

THE CAMEL'S FRAMEWORK WITH A FOCUS ON THE IMPACT OF NON-PERFORMING ASSETS OF SELECTED PRIVATE AND PUBLIC SECTOR BANKS

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Abstract: The banking industry is the backbone of the economic development of a country. The CAMEL model is one of the models to identify the financial health of the banks. NPAs are a universal phenomenon, and this study focuses on evaluating the financial health of selected Indian commercial banks using the CAMELS framework and examining the CAMELS ratios' impact on NPAs of public-sector and private-sector banks. The studies use secondary sources from RBI and different banks' websites. The study makes use of five years of data, 2021 to 2025. Five private sector banks (Axis Bank, HDFC Bank, ICICI Bank, Kotak Mahindra Bank, and INDUSLND Bank) and five public sector banks (Bank of Baroda, Canara Bank, Punjab National Bank, State Bank of India, and Union Bank of India) had been considered for the study. All these banks are evaluated on the basis of CAMEL determinants. Panel regression has been conducted to understand the factors influencing net non-performing assets. While analyzing CAMEL parameters, the fixed-effects model was conducted. The findings include that the CAMEL is useful in evaluating the financial health of banks and selected private banks' financial health is better in some of the aspects of the CAMEL model compared to public sector banks. The net NPA has an impact on the financial health of both private and public sector banks.

Keywords: CAMEL model Financial health of banks—non Performing assets, public sector banks, and private sector banks

1. INTRODUCTION

Indian banking is simply the engine of our bank industry and contributes immensely towards ensuring an ever-growing and steady economy (Srivastava & Kumar, 2024). The commercial banks also aided in this process by sweeping household savings and investing in productive businesses, loaning industry, farms and infrastructure, which also drives capital formation. In the past twenty years, the industry has evolved rapidly due to liberalization of the monetary policies, improvement in technology, and an increase of more privately run banks into the equation (Dubey et al., 2025). Despite this the Indian banks continue to encounter severe structural and cyclical conditions that would jeopardize their well being in the long-term (Pokharel & Devkota, 2025). The problem of increasing Non-Performing Assets (NPAs) of loans where no interest or principal is paid in ninety days are one of the big ones and these are the indicators of defaults and credit risk increase. High NPI is counterproductive to profitability by impairing its ability to provision as a high NPA reduces capital adequacy, lending capability and investor and deposit confidence (Nidhi & Tyagi, 2018). This particularly struck against public sector banks that control the market by overwhelming assets and the case is not any different with the private banks. Poor credit appraisal, prioritizing low-income groups, global



recessions, governance failures, and external shocks such as the COVID 19 pandemic are some of the causes of stressed assets (Carter, 2024) CAMEL is a combination of five dimensions, namely, Capital Adequacy, Asset Quality, Management Efficiency, Earnings, Liquidity, and Sensitivity to Market risk and provides the general idea of the power and strength of a bank (Mohanty, 2014).

2. METHODOLOGY:

The objective of the study is to value the financial health of selected Indian commercial banks using the CAMELS framework and to examine the CAMELS- ratios impact on NPA of public sector and private sector banks. Secondary data has been the main source from the study. The data has been collected from RBI websites and banks annual reports. This study scope covers a complex assessment of financial health and risk profile of the five selected Indian commercial banks (Axis bank, HDFC bank, ICICI bank, Kotak Mahindra Bank, INDUSIND bank) and public sector banks (Bank of Baroda, Canara Bank, Punjab National Bank, State Bank of India and Union Bank of India) and the period of the data covered is from 2021 to 2025.

DATA ANALYSIS:

CAMEL'S ANALYSIS for Private sector banks- AXIS BANK

CAMEL ANALYSIS - AXIS BANK			2025	2024	2023	2022	2021
CAPITAL ADEQUACY	(a) Capital Adequacy	(Tier 1 + Tier 2)/Total Weighted Assets	0.1186	0.1104	0.1037	0.1079	0.1085
	Tier 1 Capital	Banks Common Stock + Retained earning	179725.12	151061.6	125416.7	115174.1	101603
	Tier 2 Capital	Surplus on revaluation of assets - net of tax					
	(b) Adv/Equity	Advances / Share holder's equity	602.443	668.381	813.746	928.065	1017.903
Asset Quality	(a) NPA/Adv	Net NPA / Advances	0.3541	1.8100	1.0000	1.0000	1.0000
	(b) Adv/T.A	Advances / Total Assets	0.6465	0.6533	0.6417	0.6022	0.6262
Management Quality	Adv/Dep	Total Advances / Total Deposits	0.8873	0.9031	0.8927	0.8612	0.8818
Earning Quality	Inc/T.A	Net Income / Total assets	0.0919	0.0892	0.0772	0.0703	0.0788
Liquidity	Current Ratio	Current Assets / Total Assets	0.7500	0.7719	0.7773	0.7618	0.7688
	Cash Ratio	Cash / Deposits	0.0628	0.0805	0.0698	0.1144	0.0732

Capital Adequacy : Capital Adequacy Ratio (CAR): (Tier 1 + Tier 2) Capital/Total weighted assets: The ratio shows the buffer of the bank in terms of capital. An increased ratio is an indication of increased financial stability (Sabapathy & Birda, 2019). The trend of the CAR of Axis Bank has been variable with a slight drop in 2021 to 10.85 percent and in 2022 to 10.79 percent and again in 2025 to 11.18 percent. Although there has been some slight fluctuation, the ratio has been relatively stable and in a healthy level, which means that it has an adequate capital to cover its risk-weighted assets. **Adv/Equity (Advances to Shareholder Equity):** This ratio demonstrates the percentage of shareholder equity used to finance the loans of the bank. A downward trend indicates the bank is less becoming leveraged. The ratio of Axis Bank has shown a very good decreasing trend, 1017.90 percent in 2021, and 602.44 percent in 2025. It is quite a positive indication and it is good to see that the bank is not highly depending on equity to capitalize on its books and it is enhancing its financial base.

Asset Quality: NPA/Adv (Net NPA to Advances): It is a ratio of the percentage of non-performing loans following provisions. A lower percentage implies a quality of its assets. The NPA ratio at Axis Bank has been outstanding as it has reduced considerably relative to the previous years where the bank recorded an NPA ratio of 1.00% in 2021 and 0.35% in 2025. This is one of the main strengths and this means that the management of bad loans has been done well by the bank and the loan portfolio is healthy. **Adv/T.A (Advances to Total Assets):** This ratio indicates the concentration of the loans in the total assets of the bank. The ratio has been fluctuating between 0.62 in 2021 and 0.64 in 2025. Such stability implies a stable and predictable asset base without excessively focusing on lending.

Management Quality : This is measured by the Adv/Dep (Total Advances to Total Deposits) ratio which is the efficiency of the bank utilizing its deposits to earn profits by lending (Hikmahwati & Rahmawati, 2026). : The ratio has remained steady and high throughout the period and has been varying slightly between 0.88% and 0.90%. This implies that Axis Bank is efficient in utilizing its main source of funds (deposits) towards its main business of lending, which demonstrates the competent management.

Earnings Quality: The Inc/T.A (Net Income to Total Assets) ratio is used to measure this component and is used to give the profitability and effectiveness of the bank to generate income on its assets(Avery & Belton, 1987).The profitability of the bank has been on a steep upward trend with the profitability rising by 0.078 in 2021 to 0.091 in 2025. This is quite a good news and this means that the bank is gaining profitability with time.

Liquidity: The liquidity measures evaluate the capability of the bank to cover its short-term liabilities and the withdrawal of deposits that may come up(Viorica et al., 2020). **Current Ratio:** This ratio is presented as a ratio between the current assets and total assets. The current ratio of Axis Bank has been constant ranging between 0.75 percent and 0.77 percent within the period. A constantly high ratio is an indication that the bank has a healthy amount of liquid assets that can be utilized to meet the short-term liabilities. **Cash Ratio (Cash / Deposits):** This ratio is used to check the most liquid forms of assets against the deposits of the bank(Sharma et al., 2025). Cash ratio has been highly fluctuating with the high value of 0.11% as reported in 2023 and the lowest value of 0.06% as reported in 2025. The cash volatility may be an aspect to watch because it is less indicative of consistency in the instant cash position of the bank.

The performance of Axis Bank, measured using the CAMEL analysis, shows that the bank is performing well and thus improving in a number of aspects. The bank has shown major strengths in the quality of its assets, reduction in the NPAs is sharp, and in its earnings quality, there is an evident upward trend in profitability. It has also been effective in reducing its leverage as the Advances/Equity ratio has also been on the decline. Areas to keep an eye on: Although the bank is not experiencing any financial difficulties, its cash ratio fluctuates, so it is worth to be followed to make sure that it is able to cover all its short-term liabilities.

On the similar basis the other banks data has been analyzed and only summery of the analysis is mentioned at each bank details.

CAMEL'S ANALYSIS – HDFC BANK

CAMEL ANANYSIS -HDFC BANK			2025	2024	2023	2022	2021
CAPTIAL ADEQUACY	(a) Capital Adequacy	(Tier 1 + Tier 2)/ Total Weighted Assests	0.1359	0.1292	0.1294	0.1250	0.1248
	Tier 1 Capital	Banks Common Stock + Retained earning	501424.63	440245.81	280199.00	240092.93	203720.83
	Tier 2 Capital	Surplus on revaluation of assets - net of tax					
	(b) Adv/Equity	Advances / Share holder's equity	3423.34	3270.89	2868.59	2468.35	2054.92
Asset Quality	(a) NPA/Adv	Net NPA / Advances	0.43	0.33	0.27	0	0.00
	(b) Adv/T.A	Advances / Total Assets	0.6699	0.6869	0.6490	0.6617	0.6485
Management Quality	Adv/Dep	Total Advances / Total Deposits	0.9650	1.0442	0.8498	0.8779	0.8485
Earning Quality	Inc/T.A	Net Income / Total assets	0.0885	0.0850	0.0782	0.0760	0.0836
Liquidity	Current Ratio	Current Assests / Total Assets	0.7826	0.8027	0.7871	0.7768	0.7432
	Cash Ratio	Cash / Deposits	0.0532	0.0751	0.0622	0.0834	0.0729

This CAMEL analysis reflects that HDFC Bank has a good and well-controlled financial profile. The bank has a very high quality of assets and the NPA is low. It has a strong Capital Adequacy that is showing an upward trend. Earnings Quality has been improving consistently and the Management Quality is also effective in using funds to lend out. Areas to Watch: Although the bank is performing well, the trend in advancing to equity ratio is on the rise and this will point to increased dependence on leverage. The fluctuation in the Advances/Deposits ratio, as well as, Cash/Deposits ratio indicates that the management is effective but liquidity and funds management are also important.

CAMEL'S ANALYSIS – ICICI BANK

CAMEL ANALYSIS - ICICI BANK			2025	2024	2023	2022	2021
CAPITAL ADEQUACY	(a) Capital Adequacy	(tier 1 + Tier 2)/ Total Weighted Assets	0.1501	0.1335	0.1238	0.1159	0.1099
	Tier 1 Capital	Banks Common Stock + Retained earning	292076.3	235315.97	197652.9	167316.3	144415.59
	Tier 2 Capital	Surplus on revaluation of assets - net of tax	0.00	3,083.35	3,062.46	3,195.66	3,093.59
	(b) Adv/Equity	Advances / Share holder's equity	941.855	843.186	729.992	618.014	530.377
Asset Quality	(a) NPA/Adv	Net NPA / Advances	0.42	0.45	0.51	0.81	2.1
	(b) Adv/T.A	Advances / Total Assets	0.6334	0.6339	0.6449	0.6101	0.5978
Management Quality	Adv/Dep	Total Advances / Total Deposits	0.8332	0.8383	0.8635	0.8069	0.7868
Earning Quality	Inc/T.A	Net Income / Total assets	0.0905	0.0888	0.0816	0.0745	0.0799
Liquidity	Current Ratio	Current Assets / Total Assets	0.7556	0.7480	0.7668	0.7813	0.7660
	Cash Ratio	Cash / Deposits	0.0745	0.0635	0.0580	0.0565	0.0494

The performance of ICICI Bank under the CAMEL analysis is strong and remarkable. The bank has recorded big steps towards the development of its asset quality and capital adequacy, which are among the most vital of all the indicators of health of a bank. It has also demonstrated a steady increase in its profitability. Though the rising advances-to-equity ratio increases the leverage, it is offset by the excellent and increasing capital adequacy. In general, the statistics indicate the existence of a financially stable, controlled, and expanding bank.

CAMEL'S ANALYSIS – INDUSIND BANK

CAMEL ANALYSIS - INDUSIND BANK			2025	2024	2023	2022	2021
CAPITAL ADEQUACY	(a) Capital Adequacy	(tier 1 + Tier 2)/ Total Weighted Assets	0.1300	0.1305	0.1411	0.1387	0.1381
	Tier 1 Capital	Banks Common Stock + Retained earning	64202.86	62501.42	54320.01	47389.59	43051.8
	Tier 2 Capital	Surplus on revaluation of assets - net of tax	289.72	289.73	289.74	289.75	289.76
	(b) Adv/Equity	Advances / Share holder's equity	442.871	441.076	373.6611	308.589	274.8948
Asset Quality	(a) NPA/Adv	Net NPA / Advances	0.95	0.57	0.59	0.64	0.69
	(b) Adv/T.A	Advances / Total Assets	0.6231	0.6671	0.6337	0.5951	0.5862
Management Quality	Adv/Dep	Total Advances / Total Deposits	0.8393	0.8922	0.8617	0.8140	0.8298
Earning Quality	Inc/T.A	Net Income / Total assets	0.1018	0.1071	0.0973	0.0952	0.0980
Liquidity	Current Ratio	Current Assets / Total Assets	0.7895	0.7897	0.8149	0.8197	0.8039
	Cash Ratio	Cash / Deposits	0.1238	0.0482	0.1277	0.0533	0.0698

The bank has experienced steady increase in profitability (Earning Quality) and overall reduction in the NPAs, excepting the last year. It has also had a high and consistent advances/to deposit ratio indicating effective management. The main areas of concern are the falling Capital Adequacy Ratio and a massive increment in the Advances/Equity ratio that implies a more leveraged and possibly risky position. The recent soaring of the NPA ratio in 2025 and the instability in the Cash Ratio should also be monitored closely.

CAMEL'S ANALYSIS – KOTAK MAHINDRA BANK

CAMEL ANALYSIS -KOTAK MAHINDRA BANK			2025	2024	2023	2022	2021
CAPTIAL ADEQUACY	(a) Capital Adequacy	(tier 1 + Tier 2)/ Total Weighted Assests	0.1853	0.1756	0.1896	0.1837	0.1810
	Tier 1 Capital	Banks Common Stock + Retained earning	117239.9	96718.75	83020.26	71987.78	63229.13
	Tier 2 Capital	Surplus on revaluation of assets - net of tax					
	(b) Adv/Equity	Advances / Share holder's equity	4528.5796	4743.0353	5303.6181	8663.4813	103559.5463
Asset Quality	(a) NPA/Adv	Net NPA / Advances	0.04	0.34	0.4	0.34	1.21
	(b) Adv/T.A	Advances / Total Assets	0.6155	0.6264	0.6530	0.6317	0.5833
Management Quality	Adv/Dep	Total Advances / Total Deposits	0.8554	0.8377	0.8809	0.8703	0.7986
Earning Quality	Inc/T.A	Net Income / Total assets	0.0979	0.0934	0.0844	0.0778	0.0842
Liquidity	Current Ratio	Current Assests / Total Assets	0.7343	0.7376	0.7482	0.7620	0.7219
	Cash Ratio	Cash / Deposits	0.0836	0.0807	0.0550	0.0514	0.0446

Table Number 4.13

The bank has portrayed high Asset Quality showing close to zero NPA ratio. Its Quality of Earnings has been steadily increasing and its Management Quality is also good with high and increasing advances-to-deposits ratio. The Capital Adequacy Ratio in the bank is also good and it has been on the increase. The high Advances to Equity ratio which is in a downwards trend, is noted as an area to be observed. Although the bank is a profitable and an effective bank, this high leverage ratio is worth considering. Its liquidity ratios are also volatile indicating that it should also be regularly managed as far as short term cash position management is concerned. In general, the discussion indicates that this is a bank that is financially healthy and well-controlled, with an exceptionally good future, especially in terms of its underlying profitability and quality of assets.

CAMEL'S ANALYSIS – PUBTLIC SECTORS BANKS : BANK OF BARODA

CAMEL ANALYSIS -BANK OF BARODA			2025	2024	2023	2022	2021
CAPTIAL ADEQUACY	(a) Capital Adequacy	(tier 1 + Tier 2)/ Total Weighted Assests	0.0820	0.0749	0.0741	0.0735	0.0733
	Tier 1 Capital	Banks Common Stock + Retained earning	136925.7	112223.6	98222.89	85909.72	77045.72
	Tier 2 Capital	Surplus on revaluation of assets - net of tax					
	(b) Adv/Equity	Advances / Share holder's equity	1168.057	1029.214	908.712	750.490	682.067
Asset Quality	(a) NPA/Adv	Net NPA / Advances	0.58	0.68	0.89	2	3
	(b) Adv/T.A	Advances / Total Assets	0.67905	0.67208	0.64515	0.60810	0.61132
Management Quality	Adv/Dep	Total Advances / Total Deposits	0.82169	0.80318	0.78176	0.74302	0.73041
Earning Quality	Inc/T.A	Net Income / Total assets	0.07752	0.08015	0.06830	0.06367	0.07172
Liquidity	Current Ratio	Current Assests / Total Assets	0.77669	0.76180	0.74551	0.74514	0.76697
	Cash Ratio	Cash / Deposits	0	0	0	0	0

Bank of Baroda has demonstrated a performance that is very strong and a positive turnaround between 2021 and 2025. The most prominent attainments of the bank include Asset Quality, where dramatic measures have been reduced in NPAs and in Capital Adequacy where the CAR has been increased steadily. It is also in a positive growth

trend in its profitability and efficiency in its management. The rising leverage as evidenced by the Adv/Equity ratio will have to be kept track of but it is compensated by the rising capital adequacy. It is also necessary to mention the abnormal figures of Cash Ratio because it seems to be a mistake of data recording. In general, the bank seems to be in the healthy and stable financial direction, as it has managed to enhance the key performance indicators that were critical to its financial health in the long term.

CAMEL'S ANALYSIS - CANARA BANK

CAMEL ANALYSIS -CANARA BANK			2025	2024	2023	2022	2021
CAPITAL ADEQUACY	(a) Capital Adequacy	(tier 1 + Tier 2)/ Total Weighted Assets	0.0669	0.0645	0.0623	0.0622	0.0592
	Tier 1 Capital	Banks Common Stock + Retained earning	93450.27	77850.28	66132.1	57605.08	50600.7
	Tier 2 Capital	Surplus on revaluation of assets - net of tax	6,449.84	9,104.31	7,475.04	8,506.23	8,284.24
	(b) Adv/Equity	Advances / Share holder's equity	578.324	513.531	457.890	387.845	388.069
Asset Quality	(a) NPA/Adv	Net NPA / Advances	0.7	1.27	1.73	3	4
	(b) Adv/T.A	Advances / Total Assets	0.6258	0.6284	0.6207	0.5774	0.5579
Management Quality	Adv/Dep	Total Advances / Total Deposits	0.7201	0.7099	0.7044	0.6476	0.6322
Earning Quality	Inc/T.A	Net Income / Total assets	0.0848	0.0861	0.0771	0.0705	0.0738
Liquidity	Current Ratio	Current Assets / Total Assets	0.7709	0.7568	0.7595	0.7662	0.7690
	Cash Ratio	Cash / Deposits	0.0618	0.0542	0.0466	0.0475	0.0426

Asset Quality, where the bank has made significant progress as the number of NPAs has been drastically reduced, and Earnings Quality, where there has been a steady rise in profitability, are some of the strongest achievements of the bank. Its deposits deployment is becoming also more efficient in its management. Areas to watch: Although the performance of the bank is good, the low and slightly fluctuating Capital Adequacy Ratio and the rising leverage as shown by the Adv/Equity ratio is something which should be concerned. These are an indication that the bank is well managing its assets and earnings but the capital buffer could be higher to sustain its growth

CAMEL'S ANALYSIS - PUNJAB NATIONAL BANK

CAMEL ANALYSIS -PUNJAB NATIONAL BANK			2025	2024	2023	2022	2021
CAPTIAL ADEQUACY	(a) Capital Adequacy	(tier 1 + Tier 2)/ Total Weighted Assests	1.0271	1.0513	1.0253	1.0361	1.0116
	Tier 1 Capital	Banks Common Stock + Retained earning	1467884	1372564	1234657	1190069	761445.1
	Tier 2 Capital	Surplus on revaluation of assets - net of tax	8,305.63	8,455.13	7,048.62	7,200.41	4,758.69
	(b) Adv/Equity	Advances / Share holder's equity	0.1255	0.1318	0.1207	0.1316	0.1257
Asset Quality	(a) NPA/Adv	Net NPA / Advances	0.7	1.27	1.73	3	4
	(b) Adv/T.A	Advances / Total Assets	0.6015	0.5717	0.5568	0.5379	0.5713
Management Quality	Adv/Dep	Total Advances / Total Deposits	0.6822	0.6485	0.6353	0.6094	0.6704
Earning Quality	Inc/T.A	Net Income / Total assets	0.0889	0.0828	0.0744	0.0696	0.1133
Liquidity	Current Ratio	Current Assests / Total Assets	0.7303	0.7026	0.6583	0.6267	0.6633
	Cash Ratio	Cash / Deposits	0.0475	0.0610	0.0494	0.0397	0.0546

The most significant accomplishment of the bank is the significant change in the Asset Quality with a massive decline in NPAs. Its Capital Adequacy and Management Efficiency have also improved steadily which are good positive signs. Although the bank is on a good road, its Capital Adequacy Ratio is extremely low as compared to its competitors. The unsteadiness of the earnings and the variable liquidity ratios needs to be monitored constantly as well to be stable in the long-term. Altogether, PNB has demonstrated performing turnaround in such important aspects as the quality of assets, but it remains far to improve its capital and stabilize its revenues, especially when it compares with the banks in the private market.

4.2.4 CAMEL'S ANALYSIS - STATE BANK OF INDIA

CAMEL ANALYSIS -STATE BANK OF INIDA			2025	2024	2023	2022	2021
CAPTIAL ADEQUACY	(a) Capital Adequacy	(tier 1 + Tier 2)/ Total Weighted Assests	0.0697	0.0644	0.0648	0.0618	0.0614
	Tier 1 Capital	Banks Common Stock + Retained earning	413806.5	349690.9	299852.2	256710.2	230297.8
	Tier 2 Capital	Surplus on revaluation of assets - net of tax	27,355.62	27,355.63	27,355.64	27,355.65	27,355.66
	(b) Adv/Equity	Advances / Share holder's equity	4664.985	4150.293	3584.776	3063.405	2744.658
Asset Quality	(a) NPA/Adv	Net NPA / Advances	0.47	0.57	0.67	1.02	2
	(b) Adv/T.A	Advances / Total Assets	0.6262	0.6021	0.5828	0.5507	0.5430
Managem ent Quality	Adv/Dep	Total Advances / Total Deposits	0.7735	0.7534	0.7232	0.6748	0.6654
Earning Quality	Inc/T.A	Net Income / Total assets	0.0788	0.0759	0.0672	0.0637	0.0684
Liquidity	Current Ratio	Current Assests / Total Assets	0.7432	0.7259	0.7113	0.6987	0.6971
	Cash Ratio	Cash / Deposits	0.0422	0.0458	0.0559	0.0636	0.0579

SBI has a good and stable financial future between 2021 and 2025. The bank has achieved a lot in the quality of its asset and has lowered its NPAs drastically. Its profits and its management performance are also growing positively. The low capital adequacy ratio and the rising leverage in terms of advances to equity ratio however are variables that are worth paying close attention to. Generally, the bank has good positive movement especially in its credit risk management.

4.2.5 CAMEL'S ANALYSIS - UNION BANK OF BANK

CAMEL ANALYSIS-	Union Bank of India		2025	2024	2023	2022	2021
CAPITAL ADEQUACY	(a) Capital Adequacy	(tier 1 + Tier 2)/ Total Weighted Assets	0.0821	0.0757	0.0666	0.0655	0.0650
	Tier 1 Capital	Banks Common Stock + Retained earning	112975.2	91324.55	72201.79	65819.06	59578.25
	Tier 2 Capital	Surplus on revaluation of assets - net of tax	0.00	5,644.42	6,132.42	4,757.07	4,898.48
	(b) Adv/Equity	Advances / Share holder's equity	124.910	114.071	111.466	96.712	92.242
Asset Quality	(a) NPA/Adv	Net NPA / Advances	0.63	1.03	1.7	4	5
	(b) Adv/T.A	Advances / Total Assets	0.6357	0.6281	0.5977	0.5588	0.5540
Management Quality	Adv/Dep	Total Advances / Total Deposits	0.7280	0.7129	0.6816	0.6403	0.6397
Earning Quality	Inc/T.A	Net Income / Total assets	0.0850	0.0836	0.0748	0.0680	0.0751
Liquidity	Current Ratio	Current Assets / Total Assets	0.7572	0.7537	0.7317	0.7033	0.6870
	Cash Ratio	Cash / Deposits	0.0683	0.0433	0.0450	0.0447	0.0410

The big steps towards the asset quality that were taken by the bank reduced NPAs by a significant margin. Its capital sufficiency, its profitability, and its performance in handling matters are all heading on a favorable course. The advances to equity ratio is higher leveraged, something, however, to monitor. Overall, the bank is on a good momentum particularly in credit risk management.

3. PANEL REGRESSION

To understand the factors influencing net non performing assets while analyzing CAMEL parameters the Fixed effect model was conducted. Every bank is have different outcome with respect to these items and the same is discussed below in detail with respect to Private and Public sector banks. By adding both Private and Public sector banks data a combined banking sector, again Fixed effect model was used to estimate the required output.

PRIVATE SECTOR BANK (Model 1: Fixed-effects, using 25 observations, Included 5 cross-sectional units, Time-series length = 5 and Dependent variable: Net NPA)

	Coefficient	Std. Error	t-ratio	p-value
const	17.2598	8.19526	2.106	0.0525
CAPTIALADEQUACY	-11.3085	16.9892	-0.6656	0.5158
ASSESTQUALITY	0.120645	0.298085	0.4047	0.6914
MANAGEMENTQUALITY	8.06265	3.58733	2.248	0.0401
EARNINGQUALITY	-32.3016	24.9952	-1.292	0.2158
LIQUIDITY	-15.1815	11.1743	-1.359	0.1943

Mean dependent var	8.261614		S.D. dependent var	0.836312
Sum squared resid	3.95942		S.E. of regression	0.513772
LSDV R-squared	0.764124		Within R-squared	0.27922
LSDV F(9, 15)	5.399197		P-value(F)	0.002141
Log-likelihood	-12.43874		Akaike criterion	44.87747
Schwarz criterion	57.06623		Hannan-Quinn	48.25812
rho	-0.396879		Durbin-Watson	2.421591

Dependent Variable: Net NPA (Net Non-Performing Assets).

Regression Model: Fixed-effects model has been used where the number of observations is 25- 5 banks, which are available at 5 periods. Statistic significance: Management quality ($p = 0.0401$) is the only significant one. It is co-efficient at 8.06265 and in that case increase in Management Quality by one unit results into Net NPA, all other things held constant.

Model 2: Random-effects (GLS), using 25 observations, Using Nerlove's transformation, Included 5 cross-sectional units, Time-series length = 5, Dependent variable: Net NPA

	Coefficient	Std. Error	z	p-value
const	15.2537	6.32175	2.413	0.0158
CAPTIALADEQUACY	-14.6189	11.1645	-1.309	0.1904
ASSESTQUALITY	0.0790655	0.263279	0.3003	0.7639
MANAGEMENTQUALITY	6.8763	2.90334	2.368	0.0179
EARNINGQUALITY	-24.5926	18.6076	-1.322	0.1863
LIQUIDITY	-11.4923	8.22479	-1.397	0.1623

Mean dependent var	8.261614		S.D. dependent var	0.836312
Sum squared resid	10.35432		S.E. of regression	0.719525
Log-likelihood	-24.45506		Akaike criterion	60.91013
Schwarz criterion	68.22338		Hannan-Quinn	62.93851
rho	-0.396879		Durbin-Watson	2.421591

Dependent Variable: : Net NPA (Net Non-Performing Assets).

Regression model: The model is a random-effects model, and will consist of 25 observations, 5 firms observed Cross 5 periods.

Statistical Significance: Constant: The intercept has a significant value ($p=0.0158$).

Management Quality: The size of the coefficient is significant ($p=0.0179$) and it amounts to 6.8763. An increase of management quality by one point shifts Net NPA by approximately 6.9, other things being equal up. That is strange, as we would expect good management to reduce NPAs. Other variables: The capital adequacy, the quality of assets, the quality of earnings, and liquidity are not important, their $p=0.05$.

PUBLIC SECTOR BANKS

Model 1: Fixed-effects, using 25 observations, Included 5 cross-sectional units, Time-series length = 5, Dependent variable: Net NPA

	Coefficient	Std. Error	t-ratio	p-value
const	83389.8	20344.9	4.099	0.0009
CAPTIALADEQUACY	-28247.9	52451.6	-0.5386	0.5981
ASSESTQUALITY	2965.56	521.713	5.684	<0.0001
MANAGEMENTQUALITY	-97514.0	20946	-4.655	0.0003
EARNINGQUALITY	179630	62040.1	2.895	0.0111
LIQUIDITY	-16722.3	17592.8	-0.9505	0.3569

Mean dependent var	14685.25		S.D. dependent var	6736.323
Sum squared resid	27596910		S.E. of regression	1356.39
LSDV R-squared	0.97466		Within R-squared	0.973115
LSDV F(9, 15)	64.10599		P-value(F)	2.41E-10
Log-likelihood	-209.4027		Akaike criterion	438.8054
Schwarz criterion	450.9941		Hannan-Quinn	442.186
rho	-0.239227		Durbin-Watson	1.919112

Dependent Variable: Net NPA (Net Non-Performing Assets).

Regression Model: According to fixed-effects model where the number of observations is 25- 5 banks, which are available at 5 periods.

Quality of management: The large headline is that there is a negative correlation between Net NPA and Quality of management that is sharp in a negative direction. The coefficient is equal to -97,514 and the most recent p-value is equal to 0.0003 which means that indeed excellent governance drags the number of NPAs down. Asset Quality: Impressively, the asset Quality is indirectly correlated with Net NPA, which has a positive value ($p < 0.0001$). That is more or less the reverse of what the book says. Earning Quality: This, again, positively relates with another twist generating tremors in the conventional assumptions, Net NPA ($p = 0.0111$). Capital Adequacy/Liquidity: No statistically significant nudging of Net NPA of this model exists through either of these measures.

Joint Test on Regressors: The p-value of the joint F remains equal to 2.41 10 (-1) indicating that the predicting set of regressors as a whole explains the variation of NPA fairly well.

Model 2: Random-effects (GLS), using 25 observations, Using Nerlove's transformation, Included 5 cross-sectional units, Time-series length = 5, Dependent variable: Net NPA

	Coefficient	Std. Error	z	p-value
const	79309.9	16752	4.734	<0.0001
CAPTIALADEQUACY	-11426.7	11770.1	-0.9708	0.3316
ASSESTQUALITY	3021.56	464.396	6.506	<0.0001
MANAGEMENTQUALITY	-96674.2	18712	-5.166	<0.0001
EARNINGQUALITY	182750	52293.1	3.495	0.0005
LIQUIDITY	-18423.6	15349.5	-1.200	0.23

Mean dependent var	14685.25		S.D. dependent var	6736.323
Sum squared resid	4.05E+08		S.E. of regression	4500.485
Log-likelihood	-242.9827		Akaike criterion	497.9654
Schwarz criterion	505.2786		Hannan-Quinn	499.9937
rho	-0.239227		Durbin-Watson	1.919112

Dependent Variable: Net NPA (Net Non-Performing Assets).

Regression model: According to random-effects model, and will consist of 25 observations, 5 firms observed Cross 5 periods.

Net NPA is negatively correlated with Management Quality with a coefficient equal to (-96674.2, p -value less than 0.0001). In essence, improved quality of management is closely associated with reduced levels of NPAs which is natural. There is one positive significant relationship between Asset Quality and Net NPA (coefficient = 3021.56, p -value 0.0001). It is somewhat bizarre, as an increased Asset Quality ratio generally corresponds to an insufficient bad loan, but in this case, it is related to the increased NPA. Another positive correlation between Earning Quality and Net NPA is also big (coefficient = 182750, p-value = 0.0005). Extra unusual, because the quality of earnings would be higher reducing NPAs. This model did not find Capital Adequacy and Liquidity statistically significant (p -values of 0.3316 and 0.23, respectively). Distinctness of the joint test on regressors is very significant (p-value = 8.72e140) and therefore it shows that the independent variables jointly explain much of the variances in the Net NPA.

CONSOLIDATED BOTH PRIVATE AND PUBLIC SECTOR BANKS

Model 1: Fixed-effects, using 50 observations, Included 10 cross-sectional units, Time-series length = 5, Dependent variable: Net NPA

	Coefficient	Std. Error	t-ratio	p-value
const	22268.4	17022.7	1.308	0.1993
CAPTIALADEQUACY	43929.7	46117.5	0.9526	0.3473
ASSESTQUALITY	4329.32	441.84	9.798	<0.0001
MANAGEMENTQUALITY	-9960.12	10925.1	-0.9117	0.3682
EARNINGQUALITY	10372.2	45689.5	0.227	0.8217
LIQUIDITY	-29443.6	19264.8	-1.528	0.1354

Mean dependent var	7346.754		S.D. dependent var	8785.13
Sum squared resid	1.49E+08		S.E. of regression	2062.753
LSDV R-squared	0.960621		Within R-squared	0.854918
LSDV F(14, 35)	60.98482		P-value(F)	2.43E-20
Log-likelihood	-443.6199		Akaike criterion	917.2398
Schwarz criterion	945.9201		Hannan-Quinn	928.1614
rho	-0.103669		Durbin-Watson	1.382899

It is a fixed-effects panel regression model in which both the private and public banks are pulled and various financial ratios anticipated in relation to the Net Non-Performing Assets.

Asset Quality: It happens that the positive correlation between Asset Quality and Net NPA is surprisingly high (Coeff. = 4329.32, $p < 0.0001$). That is counterintuitive that Asset Quality is usually higher the less NPA so we have to be cautious and determine how the variables were defined. Management Quality, Earning Quality, Capital Adequacy and Liquidity: No substantial change existed in merged model Net NPA based on none of these variables.

Model 2: Random-effects (GLS), using 50 observations, Using Nerlove's transformation, Included 10 cross-sectional units, Time-series length = 5, Dependent variable: Net NPA

	Coefficient	Std. Error	z	p-value
const	30599.7	14100.9	2.17	0.03
CAPTIALADEQUACY	5683.85	15785.1	0.3601	0.7188
ASSESTQUALITY	4174.76	373.441	11.18	<0.0001
MANAGEMENTQUALITY	-9728.34	9817.03	-0.9910	0.3217
EARNINGQUALITY	7738.54	41334.3	0.1872	0.8515
LIQUIDITY	-30112.7	17457.5	-1.725	0.0845

Mean dependent var	7346.754		S.D. dependent var	8785.13
Sum squared resid	1.12E+09		S.E. of regression	4984.623
Log-likelihood	-494.0186		Akaike criterion	1000.037
Schwarz criterion	1011.509		Hannan-Quinn	1004.406
rho	-0.103669		Durbin-Watson	1.382899

After running a random-effects panel regression, which collects the data of both the private and the public sector banks in order to measure the follow-up of various financial ratios with Net Non-performing Assets (NPA).

Asset Quality : Surprisingly, the correlations show that the relationship between Asset Quality and Net NPA is significantly positive and has an important value ($p < 0.0001$). To say the least, it is strangely bound such that a positive Asset Quality ratio correlates with an overabundance of Net NPA. **Other Variables :** The Net NPA seems not to be statistically affected by Capital Adequacy, Quality of management, Earning quality and Liquidity on this consolidated model.

FINDINGS: The 2021-2025 analysis of individual banks under your analysis shows that in general financial health has been improved, although there are significant disparities in the results between institutions in the private sector and the public sector. **Capital Adequacy (C):** Capital Adequacy ratio (CAR) improved in most banks, including the private and public and indicated an improved capital base relative to risk. The CAR in general is high in the private banks as opposed to the public ones. The Advances/ Equity ratio had a varied pattern; as HDFC and ICICI Bank leverage was turning up, Kotak Mahindra and Axis bank managed to decrease theirs. **Asset Quality (A):** This is one of the major strengths of all analyzed banks. The Net NPA to Advances ratio showed a spectacular and steady decrease in both the private and the public areas. Using the case of Punjab National Bank, the company has experienced a decline in its NPA ratio of 4% in 2021 to 0.7% in 2025. **Management Quality (M):** The Advances/Deposits ratio of all the banks was high and tended to increase with a sign of good management in utilizing the deposits to its core lending operations. **Earnings Quality (E):** It was a steady increase in the Net Income to Total Assets ratio of both the private and the public sector banks. **Liquidity (L):** Liquidity ratios were in good condition and not very volatile except that the Cash Ratio showed volatility. The Bank of Baroda cash ratio data was also anomalous with a value of zero in all the years.

Findings of panel Regression Analysis. Your panel regression models give statistical evidence on the factors on Net NPA. Private Sector Banks, The method used in the analysis was fixed-effects model. The joint test on the regressors was not statistically significant, and it indicates that the independent variables as a factor do not determine the variation in Net NPA. The only variable which had statistically significant influence on Net NPA was Management Quality. Nonetheless, the positive sign of coefficients (8.06265) is counter-intuitive meaning that an increase in bad loans is related to better management. Public Sector Banks, It was found that Fixed-effects and Random-effects models would be suitable. The Management Quality ratio was very significantly associated with Net NPA in both models with a negative correlation. This comes as no surprise, and it is apparent that management is key to the minimization of NPAs. Statistically significant positive relationship existed between the Asset Quality and Earning Quality and Net NPA, which is surprising and contradicts the traditional banking theory(Mishra, 2024). The group of independent variables was discovered to be very significant in the explanation of the variation in Net NPA. Consolidated Public and private banks both the consolidated data was analyzed using Fixed-effects and Random-effects models. Across both models, the only variable which had a very significant positive relationship with Net NPA was Asset Quality(Mahajan & Bhatia, 2024). This proves the counterintuitive observation of the public sector analysis on a larger scale. The remaining CAMELS ratios were not identified to have a statistically significant effect on Net NPA in the consolidated models(Reddy & Sateesh, 2026).

4. SUGGESTIONS :

Intensify Credit Appraisal: Regulators should make the regulations more stringent in appraising credit, particularly on loans in sectors where they are said to be a major risk such as farming, small-scale industries as well as studying big companies and infrastructure (T M & T., 2025). There is need for enhancing NPA identification and reporting: The data reveals that not all CAMELS ratios are conjunctive with NPAs as it should be; this may be signifying that there is a malfunction in the variables or in the data itself. The regulators need to advocate enhanced transparency in data and bring together a uniform reporting of significant financial performances to ensure that banks do not conceal bad loans (Zeya et al., 2026). The research indicates that the quality of management is an mammoth reason why NPAs remain low especially in state-controlled banks (Ahmed et al., 2025). The policymakers should concentrate on developing policies that enhance governance systems, operating control, and risk-management in these banks in an effort to reduce vulnerability (Chowdhury, 2011). There is need for recapitalization among Public Sector Banks. Government initiatives should consider recapitalization as a means of fixing the problems in low Capital Adequacy Ratio (CAR) and high balance of non-performing assets (NPAs). That would allow the banks to cover up the losses and enhance overall efficiency (Sangmi & Nazir, 2010). Audit Regulatory Frameworks as much as the CAMELS framework is proving effective, the research proposes that the framework requires an update that includes new aspects like IT and compliance to address contemporary risks such as cyber threats and failures to observe governance standards. The RBI ought to establish minimum standards of the quality of management and the quality of earnings at a similar level with the capital adequacy and liquidity standards in place (Dzeawuni & Tanko, 2008).

In the case of private bank, the study has indicated that interest and profitability are the primary drivers of the largest response on return on assets. These are the main sources of revenue that should be focused on by banks to maximize on the performance. Proactive NPA Control in the public sector banks ought to continue their endeavors to reduce NPAs by employing efficient recovery strategies and enhanced credit review. The apparent decrease of NPAs between 2021 and 2025 all banks is a positive trend that is necessary to keep (Nwaolisa et al., 2014). There is need for banks should invest on technology to enhance early warning of stressed assets and better reason identification of risk. Technology will be useful in detecting hidden NPAs and strengthening credit appraisal (Cabaron, 2021). Banks located in the general public sector ought to seek to improve the quality of earnings because it was discovered to be very strongly correlated with NPAs. It is through increased profitability due to the core operations of the banks that the population of the banks employed can moderate potential losses, that may be caused by bad loans (Rostami, 2015). : The banking sector is supposed to responds to the changing character of financial service, such as online lending and the risks associated with the ESG-related factors, which cannot be balanced in the conventional CAMELS model (Sri & Chakraborty, 2020)

5. CONCLUSION:

Commercial banks of India could be analyzed under CAMELS framework; the analysis reveals that the sector is in imminent transition and obvious improvement has been made in addressing the major shortcomings. The NPAs have proved to be a persistent problem and both the banking system in the public and the banking sector in the private world have recorded significant improvements in the quality of the assets. Even the Net NPA to Advances Ratio has steadily decreased and this shows that the handling of credit risks is tightening and the loan book is healthier (Munir & Ahmad Bustamam, 2017). Novel description of differences between the private and the public-sector banks creates a more delicate picture. Most CAMELS parameters such as the higher are executed by the private banks. The panel regression analysis is the one providing more and more comprehensible results. In case of public-sector banks, the statistical models affirm a quite large negative correlation between the management quality and NPAs, revealing that management quality is very important in curbing the bad loans. Nevertheless, the models show certain counter-intuitive results including positive association of Asset Quality and Earning Quality with NPAs in the two types of models (public or consolidations). These are statistically significant but unexpected findings which need additional research on the definitions and correlations of variables used. The financial performance of the Indian banking system is on the positive rise due to the enhanced efficiency of its management system, increased capitalized safety and proponent decrease by more than fivefold (Samuel, 2018). However, the presence of the fact that the data is heteroskedastic is an indicator the standard errors are possibly not reliably estimated, and when some CAMELS measures, which are the subjective ones (e.g. management quality), are involved, remains a weakness (Oke & Onwere, 2023). In the future, bank sectors have to continue to focus on increasing the capital base, improved risk-management behaviors, and the use of technology to ensure stability and competitiveness in a highly dynamic economy in the long run. The CAMELS framework is an effective one in this regard, but the implementation can be enhanced by presenting additional metrics, which are intended to deal with the developing risks

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