**Preeti Kulshrestha**[*]
Dayananda Sagar University

**Anubha Srivastava**[**]
Djerapah Megah Plasindho

# Use of CAMEL Rating Framework:
# A Comparative Performance Analysis
# of Selected Commercial Banks in India

**Abstract:** The performance of the banking sector is significant for any economy. The growth of a nation relies significantly upon efficient and optimum utilization of resources and also on operational efficiency of various sectors of an economy, of which the banking sector is a critical part. Banking system strengthens the stimulation of capital formation and provides liquidity. Indian banking sector comprises private, public, rural and foreign banks. In India, public sector banks are encountering challenges from private sector banks and are under constant pressure to perform better. Hence, this study endeavors mainly to analyze and compare the financial performance of the private and public banking sector by using CAMEL rating approach and for this purpose total of fourteen banks, representing the private and public, have been selected. The selected sample are the market leaders and have the highest market capitalization in the

Date of submission: September 21, 2021; date of acceptance: December 13, 2021.

[*] Contact information: kulshrestha.preeti@rediffmail.com, Dayananda Sagar University, Bangalore, MIG Plot-70, Block-A, Shastri Puram, Agra-282001, India, phone: +919953186389; ORCID ID: https://orcid.org/0000-0001-6423-6694.

[**] Contact information: anusri2799@gmail.com, Djerapah Megah Plasindho, Sukoharjo, Jawa Tengah, Indonesia; ORCID ID: https://orcid.org/0000-0001-7055-2124.

capital market. Overall, the paper aims to measure and compare the financial performance of private and public sector banks by employing CAMEL approach on their audited financial reports of eight years period i.e. (2011–2018). The ratios considered for this analysis includes Capital Adequacy (CA), Asset Quality (AQ), Management Soundness (MS), Earnings and Liquidity (LR). This study devised ranking method based on averages of various ratios and one way annova test is applied to find out statistical significance difference amongst groups. Results shown that private sector banks are better performers compare to Public sector bank. The overall results signify that the performance of private sector banks has improved because of the implementation of modern technology banking reforms and recovery mechanism.

## ◼◼◼ INTRODUCTION

According to Pekkaya and Demir (2018) banking in any economy serves as the fundamental source for financial strength. The banks have a direct and indirect impact on almost all industries. It plays a major role on the allocation of economic resources and a country's financial stability. The implication and role of banks operating in the modern economy are unavoidable and various products and services presented by the banks to the society is rising multifarious (Bikker, 2010; Altan, Beduk & Yusufazari, 2014). According to Said and Tumin (2011), the banking sector is an integral part of the financial system and performs a strategic role in the economic development of nations.

The banks as an industry assist through stimulating capital formation, innovation, monetization and facilitating the proper implementation of monetary policy. A healthy business environment builds consumer confidence and encourages investors to infuse more capital while a controlled inflation helps in strengthening economic development. The banking sector in any economy enjoys a critical part in boosting economic growth by investing at large in infrastructure and other projects. Reforms in banks are crucial for regulating and controlling the money flow in society. In addition, the advancements in technology mobile banking, net banking services, E-wallets, Fintech and artificial intelligence, etc. are to be blamed for making banking more complex. Indian banking system endeavors to deliver their finest and enhanced services to their customers.

During the financial crisis, governments adopted a majority of stakes in most of the beleaguered financial institutions through bailouts in developed countries. This started the debate about whether government-owned banks enhance financial soundness as per Nsengiyumva (2016).

According to Wanke, Kabir Hassan and Gavião (2016) most of the previous studies based on financial analysis failed due to insufficient quantification of stability scores. Ramya, Narmadha, Lekha, Nandhitha Bagyam and Keerthana (2017) examine the State Bank of India's financial performance for the study period 2012–2016 using CAMEL approach and revealed that there is a necessity to take adequate efforts to improve the efficiency of State Bank of India on a few parameters i.e., debt-equity, operating profit, and non-interest income to total income". According to Nazir and Sangmi (2010) A good rating of Capital Adequacy exhibits a strong signal of bank's health during crisis.

## Research Problem

During the economic crisis in 2008, the Indian banking system emerged unhurt, but the financial crisis amongst worldwide economies (barring 2009–10) has put forth pressure on a bank's performance in terms of profitability and capital utilization. Many public sector banks in India are facing problems of increasing non-performing assets, shortage of resources etc. In this scenario it is imperative to assess the banking sector performance.

This paper focuses on to appraise and compare the performance of selected commercial Banks in India using CAMEL model and endeavors to recognize the key determinants that affect the financial performance of these banks in Indian economic context. Further, the study also examined the significant difference between public and private sector bank's financial performance by using CAMEL model.

## Review of Literature

The CAMEL rating method of measuring financial performance was originated in 1979 during Uniform Financial Institutions Rating System (UFIRS) implementation in the US banking sector to introduce ratings for on-site examinations of banking institutions. Sahajwala and Van den Bergh (2000) explained in their research that under the CAMEL approach, each bank is appraised based on five major dimensions which indicate bank's operations & performance.

Siva and Natarajan (2011), analysed the CAMEL norms so as to study the performance of the SBI group and established that scanning the performance of commercial banks annually aids in diagnosing its financial health. Chaudhry

and Singh (2012) tried to find out the influence of financial transformations on the trustworthiness of the Indian banking sector and its impact on asset quality. As per Ishaq, Karim, Ahmed and Zaheer (2016) this model is suggested for appraising the performance of banks by the US Federal Reserve and the Uniform Financial Institutions Rating System. According to Singla (2008) undertook this study to investigate and comprehend how financial management plays a vital role in banking sectors growth.

The ratios such as Return on assets (ROA) and return on equities (ROE), which measures the profitability and the net margin interest can be considered as two key factors to quantify the bank's performance. Performance of banks is associated with internal bank specific factors like risk, market share, interest rates, etc. and external factors such as macroeconomic & macro-financial etc. (Nouaili, Abaoub & Ochi, 2015; Atyeh, Yasin & Khatibet, 2015).

Rostami (2015) examined the influence of each constraint of CAMELS rating framework on Iranian bank's performance. Q-Tobin's ratio was adopted as a performance indicator in their study. The research outcome revealed the relationship between CAMEL model and Q-Tobin's ratio.

Baral (2005) employed financial data which was publicly available to examine the financial performance of the joint venture banks by using CAMEL model framework. The study concluded that the joint venture banks were healthier than scheduled banks but these banks were not strong enough to face the large possible shocks to their balance sheet. Echekoba, Egbunike and Ezu (2014) evaluated in their research the influence of CAMEL indicators on the profitability of Nigerian commercial banks for the period of 9 years (2001–2010) and summarised that bank's profitability was not influenced by capital adequacy, assets quality, management efficiency and earnings but highly influenced by liquidity.

Chaudhary and Sharma (2011) examined how efficiently public and private sector banks have been managing NPA. He has applied statistical tools for the projection of the movement. Cebenoyan and Strahan (2004) designed framework for examining the capital allocation & capital structure with respect to the value creation of banks which they thought was a well-founded concern with risk management secondly the risks encountered by the banks which can be frictionless hedged in the capital marketplace.

Desta (2016) concluded in their study that the composite CAMEL rating provides variations among the banks. Despite having a fair rate on a composite basis, they have variations when each component is compared individually.

Ab-Rahim, Kadri, Ee-Ling and Alim Dee (2018) indicated that the results of their study are important as the emerging economies in ASEAN countries will attract both local and global investors to invest and will strengthen their financial position in the ASEAN region. Ahsan (2016) suggested in his study that the banking sector should be given attention to bring sustainability in the economy and added further that the efficient banking system assists in reducing the risk of failure of an economy. Dhanaraj and Ponmani (2020) in their study emphasized the usefulness of CAMEL approach for bankers, stakeholders, shareholders, investors, customers, policymakers, etc. Herbert and Santoso (2020) indicated a healthy score for the sample selected but suggested that banks should take advantage of IT implementation for cost efficiency.

Hewaidy, Elshamy and Kayed (2020) concluded in their report that conventional banks performed better than Islamic banks and research findings are assumed to be significant for policymakers and other shareholders to make better decisions. Ping and Kusairi (2020) concluded that the banking sector should focus more on CAMEL components for better supervision of bank performance.

## Research Methodology

The present study endeavors to explore the significance of CAMEL rating framework in assessing the selected Indian bank's performance. The current research is descriptive and exploratory in nature and research design aims to assess the relationship between selected bank's performance and elements of CAMEL by obtaining quantitative data from the audited annual reports. The statistics have been gathered from annual reports, BSE and NSE websites of India. Few ratios are calculated under each acronym of CAMEL. In addition, individual ranking, composite rankings and average have been calculated to derive meaningful research outcome. In India, the banks can be classified as commercial banks and co-operative banks. Commercial banks, further are separated into two sectors public sector banks and private sector banks which operate at the national level and provide services. Public sector banks are regulated by the government and private sector banks have private ownership. Public sector banks are encountering challenges from private sector banks and are under constant pressure to perform better. While public sector banks have the advantage of perceived reputation and faith due to involvement of government, private sector banks provide better amenities and efficient services.

The current investigation has been executed considering the sharp differences between private sector and public sector banks in term of performance by employing CAMEL rating methods in India.

The present research assembled the data from annual reports of 14 banks comprising 7 Private and 7 Public sector banks and the period for the study was eight financial years (2011–2018). These banks were purposely selected because they provided complete financial statements for the study period. The rationale behind selecting only seven banks from their corresponding sector is because they are the top-performing large cap banks and have the highest market capitalization in Indian capital market, except J&K bank whose NPA has increased significantly over the past years and reporting the first time in last four decades of continuous financial loss. The purpose of incorporating J&K bank in the present study is to assess the financial strength of the bank despite of its limited operation in India. Total 19 ratios were calculated under the Acronyms of CAMEL rating framework which are expressed in the following table.

**Table 1.** Ratios calculated under CAMEL model

| Capital Adequacy | Asset Quality | Management Efficiency | Earnings Capability | Liquidity |
|---|---|---|---|---|
| Capital Adequacy Ratio (CAR) | Net NPA* / Net Ratio (NPAR) | Asset Utilization Ratio (AUR) | Return on Assets (ROA) | Current Ratio (CR) |
| Capital Adequacy tier I Ratio (CAR I) | Net NPA (NPA) | Return on equity Ratio (ROE) | Spread Ratio (SR) | Investment Deposit Ratio (Investment DR) |
| Capital Adequacy tier II Ratio (CAR II) | Gross NPA Ratio (GNPAR) | Profit per employee (Profit per employee) | Net Interest Margin (NIM) | Cash deposit ratio (Cash DR) |
| | | Business per employee (Business per employee) | Net profit ratio (NPR) | Credit deposit Ratio (Credit DR) |
| | | Income to expense Ratio (E/I Ratio) | | |

* Non performing asset.

S o u r c e : compiled by author.

The following hypothesis was framed to test the significant difference between financial performance of public and private sector banks.

## Hypothesis of the study

$H_0$: There is no significant difference amongst overall parameters of CAMEL model on the financial performance of public sector banks.

$H_{a1}$: There is a significant difference amongst overall parameters of CAMEL model on the financial performance of public sector banks.

$H_0$: There is no significant difference amongst overall parameters of CAMEL model on the financial performance of private sector banks.

$H_{a2}$: There is a significant difference amongst overall parameters of CAMEL model on the financial performance of private sector banks.

## Data Analysis

*Capital Adequacy (C)* – Capital adequacy is a measure of the internal efficiency of a bank. It assists the banks to stay solvent during the period of crisis. Capital Adequacy Ratio is expressed as (Tier1 Capital+ Tier2 Capital) divided by risk-weighted assets. This ratio expresses the bank's capital which serves as a cushion to engage losses before it becomes insolvent. As per Reddy (2012) capital adequacy is required to maintain depositors' confidence and preventing the bank from going bankrupt. It has an effect on the overall performance of a bank. Recognizing the importance of capital adequacy, the Reserve Bank of India (RBI) released a directive in 1992, whereby each bank in India was asked to satisfy the capital adequacy standard of 8%, the norm fixed on the footing of the passports of the Basel–III committee. Nevertheless, a substantial-high CAR indicates that the bank is conservative and has not used the wide voltage of its cap. Therefore, according to Chen (2003), to avert bank failure, it is essential to keep a noteworthy level of capital adequacy. Three ratios (CAR, CAR Tier I and CAR Tier II) are calculated in this research to derive the desired outcome. The capital adequacy ratios of the banks under study are presented in the accompanying tables.

**Table 2.** Capital Adequacy (C)

| Details | CAR | | CAR I | | CAR II | | Composite | |
|---|---|---|---|---|---|---|---|---|
| **Public Sector Banks** | Avg. % | Rank | Avg. % | Rank | Avg. % | Rank | Avg. % | Rank |
| SBI | 13.00 | 7 | 10.12 | 8 | 3.35 | 6 | 7 | 5 |
| PNB | 12.40 | 9 | 7.89 | 13 | 2.63 | 10 | 10.67 | 12 |
| BOI | 11.20 | 12 | 8.56 | 10 | 2.80 | 8 | 10.00 | 11 |
| Union Bank | 11.00 | 14 | 8.03 | 12 | 2.62 | 11 | 12.33 | 14 |
| Central Bank of India | 11.03 | 13 | 6.75 | 14 | 2.75 | 9 | 12 | 13 |
| UCO Bank | 12.13 | 10 | 8.63 | 9 | 3.63 | 5 | 8 | 7.5 |
| Bank of Maharashtra | 11.75 | 11 | 8.38 | 11 | 3.25 | 7 | 9.66 | 9.5 |
| **Private Sector Banks** | | | | | | | | |
| HDFC | 16.66 | 2 | 12.90 | 3 | 3.89 | 3 | 2.66 | 3 |
| ICICI | 18.00 | 1 | 13.75 | 2 | 4.65 | 1 | 1.33 | 1 |
| Axis Bank | 15.60 | 4 | 12.32 | 5 | 3.80 | 4 | 4.33 | 4 |
| IndusInd Bank | 14.40 | 6 | 12.57 | 4 | 2.52 | 12 | 7.33 | 6 |
| Yes Bank | 16.47 | 3 | 15.85 | 1 | 4.20 | 2 | 2 | 2 |
| Federal bank | 14.71 | 5 | 11.42 | 6 | 1.92 | 13 | 8 | 7.5 |
| J&K Bank | 12.80 | 8 | 10.62 | 7 | 1.79 | 14 | 9.66 | 9.5 |

S o u r c e : compiled by author from annual reports of respective bank.

INTERPRETATION:

The table 2, shows 8-years average of the CAR, CAR I and CAR II of selected banks and identified that all the banks have a CAR above prescribed norm of 8%. The above table shows the distribution which consists CAR and other ratios determined as per range of CAR averages for the banks. ICICI has the highest CAR with an average of 18%, followed by HDFC with 16.66% and Yes bank with 16.47%. Amongst the private sector banks J&K Bank has the lowest CAR i.e.12.80%.SBI has the highest CAR with an average of 13% and Union Bank has the lowest CAR with 11%. Public sector banks in India perform as per the

directive of RBI and governed by government rules which influences the performance of these banks. For other ratios Yes bank has the highest CAR-I i.e. 15.85% and ICICI has second highest CAR-I (13.75%). ICICI again demonstrated the highest performance in terms of CAR-II (4.65%). The composited ranking also indicate that ICICI and YES bank are two best performers. Amongst Public sector banks SBI performance is better in terms of CAR, CAR-I and CAR-II as compared to other selected banks.

The author has considered CAR as benchmark for capital adequacy and the outcome suggests that ICICI and HDFC ranks the best & Union Bank and Central Bank of India ranks the last showing poor capital adequacy. As far as CAR I is concerned, YES bank and ICICI ranks the best and Central bank and Punjab National Bank have the least rank. Considering CAR II ranks, it is understood that ICICI and Yes bank have the best capital adequacy & Bank of India and Federal Bank has inadequate capital.

*Asset Quality (A)* – It is another significant dimension for the evaluation of a bank's performance and efficiency. As per the RBI rules, the bad debts are classified as Standard, Sub-Standard and Doubtful and loss asset. The assets quality is a vital factor to inspect the level of financial strength. Three ratios namely NPA Ratio, Net NPA (million) and Gross NPA ratio are mentioned in the below table.

**Table 3.** Asset Quality (A)

| Detail | NPA R | | Net NPA (Million) | | GNPAR | | Composite | |
|---|---|---|---|---|---|---|---|---|
| Public Sector Banks | Avg. % | Rank | Avg. % | Rank | Avg. % | Rank | Avg. % | Rank |
| SBI | 5.51 | 11 | 24.73 | 14 | 6.90 | 9 | 11.33 | 12 |
| PNB | 3.86 | 10 | 11.15 | 13 | 9.51 | 13 | 12 | 13.5 |
| BOI | 3.33 | 9 | 8.42 | 9 | 8.36 | 11 | 9.66 | 9.5 |
| Union Bank | 2.72 | 8 | 8.67 | 11 | 7.29 | 10 | 9.66 | 9.5 |
| Central bank of India | 5.82 | 12 | 8.45 | 10 | 11 | 14 | 12 | 13.5 |
| UCO Bank | 6.63 | 13 | 4.55 | 6 | 8.75 | 12 | 10.33 | 11 |
| Bank of Maharashtra | 6.75 | 14 | 3.45 | 3 | 5.38 | 7 | 8 | 8 |

**Table 3.** Asset…

| Detail | NPA R | | Net NPA (Million) | | GNPAR | | Composite | |
|---|---|---|---|---|---|---|---|---|
| **Private. Banks** | | | | | | | | |
| HDFC | 0.24 | 1 | 6.40 | 7 | 1.16 | 2 | 3.33 | 1.5 |
| ICICI | 1.41 | 5 | 4.23 | 4 | 4.38 | 6 | 5 | 4 |
| Axis Bank | 1.46 | 6 | 3.45 | 2 | 2.80 | 5 | 4.33 | 3 |
| IndusInd bank | .39 | 2 | 4.25 | 5 | 1.45 | 3 | 3.33 | 1.5 |
| Yes bank | .40 | 3 | 9.45 | 12 | .74 | 1 | 5.33 | 5.5 |
| Federal bank | .67 | 4 | 6.96 | 8 | 2.20 | 4 | 5.33 | 5.5 |
| J&K Bank | 1.51 | 7 | 1.51 | 1 | 6.67 | 8 | 5.34 | 7 |

S o u r c e : compiled by author from annual reports of respective bank.

INTERPRETATION:

The table 3, defines the 8-year average of selected banks; HDFC tops with an average of 0.24 percent in terms of NPA ratio, which is less than 1% NPA per loan, followed by IndusInd Bank 0.39 percent. Yes Bank and Federal Bank showed 0.40 and 0.67 percent NPA ratio respectively. Banks with the poorest performance in terms of NPA ratios are Bank of Maharashtra and UCO Bank with an average of 6.75 and 6.63 percent followed by SBI with an average of 5.51 percent. Nevertheless, when comparing the NPA growth, J&K bank showed the highest NPA growth over the last financial year, the fact that its NPA ratio is better than other banks is due to the bank's limited operations in the country unlike other Nationalised banks. In composite ranking HDFC and IndusInd Bank demonstrated the best performance followed by Axis and ICICI bank. All private banks have performed better in term of NPA compared to Public sector banks. PNB, SBI and Central Bank of India have showed the highest NPA in the balance sheet.

***Management Efficiency (M)*** – The Management's performance is often qualitative and it is analyzed through the individual appraisal of Management sys-

tems, organizational culture, and control mechanisms. Though, the efficiency of the management for a bank can be judged with the help of other ratios of off-site valuation of a bank.

**Table 4.** Management Efficiency (M)

| Detail | Asset utilisa-tion ratio | | Return on equity | | Profit per Employee (Million) | | Business per employee (Million) | | Expenses to Income Ratio | | Composite | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Public Sector Banks | Avg % | Rank | Avg % | Rank | Avg | Rank | Avg | Rank | Avg % | Rank | Avg | Rank |
| SBI | 8.6 | 7 | 9.70 | 7 | .43 | 8 | 134 | 4 | 9.96 | 14 | 8 | 7 |
| PNB | 8.7 | 6 | 3.56 | 12 | .39 | 9 | 127 | 6 | 9.44 | 11 | 8.8 | 9 |
| BOI | 7.7 | 11 | 5.10 | 11 | .23 | 12 | 177 | 1 | 9.71 | 12 | 9.4 | 11 |
| Union Bank | 9.0 | 5 | 8.06 | 9 | .38 | 10 | 161 | 2 | 9.41 | 10 | 7.2 | 6 |
| Central bank of India | 7.8 | 10 | 2.57 | 13 | .22 | 13 | 108 | 9 | 8.89 | 8 | 10.6 | 13 |
| UCO Bank | 3.1 | 13 | 5.15 | 10 | .19 | 14 | 114 | 7 | 9.80 | 13 | 11.4 | 14 |
| Bank of Ma-harashtra | 8.1 | 8 | 2.49 | 14 | .26 | 11 | 140 | 3 | 9.40 | 9 | 9 | 10 |
| Private Banks | | | | | | | | | | | | |
| HDFC | 9.9 | 2 | 17.3 | 2 | 1.35 | 2 | 110 | 8 | 8.27 | 4 | 3.6 | 1 |
| ICICI | 13.8 | 1 | 11.2 | 5 | 1.24 | 3 | 107 | 10 | 8.69 | 6 | 5 | 4 |
| Axis Bank | 9.6 | 3 | 12.9 | 4 | 1.23 | 4 | 133 | 5 | 8.36 | 5 | 4.2 | 2 |
| IndusInd bank | 7.6 | 12 | 15.5 | 3 | 1.03 | 6 | 68 | 14 | 6.17 | 3 | 10 | 12 |
| Yes Bank | 7.9 | 9 | 19 | 1 | 1.74 | 1 | 95 | 11 | 5.87 | 1 | 4.6 | 3 |
| Federal Bank | 2.7 | 14 | 9.5 | 8 | .75 | 7 | 80 | 12 | 6.57 | 2 | 8.6 | 8 |
| J&K Bank | 9.1 | 4 | 10.4 | 6 | 1.15 | 5 | 71 | 13 | 8.79 | 7 | 7 | 5 |

S o u r c e : compiled by author from annual reports of respective bank.

INTERPRETATION:

Table 4 shows five ratios as performance indicator for institution's management efficiency. The best bank is ICICI Bank with an 8-years average of 13.8% for Asset utilization ratio. For ROE and profit per employee both HDFC and Yes bank are doing better compared to others. Low Income ratio is an indicator of better profitability. HDFC followed by Axis Bank has the lowest score. Amongst Public Sector banks Union bank has the highest average in terms of Assets utilization ratio followed by PNB and SBI. In terms of ROE (Return on Earnings) SBI stood first with 9.70%. It is to be observed that Private Sector Banks have better expenditure to Income ratios as compared to the Public Banks. On composite ranking HDFC is the best scorer and ranks one followed by Axis Bank and Yes bank. Overall public sector efficiency is less compared to private sector banks whereas UCO bank and Central Bank of India have the lowest composite rank.

As far as Asset Utilisation Ratio is concerned ICICI and HDFC has highest rank & Federal bank and UCO bank has the least rank in management efficiency. Considering ROE, it is found that YES bank and ICICI has highest rank and Bank of Maharashtra and Central bank of India finds the last place. In Profit per employee, Yes bank and UCO banks holds the first and last rank respectively. As far as Business per employee is concerned Bank of India tops the list and IndusInd Bank holds the last rank. Considering Expense-Income ratio we find that Yes bank tops the list showing good management quality and SBI holds the last rank proving poor management efficiency.

***Earnings Capabilities (E) –*** The earnings quality is a vital standard that defines the bank's ability to earn regularly. Basically, it defines the bank's profitability and describes its sustainability and growth in earnings. Four key ratios ROA, Spread Ratio (SR), Net Profit Ratio (NPR) and Net Interest Margin (NIM) is given in the following table.

**Table 5.** Earnings Capabilities (E)

| Detail | Return on asset | | Spread ratio | | Net Profit ratio | | Net interest margin | | Composite | |
|---|---|---|---|---|---|---|---|---|---|---|
| Public Sector banks | Avg % | Rank | Avg % | Rank | Avg % | Rank | Avg % | Rank | Avg | Rank |
| SBI | .73 | 8 | 6.11 | 12 | 9.08 | 8 | 2.48 | 10 | 7 | 8 |
| PNB | .55 | 10 | 6.82 | 10 | 6.14 | 10 | 2.57 | 10 | 9.75 | 9 |
| BOI | .24 | 11 | 5.56 | 14 | 2.91 | 12 | 1.91 | 8 | 11.25 | 13 |
| Union Bank | .56 | 9 | 5.92 | 13 | 6.52 | 9 | 2.19 | 13 | 11 | 11.5 |
| Central Bank of India | .11 | 13 | 8.88 | 2 | 2.33 | 13 | 2.21 | 12 | 10 | 10 |
| UCO Bank | .18 | 12 | 7.39 | 7 | 4.83 | 11 | 2.08 | 14 | 11 | 11.5 |
| Bank of Maharashtra | .08 | 14 | 6.14 | 11 | 2.31 | 14 | 2.47 | 11 | 12.5 | 14 |
| **Private Banks** | | | | | | | | | | |
| HDFC | 1.84 | 1 | 9.00 | 1 | 20.04 | 2 | 3.73 | 1 | 1.25 | 1 |
| ICICI | 1.60 | 3 | 7.30 | 8 | 20.69 | 1 | 2.70 | 6 | 4.5 | 4.5 |
| Axis Bank | 1.68 | 2 | 7.44 | 6 | 19.88 | 3 | 2.95 | 4 | 3.75 | 2 |
| IndusInd bank | 1.53 | 4 | 7.51 | 5 | 18.03 | 4 | 3.58 | 3 | 4 | 3 |
| Yes Bank | 1.45 | 5 | 8.31 | 3 | 17.79 | 5 | 2.78 | 5 | 4.5 | 4.5 |
| Federal Bank | 1.15 | 7 | 7.21 | 9 | 11.13 | 7 | 3.30 | 2 | 6.25 | 7 |
| J&K Bank | 1.16 | 6 | 8.14 | 4 | 12.89 | 6 | 2.68 | 7 | 5.75 | 6 |

S o u r c e : compiled by author from annual reports of respective bank.

INTERPRETATION:

As per table 5, HDFC has the highest earning capability with an 8-year average of 1.84%, Axis Bank follows it with 1.68% and ICICI with 1.60%, Bank of Maharashtra and Central Bank have the lowest 8-year average of 0.08% and 0.11% respectively. Bank of Maharashtra has the lowest profitability from loans dispersed. The above table shows the 8-year average of spread ratios of banks, and astonishingly Yes Bank has an average of 8.31% which is the second highest spread ratio, after HDFC with 9.00%. BOI has the lowest score with 5.56%.

On an average, nearly all the banks have shown an increase in their spread ra-
tio except in FY15-16. This may be due to a considerable increase in the NPA
of banks during that financial year. It is clearly depicted in the table that ICICI
is on top with an average of 20.69% followed by HDFC with a ratio of 20.04%,
Bank of Maharashtra and Central Bank have the lowest net profit ratio of 2.33%
and 2.31%. On composite ranking all private sector banks are representing
good earning capabilities compare to public sector banks.

Considering ROA, it is understood that HDFC bank has the best earning ca-
pability and Bank of Maharashtra has poor earning capability. As far as Spread
ratio is concerned HDFC bank tops the bank and Bank of India falls last in the
list. As per NPR ratio, ICICI tops the rank and Bank of Maharashtra falls the last
in the list. Considering NIM ratio, it is understood that HDFC bank tops in effi-
ciency capabilities and UCO bank has poor efficiency capabilities.

*Liquidity (L)* – Bank requires liquidity for smooth functioning. Liquidity and
transferability are the key components for banking sector. Investment securi-
ties like Liquid assets enable a bank to act rapidly to unanticipated necessities
for instantaneous payment. Four ratios Cash Ratio(CR), Credit Deposit Ratio,
Cash Deposit Ratio and Investment Deposit Ratio are performance indicator for
liquidity, as given below.

**Table 6**. Liquidity (L)

| Detail | Cash Ratio | | Credit Deposit Ratio | | Cash Deposit Ratio | | Investment Deposit Ratio | | Composite | |
|---|---|---|---|---|---|---|---|---|---|---|
| Public Sector Banks | Avg | Rank | Avg % | Rank | Avg % | Rank | Avg % | Rank | Avg | Rank |
| SBI | .033 | 11 | 81.1 | 7 | 4.7 | 12 | 32.0 | 10 | 10 | 10 |
| PNB | .022 | 14 | 76.2 | 9 | 4.8 | 11 | 30.9 | 11 | 11.2 | 14 |
| BOI | .045 | 8 | 75.2 | 10 | 5.3 | 8 | 23.3 | 14 | 10 | 11 |
| Union Bank | .025 | 13 | 78.0 | 8 | 5.1 | 9 | 28.9 | 12 | 10.5 | 12 |
| Central bank of India | .052 | 6 | 60.0 | 14 | 3.2 | 14 | 33.8 | 9 | 10.7 | 13 |
| UCO Bank | .063 | 3 | 65.2 | 13 | 3.7 | 13 | 36.5 | 5 | 8.5 | 7 |
| Bank of Ma-harashtra | .043 | 9 | 72.1 | 12 | 6.6 | 3 | 25.5 | 13 | 9.25 | 9 |

**Table 6**. Liquidity...

| Detail | Cash Ratio | | Credit Deposit Ratio | | Cash Deposit Ratio | | Investment Deposit Ratio | | Composite | |
|---|---|---|---|---|---|---|---|---|---|---|
| Private Bank | | | | | | | | | | |
| HDFC | .061 | 4 | 82.1 | 6 | 6.9 | 2 | 35.3 | 6 | 4.5 | 3.5 |
| ICICI | .091 | 1 | 102 | 1 | 7.0 | 1 | 48.1 | 2 | 1.25 | 1 |
| Axis Bank | .042 | 10 | 85.2 | 3 | 6.3 | 5 | 38.3 | 4 | 5.5 | 6 |
| IndusInd Bank | .057 | 5 | 88.4 | 2 | 6.2 | 6 | 34.1 | 8 | 5.2 | 5 |
| Yes Bank | .074 | 2 | 82.1 | 5 | 5.4 | 7 | 48.9 | 1 | 3.75 | 2 |
| Federal Bank | .032 | 12 | 74.8 | 11 | 4.9 | 10 | 38.7 | 3 | 9 | 8 |
| J&K Bank | .051 | 3 | 84.1 | 4 | 6.5 | 4 | 35.0 | 7 | 4.5 | 3.5 |

S o u r c e : compiled by author from annual reports of respective bank.

INTERPRETATION:

It is depicted in table 6, that ICICI has the highest current ratio with 0.09 times which can be interpreted as: for every 0.09:1 unit of current asset, it has 1 unit of liability. The bank with the lowest 8-year average of current ratio is PNB with 0.02:1 in the above table, ICICI has the best credit deposit ratio with an 8-years average of 102.1%, followed by IndusInd Bank with 88.4 % and Axis Bank with 85.2%. High credit deposit ratio of ICICI Bank shows that in case fund requirements occur, it may not have the anticipated liquidity to complete such requirements. Cash deposit ratio and investment deposit ratio of ICICI and Yes bank stipulates the high performance with maximum score. On composite ranking all private sector are showing high liquidity whereas public sector banks are facing the liquidity crunch issues.

Considering CR, it is understood that ICICI bank has the best liquidity and PNB has poor liquidity. As far as Credit DR Ratio is concerned ICICI bank is at top amongst the banks and Central Bank of India falls last in the list. As per Cash DR ratio, ICICI tops the rank and Central Bank of India falls the last in the list. Considering Investment DR Ratio it is understood that Yes bank is at top amongst selected banks in terms of liquidity and Bank of India has poor liquidity.

## Overall Performance of the Selected Banks

**Table 7.** Overall ranking of the selected banks based on the CAMELS parameter

| Bank | Capital Adequacy ( C) | Asset Quality (A) | Management Efficiency (M) | Earnings Capability ( E) | Liquidity ( L) | Avg. | Rank |
|---|---|---|---|---|---|---|---|
| **Public Sector Banks** | | | | | | | |
| SBI | 5 | 12 | 7 | 8 | 10 | 8.4 | 8 |
| PNB | 12 | 13.5 | 9 | 9 | 14 | 11.5 | 13 |
| BOI | 11 | 9.5 | 11 | 13 | 11 | 11.1 | 12 |
| Union Bank | 14 | 9.5 | 6 | 11.5 | 12 | 10.6 | 11 |
| Central Bank of India | 13 | 13.5 | 13 | 10 | 13 | 12.5 | 14 |
| UCO Bank | 7.5 | 11 | 14 | 11.5 | 7 | 10.2 | 10 |
| Bank of Maharashtra | 9.5 | 8 | 10 | 14 | 9 | 10.1 | 9 |
| **Pvt. Banks** | | | | | | | |
| HDFC | 3 | 1.5 | 1 | 1 | 3.5 | 2 | 1 |
| ICICI | 1 | 4 | 4 | 4.5 | 1 | 2.9 | 2 |
| Axis Bank | 4 | 3 | 2 | 2 | 6 | 3.4 | 3.5 |
| IndusInd Bank | 6 | 1.5 | 12 | 3 | 5 | 5.5 | 5 |
| Yes Bank | 2 | 5.5 | 3 | 4.5 | 2 | 3.4 | 3.5 |
| Federal Bank | 7.5 | 5.5 | 8 | 7 | 8 | 7.2 | 7 |
| J&K Bank | 9.5 | 7 | 5 | 6 | 3.5 | 6.2 | 6 |

S o u r c e : compiled by author from annual reports of selected banks.

Table 7 indicates the aggregate average of total ranks obtained on various parameters under CAMEL approach. The above table explains that all the private banks are scoring better on all parameters of CAMEL rating due their operational efficiency and aggressive approach. The decision making ability, strategy and policy implement in private sector banks are better than public sector banks. Overall, it can be established that private sector banks in India perform better as associated to public sector banks.

**Table 8.** Annova Test (Public Sector Banks)

| Source of Variation | SS | df | MS | F | P-value | F crit |
|---|---|---|---|---|---|---|
| Between Groups | 140302.9902 | 18 | 7794.610567 | 193.3328907 | 2.354286E-52 | 1.72353928 |
| Within Groups | 4596.142961 | 114 | 40.31704352 | | | |
| Total | 144899.1332 | 132 | | | | |

S o u r c e : compiled by author from the results of SPSS.

There was a statistically significant difference amongst groups as determined by one way annova test with P-value of 2.354286E-52 is greater than critical value (1.72353928). Hence, null hypothesis is rejected. There is a significant difference amongst overall parameters of CAMEL model on the financial performance of public sector banks.

**Table 9.** Annova Test (Private Sector Banks)

| Source of Variation | SS | Df | MS | F | P-value | F crit |
|---|---|---|---|---|---|---|
| Between Groups | 78412.79234 | 18 | 4356.266241 | 98.94645163 | 2.54289E-53 | 1.71343948 |
| Within Groups | 4182.517777 | 95 | 44.02650291 | | | |
| Total | 82595.31012 | 113 | | | | |

S o u r c e : compiled by author from the results of SPSS.

There was a statistically significant difference amongst groups as determined by one way annova test with P-value of 2.54289E-53 which is smaller than 0.05. F value is also greater than critical value (1.71343948). Hence, null hypothesis is rejected. There is a significant difference amongst overall parameters of CAMEL model on the financial performance of private sector banks.

## Results and Discussion

Capital adequacy ratios analysis shows that ICICI bank ranks the best capital adequacy & Union Bank has poor capital adequacy ratio. Regarding Asset Qual-

ity, HDFC bank and IndusInd Bank rated excellent whereas Central bank of India and PNB ranks last. This analysis shows that amongst the banks considered the asset quality of HDFC and IndusInd Bank is the best and the Central bank of India and PNB has the poor asset quality. In order to assess the Management Efficiency aspects such as Asset Utilisation, Return on Equity, and Profit per employee, Business per employee, Expense-Income ratio is considered. The study shows that the HDFC Bank tops in management efficiency and UCO bank has poor management efficiency.

In order to evaluate the Earning Capability of banks, return on Assets, Spread ratio, NPR ratio and NIM ratio are calculated. It is found that HDFC bank has the best earning capability and Bank of Maharashtra has poor earning capability. Based on Liquidity, it is found that ICICI bank has the best earning capability and PNB has poor liquidity. Among the banks considered, HDFC Bank and ICICI Banks are the best performing banks & PNB and Central Bank of India are poor performers. On the basis of analysis, it is found that private sector banks are better performers compare to public sector bank.

## ◼◼◼ CONCLUSION

Due to fast-paced fluctuations in the banking sector, all the banks all around the world intend to improve their supervision quality and methods. In order to evaluate the function of banks, most of the developed nations are adopting a uniform financial rating system that is CAMEL RATING accompanied by other prevailing procedures. The current study suffers from few limitations similar to other previous investigations. The paper has incorporated only 14 banks for research purposes which may not represent the whole banking sector and has considered only eight years as study period. Future authors may add more ratios to compare and evaluate the performance of banks and can take a large sample size. There is also a possibility to compare Indian banks with other international banks too. Further, researchers can also investigate the performance of the banking sector by considering models similar to CAMEL like bankometer S-score model, Z score models etc.

The current paper focused on assessing the financial performance of selected Indian banks using CAMEL Ratio. According to Kumari (2017), CAMELS rating system is a quantitative technique and widely used in various countries. The results of this study show that there is a statistically significant difference

between the overall performance of all the public sector banks and private sector banks in India. The result of the study is similar to (Purohit & Bothra, 2018) who concluded that private sector banks are at a better position. The overall results signify that the performance of private sector banks has improved because of the implementation of modern technology banking reforms and recovery mechanism. Further another reason is because private sector banks are financially stronger than public sector banks.

### ■■■ References

Ab-Rahim, R., Kadri, N., Ee-Ling, A.-C., & Alim Dee, A. (2018). CAMEL Analysis on Performance of ASEAN Public Listed Bank. *International Business Research*, 11(4), 96––105. http://dx.doi.org/10.5539/ibr.v11n4p96.

Ahsan, M.K. (2016). Measuring Financial Performance Based on CAMEL: A Study on Selected Islamic Banks in Bangladesh. *Asian Business Review*, 6(1), 47–56. http://dx.doi.org/10.18034/abr.v6i1.26.

Altan, M., Beduk, A., & Yusufazari, H. (2014). Performance Analysis of Banks in Turkey Using Camel Approach. 14th International Academic Conference, Malta, 2014.

Atyeh, M.H., Yasin, J., & Khatib, A.M. (2015). Measuring the performance of the Kuwaiti banking sector before and after the recent financial crisis. *Business & Financial Affairs*, 4(3), 1–3. http://dx.doi.org/10.4172/2167-0234.1000156.

Baral, K.J. (2005). Health check-up of commercial banks in the framework of CAMEL: A case study of joint venture banks in Nepal. *Journal of Nepalese Business Studies*, 2(1), 41–55. http://dx.doi.org/10.3126/jnbs.v2i1.55.

Bikker, J.A. (2010). Measuring performance of banks: An assessment. *Journal of Applied Business and Economics*, 11(4), 141–159.

Cebenoyan, S., & Strahan, P.E. (2004). Risk management, capital structure and lending at banks. *Journal of Banking & Finance*, 28(1), 19–43.

Chaudhary, K., & Sharma, M. (2011). Performance of Indian Public Sector Banks and Private Sector Banks: A Comparative Study. *International Journal of Innovation*, 2(3), 249–256.

Chaudhry, S., & Singh, S. (2012). Impact of Reforms on the Asset Quality in Indian Banking. *International Journal of Multidisciplinary*, 5(2), 17–24.

Chen, J. (2003). Capital adequacy of Chinese banks: evaluation and enhancement. *Journal of Banking Regulation*, 4(4), 320-327. http://dx.doi.org/10.1057/palgrave.jbr.2340149.

Desta, T. (2016). Financial performance of the best African Banks: A comparative analysis through CAMEL rating. *Journal of Accounting and Management*, 6(1), 1–20.

Dhanaraj, V.T., & Ponmani, U. (2020). Performance evaluation of Indian commercial bank through: A CAMEL approach (with special reference to selected private and public). *ARIV – International Journal of Business*, 1(2).

Echekoba, F.N., Egbunike, C.F., & Ezu, G.K. (2014). Determinants of Bank Profitability in Nigeria: Using Camel Rating Model (2001–2010). *Journal of Business and Management*, 16(9), 44–50. http://dx.doi.org/10.9790/487X-16964450.

Herbert, G., & Santoso, W. (2020). Bank health examination with camel approach to achieve competitive advantage: a case study in. Bank National Nobu, Tbk. *International Journal of Research and Analytical Reviews*, 7(4), 542–549.

Hewaidy, A.M., Elshamy, M.A., & Kayed, M.A. (2020). Bank Performance and the Association Between Accounting Income and the CAMEL Framework: Evidence from Kuwait. *Journal of Accounting and Finance*, 20(3), 73–85. http://dx.doi.org/10.33423/jaf.v20i3.3010.

Ishaq, A.B., Karim, A., Ahmed, S., & Zaheer, A. (2016). Evaluating performance of commercial banks in Pakistan: "An application of Camel model". *Journal of Business & Financial Affairs*, 5(1), 1–30. http://dx.doi.org/10.2139/ssrn.2716691.

Kumari, I.G.S. (2017). A study on the financial performance of foreign commercial banks in Sri Lanka: An application of camel rating system. *Economics*, *Commerce and Trade Management*: *An International Journal* (*ECTIJ*), 1(1), 59–70.

Nazir, T., & Sangmi, M. (2010). Analyzing financial performance of commercial banks in India: An application of CAMEL model. *Pakistan Journal of Commerce and Social Sciences*, 4(1), 40–55.

Nouaili, M., Abaoub, E., & Ochi, A. (2015). The determinants of banking performance in front of financial changes: Case of trade banks in Tunisia. *International Journal of Economics and Financial Issues*, 5(2), 410–417.

Nsengiyumva, J. (2016). Does Government Ownership Negatively Affect Soundness of Banks? New Evidence. *International Review of Management and Business Research*, 5(3), 743–765.

Pekkaya M., & Demir F.E. (2018). *Determining the Priorities of CAMELS Dimensions Based on Bank Performance*. In H. Dincer, Ü. Hacioglu, S. Yüksel (Eds.), *Global Approaches in Financial Economics*, *Banking*, *and Finance*. Cham: Springer, Cham. http://dx.doi.org/10.1007/978-3-319-78494-6_21.

Ping, K.G., & Kusairi, S. (2020). Analysis of CAMEL Components and Commercial Bank Performance: Panel Data Analysis. *Jurnal Organisasi Dan Manajemen*, 16(1), 1–10. http://dx.doi.org/10.33830/jom.v16i1.835.2020.

Purohit, A., & Bothra, P. (2018). A Camel Model Analysis of Selected Public and Private Sector Banks in India. *International Journal of Management and Applied Science*, 4(3), 91–98.

Ramya, S., Narmadha, N.K.B., Lekha, S., Nandhitha Bagyam, V.R., & Keerthana, A. (2017). Analysis of financial performance of state bank of India using camels approach. *International Journal of Applied Research*, 3(2), 449–452.

Reddy, K.S. (2012). Relative Performance of Commercial Banks in India Using Camel Approach. *International Journal of Multidisciplinary Research*, 2(3), 38–58.

Rostami, M. (2015). Determination of CAMELS model on bank's performance. *International Journal of Multidisciplinary Research and Development*, 2(10), 652–664.

Rostami, M. (2015). CAMELS' Analysis in Banking Industry. *Global Journal of Engineering Science and Research Management Research Management*, 2(11), 10–26.

Sahajwala, R., & Van den Bergh, P. (2000). Supervisory risk assessment and early warning systems. *Basle Committee on Banking Supervision Working Papers*, No. 4, Bank of International Settlements.

Said, R.M., & Tumin, M.H. (2011). Peformance and financial ratios of commercial banks in Malaysia and China. *International Review of Business Research Papers*, 7(2), 157––169.

Singla, H.K. (2008). Financial Performance of Banks in India. *The IUP Journal of Bank Management*, 7(1), 50–62.

Siva, S., & Natarajan, P. (2011). CAMEL Rating scanning (CRS) of SBI Groups. *Journal of Banking Financial Services and Insurance Research*, 1(7), 1–17.

Wanke, P., Kabir Hassan, M., & Gavião, L.O. (2017). Islamic banking and performance in the Asean banking industry: A TOPSIS approach with probabilistic weights. *International Journal of Business and Society*, 18(S1), 129–150.