (β_i) is a predictor of each variable related to capital adequacy of banks. The regression analysis results reveal the following observations.

1. The value of adjusted R^2 highlights that 88.3% variability in the capital adequacy of Indian private sector banks can be explained by independent variables.

2. The Durban Watson test value 2.34 indicates almost the absence of no serial correlation among the variables.
3. The F-Test value is 29.60 and p-values is less than 5% for the data variables. This indicates the very well fit of regression model. In other words the null hypothesis (Ho: There is no effect of given explanatory variables on dependent variables) is rejected.
4. The regression coefficients of independent variables viz. Loans, Management Efficiency, Liquidity and Sensitivity are statistically significant at 5% significance level and they have significant influence on the capital adequacy of private sector banks.
5. The regression coefficient of independent variable asset quality has no statistically significant influence on capital adequacy of private sector banks.

Based on the estimated regression equation it can be inferred that the t-value for β_1 coefficient is 2.19 which is less than p-value at 5% level of significance. Hence H_{01} is rejected. It means, in case of Indian Private Sector Banks Loans have significant influence on capital adequacy of banks.

The t-value is β_2 coefficient is -0.705 which is more than p-value at 5% level of significance. Thus H_{02} is accepted and it is concluded that the presence of non-performing assets have negligible effect on the capital adequacy of Indian Private Sector Banks.

Management Efficiency (M) measured by proxy variable Expenditure to Income Ratio shows negative correlation with capital adequacy. It implies that more expenditure by banks in relation to income will influence on capital adequacy. The t-value of β_3 is 2.431 which is less than p-value at 5% significance level hence H_{03} is rejected.

The regression coefficient β_4 which measures liquidity by proxy variable Liquid Asset to Total Asset Ratio has t-value of 7.938 which is less than p-value at 5% significance level. Hence H_{04} is rejected.

The β_5 coefficient which shows sensitivity measured by proxy variable Total Securities to Total Assets ratio has T-value is 10.569 and p-value is less at 5% level of significance, hence H_{05} is rejected. It means sensitivity towards market risk has positive influence on capital adequacy of sample banks.

5. Conclusion

In the light of the objective to investigate the determinants of capital adequacy patterns in the Indian Private Sector Banks, the multiple linear regressions is applied to data and found empirical support from some suppositions available in the literature. In particular, the present study focuses on Loans, Asset Quality, Management Efficiency, Liquidity and Sensitivity as the bank's performance characteristics. Such characteristics reflect some anticipated risks like credit risks, operational efficiency risk, liquidity risks and sensitivity risks and attempts to measure whether the these factors affect the variability of capital adequacy. The study highlighted that loans (Total Advances to Assets Ratio) has a statistically significant relationship with CAR which indicates that as loans and advances increase, the interest income and profitability will increase. It means the Indian Private Sector banks may have higher incentive to provide

safeguard of their owner's capital. Similarly, management efficiency (Expenditure to Income Ratio) is found to have a statistically significant effect on CAR which reveals that banks with good income as compared to their expenditure tend to improve capital of Indian Private sector Banks. It is also found that liquidity (Liquid Asset to Total Asset Ratio) has a statistically significant influence on CAR which reveals that an increase in bank liquidity reflects bank's ability to meet its credit demand and cash flow requirements. The study further highlights that sensitivity (GAP = Risk Sensitive Assets - Risk Sensitive Liabilities) towards market risk has positive influence on capital adequacy of sample banks. Further, study concludes that non-performing assets (NPAs) is found to have a statistically insignificant relationship with CAR which highlights the fact that the increase in bad debts will depreciate the value of capital and banks may be exposed to credit risks. Finally, the estimated model identified that the proxy variables like Loans (Total Advances to Assets Ratio), Management Efficiency (Expenditure to Income Ratio), Liquidity (Liquid Asset to Total Asset Ratio) and Sensitivity (GAP = Risk Sensitive Assets - Risk Sensitive Liabilities) have significant impact on the Capital adequacy ratio and have the ability to explain why Indian Private Sector banks maintain minimum capital beyond the amount required by the regulation. Therefore, the present study accepts alternative hypotheses 1, 3, 4 and 5 and rejected the 2 null hypotheses.

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