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## Comparative Analysis of Capital Adequacy and Asset Quality of PSBs in India before and after Covid 19

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### Abstract

Our analysis of the financial performance of twelve Public Sector Banks (PSBs) in India, focusing on Capital Adequacy and Asset Quality before and after the COVID-19 crisis, presents insightful findings. The significant improvements in both the Capital Adequacy Ratio (CAR) and the Net Non-Performing Assets (NNPA) to Net Advances Ratio post-crisis suggest a positive trend in the financial health of these banks. These observations align with broader industry trends. For instance, the Economic Survey 2021-22 reported that the GNPA ratio of PSBs decreased from 9.4% in September 2020 to 8.6% in September 2021, while the Capital Adequacy Ratio improved from 14.32% in March 2019 to 16.54% in September 2021. India Budget+2 India Budget+2 Additionally, the Press Information Bureau highlighted that the Gross NPA ratio of PSBs declined from 14.6% in March 2018 to 5.53% in December 2022, and the Capital Adequacy Ratio improved from 11.5% in March 2015 to 14.5% in December 2022. Press Information Bureau. These improvements can be attributed to several factors, including enhanced regulatory oversight, implementation of asset quality reviews, and strategic reforms aimed at strengthening the banking sector's resilience. The adoption of Basel III norms has also played a crucial role in bolstering capital buffers, enabling banks to better absorb financial shocks. Journal ARJASS. However, it's important to note that while aggregate figures show improvement, variations exist among individual banks. For example, Punjab & Sind Bank reported a Gross NPA ratio of 14.18% and a Net NPA ratio of 8.03% for the fiscal year ending 2019-20. Such disparities underscore the need for targeted interventions and continuous monitoring to ensure sustained improvements across all PSBs. Wikipedia. In conclusion, your study corroborates existing evidence of enhanced financial stability among PSBs post-COVID-19. Ongoing reforms, vigilant asset quality management, and adherence to capital adequacy norms are essential to maintain and further this positive trajectory.

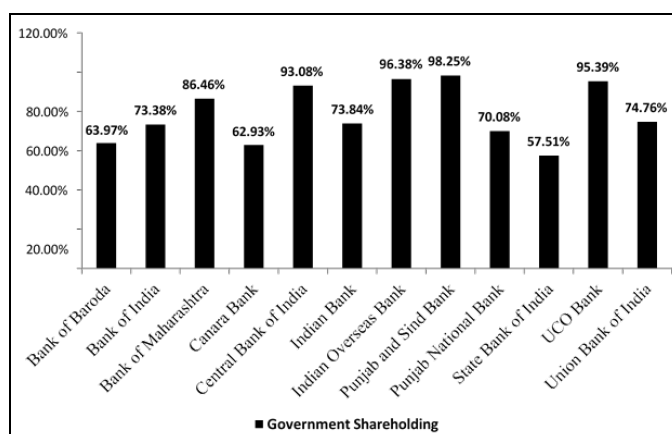
**Keywords:** Capital Adequacy, Asset Quality, PSBs in India, Shapiro-Wilk Test, Paired t-test, Covid-19 Crisis.

### Introduction

#### Capital Adequacy and Asset Quality of PSBs in India

On December 31, 2019, W.H.O. announced COVID-19 as pandemic. The financial performance of banking industry in India is affected severely during COVID-19 pandemic. According to Department of Financial Services, there are

twelve Public Sector Banks (PSBs) in India as on January 10, 2025. A public sector bank in India refers to 'a bank in which the government owns at least 51% of its stakes'. The PSBs in India and government shareholding is given in the form of bar diagram below:-



Source: Department of Financial Services & R.B.I. (Jan. 10, 2025)

Fig 1: Public Sector Banks (PSBs) in India.

The financial performance of PSBs in India can be evaluated with the help of representative financial ratios based on CAMEL model before and after Covid-19 crisis. The investor and policy makers are interested to know the resilience and soundness of banking sector.

### Literature Review

In India, RBI adopted CAMEL model in 1996 which is a tool to diagnose the financial health of banks. CAMEL is an acronym for five parameters such as Capital Adequacy, Asset quality, Management Soundness, Earning ability and Liquidity.

According to CAMEL model analysis, Capital Adequacy of bank is measured by Capital Adequacy Ratio; Asset Quality is measured by Net NPA/Net Advances Ratio; Management Quality is measured by Profit per employee; Earning Ability is measured by Return on Equity and Liquidity is measured by Cash Deposits Ratio (Srinivasan & Saminathan, 2016) <sup>[5]</sup>.

The paper related to pre and post analysis demonstrates the financial performance of State-Owned Conventional and Islamic Banks in Indonesia. It utilizes paired sample t-tests to analyse Capital Adequacy Ratio and Non-Performing Loans/Financing before and during the Covid-19 pandemic. (H, Suhendri *et al*, 2022) <sup>[2]</sup>.

Another similar paper related to pre and post analysis used Wilcoxon rank test was employed to determine whether there were significant differences in the banks' performance metrics before and after the pandemic. The study examined a sample of 34 banks from the South Asian region, covering a period from 2016 to 2021. (Qadri SU, Ma Z, Raza M, Li M, Qadri S, Ye C and Xie H, 2023) <sup>[6]</sup>.

The recent study in context of India asserts that during the pandemic, average liquidity metrics of selected private banks were adversely affected, while profitability showed linear growth. Post-Covid, HDFC Bank and Kotak Mahindra Bank emerged as top performers in liquidity and profitability (Rajdeep, Endaw, Neha, Bhattacharya, 2024) <sup>[4]</sup>.

The primary objective of this present paper is to evaluate the performance of PSBs in India in terms of Capital Adequacy and Asset Quality Pre and Post Covid-19 Crisis. There are two relevant research questions which are as follows:-

- i). Is there significant difference in Capital Adequacy Ratio among PSBs Pre and Post Covid-19 crisis?
- ii). Is there significant difference in Net NPA to Net Advances Ratio among PSBs Pre and Post Covid-19 crisis?

### Research Methodology

The current study is based on ex-post facto descriptive research. Pre and post analysis of financial performance of twelve Indian Public Sector Banks (PSBs) in terms of Capital Adequacy and Asset Quality have been taken for the study. The financial year 2018-2019 has been taken as the time period pre covid-19 crisis and 2021-2022 has been taken as the time period post covid-19 crisis. The secondary data has been collected from DBIE, RBI. Which test is to be used in case of Pre and Post Analysis? This can be identified by Normality Test. Shapiro-Wilk Test for normality has been used in which a large p-value indicates the data set is normally distributed. Paired Sample t-Test is used to compare the average of two data sets (before and after data) that are paired with each other, but have different behavior when data are normally distributed, while the Wilcoxon test is used when data are not normally distributed. The data analysis has been done by MS Excel Add-ins, Real Statistics.

## Data Analysis and Findings

### 1. First Objective

Capital Adequacy is measured by The Capital Adequacy Ratio (CAR). It is a measure used to evaluate a bank's ability to absorb potential losses and meet its obligations. It is calculated by dividing a bank's capital by its risk-weighted assets. If this ratio is higher then, banks have sufficient financial cushion to absorb losses before becoming insolvent. The hypothesis related to first research objective is as follows:-

**Null Hypothesis (Ho):** There is no significant difference in Capital Adequacy Ratio among PSBs Pre and Post Covid-19 Crisis.

**Alternate Hypothesis (Ha):** There is significant difference in Capital Adequacy Ratio among PSBs Pre and Post Covid-19 Crisis

The data related to Capital Adequacy Ratio of twelve Public Sector Banks (PSBs) of India has been collected from DBIE, RBI. The Capital Adequacy Ratio (CAR) of year 2019 (pre Covid-19 crisis) and 2022 (pre Covid-19 crisis) of 12 PSBs are given in table 1.

**Table 1:** Capital Adequacy Ratio (CAR)

Public Sector Banks	CAR 2019	CAR 2022
Bank of Baroda	13.42	15.68
Bank of India	14.19	16.51
Bank of Maharashtra	11.86	16.48
Canara Bank	11.90	14.90
Central Bank of India	9.61	13.84
Indian Bank	13.21	16.53
Indian Overseas Bank	10.21	13.83
Punjab and Sind Bank	10.93	18.54
Punjab National Bank	9.73	14.50
State Bank of India	12.72	13.83
UCO Bank	10.70	13.74
Union Bank Of India	11.78	14.52

*Source: DBIE, RBI*

With the help of MS Excel Add-ins, Real Statistics, Shapiro-Wilk Test for normality has been applied to data tabulated in Table 1. The output generated by MS Excel is given in Table1a.

**Table 1a:** Shapiro-Wilk Test

	CAR 2019	CAR 2022
W-stat	0.956173	0.872137
p-value	0.728121	0.069563
Alpha	0.05	0.05
Normal	Yes	Yes

*Source: Output generated by MS Excel*

The significance value of the Shapiro-Wilk Test is 0.728121 in 2019 and 0.069563 in 2022 which is greater than 5% level of significance, and then it is assumed that data in Table 1 i.e. Capital Adequacy Ratio (CAR) is normally distributed. In this case 'Paired t-test' is applied to data in Table1 to analyse pre and post Covid-19 crisis. The Output generated by MS Excel Add-ins, Real Statistics is given in Table 1b.

**Table 1b:** t-test: Two Paired Samples (Output generated by MS Excel)

Summary			Alpha = 0.05		
Groups	Count	Mean	Std. Dev	Std. Error	t
CAR 2022	12	15.24	1.515555		
CAR 2019	12	11.69	1.495783		
Difference	12	3.55	1.651126	0.476639	7.455151
t-test					
	p-value	t-critical	Lower	Upper	Significance
One Tail	6.35E-06	1.795885			yes
Two Tail	1.27E-05 (Less than 5%)	2.200985	2.504341	4.602492	yes

The significance value is less than 0.05, and then null hypothesis is rejected, meaning that there is a significant difference in Capital Adequacy Ratio before and after the Covid-19 crisis. The mean value of Capital Adequacy Ratio has been increased from 11.69 in 2019 to 15.24 in 2022. This shows that Capital Adequacy of PSBs improved post Covid-19 crisis.

## 2. Second Objective

Asset Quality of bank is measured by Net NPA/Net Advances Ratio. This indicates the level of non-performing assets in net advances. Non-Performing Asset (NPA) refers to 'a loan or advance for which the principal or interest payment remained overdue for a period of 90 days'. Reducing NPAs is critical for the financial stability of the bank. Net NPA is the difference between Gross NPA and Provisions. Lower Net NPA/Net Advances Ratio means better asset quality. The hypothesis related to second research objective is as follows:-

**Null Hypothesis (Ho):** There is no significant difference in Net NPA to Net Advances Ratio among PSBs Pre and Post Covid-19 Crisis.

**Alternate Hypothesis (Ha):** There is significant difference in Net NPA to Net Advances Ratio among PSBs Pre and Post Covid-19 Crisis.

The data related to Net NPA to Net Advances Ratio of 12 Public Sector Banks (PSBs) of India for the year 2019 (pre

Covid-19 crisis) and 2022 (pre Covid-19 crisis) are given in Table 2.

**Table 2:** Ratio of Net NPA to Net Advances

Public Sector Banks	2019	2022
Bank of Baroda	3.33	1.72
Bank of India	5.61	2.34
Bank of Maharashtra	5.52	0.97
Canara Bank	5.37	2.65
Central Bank of India	7.73	3.97
Indian Bank	3.75	2.27
Indian Overseas Bank	10.81	2.65
Punjab and Sind Bank	7.22	2.74
Punjab National Bank	6.56	4.80
State Bank Of India	3.01	1.02
UCO Bank	9.72	2.70
Union Bank of India	6.85	3.68

*Source: DBIE, RBI*

With the help of MS Excel Add-ins, Real Statistics, Shapiro-Wilk Test for normality has been applied to data tabulated in Table 2. The output generated by MS Excel is given in Table 2a.

**Table 2a:** The output generated by MS Excel

	2019	2022
	0.9534	0.948262
p-value	0.687086	0.611732
Alpha	0.05	0.05
Normal	Yes	Yes

*Source: Output generated by MS Excel*

The significance value of the Shapiro-Wilk Test is 0.687086 in 2019 and 0.611732 in 2022 which is greater than 5% level of significance, and then it is assumed that data in Table 2 i.e. Net NPA to Net Advances Ratio is normally distributed. In this case 'Paired t-test' is applied to data in table 2 to analyse pre and post situation. The Output generated by MS Excel Add-ins, Real Statistics is given in Table 2b.

**Table 2b:** t-test: Two Paired Samples (Output generated by MS Excel)

Summary			Alpha= 0.05		
Groups	Count	Mean	Std. Dev	Std. Error	t
2022	12	2.63	1.12871978		
2019	12	6.29	2.40063628		
Difference	12	-3.66	2.12439278	0.613259373	-5.974905285
t-test					
	p-value	t-critical	Lower	Upper	Significance
One Tail	4.62704E-05	1.795884819			yes
Two Tail	9.25408E-05 (Less than 5%)	2.20098516	-5.0139414	-2.314391888	yes

The significance value is less than 0.05, and then null hypothesis is rejected, meaning that there is a significant difference in Net NPA to Net Advances Ratio before and after the Covid-19 crisis. The mean value of Net NPA to Net Advances Ratio decreased to 2.63 in 2022 from 6.29 in 2019. This shows that Asset Quality of PSBs improved post Covid-19 crisis.

## Limitations and Further Research

The current study is based on secondary data only which is collected for financial year 2018-2019 and 2021-2022 to evaluate Capital Adequacy and Asset Quality of Public Sector Banks in India. The further research can be done for Private Sector Banks, Foreign Banks etc. in context of Indian banking

sector using five sub parameters of CAMEL Model for pre and post analysis.

### Conclusion

There is significant improvement in Capital Adequacy i.e. increase in Capital Adequacy Ratio among PSBs Post Covid-19 Crisis at 5% significance level. In addition to it, there is also significant improvement in Asset Quality i.e. decrease in Net NPA to Net Advances Ratio among PSBs Post Covid-19 Crisis at 5% significance level. Therefore, the financial performance of PSBs in India has improved post Covid-19 Crisis. This shows the resilience and soundness of financial health of Indian PSBs.

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