A Multi-Dimensional Performance Analysis of Private Banking in India

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ABSTRACT

In the widespread economic arena for "economic development of an economy", the role and prominence of banking system cannot be undervalued. The performance of banking sector is deliberated as an effective measure or quantum to observe the financial fitness of an economy. For the assessment of performance of banks in India, Reserve Bank of India has recommended two supervisory rating models (Capital Adequacy, Assets Quality, Management, Earning, Liquidity, and Sensitivity) and CACS (Capital Adequacy, Assets Quality, Compliance, Systems and Controls).

The present study is an attempt to use the CAMELS rating model to assess the status and performance of select set of private sector banks. The CAMELS model is applied on the secondary data related to different ratios obtained from Reserve Bank of India annual reports covering the period from 2009-2010 to 2013-2014. The objective was to conduct a multidimensional performance analysis of the core banking sector in India.

Keywords*: CAMELS, Performance Analysis, Banking Supervision, Multi-Dimensional Analysis, Bank Rating System, WEKA, Data Mining*

1. INTRODUCTION

The Banking Regulation Act, 1949 empowers the Reserve Bank of India to inspect and supervise the performance of commercial banks in India. This performance analysis is conducted by Department of Banking Supervision (DBS) which functions under the direction of the Board for Financial Supervision (BFS). Indian commercial banks are rated as per supervisory rating model approved by the BFS which is based on "CAMELS" concept. The Uniform Financial Institutions Rating System (UFIRS) commonly known as the CAMELS rating system, was adopted by the Federal Financial Institutions Examination Council (FFIEC) on November 13, 1979.

The FFIEC updated the UFIRS in December 1996 and the revision was effective January 1, 1997. These revisions include the addition of a 6th component addressing sensitivity to market risks - identification of risks within the component and composite rating descriptions.

CAMEL stands for

- Capital adequacy,
- Asset quality,
- Management capability,
- Earnings quantity and quality,
- Liquidity. (also called asset liability management)

It was later updated with the sixth key component and that is

- Sensitivity (sensitivity to market risk, especially interest rate risk) (Some authors also mention this as Systems and Control) [3][8].

so since then it is CAMELS.

The supervisory objectives of the inspection program of a bank holding company are to ascertain whether the financial strength of the bank holding company is being maintained on an ongoing basis and to determine the effects or consequences of transactions between a holding company or its nonbanking subsidiaries and its subsidiary banks.
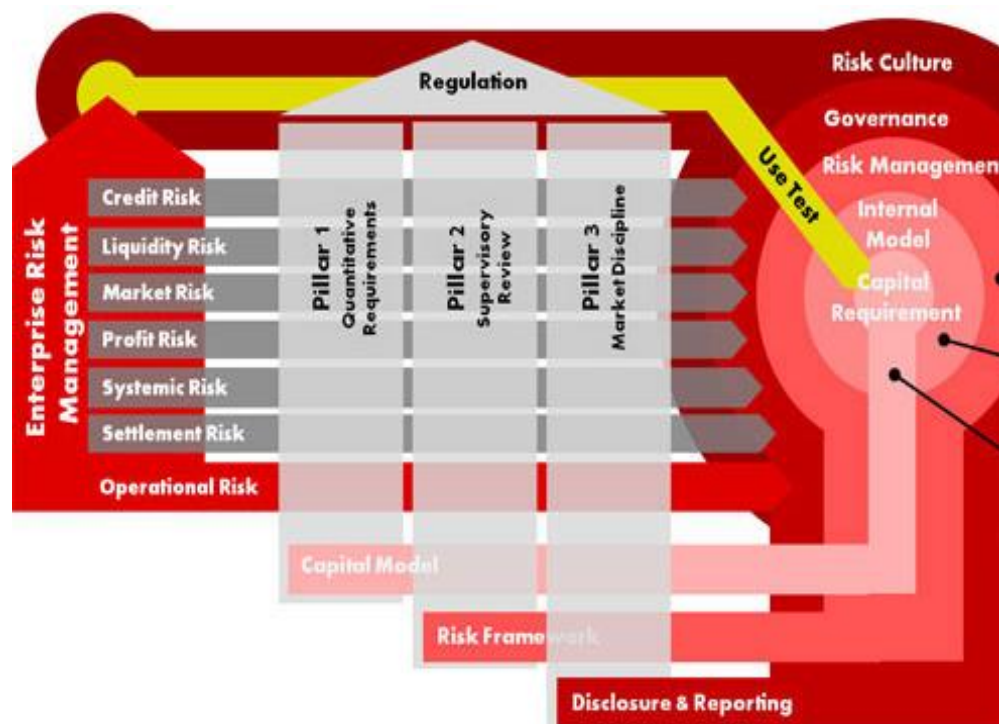
Figure 1: Risk assessment framework for financial institutions.

Over an epoch of time the banking sector in India has witnessed an archetype change in terms of evolution and performance. The financial policy makers and analysts have incorporated a number of policy initiatives to measures the financial performance and appraisal of operations of the banking system. The fact that banks work under the most unpredictable circumstances and the financial transactions industry as such in the growing phase makes it an motivating theme of the current study. The banking sector's performance is professed as the replica of economic activities performed in an economy [12]. Sound financial health of a bank provides the assurance not only to its depositors but is equally significant for its stakeholders and economy as a whole[16].

2. II.   LITERATURE REVIEW

A well-functioning financial sector facilitates efficient intermediation of financial resources. The more efficient a financial system is in resource generation and in its allocation, the greater is its contribution to economic growth. An efficient system of financial intermediation also contributes to the risk mitigation process in the economy.[1]
For instance, enhanced efficiency in banking can result in greater and more appropriate innovations, improved profitability as well as greater safety and soundness when the improvement in productivity is channeled towards strengthening capital buffers that absorb risk [4].
The CAMELS model is very much popular among regulators due to its effectiveness. Several authors argued that this model is highly compatible for the assessment of the performance of the bank [11, 19, 23].

Cole et al. (1995) conducted a study on "A CAMEL Rating's Shelf Life" and their findings suggest that, if a bank has not been examined for more than two quarters, off-site monitoring systems usually provide a more accurate indication of survivability than its CAMEL rating [9].

Barr et al. (2002) described the CAMELS rating system used by bank examiners and regulators; and finds that banks with high efficiency scores also have strong CAMELS ratings. The authors opined in their study 'Evaluating the Productive Efficiency and Performance of U.S. Commercial Banks' viewed that "CAMEL rating criteria has become a concise and indispensable tool for examiners and regulators". This rating criterion ensures a bank's healthy conditions by reviewing different aspects of a bank based on variety of information sources such as financial statement, funding sources, macroeconomic data, budget and cash flow [4].

Godlewski (2003) tested the validity of the CAMEL rating typology for bank's default modelisation in emerging markets. He focused explicitly on using a logical model applied to a database of defaulted banks in emerging markets [10].

Said and Saucier (2003) used CAMEL rating methodology to evaluate the liquidity, solvency and efficiency of Japanese Banks, the study evaluated capital adequacy, assets and management quality, earnings ability and liquidity position [15].

Veni (2004) highlighted the importance of capital adequacy requirement and the measures adopted by banks to build up their capital ratios. The study highlighted that the rating agencies using CAMEL model emphasized on capital adequacy ratios of banks in order to rate the bank's certificate of deposits, fixed deposits and bonds [24].

Sarker (2005) found that CAMELS methodology was adopted by North America Bank regulators to judge the financial and managerial reliability of commercial lending institutions. This model assesses the overall condition of the bank, its strengths and weaknesses. For Bangladesh he examined the CAMEL model for regulation and supervision of Islamic banks by the central bank. This study enabled the regulators and supervisors to get a Shariah benchmark to supervise and inspect Islamic banks and Islamic financial institutions from an Islamic perspective [18].

Nurazi and Evans (2005) investigated whether CAMEL(S) ratios could be used to predict bank failure. The results suggested that adequacy ratio, assets quality, management, earnings, liquidity and bank size are statistically significant in explaining bank failure [14].

Bhayani (2006) analyzed the performance of new private sector banks through the help of the CAMEL model. Four leading private sector banks – Industrial Credit & Investment Corporation of India, Housing Development Finance Corporation, Unit Trust of India and Industrial Development Bank of India - had been taken as a sample [6].

Bodla and Verma (2006) attempted CAMEL rating system to analyze the problems faced by the banks and analyzed the comparative analysis of the performance of various banks [7].

Grier (2007) recommended that management is considered to be the single most important element in the CAMEL rating system because it plays a significant role in bank's success [11].

In an empirical study Bernanke (2007) observed that U.S. Federal Reserve investigated the safety and soundness of financial stability in banks through the on-site bank examination with the support of the CAMEL rating model [5].

Wirnkar and Tanko (2008) emphasized the importance of CAMEL model in examining the overall performance of bank. The study highlighted the importance of each component in CAMEL and evaluated the best ratios that bank regulators can adopt in assessing the efficiency of banks [25].

Gupta and Kaur (2008) in their study used CAMEL model for the assessment of the performance of Indian private sector banks and ranked the top five and bottom five banks. The authors conducted the study with the main objective to assess the performance of Indian Private Sector Banks on the basis of Camel Model and gave rating to top five and bottom five banks. They ranked 20 old and 10 new private sector banks on the basis of CAMEL model. They considered the financial data for the period of five years i.e., from 2003-07[13].

Uzhegova, O., (2010)in his study claimed that the strength of CAMEL's factor is responsible for the overall strength of the bank [23].

Al-Tamimi (2010) using the rating model investigated factors influencing the performance of Islamic and conventional banks in (UAE) during 1996 to 2008. The study revealed that liquidity and concentration were crucial determinants of the performance of conventional banks while cost and number of branches significantly influenced the performance of Islamic banks[2].

3. III.   METHODOLOGY AND DATA ANALYSIS

The present study is a descriptive research study based on analytical research design. The study is analytical in nature and based on secondary data. The data is collected from RBI publications, annual reports of different banks and from the websites of different banks.

The period for evaluating performance through CAMEL in this study ranges from 2009-10 to 2013-14, i.e., for 5 years. The absolute data for these banks on capital adequacy, asset quality, management efficiency, earning quality and liquidity ratios is collected from various sources such as annual reports of the banks, RBI publications, and journals etc. The study is aimed at discovering the indicators as per CAMEL Performance Analysis Framework for various private sector banks.

The data was analyzed using WEKA data mining toolkit. The data was compiled from secondary sources and compiled in a CSV file for data analytics. The data was then mined for significant patterns and cluster assignments. The data was compared to standards set by RBI for basic compliance and then partitioned around representative cluster medoids using K Means Algorithm in WEKA workbench. The clusters were then analyzed for conformance to performance benchmarks. The clusters that exceeded the desired benchmarks were reported as deserving candidates for a strong rating. This was done for multiple dimensions associated to the CAMEL acronym. A representative set for these multidimensional indicators is as follows:

1. Capital Adequacy
1. Capital Adequacy Ratio (CAR)
2. Debt-Equity Ratio
3. Advances to Assets Ratio

2. Asset Quality
1. Net NPAs to Net Advances Ratio
2. Investments to Total Assets
3. Net NPAs to Total Assets

3. Management Efficiency
1. Total Advance to Total Deposit Ratio
2. Business per Employee
3. Profit per employee
4. Profit / Branch

4. Earning Quality
1. Dividend Payout Ratio
2. Operating Profit to Total Assets(ROA)
3. Net Interest Margin (NIM) (Net Profit) to Assets
4. Interest Income to Total Income
5. Non Interest Income to Total Income

5. Liquidity

1. Liquid Assets to Total Assets
2. Liquidity to Deposits

6. Sensitivity
   1. Price Earnings Ratio
   2. Total Securities to Total Assets Ratio
   3. GAP

To limit the scope of this paper we are focusing only on point 1 viz Capital Adequacy in this current research paper. The other parts of analysis shall be presented in future research work.

A capital adequacy ratio (CAR) is a measure of the amount of a bank's core capital expressed as a percentage of its risk-weighted asset. Capital adequacy ratio is defined as:

$$CAR = \frac{\text{Tier 1 capital} + \text{Tier 2 capital}}{\text{Risk weighted assets}}$$

$$CAR = \frac{T_1 + T_2}{a}$$

The reason why minimum capital adequacy criteria are critical is to ensure that banks have enough buffers to absorb a reasonable amount of losses before declaring themselves insolvent and, consequently, losing depositors' funds. Adequacy rates guarantee the efficiency and stability of a country's financial system by reducing the risk of bank failures. If a bank is declared insolvent, this collides confidence in the financial system and destroys the entire financial market system.

During the liquidation process, depositors' funds have a higher priority in bank capital, so depositors can only save money if a bank registers a loss greater than the amount of capital it owns. Therefore, the higher the capital adequacy ratio of the bank, the greater the degree of protection of the depositor's money.

Capital is the capital that is permanently and easily available to mitigate the losses suffered by a bank without requiring it to stop operating. A good example of a bank's capital is its ordinary social capital.

The second tier capital is what reduces losses in case the bank is liquidating, thus providing a lower degree of protection to depositors and creditors. It is used to absorb losses if a bank loses all its level one capital.

Higher CAR means banks are financially strong enough to protect the stakeholders' interest[17]. As per RBI guideline for banks in India has to maintain a CAR of 9%. Data was collected from RBI documentation and various secondary sources. The relevant ratios were calculated /compiled for a five year duration of 2009-2010 to 2014-2015.

4. IV.   DATA ANALYSIS AND FINDINGS OF DAT MINING

4.1 Capital Adequacy Calculation for Private sector banks

Capital adequacy reflects the overall financial position of a bank. Adequate capital held by the bank provides protection to investors' interest and it enhances the stability and efficiency of bank. Capital Adequacy is an indicator which determines the financial health and soundness of a bank. From the capital adequacy it can be determined whether the bank has sufficient resources to meet its obligations [21]. The data analysis is presented in table 1

S No	Name of the bank	Capital Adequacy Ratio (%)	Debt Equity Ratio (times)	Total Advances to Total Asset Ratio
1	Axis Bank Ltd.	14.05	10.09	0.573
2	City Union Bank Ltd.	12.97	21.51	0.61
3	Development Credit Bank Ltd.	13.8	9.17	0.563
4	Dhanalakshmi Bank Ltd.	13.39	21.44	0.61
5	Federal Bank Ltd.	18.46	23.41	0.607
6	HDFC Bank Ltd.	16.45	8.58	0.563
7	ICICI Bank Ltd.	18.16	4.14	0.537
8	Indusind Bank Ltd.	14.52	12.28	0.573
9	ING Vysya Bank Ltd.	13.17	13.1	0.56
10	Jammu & Kashmir Bank Ltd.	14.7	12.6	0.54
11	Karnataka Bank Ltd.	13.06	12.39	0.533
12	Karur Vysya Bank Ltd.	14.61	11.59	0.617
13	Kotak Mahindra Bank Ltd.	19.43	4.52	0.57
14	Lakshmi Vilas Bank Ltd.	12.77	6.7	0.613
15	South Indian Bank Ltd.	14.72	21.78	0.56
16	YES Bank Ltd.	17.9	8.79	0.577

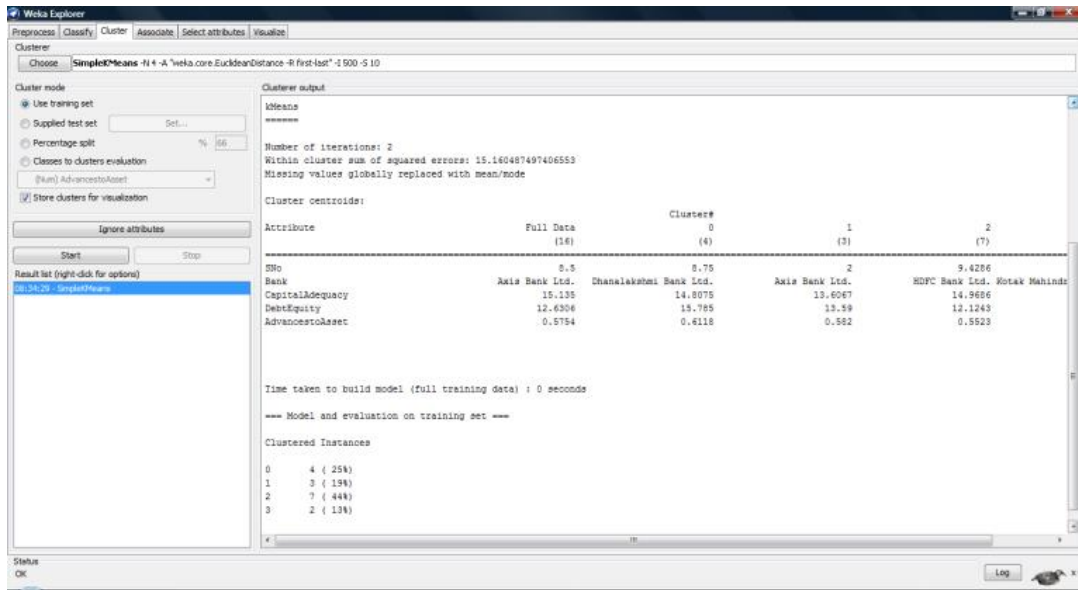**Table 1**: Data Analysis for Private Sector Banks

Figure 2: K Means Clustering using Weka

In the CAMELS rating criteria we have used the K Means Clustering Algorithm which subdivide and analyze the data into 4 representative clusters as shown in Figure above in figure 2 . The centroid value for full data set for capital adequacy is 15.135. The representative debt equity ratio for the set is 12.63 and Advances to Asset ratio is 0.5754.

Next the K Means Algorithm segregates the data in a 3 pillar representative cluster assignments. These three clusters represent the clusters and their representative values better understanding of representative groups in private banking set.
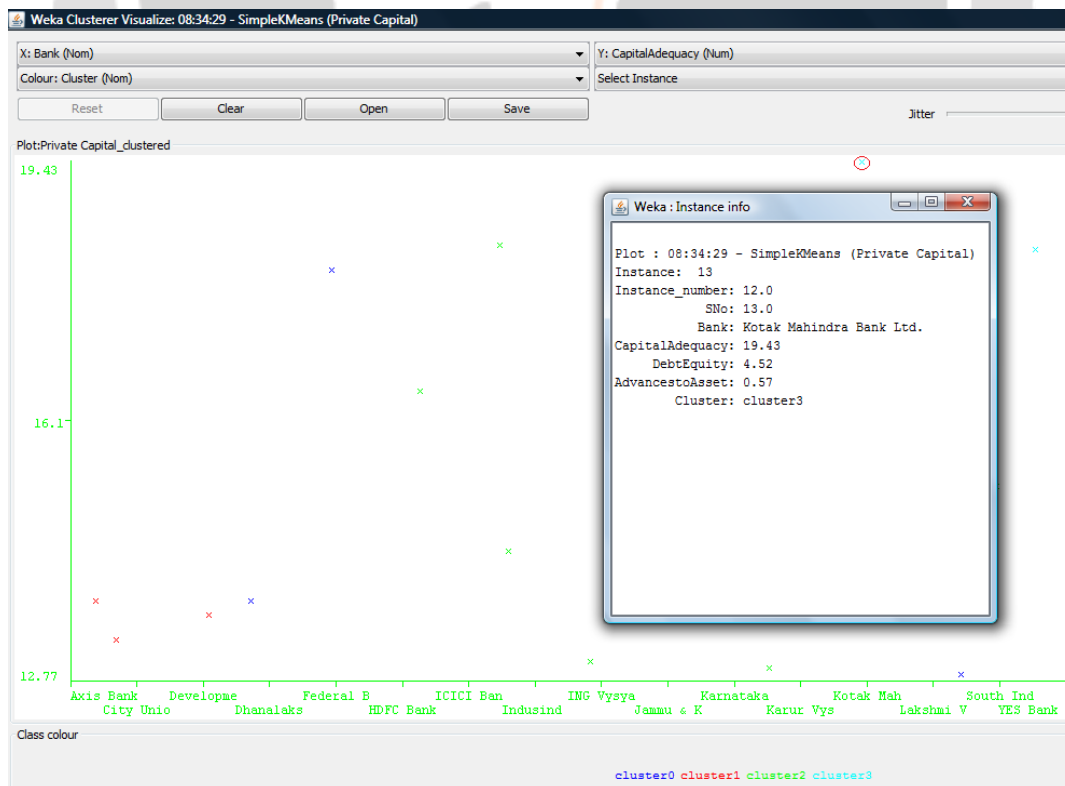

Figure 3: Cluster interpretation using WEKA

4.2 Capital Adequacy Ratio

Capital Adequacy ratio ensures that banks can adopt a reasonable level of losses arising from operations and to ascertain bank's loss bearing capacity. Capital Adequacy Ratio (CAR) is the ratio of a bank's capital to its risk. National regulators track a bank's CAR to ensure that it can absorb a reasonable amount of loss and complies with statutory Capital requirements[22].

It is a measure of a bank's capital. It is expressed as a percentage of a bank's risk weighted credit exposures and is sometime called as Capital to Risk (Weighted) Assets Ratio (CRAR). This ratio is used to protect depositors and promote stability and efficiency of financial systems around the world.

Two types of capital are measured: tier one capital, which can absorb losses without a bank being required to cease trading, and tier two capital, which can absorb losses in the event of a winding-up and so provides a lesser degree of protection to depositors. CAR = (Tier-I Capital + Tier-II Capital) / Risk Weighted Assets.

Higher CAR means banks are financially strong enough to protect the stakeholders' interest. As per RBI guideline for banks in India has to maintain a CAR of 9%. The ratio is adequately maintained by the participating set of banks. Within the group comparison shows that Lakshmi Vilas Bank Ltd is relatively at a lower side with CAR at 12.77 %. Still the bank is not missing the statutory requirement. The Kotak Mahindra Bank Ltd is having the highest CAR of 19.4%.

Capital adequacy ratio is the ratio which determines the bank's capacity to meet the time liabilities and other risks such as credit risk, operational risk etc. In the most simple formulation, a bank's capital is the "cushion" for potential losses, and protects the bank's depositors and other lenders. Since different types of assets have different risk profiles, CAR primarily adjusts for assets that are less risky by allowing banks to "discount" lower-risk assets.

4.3 Debt-Equity Ratio
   The debt/equity ratio is a leverage ratio that represents what amount of debt and equity is being used to finance a company's assets. It is calculated as total liabilities divided by total shareholders' equity. The debt/equity ratio is considered a key financial metric because it indicates potential financial risk.
The degree of leverage of a bank is reflected by debt-equity ratio. It shows the proportion of debt and equity in the total finance of the bank. It is calculated by dividing total borrowings with shareholders' net worth. Higher debt-equity ratio indicates less protection for the depositors and creditors and vice-versa. This ratio indicates the proportion of external funds and the internal funds used in the bank. It indicates the leverage capacity of the bank how efficiently bank is substituting the different sources of finance.

When banks make loans to non-financial companies, they usually insist that borrowers have enough equity. Loan terms and covenants are used to protect creditors. Wherein, for their own case the rule is construed differently. Debt equity ratio is found more or less around 5 percent for state bank group and nationalized bank group while debt equity ratio of both new and old private sector banks lies between a wide range of 4 to 24 percent.

ICICI Bank Ltd.   with a debt equity ratio of 4.14, Kotak Mahindra Bank Ltd. with   4.52, and Lakshmi Vilas Bank Ltd. with 6.7 demonstrates a good ratio position. On the other hand Dhanalakshmi Bank Ltd. with a DE ratio of 21.44, City Union Bank Ltd. at 21.51, South Indian Bank Ltd. with 21.78
And Federal Bank Ltd. with debt equity ratio of 23.41show a high risk cluster. Therefore these banks are required to reduce their D-E ratio to reduce the risk involved in their capital structure as high dependency on debt enhance the riskiness of banks.

4.4 Advances to Assets Ratio

This is a ratio between total advances and total assets. It is calculated by dividing the total advances with total assets. This ratio indicates a bank's aggressiveness in lending which ultimately leads to better profitability. Higher ratio is preferred as compared to lower one. Total advances also include receivables. The value of total assets excludes the re-valuation of all the assets.

The ratio is used to identify existing relationship among advances of bank and its total assets and it can also be calculated by dividing net investment with total assets. Higher Advances to Assets indicates the bank aggressiveness in lending. Higher ratio indicates higher investment which results
in higher profitability. This ratio is also sometimes expressed as a percentage. Perusal of the data analysis shows that roughly at par on this parameter and range between 0.53 on a lower side to 0.617 on a higher side. This can be expressed differently as 53% to 61.75. Karnataka Bank Ltd.   at 0.533, ICICI Bank Ltd.at 0.537, and Jammu & Kashmir Bank Ltd. at 0.54 represent the lower side of the ratio. On the other hand Dhanalakshmi Bank Ltd. at 0.61, Lakshmi Vilas Bank Ltd. at 0.613and Karur Vysya Bank Ltd.at 0.617 show aggressive lending.

5. CONCLUSION

The performance of banking sector is deliberated as an effective measure or quantum to observe the financial fitness of an economy. The CAMELS model is very much popular among regulators due to its effectiveness The present study is a descriptive research study based on analytical research design. Capital Adequacy Ratio (CAR) is the ratio of a bank's capital to its risk. National regulators track a bank's CAR to ensure that it can absorb a reasonable amount of loss and complies with statutory Capital requirements. The Kotak Mahindra Bank Ltd is having the highest CAR of 19.4%. The degree of leverage of a bank is reflected by debt-equity ratio. It shows the proportion of debt and equity in the total finance of the bank. Banks with higher debt equity ratio are required to reduce their D-E ratio. Advances to Assets indicates the bank aggressiveness in lending. Higher ratio indicates higher investment which results in higher profitability. Karur Vysya Bank Ltd.stands tall in the group with advances to asset ratio at 61.7%.

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