



An Empirical Analysis of Financial Performance and Solvency Position of Selected Public Sector Banks with Parametric Statistical Techniques

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At the present time, people are closely connected with many financial activities in their daily lives. Our financial system has different sectors that help individuals and businesses meet their financial needs. In a competitive scenario the banking sector plays a major and very important role in the economy. Financial system includes Banks to collect deposits, provide loans, and support economic growth. In addition to in recent years, many banks have been facing serious problems related to their solvency position. Our study focuses on a comparison of the solvency position of two major banks: Punjab National Bank (PNB), which is a public sector bank, and Axis Bank, which is a private sector bank. The main objective our paper is to examine and compare the financial strength by using financial statement analysis from their annual report. In our research paper several key financial ratios such as the NPA ratio and the Capital Adequacy Ratio (CAR) have been calculated. It helps in understanding the ability of banks to meet their long-term obligations and manage financial risks. We also used the modified Altman's Z-score model to get an overall view of the financial health of both banks. To check the statistical significance of the results, we applied a single-factor ANOVA test on the Z-score and selected financial ratios. This helped us to identify whether there is any significant difference in the solvency position of the two banks.

Keywords: Corporate Solvency, Capital Adequacy Ratio (CAR), Non-performing Assets (NPA), Altman's Z Score Model, Single Factor ANOVA

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1. Introduction

In our day-to-day life all of us by any how are connected with a financial transaction. From payment of insurance premium to investment options in various schemes we all use different banking services and also, we save our excess income as deposits in those banks. Initially when we keep our savings as deposits in various banks, we always consider the safety and security of our deposited money. Primarily there is a provision that as per Deposit Insurance Credit Guarantee (DICG) scheme amount of deposit up to rupees five lacs are insured by Government of India. If anyone has deposit amount more than that specified limit then settlement is made on proportionate basis. In that case depositors may lose their money. Again, if a commercial bank has taken any borrowings, it must make timely payment of interest and principal amount on the predetermined time. Likewise, the main objective of any organisation including banking sector is wealth maximization to the shareholders i.e. maximization of EPS. So, it must be ensured that investors funds has been used with full safety & security. And the given loans & advances must be performing. Also every bank should have adequate amount of Capital to absorb any uncertain loss so that investors can not be afraid of about their investment loss. In our study a comparison of solvency position has been done between the selected banks by use of different financial ratios. Again, with the use of test statistics readers can see that if there is any inconsistency about the solvency position between these banks or not. And can take any action regarding their investment or deposit in these banks accordingly.

2. Significance of the Study

In the recent times many banks are facing solvency problem because of inadequate capital base and also for getting it's advances as non-performing. As a result all the related stakeholders will fall into trouble. Not only public sector banks but now private banks also indulging in creation of NPA due to bad handling of credit sanction & recovery process. Our study will be helpful in finding some insights about the solvency status of the selected banks. Investors will be also benefited from such information.

3. Literature Review

1. In this paper we can see the analysis of the solvency position of SBI. Here the author has computed some financial ratios concerning solvency criteria. But we can not judge whether the value of ratio in different selected years are significantly different or not. As there is no use of statistical tools. Also, the interpretation part is not well presented and not very much eye-catching. So the readers will find it hard to gather relevant information from this area. (Vanaja & Mohan, 2019)

2. Here the author has used a statistical prediction model namely Altman's Z score model to make & show a comparison of solvency status & liquidity criteria among different group of banks. Besides in the research methodology part many important ratio were mentioned that indicates solvency criteria. But computation of such ratio has not been shown in data analysis part. Again as the data taken is prior to 2020, no comparison of financial performance can be available for the pre and post-pandemic time period. Though in the recent times there are many changes occurred in the economy. (Rani, 2022)

3. Here the main aspect were given on mere ratio computation and interpretation of such ratio concerned with solvency & liquidity position. Here neither any specific model nor any test statistics has been used to draw a significant conclusion. Though there was the category of private & public sector bank mentioned, but detail name of the banks were not available. (Pushkala, 2017)

4. A brief idea can be available from this paper regarding how solvency & liquidity make impact on profitability. The paper was written from the point of view of banks. We can know how an independent variable make impact on a dependent variable by focusing on the statistical test analysis. But here no specific models were used. Besides the category wise comparison was also missing. (Khan, 2021)

4. Research Gap

From the existing literature review we have identified some dissimilarities about the analysis and overall presentation. Each paper was focused on a particular topic. In most of the cases Bankometer model has been used for prediction of solvency position. Besides in many paper the data analysis was shown only by mere calculation & interpretation of financial ratio.

But another model namely Modified Altman's Z score is also an important model for solvency prediction. But there is no such work found by us based on this model. So, from that point we have designed our paper by providing an wide range of analysis by graphical presentation of financial ratios and also by statistically testing important ratios. Also, the overall prediction parameter has been statistically tested with the Z score value. Thus, the paper will provide a wide view about the solvency position of the selected banks.

5. Objective of the Study

- To calculate some financial ratio concerning solvency & liquidity of the selected banks for the last five financial period.
- To verify the result by applying specific financial distress analysis model in between the selected banks with statistical test.
- To make the analysis of significant differences in between the banks selected if any in terms of some important ratios by using of proper statistical tool.

6. Research Methodology

This paper analyzes the Liquidity and Solvency analysis of two particular banks. We have taken two banks namely PNB & AXIS banks. We have also taken One Financial Model and some important financial ratios which can helps to determine the Short term solvency and sustainability. Also, we have done some testing of Hypothesis with the helping of Statistical tools (Analysis of Variance i.e. ANOVA) to measure the test of significance of two banks. We have tried to examine and compare the mean between two or more Parameters of the Given Banks to Judge their Short-term Solvency & their footprint in Long Run. We have also tried to examine various Independent variables to compare the test value of Dependable variable.

Debt Equity Ratio = (Short term Debt + Long term Debt + Fixed Payments) / Equity Share Capital + Reserve & Surplus)

This Ratio analyze the financial risk of any company. When a company using higher amount of debt capital, it comprises higher risk. But at the same time it can increase the Earning Per Share that is Shareholder wealth.

Financial Leverage Ratio = Operating Profit (EBIT) / Earning before Tax (EBT)

This Ratio Analyze Financial Impact of any company's Capital Structure. If this Ratio Increases, it can impact more amount of Return to Investors as compensating the added Financial Risk. Investor can easily diversify the Portfolio according this ratio.

Tier I Leverage Ratio = Tier I Capital / Consolidated Asset or Total Asset

This Ratio measures Bank's Overall Financial Strength by comprising its core equity capital to its Risk weighted Assets.

Tier I Capital = [Shareholder's Equity + Retained Earnings + Free Reserves & Surplus + Investment Fluctuations Reserves] - [Intangible Assets - Losses - Equity Investment in Subsidiaries]

Tier II Capital = [Revaluation Reserve + Subordinated Debt + Hybrid Capital + Undisclosed Reserve + General Provisions & Loss Reserve + Long term Unsecured Loans + Bonds + Debt Capital Instruments + Redeemable Cumulative Preference Shares + Perpetual Cumulative Preference Shares]

Capital Adequacy Ratio = [Tier I Capital + Tier II Capital] / Risk weighted Asset

This ratio signifies Total Capital with the comprising of total risk belongs to the asset.

Risk Weighted Asset = Total Risk Exposure * Relevant Loan Assets.

Interest Coverage Ratio = Operating Profit (EBIT) / Interest Expenses

Debt Service Coverage Ratio = Net Operating Income (NOI) / Total Debt

Asset Coverage Ratio = [Asset - Tangible Asset] - [Current Liability - Short Term Debt] / Total Debt

Net Operating Income (NOI) = Operating Income - Operating Expenses

This Ratio Implies how much operating Profit covers total Interest expended by the banks.

Shareholder Equity Ratio = Total Shareholders Equity / Total Asset

Shareholder Equity = Total Asset - Total Outside Liability

Or, Shareholder Equity = Paid Up Capital + Retained Earnings

If this Ratio higher, it implies higher proportions of asset are financing using shareholders fund rather than the borrowed capital.

Credit to Deposit Ratio = Total Credit or Total Loans / Total Deposits

This Ratio Signifies how much bank deposits are lent out as deposit. In an Industrial Standard the Ideal Ratio is 80% to 90%. It can helps Liquidity Management, Risk Assessment, Probability & Growth & Economic Indicator. With the help of this Ratio, Bank can diversify the Credit Portfolio across the Various Sectors to mitigate the Risk.

Provision Coverage Ratio = Total Provision / Gross NPA

This Implies how much percentage of Fund Bank can set aside for their Bad Credits or Loans. This can also implies that Higher the Provision Coverage Ratio that can Shields against NPA or Bad Loans or Credits.

Gross NPA = Initial Gross NPA Opening Balance + Net Addition during the year

Provisions = Initial Provisions (Opening Balance) + [Provision Make during the year – Written off back provisions]

Current Account Savings Account (CASA) Ratio = [Total Current Accounts + Total Savings Accounts] / Total Deposits

This Ratio Implies that Higher the CASA Ratio better Operating Efficiency in the particular bank.

Interest Expenditure to total Fund Ratio = Interest Expenses / Total Deposits

Higher of this Ratio means the bank pays more amount of Interest on Deposits to Customers.

Current Ratio = Current Asset / Current Liabilities

The Ideal Industrial Standard is 2:1. This implies for One Unit of current liability buffer against Two Units of Current Asset.

Cash Ratio = [Cash + Cash Equivalent] / Total Current Liability

It can measure the Liquidity & Solvency. Higher the ratio which implies benevolent for the Organizations.

Gross NPA Ratio = [Total Gross NPA] / Total Loans & Advances

This ratio stands for Gross Non Performing Assets. GNPA is an Absolute amount of Valuation. The amount of asset which is set aside for their profits or income and such assets turn into losses in future. It's a method in which banks may disclose bad loans which could have to maintain healthy books of accounts.

Net NPA Ratio = [Total Net NPA] / Total Loans & Advances

Net NPA = Gross NPA - Provisions

This ratio represents the portion of gross NPA for which there are still no provisions. It can also state that as a future risk of losses for which banks may capacity to keep provision there by further declining of profits. This Net NPA is a measure of the actual losses that a banks has incurred on its NPA. A high net NPA indicates that a bank incurred Large Amount of Losses on the NPA's.

Cash Earning Retention Ratio = (Net Retained Earnings) / (Total Earnings After Taxes)

Net Retained Earnings = Net Profit – Dividend declared

This ratio is higher, which may indicate that company or firm is using its own fund in growth & any expansion plans. Lower of the ratio, which states that firm is paying out more amount of dividend what is retained.

Modified Altzman Z Score Model:

This model developed in Post Globalization era & to Examine the Solvency Status of the Particular Bank. This as an Experiential Study to Suggest the Solvency and Liquidity Risk of the Bank.

$$Z = 3.25 + 6.56 X_1 + 3.26 X_2 + 6.72 X_3 + 1.05 X_4$$

Variable	Formula
X1	Working Capital/Total Asset
X2	Retained / Total Assest
X3	EBIT / Total Asset
X4	Market Value of Equity / Book Value of Debt

Ideal Std.(Modified Altzman Z Score Model)

Z <1.1 : Higher Probability of Bankruptcy

1.1 < Z <2.6 : Grey area, Distress is Not High

Z >2.6 : Grey Domain, Distress is very Less.

7. Data Analysis & Findings

Graphical Presentation

Table 1: Debt Equity Ratio (Calculated)		
Financial Year	PNB	AXIS
2023-24	1.38	1.32
2022-23	1.47	1.32
2021-22	1.46	1.5
2020-21	1.11	1.5
2019-20	1.47	1.62
Avg.	1.378	1.452
St. Deviation	0.154	0.130
Co Efficient of Variation	11.212	8.958

Interpretation: From Table 1 we have seen that Avg. Debt Equity Ratio is little bit lower of PNB Bank as compare to AXIS Bank. At the same time we have also observed Co efficient of variation is higher in PNB as compare to AXIS. We know that if Higher Co efficient of Variation which signifies higher amount of Risk of Liquidity and vice versa.

Table 2: Financial Leverage Ratio (Calculated)		
Financial Year	PNB	AXIS
2023-24	3.68	2.6
2022-23	3.25	3.13
2021-22	3.22	2.38
2020-21	3.19	2.34
2019-20	3.47	2.6
Avg.	3.362	2.61
St. Deviation	0.209	0.315
Co Efficient of Variation	6.223	12.061

Interpretation: From Table 2 we have seen that Avg. Financial Leverage Ratio is little bit higher of PNB Bank as compare to AXIS Bank. But we have also observed Co efficient of variation is lower in PNB as compare to AXIS. We know that if lower Co efficient of Variation which signifies lower amount of Risk of Liquidity and vice versa.

Table 3: Capital Adequacy Ratio (Tabulated)		
Financial Year	PNB	AXIS
2023-24	15.97	16.63
2022-23	15.5	17.64
2021-22	14.5	18.54
2020-21	14.32	19.12
2019-20	14.14	17.53
Avg.	14.886	17.892
St. Deviation	0.803	0.964
Co Efficient of Variation	5.393	5.386

Interpretation: From Table 3 we have seen that Avg. Capital Adequacy Ratio is little bit lower of PNB Bank as compare to AXIS Bank.

Simultaneously we have also observed Co efficient of variation is higher in PNB as compare to AXIS. We know that lower Co-efficient of Variation which signifies lower amount of Risk of Liquidity and vice versa. Lower Capital Adequacy Ratio which denotes that Asset with Risk Exposure is higher than the other bank.

Table 4: Interest Coverage Ratio (Calculated)		
Financial Year	PNB	AXIS
2023-24	1.39	1.65
2022-23	1.46	1.78
2021-22	1.47	1.75
2020-21	1.48	1.77
2019-20	1.42	1.65
Avg.	1.444	1.72
St. Deviation	0.038	0.065
Co Efficient of Variation	2.619	3.768

Interpretation: From Table 4 we have seen that Avg. Interest Coverage ratio is little bit lower of PNB Bank as compare to AXIS Bank. Simultaneously we have also observed Co efficient of variation is lower in PNB as compare to AXIS.

Table 5: Shareholder Equity Ratio (Calculated)		
Financial Year	PNB	AXIS
2023-24	0.068	0.102
2022-23	0.068	0.102
2021-22	0.068	0.095
2020-21	0.068	0.095
2019-20	0.073	0.098
Avg.	0.069	0.0984
St. Deviation	0.002	0.004
Co-efficient of Variation	3.241	3.564

Interpretation: From Table 5 we have seen that Avg. Shareholder's equity is lower of PNB Bank as compare to AXIS Bank. At the same path we have also observed Co efficient of variation is higher in AXIS as weigh against to PNB.

Table 6: Credit to Deposit Ratio (Calculated)		
Financial Year	PNB	AXIS
2023-24	66.59	89.82
2022-23	64.23	87.81
2021-22	62.26	87.08
2020-21	63.31	88.7
2019-20	67.4	89.71
Avg.	64.758	88.624
St. Deviation	2.177	1.190
Co Efficient of Variation	3.361	1.342

Interpretation: From Table 6 we have seen that Avg. Credit to Deposit ratio is lesser of PNB Bank as compare to AXIS Bank.

Simultaneously we have also observed Co efficient of variation is higher in PNB as compare to AXIS.

Table 7: CASA Ratio (Tabulated)		
Financial Year	PNB	AXIS
2023-24	40.33	42.98
2022-23	41.99	47.15
2021-22	46.55	44.99
2020-21	44.54	44.92
2019-20	42.97	41.19
Avg.	43.276	44.246
St. Deviation	2.384	2.257
Co Efficient of Variation	5.510	5.102

Interpretation: From Table 7 we have seen that Avg. CASA ratio is elevated of AXIS Bank as compare to PNB. Simultaneously we have also observed Co efficient of variation is lower in AXIS as compare to PNB.

Table 8: Int. Expenditure to Total Fund Ratio (Calculated)		
Financial Year	PNB	AXIS
2023-24	4.44	4.26
2022-23	3.67	3.39
2021-22	3.61	3.15
2020-21	4.84	3.6
2019-20	4.55	4.36
Avg.	4.222	3.752
St. Deviation	0.551	0.535
Co Efficient of Variation	13.061	14.255

Interpretation: From Table 8 we have seen that Avg. Interest Expenditure to total Fund ratio is little bit lower of AXIS Bank as compare to PNB. Simultaneously we have also observed Co efficient of variation is lower in PNB as compare to AXIS.

Table 9: Current Ratio (Calculated)		
Financial Year	PNB	AXIS
2023-24	5.53	2.88
2022-23	5.53	2.84
2021-22	7.55	3.02
2020-21	7.55	3.04
2019-20	7.43	3.52
Avg.	6.718	3.06
St. Deviation	1.086	0.271
Co Efficient of Variation	16.160	8.866

Interpretation: From Table 9 we have seen that Avg. Current ratio is higher of PNB Bank as compare to AXIS Bank. But we have also observed Co efficient of variation is lower in AXIS as compare to PNB.

Table 10: Cash Ratio (Calculated)		
Financial Year	PNB	AXIS
2023-24	0.083	0.077
2022-23	0.083	0.077
2021-22	0.106	0.081
2020-21	0.106	0.081
2019-20	0.101	0.094
Avg.	0.0958	0.082
St. Deviation	0.012	0.007
Co Efficient of Variation	12.382	8.537

Interpretation: From Table 10 we have seen that Avg. Cash ratio is higher of PNB Bank as compare to AXIS Bank. Concurrently we have also observed Co efficient of variation is lower in PNB as compare to AXIS.

Table 11: Gross NPA		
Financial Year	PNB	AXIS
2023-24	5.73	1.43
2022-23	5.73	1.43
2021-22	8.74	2
2020-21	9	2.02
2019-20	12	2.82
Avg.	8.24	1.94
St. Deviation	2.625	0.571
Co Efficient of Variation	31.858	29.438

Interpretation: From Table 11 we have seen that Avg. Gross NPA is higher of PNB Bank as compare to AXIS Bank. Concurrently we have also observed Co efficient of variation is lower in AXIS as compare to PNB.

Table 12: Net NPA		
Financial Year	PNB	AXIS
2023-24	0.73	0.31
2022-23	0.75	1.83
2021-22	2.72	1
2020-21	2.72	0.39
2019-20	4.79	0.73
Avg.	2.342	0.852
St. Deviation	1.689	0.612
Co Efficient of Variation	72.120	71.886

Interpretation: From Table 12 we have seen that Avg. Net NPA is progressive of PNB Bank as compare to AXIS Bank. Alongside we have also observed Co efficient of variation is lower in AXIS as comparison to PNB.

Table 13: Cash Earnings to Retention Ratio

Financial Year	PNB	AXIS
2023-24	81.93	98.83
2022-23	78.98	98.65
2021-22	83.79	100
2020-21	100	100
2019-20	100	100
Avg.	88.94	99.50
St. Deviation	10.241	0.693
Co Efficient of Variation	11.514	0.697

Interpretation: From Table 13 we have seen that Cash Earnings to Retention ratio is cutting-edge of AXIS as compare to PNB. Alongside we have also observed Co efficient of variation is lower in AXIS as difference to PNB.

Analysis of Statistics (ANOVA)

Table 14: Debt Equity Ratio (Anova)

Financial Year	PNB	AXIS
2023-24	1.38	1.32
2022-23	1.47	1.32
2021-22	1.46	1.5
2020-21	1.11	1.5
2019-20	1.47	1.62
Avg.	1.378	1.452
St. Deviation	0.154	0.130
Co Efficient of Variation	11.212	8.958

Table 15: Anova Analysis of Debt Equity Ratio In between PNB & AXIS (Single Factor)

Groups	Count	Sum	Average	Variance		
Column 1	5	6.89	1.378	0.02387		
Column 2	5	7.26	1.452	0.01692		
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.01369	1	0.01369	0.671243	0.43634417	5.317655
Within Groups	0.163168	8	0.020395			
Total	0.176859	9				

We have used one of the Statistical tool namely Anova Single factor. We have made some assumptions before testing of this model.

H₀ (Null Hypothesis): There will be no Signifying difference in PNB & AXIS Bank regarding Debt Equity Ratio.

H₁ (Alternative Hypothesis): There will be Signifying difference in PNB & AXIS Bank regarding Debt Equity Ratio.

Result: As Table 15 Indicates F (Calculated Value: 0.6712) which is lower than F (Critical Table Value at 5% significance level: 5.318), as a conclusion it may be accept Null Hypothesis & rejected a Alternative Hypothesis, as this may not be signifying difference in this model statistics. As P Value is 0.43 which is greater than 0.05 (i.e. 5% Significance Level), there may be acceptance of Null Hypothesis that is no signifying difference is observed in between two Banks with respect to Debt equity Ratio. Therefore, we may draw the statement as per Debt equity ratio concern, there will be Signifying difference in PNB & AXIS Bank. As per Avg. of both the banks, both the Banks under in Grey Domain.

Table 16: Financial Leverage Ratio (Anova)

Financial Year	PNB	AXIS
2023-24	3.68	2.6
2022-23	3.25	3.13
2021-22	3.22	2.38
2020-21	3.19	2.34
2019-20	3.47	2.6
Avg.	3.362	2.61
St. Deviation	0.209	0.315
Co Efficient of Variation	6.223	12.061

Table 17: Anova Analysis of Financial Leverage Ratio In between PNB & AXIS (Single Factor)

Groups	Count	Sum	Average	Variance		
Column 1	5	16.81	3.362	0.04377		
Column 2	5	13.05	2.61	0.0991		
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	1.41376	1	1.41376	19.79086	0.002143024	5.317655
Within Groups	0.571488	8	0.071435			
Total	1.985249	9				

We have used one of the Statistical tools namely Anova Single factor. We have made some assumptions before testing of this model.

H₀ (Null Hypothesis): There will be no Signifying difference in PNB & AXIS Bank concerning Financial Leverage Ratio.

H₁ (Alternative Hypothesis): There will be Signifying difference in PNB & AXIS Bank concerning Financial Leverage Ratio.

Result: As Table 17 Indicates F (Calculated Value: 19.79086) which is higher than F (Critical Table Value at 5% significance level: 5.318), as a conclusion it may be rejected Null Hypothesis & Accept an Alternative Hypothesis.

As P Value measures the probability of obtaining the observed results, assuming the Null hypothesis is true. The lesser the P Value, the greater the statistical significance of the observed difference. A P Value is 0.05 or lesser is generally considered as statistically significant. Therefore, we may draw the statement as per Financial charges leverage ratio apprehension, there will be Signifying difference in PNB & AXIS Bank.

Financial Year	PNB	AXIS
2023-24	15.97	16.63
2022-23	15.5	17.64
2021-22	14.5	18.54
2020-21	14.32	19.12
2019-20	14.14	17.53
Avg.	14.886	17.892
St. Deviation	0.802795	0.963727
Co Efficient of Variation	5.392954	5.386358

Groups	Count	Sum	Average	Variance		
Column 1	5	74.43	14.886	0.64448		
Column 2	5	89.46	17.892	0.92877		
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	22.59009	1	22.59009	28.71774	0.000678572	5.317655
Within Groups	6.293	8	0.786625			
Total	28.88309	9				

We have used one of the Statistical tools namely Anova Single factor. We have made some assumptions before testing of this model.

H₀ (Null Hypothesis): There will be no Signifying difference in PNB & AXIS Bank about Capital Adequacy Ratio.

H₁ (Alternative Hypothesis): There will be Signifying difference in PNB & AXIS Bank about Capital Adequacy Ratio.

Result: As Table 19 Indicates F (Calculated Value: 28.7178) which is higher than F (Critical Table Value at 5% significance level: 5.318), as a conclusion it may be rejected Null Hypothesis & Accept an Alternative Hypothesis.

As P value is 0.006 which is lesser than 0.05, we can draw the conclusion that there may be signifying difference in between PNB & Axis bank with respect to Tier I & Tier II Capital concerned with Risk Weighted Assets. Therefore, we may draw the statement as per Capital Adequacy ratio concern, there will be Signifying difference in PNB & AXIS Bank.

Financial Year	PNB	AXIS
2023-24	1.39	1.65
2022-23	1.46	1.78
2021-22	1.47	1.75
2020-21	1.48	1.77
2019-20	1.42	1.65
Avg.	1.444	1.72
St. Deviation	0.038	0.065
Co Efficient of Variation	2.619	3.768

Groups	Count	Sum	Average	Variance		
Column 1	5	7.22	1.444	0.00143		
Column 2	5	8.6	1.72	0.0042		
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.19044	1	0.19044	67.65187	3.5743	5.317655
Within Groups	0.02252	8	0.002815			
Total	0.21296	9				

We have used one of the Statistical tools namely Anova Single factor. We have made some assumptions before testing of this model.

H₀ (Null Hypothesis): There will be no Signifying difference in PNB & AXIS Bank about Interest Coverage Ratio.

H₁ (Alternative Hypothesis): There will be Signifying difference in PNB & AXIS Bank about Interest Coverage Ratio.

Result: As Table 21 Indicates F (Calculated Value: 67.65187) which is higher than F (Critical Table Value at 5% significance level: 5.318), as a conclusion it may be significant as concerned to total interest coverage. As P value is higher that is 3.57 which is greater than 5% significance level, we can say that to accept Null hypothesis. Therefore, we may draw the statement as per Interest Coverage ratio concern, there will be no Signifying difference in PNB & AXIS Bank.

Table 22: Shareholder Equity Ratio (Anova)

Financial Year	PNB	AXIS
2023-24	0.068	0.102
2022-23	0.068	0.102
2021-22	0.068	0.095
2020-21	0.068	0.095
2019-20	0.073	0.098
Avg.	0.069	0.0984
St. Deviation	0.002	0.004
Co Efficient of Variation	3.241	3.564

Table 23: Anova Analysis of Shareholder Equity Ratio In between PNB & AXIS (Single Factor)

Groups	Count	Sum	Average	Variance		
Column 1	5	0.345	0.069	5E-06		
Column 2	5	0.492	0.0984	1.23E-05		
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.002161	1	0.002161	249.815	2.56713	5.317655
Within Groups	6.91E-06	8	8.64			
Total	0.00223	9				

We have used one of the Statistical tools namely Anova Single factor. We have made some assumptions before testing of this model.

H₀ (Null Hypothesis): There will be no Signifying difference in PNB & AXIS Bank about Shareholder Equity Ratio.

H₁ (Alternative Hypothesis): There will be Signifying difference in PNB & AXIS Bank about Shareholder Equity Ratio.

Result: As Table 23 Indicates F (Calculated Value: 249.815) which is higher than F (Critical Table Value at 5% significance level: 5.318), as a conclusion it may be rejected Null Hypothesis & Accept Alternative Hypothesis. Simultaneously, P value factor which is observed 2.564 which is elevated than 0.05, we may draw the conclusion that there will be no difference in between PNB & AXIS Banks with respect to Shareholder Equity Ratio. As per F calculated value, we may draw the statement as per Shareholder Equity ratio concern, there will be Signifying difference in PNB & AXIS Bank.

Table 24: Gross NPA Ratio (Anova)

Financial Year	PNB	AXIS
2023-24	5.73	1.43
2022-23	5.73	1.43
2021-22	8.74	2
2020-21	9	2.02
2019-20	12	2.82
Avg.	8.24	1.94
St. Deviation	2.625	0.571
Co Efficient of Variation	31.858	29.438

Table 25: Anova Analysis of Gross NPA Ratio In between PNB & AXIS (Single Factor)

Groups	Count	Sum	Average	Variance		
Column 1	5	41.2	8.24	6.89135		
Column 2	5	9.7	1.94	0.32615		
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	99.225	1	99.225	27.49567	0.000779843	5.317655
Within Groups	28.87	8	3.60875			
Total	128.095	9				

We have used one of the Statistical tools namely Anova Single factor. We have made some assumptions before testing of this model.

H₀ (Null Hypothesis): There will be no Signifying difference in PNB & AXIS Bank around Gross NPA Ratio.

H₁ (Alternative Hypothesis): There will be Signifying difference in PNB & AXIS Bank around Gross NPA Ratio.

Result: As Table 25 Indicates F (Calculated Value: 27.4957) which is higher than F (Critical Table Value at 5% significance level: 5.318), as a conclusion it may be significant as compare to P value 0.0007 which is lower than 0.05 significance level, we may reject Null Hypothesis that is there will be no signifying difference in between two banks.

Table 26: Net NPA Ratio (Anova)

Financial Year	PNB	AXIS
2023-24	0.73	0.31
2022-23	0.75	1.83
2021-22	2.72	1
2020-21	2.72	0.39
2019-20	4.79	0.73
Avg.	2.342	0.852
St. Deviation	1.689	0.612
Co Efficient of Variation	72.120	71.886

Table 27: Anova Analysis of Net NPA Ratio In between PNB & AXIS (Single Factor)

Groups	Count	Sum	Average	Variance		
Column 1	5	11.7	2.342	2.85287		
Column 2	5	4.26	0.852	0.37512		
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	5.55025	1	5.55025	3.438827	0.100792446	5.317655
Within Groups	12.91196	8	1.613995			
Total	18.46221	9				

We have used one of the Statistical tools namely Anova Single factor. We have made some assumptions before testing of this model.

H_0 (Null Hypothesis): There will be no Signifying difference in PNB & AXIS Bank around Net NPA Ratio.

H_1 (Alternative Hypothesis): There will be Signifying difference in PNB & AXIS Bank around Net NPA Ratio.

Result: As Table 27 Indicates F (Calculated Value: 3.438827) which is lower than F (Critical Table Value at 5% significance level: 5.318), as a conclusion it may be rejected Alternative Hypothesis & Accept a Null Hypothesis. This difference of this ratio may not be significant, that it may observed that P value which is 0.1 which is greater than 5% significance level (i.e.0.05) , this can also draw to accept Alternative hypothesis. Therefore, we may draw the statement as per Net NPA ratio concern, there will be no Signifying difference in PNB & AXIS Bank.

Financial Year	PNB	AXIS
2023-24	81.93	98.83
2022-23	78.98	98.65
2021-22	83.79	100
2020-21	100	100
2019-20	100	100
Avg.	88.94	99.496
St. Deviation	10.241	0.693
Co Efficient of Variation	11.514	0.697

Groups	Count	Sum	Average	Variance		
Column 1	5	444.7	88.94	104.8778		
Column 2	5	497.48	99.496	0.48033		
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	278.5728	1	278.5728	5.28811	0.050503211	5.317655
Within Groups	421.4327	8	52.67909			
Total	700.0056	9				

We have used one of the Statistical tools namely Anova Single factor. We have made some assumptions before testing of this model.

H_0 (Null Hypothesis): There will be no Signifying difference in PNB & AXIS Bank around Cash Earnings Retention Ratio.

H_1 (Alternative Hypothesis): There will be Signifying difference in PNB & AXIS Bank around Cash Earnings Retention Ratio.

Result: As Table 29 Indicates F (Calculated Value: 5.28811) which is lower than F (Critical Table Value at 5% significance level: 5.318), as a conclusion it may be rejected Alternative Hypothesis & Accept a Null Hypothesis. That is it may not be significant. As compare to P Value which is 0.0505 a little bit higher that 5% significance level, we can say that there will be a little bit difference in between Cash earnings retention ratio in between two banks. Therefore, we may draw the statement as per Cash Earnings Retention ratio concern, there will be no Signifying difference in PNB & AXIS Bank.

Modified Altsman Z Score Model:

Variable	Formula	2023-24	2022-23	2021-22	2020-21	2019-20
X1	Working Capital/Total Asset	0.1022	0.1022	0.1323	0.1323	0.1341
X2	Retained / Total Assets	0.0000	0.1647	0.1648	0.0000	0.1543
X3	EBIT / Total Asset	0.0587	0.0469	0.0458	0.0501	0.0389
X4	Market Value of Equity / Book Value of Debt	3.0797	1.1408	0.7535	0.7481	0.7798
Z Score (Calculated)		7.549	5.970	5.754	5.240	5.713

Variable	Formula	2023-24	2022-23	2021-22	2020-21	2019-20
X1	Working Capital/Total Asset	0.0773	0.0768	0.0906	0.0909	0.1142
X2	Retained / Total Assets	0.1013	0.1013	0.0944	0.0944	0.0974
X3	EBIT / Total Asset	0.0654	0.0420	0.0448	0.0456	0.0518
X4	Market Value of Equity / Book Value of Debt	1.8285	1.3487	1.2033	1.1807	0.7377
Z Score (Calculated)		6.447	5.782	5.717	5.701	5.439

Table 32: Analysis of Modified Altman Z Score Model in between PNB & AXIS

Years	PNB	AXIS
2023-24	7.549	6.447
2022-23	5.970	5.782
2021-22	5.754	5.717
2020-21	5.240	5.701
2019-20	5.713	5.439
Avg.	6.045	5.817

Table 33: ANOVA [Analysis of Modified Altman Z Score Model in between PNB & AXIS]

Groups	Count	Sum	Average	Variance		
Column 1	5	30.2259	6.045188247	0.777218398		
Column 2	5	29.0853	5.817055823	0.141086104		
Source of Variation	SS	df	MS	F	P-value	F crit (5%)
Between Groups	0.1301110071	1	0.130111007	0.28337225	0.608961956	5.318
Within Groups	3.6732180098	8	0.459152251			
Total	3.8033290169	9				

We have used one of the Statistical tool namely Anova Single factor. We have made some assumptions before testing of this model.

H₀ (Null Hypothesis): There will be Signifying no difference in PNB & AXIS Bank regarding Modified Altman Z Score Model.

H₁ (Alternative Hypothesis): There will be Signifying difference in PNB & AXIS Bank regarding Modified Altman Z Score Model.

Result: As Table 33 Indicates F (Calculated Value: 0.2833) which is lower than F (Critical Table Value at 5% significance level: 5.318), as a conclusion it may be rejected Alternative Hypothesis & Accept a Null Hypothesis. Simultaneously, Observed P Value is 0.608 which is greater than 0.05 (5 % significance Level), Null Hypothesis is rejected. Therefore, we may draw the statement as per Modified Altman Z Score Model there will be no Signifying difference in PNB & AXIS Bank. As per Avg. of both the banks, both the Banks under in Grey Domain and Distress is less.

8. Concluding Observation

In our paper an overall analysis has been done on the basis of different important financial ratio calculation and the use of a significant statistical model. As a result, an wide aspect of analysis can be seen from various angle. From the various ratios mentioned in the research methodology, the most important ratios indicating solvency position has been also tested with single factor ANOVA tool. As a result, we can see whether there is any significant difference in between the selected variables or not. And it is also seen that in case of some relevant ratio like shareholders' equity, Gross NPA, CAR etc. there is significant differences between the selected banks. Again to find an overall implication we have also tested the modified Altman Z score . And the result shows that there is no significant difference of z score value between the banks. But as the value of z score is greater than 2.6, both the banks having z score value [PNB: 6.045; AXIS: 5.817] are far away from financial distress. Since the above mentioned ratio are very useful for strengthening capital base, it is seen that in spite of having high amount of Gross NPA, higher percentage of CAR can absorb such risk and by using financial leverage it can magnify it's return for shareholders. As a result, we can see a matching inference from the Altman model result that both the banks are not in solvency problem.

Future Direction of Study

If the data collection period can be increased then a different inference may be available. Again we have taken only one bank from public & private sector each. So if the number of banks can be increased under each category, then an intra group comparison can be available.

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