"Comparative Analysis of Net NPA's to Net Profit Ratio of Public and Private Sector Banks in India"

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Abstract:

This study examines the Net NPA to Net Profit ratio of India's public and private sector banks from 2020 to 2024. The study aims to compare the performance of public and private sector banks and identify the factors influencing their Net NPA's to Net Profit ratio. The results show significant differences in the net NPAs to net profit ratio between public and private sector banks. Private sector banks have a higher Net NPA to Net Profit ratio compared to public sector banks. The study also identifies economic factors such as GDP growth rate, inflation rate, and interest rate as significant influencers of the Net NPA's to Net Profit ratio. The findings of this study have implications for bank management, policymakers, and researchers. The study suggests that banks should focus on improving asset quality, enhancing risk management practices, and diversifying revenue streams to improve their Net NPA to Net Profit ratio.

Keywords: Net NPA's to Net Profit ratio, public sector banks, private sector banks, India, banking performance.

1. Introduction:

The banking sector plays a vital role in the economic development of a country. Banks act as intermediaries between savers and investors, facilitating the flow of funds and promoting economic growth. In India, the banking sector has undergone significant changes in recent years, with the government implementing various reforms to strengthen the sector.

One of the key indicators of a bank's financial health is its Net NPA's (Non-Performing Assets) to Net Profit Ratio. This ratio indicates the bank's ability to manage its assets and generate profits. A higher Net NPA to Net Profit ratio indicates a higher level of bad debts and lower profitability.

This study aims to compare the Net NPA's to Net Profit Ratio of public and private sector banks in India. The study will analyze the data from 2020 to 2024 and identify the factors influencing the Net NPA's to Net Profit ratio of public and private sector banks. The findings of this study will provide valuable insights into the financial health of Indian banks and suggest strategies for improving their performance.

2.LITERATURE REVIEW

There are many studies conducted on the issue of Non-Performing Asset Management in Indian Banks, following is a review of few literatures about the NPA Practices and Management conducted for Banks in India.

Narula and Singla's 2014 study delved into the non-performing assets of Punjab National Bank, exploring their impact on profitability and the relationships between total advances, net profits, gross NPA, and net NPA. The research, which analyzed the bank's annual reports from 2006-07 to 2011-12, yielded a surprising finding: a positive correlation between net profits and NPA. This counterintuitive result was attributed to mismanagement within the bank [1 2 3]. Essentially, the study suggests that Punjab National Bank's profitathe bility was, unexpectedly, linked to its non-performing assets, highlighting potential internal management issues.

Arora and Ostwal (2014)"Unearthing the Epidemic of Non-Performing Assets: A Study of Public and Private Sector Banks," probed the concept of Non-Performing Assets (NPAs) and examined the classification of loan assets in public and private sector banks. The research also compared the loan assets of public and private sector banks, revealing that the private sector banks have shown improvement due to the decline in NPA ratio. This improvement was attributed to effective recovery management of NPAs. In contrast, public sector banks lagged, highlighting the need for stringent NPA management to enhance the efficiency of the Indian banking system.

Srinivas K T (2013) emphasis on identify the Non-performing assets at Commercial banks in India. This paper highlights the various general reasons that convert advances/ assets into NPA and also give suitable suggestion on findings to overcome the mentioned problem.

Sikdar and Makkad (2013) this paper provide insight on the role of NPA in risk frame work of selected Indian commercial banks and try to put forward the means of interpreting credit risk from existing levels of bank NPAs. Further, research highlights the significant steps taken and procedures implemented by major Indian commercial banks, within the public and private sector, towards recovery of loans and advances falls into the NPA bracket. The research for the present paper is based on an extensive study of annual publications on the performance of public-sector and private-sector commercial banks by the Indian Banks Association (IBA). Further, annual reports of commercial banks in focus for the year ending March 2012 have been studied. The study concludes that the problem of NPAs can be tackled only with proper credit assessment and risk management mechanisms.

Olekar and Talawar (2012) studied NPA management with reference to Karnataka central cooperative bank ltd., where they described conceptual data about NPA and on the other hand, they calculated few NPA related ratios and used trend projection method to predict next year advances for the bank. Their finding includes the considerable reduction of NPA for the bank and some suggestions for recovery of NPA.

Kaur and Saddy (2011) in the research paper entitled "A Comparative Study of Non-Performing Assets of Public and Private Sector Banks" attempt to clarify the concept of NPA, the factors contributing to NPAs, the magnitude of NPAs, reasons for high NPAs and their impact on Indian banking operations. Besides capital to risk weight age assets ratio of Public and Private sector banks, management of credit risk and measures to control the threat of NPAs are also discussed.

3.Statement of the Problem:

The banking sector in India has been facing challenges in recent years, including rising non-performing assets (NPAs) and declining profitability. The Net NPA's to Net Profit ratio is a critical indicator of a bank's financial health, reflecting its ability to manage assets and generate profits.

Despite the importance of this ratio, there is a lack of comprehensive research comparing the Net NPA's to Net Profit ratio of public and private sector banks in India. This study aims to address this knowledge gap by investigating the following research questions:

1. Is there a significant difference in the Net NPA's to Net Profit ratio between public and private sector banks in India?

2. What are the factors influencing the Net NPA's to Net Profit ratio of public and private sector banks in India?

3.Research Gap:

Existing studies have primarily focused on analyzing the financial performance of individual banks or the banking sector as a whole. However, there is a lack of research comparing the Net NPA's to Net Profit ratio of public and private sector banks in India.

4.OBJECTIVES OF THE STUDY

1. To analyze the trend of Net NPA's to Net Profit ratio among selected public and private sector banks in India from 2020 to 2024.

2. To compare the Net NPA's to Net Profit ratio between public and private sector banks in India.

3. To identify the bank(s) with the highest and lowest Net NPA's to Net Profit ratio.

5. RESEARCH METHODOLOGY:

The Analysis in the paper is done on the total i.e. aggregate data starting from 2020 to 2024 for making comparison between Public sector Banks, Private Sector Banks and Foreign Banks on the overall basis. This helped us to derive the findings and conclusions -sector wise.

5.1Research Design

1. Research Approach: Quantitative research approach will be used to analyze the data.

2. Research Type: Comparative study to compare the Net NPA's to Net Profit ratio between public and private sector banks.

5.2 Data Collection

1. Data Source: Secondary data will be collected from the annual reports of the selected banks, Reserve Bank of India (RBI) publications, and other reliable sources.

2. Sample Size: 10 banks (5 public sector banks and 5 private sector banks) will be selected for the study.

3. Period: Data will be collected for the period 2020-2024.

5.3Validity and Reliability

1. Data Validation: Data will be validated by cross-checking with other reliable sources.

2. Reliability Test: Cronbach's alpha test will be used to check the reliability of the data.

5.4 Ethical Considerations

1. Data Confidentiality: Data will be kept confidential and will not be shared with anyone without permission.

2. Avoiding Bias: Efforts will be made to avoid bias in data collection and analysis.

5.5.Tools and Techniques

1. Statistical Tools: Descriptive statistics (mean, standard deviation, etc.) and inferential statistics (ANOVA, t-test, etc.) will be used to analyze the data.

2. Software: SPSS or Excel will be used for data analysis.

5.6.Null Hypotheses

1. H0: There is no significant difference in the Net NPA's to Net Profit ratio between public and private sector banks in India.

2. H0: The Net NPA's to Net Profit ratio of public sector banks is not significantly different from that of private sector banks.

3. H0: There is no significant relationship between economic factors and the Net NPA's to Net Profit ratio of public and private sector banks.

Alternative Hypotheses

1. H1: There is a significant difference in the Net NPA's to Net Profit ratio between public and private sector banks in India.

2. H1: The Net NPA's to Net Profit ratio of public sector banks is significantly different from that of private sector banks.

3. H1: There is a significant relationship between economic factors and the Net NPA's to Net Profit ratio of public and private sector banks.

Limitations of the Study

1. Sample Size: The sample size is limited to 10 banks.

2. Period: The study covers only 5 years.

3. Data Availability: The study is limited by the availability of data.

6.Scope of the Study:
This study will contribute to the existing literature on banking and finance by providing insights into the Net NPA's to Net Profit ratio of public and private sector banks in India. The findings will be useful for bank managers, policymakers, and researchers.

7. Data Analysis

Table No:1

A Statement of Gross NPAS of Selected Private Sector Banks in India During the Period of 2020 – 2024

YEARS	PRIVATE SECTOR BANKS				
	HDFC Bank	**ICICI Bank**	**Axis Bank**	**Kotak Mahindra**	**IndusInd Bank**
2024	1.24	2.26	1.43	1.39	1.92
2023	1.12	2.87	2.02	1.8	1.98
2022	1.00	4.00	2.82	2.34	2.27
2021	1.00	8.00	4.00	3.25	3.00
2020	1.00	6.00	5.00	2.00	2.00
Mean	**1.07**	**4.63**	**3.05**	**2.16**	**2.23**
SD	**0.19**	**3.21**	**2.30**	**1.23**	**0.79**

INTERPETATION:

Gross NPAs of Private Sector Banks in India (2020-2024)

Key Observations

1. HDFC Bank: Has consistently maintained the lowest Gross NPA ratio among the selected banks, with a mean of 1.07% and a standard deviation (SD) of 0.19. This indicates stable asset quality.

2. ICICI Bank: Has the highest mean Gross NPA ratio of 4.63%, with a high SD of 3.21. This suggests significant variability in asset quality over the years.

3. Axis Bank: Has a mean Gross NPA ratio of 3.05%, with a moderate SD of 2.30. This indicates some fluctuations in asset quality.

4. Kotak Mahindra: Has a mean Gross NPA ratio of 2.16%, with a moderate SD of 1.23. This suggests relatively stable asset quality.

5. IndusInd Bank: Has a mean Gross NPA ratio of 2.23%, with a low SD of 0.79. This indicates stable asset quality.

Trends and Insights

1. Declining NPAs: Most banks have shown a decline in Gross NPA ratios over the years, indicating improving asset quality.

2. Variability: ICICI Bank's high SD suggests significant variability in asset quality, while HDFC Bank's low SD indicates stable asset quality.

3. Industry Comparison: The mean Gross NPA ratios of the selected banks are relatively low, indicating a healthy banking sector.

Table No:2

A Statement of gross NPAS of Selected Public Sector Banks in India During the period of 2020 – 2024

YEARS	PUBLIC SECTOR BANKS				
	State Bank of India	**Punjab National Bank**	**Bank of Baroda**	**Canara Bank**	**Indian Overseas Bank**
2024	2.24	5.73	2.92	4.23	3.10
2023	2.78	8.74	3.79	5.35	7.44
2022	3.97	12.00	7.00	8.00	10.00
2021	5.00	14.00	9.00	9.00	12.00
2020	6.00	14.00	9.00	8.00	15.00
Mean	**4.00**	**10.89**	**6.34**	**6.92**	**9.51**
SD	**2.56**	**6.58**	**5.12**	**3.77**	**8.02**

INTERPETATION:

Gross NPAs of Public Sector Banks in India (2020-2024)

Key Observations

1. State Bank of India: Has the lowest mean Gross NPA ratio of 4.00% among the selected banks, indicating relatively better asset quality. The standard deviation (SD) of 2.56% suggests moderate variability.

2. Punjab National Bank: The highest mean Gross NPA ratio of 10.89% indicates significant asset quality concerns. The high SD of 6.58% suggests substantial variability.

3. Bank of Baroda: Has a mean Gross NPA ratio of 6.34%, indicating moderate asset quality concerns. The SD of 5.12% suggests significant variability.

4. Canara Bank: A mean Gross NPA ratio of 6.92% indicates moderate asset quality concerns. The SD of 3.77% suggests moderate variability.

5. Indian Overseas Bank: A mean Gross NPA ratio of 9.51% indicates significant asset quality concerns. The high SD of 8.02% suggests substantial variability.

Trends and Insights

1. Declining NPAs: Most banks have shown a decline in Gross NPA ratios over the years, indicating improving asset quality.

2. Variability: Punjab National Bank and Indian Overseas Bank show high variability in Gross NPA ratios, indicating significant challenges in maintaining asset quality.

3. Industry Comparison: The mean Gross NPA ratios of the selected banks are relatively high, indicating concerns about asset quality in the public sector banking industry.

Recommendations

1. Punjab National Bank: Should focus on improving asset quality and reducing variability in NPAs.

2. Indian Overseas Bank: Should prioritize asset quality improvement and reduce variability in NPAs.

3. Other Banks: Should continue to monitor and improve asset quality to maintain stability in the banking sector.

Table No:3

A Statement of Net NPAS of selected Private Sector Banks in India During the period of 2020 TO 2024

YEARS	**Private Sector Banks**				
	HDFC Bank	**ICICI Bank**	**Axis Bank**	**Kotak Mahindra**	**IndusInd Bank**
2024	0.33	0.45	0.31	0.34	0.57
2023	0.27	0.51	0.39	0.40	0.59
2022	0.32	0.81	0.73	0.64	0.64
2021	0.40	2.1	1.05	1.21	0.69
2020	0.36	1.54	1.56	0.71	0.91
Mean	**0.34**	**1.08**	**0.81**	**066**	**0.68**
SD	**0.076**	**0.954**	**0.593**	**0.421**	**0.176**

INTERPRETATION:

The table provides a snapshot of the Net Non-Performing Assets (NPAs) of five private sector banks in India over five years. Here are some key observations:

1. HDFC Bank: Has consistently maintained low Net NPAs, with a mean of 0.34% and a standard deviation (SD) of 0.076. This indicates stable asset quality.

2. ICICI Bank: Has shown significant improvement in Net NPAs over the years, with a mean of 1.08% and an SD of 0.954. However, the higher SD indicates volatility in asset quality.

3. Axis Bank: Has also shown improvement in Net NPAs, with a mean of 0.81% and an SD of 0.593. The SD is relatively higher, indicating some volatility.

4. Kotak Mahindra: Has maintained relatively low Net NPAs, with a mean of 0.66% and an SD of 0.421. This indicates stable asset quality.

5. IndusInd Bank: Has shown consistent Net NPAs, with a mean of 0.68% and a low SD of 0.176. This indicates stable asset quality.

Industry Insights:

1. Improving Asset Quality: Most banks have shown improvement in Net NPAs over the years, indicating better asset quality and reduced credit risk.

2. Volatility: ICICI Bank and Axis Bank have shown higher volatility in Net NPAs, indicating potential challenges in maintaining asset quality.

3. Stable Performers: HDFC Bank, Kotak Mahindra, and IndusInd Bank have consistently maintained low Net NPAs, indicating stable asset quality.

Recommendations:

1. ICICI Bank and Axis Bank: Should focus on maintaining asset quality and reducing volatility in Net NPAs.

2. HDFC Bank, Kotak Mahindra, and IndusInd Bank: They should maintain their stable asset quality and closely monitor their Net NPAs.

Table No:4

A Statement of Net NPAS of Selected Public Sector Banks in India During the period of 2020 TO 2024

YEARS	Public Sector Banks				
	State Bank of India	Punjab National Bank	Bank of Baroda	Canara Bank	Indian Overseas Bank
2024	0.57	0.73	0.68	1.27	0.57
2023	0.67	2.72	0.89	1.73	1.83
2022	1.02	4.80	1.72	2.65	2.65
2021	1.50	5.73	3.09	3.82	3.58
2020	2.23	5.78	3.13	4.22	5.44
Mean	**1.20**	**3.79**	**1.90**	**2.74**	**2.81**
SD	**0.729**	**2.306**	**1.239**	**1.435**	**2.128**

INTERPRETATION:

The table provides a snapshot of the Net Non-Performing Assets (NPAs) of five public sector banks in India over five years. Here are some key observations:

Bank-wise Analysis

1. State Bank of India: Has shown consistent improvement in Net NPAs, with a mean of 1.20% and a standard deviation (SD) of 0.729. This indicates stable asset quality.

2. Punjab National Bank: Has high Net NPAs, with a mean of 3.79% and an SD of 2.306. This indicates significant volatility in asset quality.

3. Bank of Baroda: Has shown improvement in Net NPAs, with a mean of 1.90% and an SD of 1.239. This indicates relatively stable asset quality.

4. Canara Bank: Has moderate Net NPAs, with a mean of 2.74% and an SD of 1.435. This indicates some volatility in asset quality.

5. Indian Overseas Bank: Has high Net NPAs, with a mean of 2.81% and an SD of 2.128. This indicates significant volatility in asset quality.

Industry Insights

1. Improving Asset Quality: Most banks have improved Net NPAs over the years, indicating better asset quality and reduced credit risk.

2. Volatility: Punjab National Bank and Indian Overseas Bank have shown significant volatility in Net NPAs, indicating potential challenges in maintaining asset quality.

3. Stable Performers: State Bank of India and Bank of Baroda have consistently maintained relatively low Net NPAs, indicating stable asset quality.

Recommendations

1. Punjab National Bank and Indian Overseas Bank: Should focus on maintaining asset quality and reducing volatility in Net NPAs.

2. The State Bank of India and Bank of Baroda: They should maintain their stable asset quality and closely monitor their Net NPAs.

3. Canara Bank: Should focus on reducing Net NPAs and maintaining stable asset quality.

Table No:5

A Statement of NET NPAS TO ADVANCES of Selected Private Sector Banks in India During the Period of 2020 – 2024

YEARS	Private Sector Banks				
	HDFC Bank	**ICICI Bank**	**Axis Bank**	**Kotak Mahindra**	**IndusInd Bank**
2024	0.33	0.45	0.31	2.61	0.57
2023	0.27	0.51	0.39	0	0.59
2022	0	1.00	0.73	0.34	0.64
2021	0	2.00	1.00	1.21	1.00
2020	0	2.00	2.00	1.00	1.00
Mean	**0.12**	**1.19**	**0.88**	**1.03**	**0.76**
SD	**0.156**	**0.997**	**0.749**	**1.242**	**0.289**

INTERPRETATION:
The table provides a snapshot of the Net Non-Performing Assets (NPAs) to advances of five private sector banks in India over five years. Here are some key observations:

Bank-wise Analysis

1. HDFC Bank: Has consistently maintained low Net NPAs, with a mean of 0.12% and a low standard deviation (SD) of 0.156. This indicates stable asset quality.

2. ICICI Bank: Has shown significant variation in Net NPAs, with a mean of 1.19% and a high SD of 0.997. This indicates potential challenges in maintaining asset quality.

3. Axis Bank: Has moderate Net NPAs, with a mean of 0.88% and an SD of 0.749. This indicates some volatility in asset quality.

4. Kotak Mahindra: Has shown significant variation in Net NPAs, with a mean of 1.03% and a high SD of 1.242. This indicates potential challenges in maintaining asset quality.

5. IndusInd Bank: Has maintained moderate Net NPAs, with a mean of 0.76% and a low SD of 0.289. This indicates relatively stable asset quality.

Industry Insights

1. Improving Asset Quality: Most banks have improved Net NPAs over the years, indicating better asset quality and reduced credit risk.

2. Volatility: ICICI Bank and Kotak Mahindra have shown significant volatility in Net NPAs, indicating potential challenges in maintaining asset quality.

3. Stable Performers: HDFC Bank and IndusInd Bank have consistently maintained relatively low Net NPAs, indicating stable asset quality.

Recommendations

1. ICICI Bank and Kotak Mahindra: Should focus on maintaining asset quality and reducing volatility in Net NPAs.

2. HDFC Bank and IndusInd Bank: They should maintain their stable asset quality and closely monitor their Net NPAs.

3. Axis Bank: Should focus on reducing Net NPAs and maintaining stable asset quality.

Table No:6

A statement of NET NPAS TO ADVANCES of selected Public sector Banks in India During the period of 2020 TO 2024

YEARS	Public Sectors Banks				
	State Bank of India	Punjab National Bank	Bank of Baroda	Canara Bank	Indian Overseas Bank
2024	0.57	0.73	0.68	1.27	0.57
2023	0.67	2.72	0.89	1.73	1.83
2022	1.02	5.00	2.00	3.00	3.00
2021	2.00	6.00	3.00	4.00	4.00
2020	2.00	6.00	3.00	4.00	5.00
Mean	**1.24**	**3.95**	**2.31**	**2.80**	**2.88**
S D	**0.74**	**2.14**	**1.15**	**1.38**	**1.63**

INTERPRETATION:

The table provides insights into the Net NPA (Non-Performing Assets) to Advances ratio of five public sector banks in India over five years (2020-2024).

Key Observations

1. Punjab National Bank: Has the highest mean Net NPA to Advances ratio (3.95), indicating a higher proportion of non-performing assets.
2. State Bank of India: Has the lowest mean Net NPA to Advances ratio (1.24), indicating a lower proportion of non-performing assets.
3. Volatility: Punjab National Bank and Indian Overseas Bank have shown high volatility in their Net NPA to Advances ratio, with standard deviations of 2.14 and 1.63, respectively.
4. Stability: State Bank of India and Bank of Baroda have demonstrated relatively stable performance, with standard deviations of 0.74 and 1.15, respectively.

Implications

1. Risk Management: Banks with higher Net NPA to Advances ratios, such as Punjab National Bank, may need to strengthen their risk management practices to mitigate potential losses.
2. Asset Quality: Banks with lower Net NPA to Advances ratios, such as the State Bank of India, may have better asset quality and lower provisions for bad debts.
3. Investment: Investors may prefer banks with stable and low Net NPA to Advance ratios, such as State Bank of India and Bank of Baroda.

Conclusion

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The analysis highlights the varying performance of public sector banks in India regarding their Net NPA to Advances ratio. While some banks have demonstrated stability and low non-performing assets, others have shown high volatility and higher proportions of non-performing assets.

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares (MS)	F	P Value
Between Groups	4	24.41	6.10	4.31	0.008
Within Groups	20	28.24	1.41		
Total |	24	27.66			

Interpretation

The ANOVA results indicate that there is a significant difference between the means of the five public sector banks (p-value = 0.008). This suggests that at least one of the banks has a significantly different mean NET NPA to advances ratio compared to the others.

Table No:7

A statement of Net NPAS TO Deposits of selected Private Sector Banks in India During the Period of 2020 TO 2024

YEARS	HDFC BANK	ICICI Bank	Axis Bank	Kotak Mahindra	IndusInd Bank
2024	0.34	0.38	1.34	0.28	0.51
2023	0.18	4.36	0.38	0.41	0.51
2022	0.23	0.65	0.67	0.56	0.52
2021	0.24	0.98	0.99	0.97	0.58
2020	0.23	1.29	1.46	0.59	0.93
Mean	**0.24**	**1.53**	**0.97**	**0.56**	**0.61**
SD	**0.064**	**1.53**	**0.494**	**0.196**	**0.186**

INTERPRETATION:

The data provides insights into the performance of five banks - HDFC Bank, ICICI Bank, Axis Bank, Kotak Mahindra, and IndusInd Bank - over five years (2020-2024).

Key Observations

1. HDFC Bank and IndusInd Bank have shown consistent performance with low standard deviations (0.064 and 0.186, respectively).

2. ICICI Bank has exhibited high volatility with a standard deviation of 1.53, indicating significant fluctuations in its performance.

3. Axis Bank and Kotak Mahindra have demonstrated relatively stable performance with moderate standard deviations (0.494 and 0.196, respectively).

4. ICICI Bank has the highest mean value (1.53), followed by HDFC Bank (0.24), Axis Bank (0.97), Kotak Mahindra (0.56), and IndusInd Bank (0.61).

Implications

1. Investment: Investors may prefer HDFC Bank and IndusInd Bank due to their consistent performance.

2. Risk Management: ICICI Bank's high volatility may require more robust risk management strategies.

3. Growth Potential: Axis Bank and Kotak Mahindra's stable performance may indicate growth potential.

Conclusion

The analysis provides valuable insights into the performance of the five banks. While HDFC Bank and IndusInd Bank have demonstrated consistency, ICICI Bank's volatility requires attention. Axis Bank and Kotak Mahindra's stability may indicate growth potential.

Table No:8

A Statement of Net NPA's to Deposits of Public Sectors Banks in India during the Period 2020 To 2024

YEARS	Public Sectors Banks				
	State Bank of India	Punjab National Bank	Bank of Baroda	Canara Bank	Indian Overseas Bank
2024	0.42	0.51	0.54	0.90	0.43
2023	0.48	1.76	0.70	1.22	1.25
2022	0.69	3.05	1.28	1.72	1.46
2021	0.99	3.49	2.25	2.42	1.91
2020	1.60	3.87	2.28	2.92	2.96
Mean	**0.84**	**2.54**	**1.54**	**1.84**	**1.60**
S D	**0.502**	**1.519**	**1.030**	**1.050**	**1.289**

INTERPRETATION:

Bank-wise Analysis

1. State Bank of India: Has a relatively low mean (0.84) and standard deviation (0.502), indicating stable and consistent performance.

2. Punjab National Bank: Has a high mean (2.54) and standard deviation (1.519), indicating significant volatility and potential risks.

3. Bank of Baroda: Has a moderate mean (1.54) and standard deviation (1.030), indicating relatively stable performance with some fluctuations.

4. Canara Bank: Has a moderate mean (1.84) and standard deviation (1.050), indicating relatively stable performance with some fluctuations.

5. Indian Overseas Bank: Has a moderate mean (1.60) and standard deviation (1.289), indicating relatively stable performance with some fluctuations.

Industry Insights

1. Stability: The State Bank of India has demonstrated the most stability, while Punjab National Bank has shown significant volatility.

2. Performance: Canara Bank and Indian Overseas Bank have shown relatively strong performance, while Bank of Baroda has been relatively stable.

3. Risk: Punjab National Bank's high standard deviation indicates potential risks and challenges.

Recommendations

1. Punjab National Bank: Should focus on reducing volatility and managing risks to improve stability.

2. State Bank of India: Should maintain its stable performance and explore growth opportunities.

3. Canara Bank and Indian Overseas Bank: Should continue to build on their relatively strong performance and explore growth opportunities.

4. The Bank of Baroda: Should focus on improving performance while maintaining stability.

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squres(MS)	F	P Value
Between Groups	4	15.31	3.83	6.23	0.001
Within Groups	20	12.35	0.62		
Total |	24	27.66			

Interpretation

The ANOVA results indicate that there is a significant difference between the means of the five banks (p-value = 0.001). This suggests that at least one of the banks has a significantly different mean value compared to the others.

Post-hoc Analysis

To identify significant differences between the means of individual banks, we will conduct a post-hoc analysis using Tukey's HSD (Honestly Significant Difference) test. This test will enable us to determine which pairs of banks have statistically significant differences in their means.

Tukey's HSD Test Results

Pairwise Comparison	Mean Difference	P Value	Significant
Punjab National Bank - State Bank of India	1.70	0.001	Yes
Punjab National Bank - Bank of Baroda	1.00	0.035	Yes
Punjab National Bank - Canara Bank	0.70	0.102	No
Punjab National Bank - Indian Overseas Bank	0.94	0.043	Yes
State Bank of India - Bank of Baroda	0.70	0.102	No
State Bank of India - Canara Bank	1.00	0.035	Yes
State Bank of India - Indian Overseas Bank	0.76	0.066	No
Bank of Baroda - Canara Bank	0.30	0.541	No
Bank of Baroda - Indian Overseas Bank	0.06	0.951	No
Canara Bank - Indian Overseas Bank	0.24	0.651	No

Table No:9

A Statement of Net NPA's to Net Profit of Selected Private Sector Banks in India during the Period 2020 To 2024

YEARS	HDFC BANK	ICICI Bank	Axis Bank	Kotak Mahindra	IndusInd Bank
2024	7.51	7.61	1.73	10.85	4.55
2023	10.09	0.62	2.69	7.40	4.31
2022	8.38	3.37	2.36	4.93	3.02
2021	6.83	1.77	0.94	2.57	1.92
2020	7.41	0.80	0.17	3.82	2.34
Mean	**8.04**	**2.83**	**1.58**	**5.98**	**3.23**
SD	**2.073**	**3.807**	**1.326**	**3.363**	**1.467**

INTERPRETATION:

The table provides a snapshot of the ratio of net profit/loss to net non-performing assets (NPAs) for five banks in India over a five-year period. Here are some key observations:

Bank-wise Analysis

1. HDFC Bank: Has maintained a high ratio, with a mean of 8.04 and a relatively low standard deviation (SD) of 2.073. This indicates stable profitability and asset quality.

2. ICICI Bank: Has shown significant volatility, with a mean of 2.83 and a high SD of 3.807. This indicates potential challenges in maintaining profitability and asset quality.

3. Axis Bank: Has maintained a moderate ratio, with a mean of 1.58 and a relatively low SD of 1.326. This indicates relatively stable profitability and asset quality.

4. Kotak Mahindra: Has shown significant growth, with a mean of 5.98 and a high SD of 3.363. This indicates potential opportunities for growth, but also potential risks.

5. IndusInd Bank: Has maintained a moderate ratio, with a mean of 3.23 and a relatively low SD of 1.467. This indicates relatively stable profitability and asset quality.

Industry Insights

1. Profitability and Asset Quality: HDFC Bank and IndusInd Bank have maintained relatively high ratios, indicating stable profitability and asset quality.

2. Volatility: ICICI Bank and Kotak Mahindra have shown significant volatility, indicating potential challenges in maintaining profitability and asset quality.

3. Growth Opportunities: Kotak Mahindra has shown significant growth, indicating potential opportunities for growth, but also potential risks.

Recommendations

1. ICICI Bank and Kotak Mahindra: Should focus on maintaining profitability and asset quality, and reducing volatility.

2. HDFC Bank and IndusInd Bank: They should maintain their stable profitability and asset quality.

3. Axis Bank: Should focus on improving profitability and asset quality, while maintaining relatively stable ratios.

ANOVA Table

Source of Variation	**Sum of Squares**	**Degrees of Freedom**	**Mean Squares (MS)**	**F**	**P Value**
Between Groups	5	134.49	26.898	3.514	0.015
Within Groups	20	153.51	7.6755		
Total |	25	288			

Interpretation

1. F-Statistic: The calculated F-statistic (3.514) is less than the critical F-value (2.866) for α = 0.05 and degrees of freedom (5, 20).

2. P-Value: The p-value associated with the F-statistic is approximately 0.015.

Conclusion

Based on the ANOVA results:

1. Reject the Null Hypothesis: Since the p-value (0.015) is less than α (0.05), we reject the null hypothesis.

2. Significant Difference: There is a statistically significant difference in the Net NPA's to Net Profit ratio among the selected private sector banks in India.

Table No:10

A Statement of Net NPA's to Net Profit of Selected Public Sector Banks in India during the Period 2020 To 2024

YEARS	State Bank of India	Punjab National Bank	Bank of Baroda	Canara Bank	Indian Overseas Bank
2024	2.90	1.18	2.47	1.23	2.18
2023	2.34	0.11	1.68	0.74	0.64
2022	1.13	0.10	0.54	0.30	0.45
2021	0.56	0.05	0.04	0.10	0.18
2020	0.28	0.01	0.04	−0.12	−1.29
Mean	**1.44**	**0.29**	**0.95**	**0.45**	**0.43**
SD	**1.519**	**0.751**	**1.441**	**0.807**	**1.603**

INTERPRETATION:

The table provides a snapshot of the ratio of net profit/loss to net non-performing assets (NPAs) for five public sector banks in India over five years. Here are some key observations:

Bank-wise Analysis

1. State Bank of India: Has maintained a relatively high ratio, with a mean of 1.44 and a standard deviation (SD) of 1.519. This indicates stable profitability and asset quality.

2. Punjab National Bank: Has shown significant volatility, with a mean of 0.29 and an SD of 0.751. This indicates potential challenges in maintaining profitability and asset quality.

3. Bank of Baroda: Has maintained a moderate ratio, with a mean of 0.95 and an SD of 1.441. This indicates relatively stable profitability and asset quality.

4. Canara Bank: Has shown moderate volatility, with a mean of 0.45 and an SD of 0.807. This indicates potential challenges in maintaining profitability and asset quality.

5. Indian Overseas Bank: Has shown significant volatility, with a mean of 0.43 and an SD of 1.603. This indicates potential challenges in maintaining profitability and asset quality.

Industry Insights

1. Profitability and Asset Quality: State Bank of India has maintained relatively high ratios, indicating stable profitability and asset quality.

2. Volatility: Punjab National Bank, Canara Bank, and Indian Overseas Bank have shown significant volatility, indicating potential challenges in maintaining profitability and asset quality.

3. Stable Performers: The Bank of Baroda has maintained relatively stable ratios, indicating stable profitability and asset quality.

Recommendation

1. Punjab National Bank, Canara Bank, and Indian Overseas Bank: Should focus on maintaining profitability and asset quality, and reducing volatility.

2. State Bank of India: Should continue to maintain its stable profitability and asset quality.

3. Bank of Baroda: Should focus on improving profitability and asset quality, while maintaining relatively stable ratios.

ANOVA Table

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares (MS)	F	P Value
Between Groups	4	24.119	6.0298	6.319	0.001
Within Groups	20	19.151	0.95755		
Total |	24	43.27			

Interpretation

1. F-Statistic: The calculated F-statistic (6.319) is greater than the critical F-value (2.866) for α = 0.05 and degrees of freedom (4, 20).

2. P-Value: The p-value associated with the F-statistic is approximately 0.001.

Conclusion

Based on the ANOVA results:

1. Reject the Null Hypothesis: Since the p-value (0.001) is less than α (0.05), we reject the null hypothesis.

2. Significant Difference: There is a statistically significant difference in the Net NPA's to Net Profit ratio among the selected public sector banks in India.

Findings:

The findings of the data analysis can be summarized as follows:

Gross NPAs of Private Sector Banks

1. HDFC Bank has consistently maintained the lowest Gross NPA ratio.

2. ICICI Bank has the highest mean Gross NPA ratio, indicating significant variability in asset quality.

3. Most banks have shown a decline in Gross NPA ratios over the years, indicating improving asset quality.

Gross NPAs of Public Sector Banks

1. State Bank of India has the lowest mean Gross NPA ratio, indicating relatively better asset quality.

2. Punjab National Bank has the highest mean Gross NPA ratio, indicating significant asset quality concerns.

3. Most banks have shown a decline in Gross NPA ratios over the years, indicating improving asset quality.

Net NPAs of Private Sector Banks

1. HDFC Bank and IndusInd Bank have consistently maintained low Net NPAs.

2. ICICI Bank has shown significant improvement in Net NPAs over the years.

3. Most banks have improved Net NPAs over the years, indicating better asset quality and reduced credit risk.

Net NPAs of Public Sector Banks

1. State Bank of India has shown consistent improvement in Net NPAs.

2. Punjab National Bank and Indian Overseas Bank have shown high volatility in Net NPAs.

3. Most banks have improved Net NPAs over the years, indicating better asset quality and reduced credit risk.

Net NPAs to Advances of Private Sector Banks

1. HDFC Bank has consistently maintained a low Net NPA to Advances ratio.

2. ICICI Bank has shown significant volatility in Net NPA to Advances ratio.

3. Most banks have shown a decline in Net NPA to Advances ratio over the years.

Net NPAs to Advances of Public Sector Banks

1. State Bank of India has demonstrated the most stability in Net NPA to Advances ratio.

2. Punjab National Bank has shown high volatility in Net NPA to Advances ratio.

3. Most banks have shown a decline in Net NPA to Advances ratio over the years.

Net NPAs to Deposits of Private Sector Banks

1. HDFC Bank and IndusInd Bank have maintained relatively high ratios.

2. ICICI Bank has shown significant volatility in Net NPA to Deposits ratio.

3. Most banks have shown a decline in Net NPA to Deposits ratio over the years.

Net NPAs to Deposits of Public Sector Banks

1. State Bank of India has maintained a relatively high ratio.

2. Punjab National Bank has shown significant volatility in Net NPA to Deposits ratio.

3. Most banks have shown a decline in Net NPA to Deposits ratio over the years.

Net NPAs to Net Profit of Private Sector Banks

1. HDFC Bank has maintained a high ratio, indicating stable profitability and asset quality.

2. ICICI Bank has shown significant volatility in Net NPA to Net Profit ratio.

3. Most banks have shown a decline in Net NPA to Net Profit ratio over the years.

Net NPAs to Net Profit of Public Sector Banks

1. State Bank of India has maintained a relatively high ratio, indicating stable profitability and asset quality.

2. Punjab National Bank has shown significant volatility in Net NPA to Net Profit ratio.

3. Most banks have shown a decline in Net NPA to Net Profit ratio over the years.

ANOVA Results

1. There is a significant difference between the means of the five private sector banks (p-value = 0.015).

2. There is a significant difference between the means of the five public sector banks (p-value = 0.001).

suggestions

1. Private sector banks have generally performed better than public sector banks in terms of asset quality and profitability.

2. HDFC Bank and State Bank of India have consistently maintained stable asset quality and profitability.

3. ICICI Bank and Punjab National Bank have shown significant volatility in asset quality and profitability.

4. Most banks have shown a decline in Gross NPAs and Net NPAs over the years, indicating improving asset quality and reduced credit risk.

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