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An Impact of Capital Adequacy Ratio on the Profitability of Private Sector Banks in India – A Study

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ABSTRACT

Profitability being one of the cardinal principles of bank lending acts as a game changer for the survival and success of private sector banks in India. In order to stay profitable, banks have to capitalise on every penny advanced to yield the expected returns. However, considering the constraints laid down by the Reserve Bank of India, banks have to maintain a minimum capital adequacy ratio, as per the current BASEL III regulations active in India. With the mergers of public sector banks, the challenge has got just tougher for the private sector banks in India. Expansion and Diversification are the key strategies adopted by the key players from the private banking sector, however, with the minimum capital adequacy ratio observed by them, it is necessary to understand its actual impact on the bank's profitability. This research paper aims to throw light upon the linkage that capital adequacy has with the bank's profitability. It attempts to establish a relation between the Capital Adequacy Ratio with the Net profits of the bank. For the purpose of this study, data from the past 5 years of the leading private sector banks has been collected, namely, HDFC Bank, ICICI Bank, Kotak Mahindra Bank, AXIS Bank and YES Bank. The collected data has been analysed using Pearson's Correlation to establish a relation between the CAR Ratio & the bank's profitability. Hypothesis testing has been further done to study the quantum of proportionate change in the profitability with a change in the CAR Ratio for private sector banks using applicable research tools. The said research tools are applied to achieve the desired results while maintaining the required quantum of accuracy. It also aims to understand the proportionate impact of changes in CAR to the bank's profitability, which can act as a suggested measure for banks to develop a reliable framework for efficient capital management and increase overall efficiency. The results derived from the data collected and analyzed aim to provide scope for further study on the subject matter.

Keywords-- Capital Adequacy, Profitability, CAR Ratio, Net Profits, Private Sector Banks

I. INTRODUCTION

The banking has played a significant role in the development of the Indian economy and continues to represent as one of the strongest pillars of our country. By fulfilling its primary functions of accepting deposits and granting loans, banks play a vital role by providing credit to the needy, thereby acting as a vital link between the borrowers and the lenders, further fulfilling the function of transfer of credit. The banking system plays the role of transferring funds from the saving unites to the investing units (Saona, 2011), thereby generating reasonable income in the process. Considering the changes in lending pattern nature of businesses, volume of credit requirements and regulatory compliances developed over time, it has been a greater challenge for private sector banks to Keep up with the Jonas. As the country relies strongly on public sector banks, secured lendings and deposits have already proven to be a major threat for the survival and flourishing of private sector banks in India. Since the introduction of Basel, I norms post the NEP policy of 1991 and further strengthening the grip on revised capital framework through implementation of Basel II norms in 2004, it has been all but challenging for the private sector banks to compete on a fair accord with the public sector giants. With the implementation of Basel III and the arrival of Basel IV norms in India proposed from 2023 onwards, it appears crucial for the private sector banks to meet compliance parameters on the reserves, along with handling pressure from stakeholders on profit maximization while continuing to aim at higher returns by marginal risk increase. The essence of establishing compliance with capital ratios, liquidity rules, enforcement of larger exposure rules and the right of inspection is to deter excessive risk taking (Saona, 2011, Valdez, 2001). RBI has been tightening its grip around all commercial banks with regards to the capital to risk weighted assets lendings are concerned, with an effort to eliminate risky lendings as much as possible. To make the private players avoid getting beaten to a hasty retreat, an effort is made through this research paper to understand how the private sector banks have currently set their capital adequacy ratios to achieve the targeted profits annually. This paper also aims to understand if these capital decisions are associated with their risk-taking capacity as well as changes in regulatory capital requirements. A verification,

much necessary, of the association between the bank's capital regulations and the bank management's capital advancing decisions might provide some insights about the effectiveness of the bank's internal regulatory framework. The purpose for this study becomes essential as it affects banking system operations in general, as this nexus between bank capital / earnings / regulations are seldom researched although it is often stressed as a key policy issue in regulating banks in developing countries, and India is no exception to it. Several internal factors affecting a bank's profitability include diversion of funds for expansion, diversification, taking up new projects, promoting associate concerns, cost overruns during the project implementation stage, business (product, marketing, etc.) failure, inefficient management, strained labor relations, inappropriate technical problems, product obsolescence, etc., while external factors include recession, non-payment in other countries, input shortage, price escalation, accidents and natural calamities (Muniappan, 2002). Hence, the main objective of this paper is to investigate whether the increasing capital adequacy ratios in the last 3 years through the previously implemented Basel norms produce the desired increase in the bank's profitability, thereby reducing risky lendings and NPA's. An empirical verification of the association between capital regulations and bank management's capital decisions might provide some clue about the effectiveness of a regulatory framework of India's banking system operation. With the other Asian nations successfully adopting Basel norms prior to India, (Malaysia adopting Basel I in 1989 with 8% CAR Ratio and further increasing it to 10% in 1999), the risk coverage was widened for the banks, further enhancing profitability (Rubi Ahmed & M. Ariff, 2009). This paper aims to identify the impact of the increased capital adequacy ratio and its contribution towards the profitability of private sector banks in India. HDFC Bank, ICICI Bank, Kotak Mahindra Bank, AXIS Bank and YES Bank have been the top 5 players in the private sector banks in the country, and hence have been chosen for the purpose of the study. Over the last decade, majority of these banks have enjoyed high earnings in India. This could also majorly be due to the excellent economic outlooks; however, a study needs to be performed as to how much have the increased capital adequacy ratios contributed to the bank's vault. Our findings may also help to establish some benchmarks for future studies on bank capital adequacy ratios and to evaluate the usefulness of higher regulatory capital standards as imposed by regulators to promote sound lendings by private sector banks in India.

II. LITERATURE REVIEW

Profitability is the prime motive of private sector banks in India and the only source for their survival, growth, expansion and diversification. Several attempts were made previously to empirically evaluate the effect of capital adequacy requirement on bank profitability include but are not limited to the following: Staikouras and Wood (2004) found that bank profitability is positively affected by the variables of concentration and market share. Sayilgan and Yildirim (2009) through their study had found that capital adequacy positively impacts on profitability on banks. Financial performance is an assessment of the financial conditions or profitability of a bank in order to gain insight into the health of the bank using an index that relates two pieces of financial data, called financial ratios (Torbira and Zaagha, 2016). Some previous studies have attempted to show that capital adequacy measures indeed influence the financial performance variable of businesses in general and banks in particular. Onoalapo and Olufemi (2012) study reveal that, capital adequacy ratio did not reflect the profitability of banks represented by Return on Assets, Return on Capital Employed and Percentage of Profit before Tax. Similarly, Santos (2000) asserts that bank regulation through higher capital requirements negatively affect bank development and credit expansion by increasing fixed and operating costs. However, Ezike and Oke (2013) study shows that capital adequacy proxied by Shareholders Fund exert positive influence on banks' profit, total assets, total deposits, return on assets, earnings per share, loans and advances and credit risk, although not all were statistically significant. Asikhia & Sokefun (2013), examined the effect of capital adequacy on profitability of deposit- taking banks in Nigeria. The study was performed to assess the effect of Capital Adequacy of both foreign and domestic banks in Nigeria and their profitability. The results derived from the study revealed that there was a strong positive relationship between the capital adequacy ratio and the profitability of banks in Nigeria. However, given the situation, other internal and external factors were also responsible for the results to be derived as expected. Considering the Indian economy, the volume, leverage and quantum of banking transactions vary and factor-wise impact may also make a difference. Hence, it is difficult to state that a similar situation exists with the private sector banks in our country. Agbeja, O., Adelakun, O.J., & Olufemi, F. I. (2015), examined whether or not capital adequacy ratio affects bank profitability, it also analyzes the effect of loans and advances on bank profitability as well as the impact of capital adequacy ratio on banks' exposure to credit risk. This study also had similar results that higher the capital adequacy ratio, higher the profitability of the banks. As most of the countries mentioned in the literature review have varied results and findings, it is necessary to consider that the results derived

from this study will be based upon the time period selected, considering other internal and external variables observing normal mode of deviation (not too fluctuating or changing).

III. RESEARCH METHODOLOGY

3.1 Problem Statement

Over the years researchers have studied the problems related to how profits play a crucial role for the survival of banks. It has been observed that when the bank's monitor their credit control techniques strictly, the profitability increases and losses are reduced. Heavy losses affect the bank's lending capacity, further decreasing the profitability, which further stresses several other factors. The bank's health is determined by its profitability which in turn is affected by the efficiency shown by a bank in managing its lendings. There is abundant literature available on the profitability concern for private sector banks and several studies have denoted the reasons for the same. However, there is an acute lacuna when it comes to the contribution of capital adequacy towards the profitability of private sector banks in India, in specific. This study aims to cover the phenomenon not studied earlier for the selected banks for the last 3 years and identify the relationship between the two variables, namely Capital Adequacy (Variable 1) and Profitability (Variable 2).

3.2 Objectives of the Study

The main objectives of the study are:

1. To study the capital adequacy trend along with concurrent profitability for selected private sector banks in India.
2. To identify the relation of the bank's capital adequacy ratio with the bank's profits
3. To analyze the impact of changing capital adequacy ratio on the bank's profitability
4. To assess the contribution of capital adequacy towards the bank's profitability

3.3 Period of the Study

This study intends to examine the impact of capital adequacy ratios on the profitability of the selected private sector banks in India. The 5 banks are selected to measure the profitability over the last 3 financial years from 2017-18 to 2019-20.

3.4 Scope of the Study

This study is designed to understand the impact of change of a bank's capital adequacy on its overall profitability. While the various factors contributing to the bank's profitability have been studied earlier, the impact of capital adequacy ratio on the profitability of private sector banks is poorly understood. The scope of the study is limited to the 5 private sector banks selected for the time period specified above.

3.5 Data Source

This research is purely analytical research based on Secondary data collected from the list of sources which are mentioned in Annexure I. The data for the purpose has been collected from the annual reports of the concerned banks. For the purpose of verifying the quantum of the data collected, additional sources were referred to for support, mentioned in Annexure II.

3.6 Data Collection

The data relating to Profitability and Capital Adequacy for this research paper was collected from various sources, some of which are government databases and are reliable for our study like www.rbi.org.in, www.moneycontrol.com, www.bseindia.com, the official websites of the banks taken for this study and from other additional sources.

3.7 Research Design

This study employs the quantitative research design. This is because the study involves events that have already taken place. Annual aggregate bank data on return on assets, total qualifying capital and net profits, capital adequacy ratios, total advances, deposits and return on assts has been generated from secondary sources (Annual Reports of the banks) for the period of 2017 to 2020). The research design selected for the purpose of this study is **Longitudinal Correlation Design**. The two variables to be analyzed for the purpose of this study include Capital Adequacy and Net Profits. To identify the relation between the two variables, **Pearson's Correlation** has been used. The study intends to observe the collected data without trying to influence any of the variables involved. The design is selected to establish a real sequence of the events and to derive the results while maintaining the quantum of accuracy. The following charts and diagrams signify the Year Wise, Bank Wise and Overall Bank Statistics with regards to Capital Adequacy Ratios, Gross Profits, Net Profits and Net Profits percentage to earnings. The effort taken in the process is to identify the behavior of the year on year changing CAR Ratio towards the Net profits of the selected banks. All information needed for the purpose of the study was collected from reliable government sources and any excess information which is irrelevant for the purpose of this study hitherto has been discarded. Hypothesis testing has been performed to test the derived results out of this study. The results were tested under One Null Hypothesis (H0) and One Alternate Hypothesis (H1) as follows:

H0: There is no relation between Capital Adequacy and Net Profits of the banks.
H1: There is a relation between Capital Adequacy and Net Profits of the banks.

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Sr. No	Bank Name	Year	CAR Ratio	Tier 1 Capital Ratio	Deposits	Gross Advances (₹ in Cr)	Net profit (₹ in Cr)	Increase in Profitability	Return on Assets (ROA)
1	HDFC BANK	2017-18	14.8	13.25	788771	658333	17487	-	1.93
		2018-19	17.1	15.78	923141	819401	21078	20.50%	1.9
		2019-20	18.5	17.23	1147502	993703	26257.3	24.60%	2.01
2	ICICI BANK	2017-18	18.42	14.35	560975	512395	6777	-	0.87
		2018-19	16.89	15.09	652920	586647	3363	-50.37627269	0.39
		2019-20	16.11	14.72	770969	645290	7931	135.8311032	0.81
3	KOTAK BANK	2017-18	18.2	17.6	1912357	205997	6201	-	1.73
		2018-19	17.5	16.9	2248242	243462	7204	16.17481051	1.69
		2019-20	17.9	17.3	2406002	249879	8593	19.28095502	1.87
4	YES BANK	2017-18	18.4	13.2	200738	203534	4225	0	1.6
		2018-19	16.5	11.3	227610	241500	1720	-59.28994083	0.5
		2019-20	8.5	6.5	105363	171443	-16418	-1054.534884	-5.1
5	AXIS BANK	2017-18	16.57	13.04	640105	439650	276	-	0.04
		2018-19	15.84	12.54	548471	494798	4677	1594.565217	0.63
		2019-20	17.53	14.49	640105	571424	1627	-65.21274321	0.2

Table 1.1: Overall Bank Data for 3 Financial Years

The above table depicts the overall bank data for the last three financial years from 2017 eighteen till 2019 20 for the five selected banks. As per the annual reports HDFC Bank has reported an increasing net profit year on year, which is in line with its increasing capital adequacy ratio for all the three years. On the other hand, ICICI bank has seen a dip in net profits for be financially or 2018 nineteen which appears to be consequent to its reduced capital adequacy ratio. Kotak bank also has seen a dip in the capital adequacy ratio for the financial year 2018 nineteen followed by a marginal increase in the capital adequacy ratio thereby increasing its profitability for financial year 2019 twenty as compared to the previous financial year. in the case of YES bank considering the scam that was revealed two years ago, is bank had seen highest dip in the capital adequacy ratio as compared to all the other banks considered for the purpose of the study. While computing YES bank's profitability, it happens to be the only bank with a net loss for financial year 2019 20 with a consequent decrease in its capital adequacy ratio and tier one capital ratio, and hence a challenge in the analysis. The trend with Axis Bank seems to be unstable as far as net profits of the bank are concerned, however, the bank has shown a steady increase in the operating profits year on year as per its financial records it's an annual report as follows:

Axis Bank Operating Profit (₹. in Cr)

FY 2017-18 – 15594 FY 2018-19 – 19005 FY 2019-20 – 23438

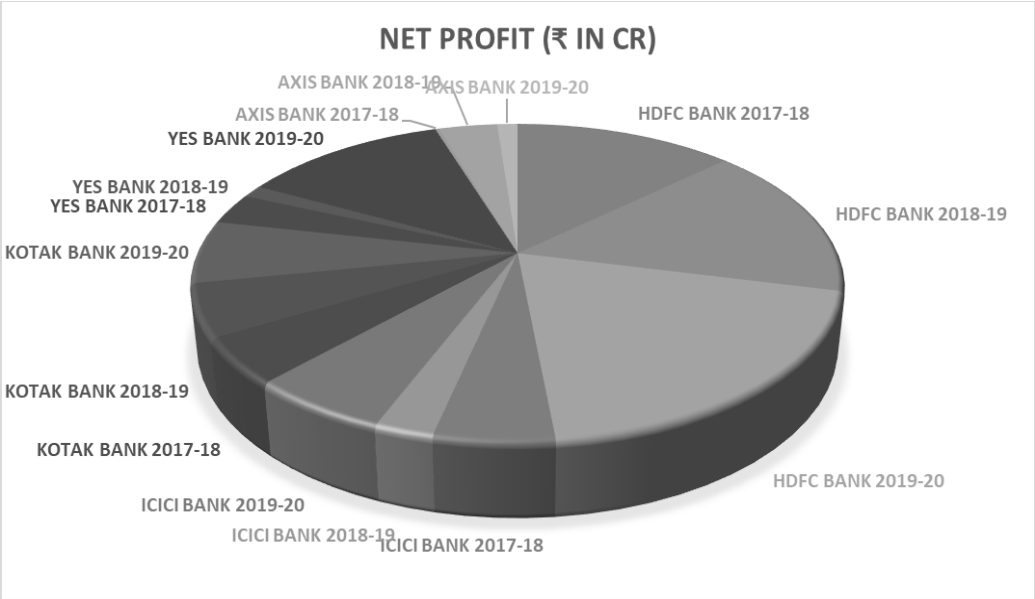

Figure 1.1: Net Profits for the banks for the 3 Financial Years

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Figure 1.1 depicts the year-on-year net profits for all the five banks selected. As per market capitalization, HDFC Bank holds the largest states in the private banking sector in our country. Answering the huge and varied diversification the bank has recorded are your own your increase in the net profits but the subsequent increase in the capital adequacy ratio as well. the second player in the league being ICICI bank stands to be the second strongest. Kotak bank has also emerged as a new player in the private banking sector in India has still managed to become an integral part of the top three private sector banks in our country with a constantly increasing net profit recorded here on your basis and stop. The focus of Axis Bank all domain an increasing that operating profit trend year-on-year basis has been establishing a diversified portfolio further giving relevance to write off bad debts which in turn resulted and overall end the net profits for the financial year 2019-20. The YES BANK scam DID impact the financial statements brutally and further reduction of the CAR ratio has led to not only heavy losses but also a negative return on assets for the bank.

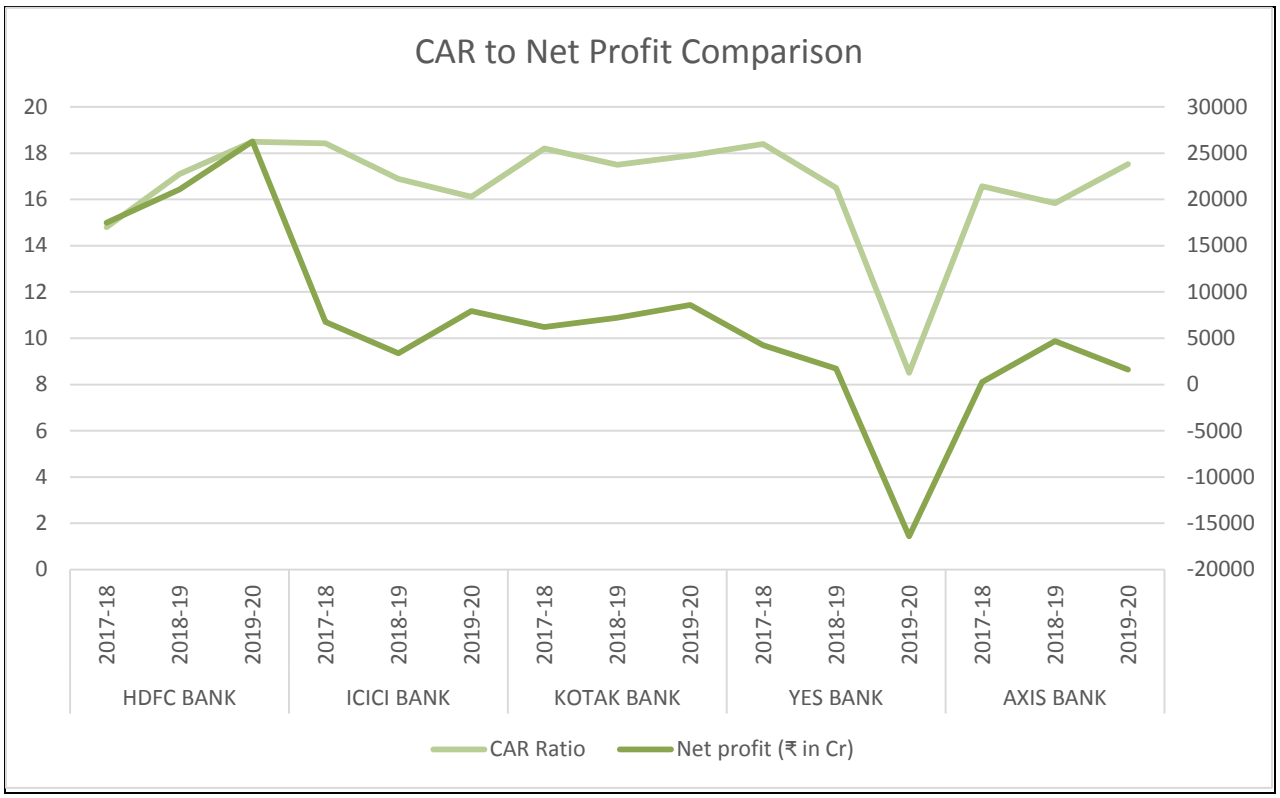

Figure 1.2: Capital Adequacy Ratio to Net Profit Comparison for 3 Financial years

Figure 1.2 is a clear indication that the net profits of the banks have a similar alignment to the capital adequacy ratios of the selected banks. The bank's net profits align considerably parallel to the bank's overall profitability. To understand if the relation between the capital adequacy ratio and net profit of each bank is aligned in a similar pattern, a year wise bifurcation has been done to understand if both the variables align in a similar pattern. Further data analysis on the collected data have been performed to understand the statistical results on a year wise basis.

Year-Wise Statistics						
	2017-18		2018-19		2019-20	
Bank Name	CAR Ratio	Net Profits	CAR Ratio	Net Profits	CAR Ratio	Net Profits
HDFC Bank	14.8	17487	17.1	21078	18.5	26257.3
ICICI Bank	18.42	6777	16.89	3363	16.11	7931
Kotak Bank	18.2	6201	17.5	7204	17.9	8593
YES Bank	18.4	4225	16.5	1720	8.5	-16418
Axis Bank	16.57	276	15.84	4677	17.53	1627
Mean	17.278	6993.2	16.766	7608.4	15.708	5598.06
Std Deviation	1.585472		0.631253		4.124218	
Co-Variance	-5066.22		1591.276		43327.97	
Correlation	-0.6246		0.404374		0.855879	

Table 1.2: Year-wise comparison of Capital Adequacy to Profitability

The above table clearly depicts the statistics for each year consolidated for all banks collectively. The Standard Deviation achieved year-wise for the selected private sector banks collectively is derived at 1.58 for 2017-18, 0.63 for 2018-19 and 4.12 for 2019-20. However, the major component that describes the relationship between the two variables selected and also is the major indicator for the purpose of this study is the correlation between the capital adequacy ratio and the net profits of the private sector banks. looking at the correlation trend year wise, we have a changing relationship between the CAR Ratio and the bank's profitability. On the basis of the literature review, it is true that CAR ratio may not be the only factor to contribute towards the bank's profitability. Considering a year-wise analysis, the Correlation is –0.62 for 2017-18, 0.40 for 2018-19 and 0.85 for 2019-20. The negative correlation derived for 2017-18 is due to the sudden changes faced by private banks in 2017, in line with the implementation of BASEL III norms. However, to understand and establish a relation between the CAR ratio and its impact on the overall profitability of the selected banks, the overall correlation for all 3 years was needed to be derived on the basis of overall analysis of the data collected and presented in Table 1.1. The year-wise data reflects inconsistency in the correlation between the 2 variables studied for the purpose of this research paper. However, as per the analysis, the correlation seems to be changing on a year-on-year basis, hence to identify the sensitivity between the variables, a further analysis of bank-wise analysis has been conducted.

CAR Ratio		*Net profit (₹ in Cr)*	*Increase in Profitability*			*Return on Assets (ROA)*	
Mean	16.584	Mean	6733.22	Mean	42.45928304	Mean	0.738
Standard Error	0.640298	Standard Error	2543.679928	Standard Error	137.7703848	Standard Error	0.454474265
Median	17.1	Median	6201	Median	0	Median	0.87
Std Deviation	2.479864	Standard Deviation	9851.629998	Standard Deviation	533.5824059	Standard Deviation	1.760171258
Sample Variance	6.149726	Sample Variance	97054613.63	Sample Variance	284710.1839	Sample Variance	3.098202857
Kurtosis	8.807596	Kurtosis	1.965196159	Kurtosis	8.294156157	Kurtosis	9.652492913
Skewness	-2.739974	Skewness	-0.116697479	Skewness	1.728671632	Skewness	-2.875600043

Table 1.3: Descriptive Statistics for Table 1.1

A per Table 1.3, considering the risk to return ratio, the standard deviation for CAR Ratio is derived at **2.47,** whereas that for ROA is derived at **1.760.** A negative skew denotes that the mean of the CAR and profitability for the selected banks is less than the mode. It signifies that out of the total banks selected, most of the banks have shown a similar reaction to the CAR ratio for the given time period. Considering the tail of distribution through Kurtosis, it denotes as a Platykurtic as the CAR and profitability seem to have a spread-out distribution, resulting in flattening of the trend line, as earlier displayed in Figure 1.2. It denotes that the two variables have a relatively spread-out sensitivity and are not hyper-reactive to each other. On analyzing the overall distribution, we can reach a point that helps us to analyze the overall results from this study for the considered time period.

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		2018-19	16.89	15.09	652920	586647	3363	-50.38	0.39
		2019-20	16.11	14.72	770969	645290	7931	135.83	0.81
3	KOTAK BANK	2017-18	18.2	17.6	1912357	205997	6201	0.00	1.73
		2018-19	17.5	16.9	2248242	243462	7204	16.17	1.69
		2019-20	17.9	17.3	2406002	249879	8593	19.28	1.87
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		2018-19	15.84	12.54	548471	494798	4677	1594.57	0.63
		2019-20	17.53	14.49	640105	571424	1627	-65.21	0.2
		Mean	16.584	14.21933333	918218.0667	469163.7333	6733.22	38.76970441	0.738
		Std. Deviation	**2.479864**	2.866113513	717320.1084	249511.0961	9851.629998	511.4789776	1.760171258
		Co-Variance	486.6573						
		Correlation	**0.411084**						

Table 1.4: Overall Summary Bank-wise and Year-wise

Overall Standard Deviation was derived at **2.47.** After analyzing the collected data and applying Pearson's Correlation to it, the overall correlation between the two variables was derived at **0.411.** A positive correlation denotes that there is a positive relationship between the two variables, which means that every increase in variable 1 will lead to a subsequent increase in variable 2. As the correlation derived does not equate to ZERO, the null hypothesis H0 does not stand to be valid, and hence is VOID. To further elaborate on H1, as the correlation derived is a **POSITIVE 0.411**, it is clear that there is a significant positive relation between the CAR ratio and the net profits of the bank for the time period selected. Considering the changing correlation each year, a further analysis of variances (ANOVA) is performed to understand the degree of sensitivity of subsequent change in Variable 2 with each change in Variable 1. The results derived were as follows:

ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Rows	679588274.1	14	48542019.58	1.000606	0.49955553	2.483725741
Columns	338348993.7	1	338348993.7	**6.974456**	**0.019369423**	4.600109937
Error	679176402.8	14	48512600.2			
Total	1697113671	29				

Table 1.5: ANOVA TEST on Variable 1 and 2

The results derived from ANOVA testing is F-value **6.97** and **P-Value 0.01.** The huge F-Value also supports the earlier analysis of hypothesis testing done, clearly ruling out H0 as void. The P-value derived from the data analysis is 0.01, further strongly proving alternate hypothesis H1 to be true from the above study.

IV. RESULTS AND FINDINGS

On the basis of application of the research tools and methods, the findings from the testings performed are as follows:

Application of Pearson's Correlation on a year-wise basis derived contradictory results, with 2017-18 having a negative correlation between Variable 1 and 2, whereas 2018-19 and 2019-20 having a positive correlation between Variable 1 and 2. The overall results derived reflect a positive correlation between the variables, further proving that other external factors being constant, a bank's higher capital adequacy ratio will have an increase in its overall profitability. To further elaborate the studied data and results, the year-wise correlation does not appear to be stable or moving at a constant pace along the axis. This is an important indication that there could be other factors responsible for the bank's overall profitability, which appears as a limitation to this study. Also, from the analysis it is clear that the degree of change in net profits is not equal to the degree of change in the CAR ratio for the banks. Hence, although the direction of change is the same, the velocity differs. As per our analysis, it is understood that capital adequacy ratio is one of the important and contributing factors towards the profitability of private sector banks in India. However, we are depicting the possibility for it i.e. CAR not be the only contributing factor to a bank's profitability.

V. CONCLUSION

This study evaluated the changing trend of capital adequacy ratio and its subsequent impact on the profitability of private sector banks in India. Though the years studied, it has been identified that increase in capital adequacy has resulted in an increase in the overall profitability and the return on assets for private sector banks in India. As the private sector banks become profitable, it reduces the propensity of losses to the banking sector in India, and apparently aims towards achieving a stable banking sector and system in the country. The study also derived an observation that capital adequacy is not the only factor to yield high profitability for the banks, and hence, bank regulators should not only focus on maintaining a high capital adequacy, but also focus on strategic monitoring and regular evaluations in order to maintain the bank's financial strength and stability, further increasing the bank's overall performance. Private sector banks have been the major contributors in India, and their performance will have a parallel impact on the economy. With the predicted implementation of BASEL IV norms in India, it will become all but difficult for the private sector banks to design the pattern of lendings and stand strong against the ever-merging public sector banks in our country. As a measure of recommendation, private sector banks should focus on effective internal control to absorb any external shocks that it faces. As those remains an area of concern for a few loss-making private sector banks, stabilizing the CAR Ratio while focussing on risk averse lending's with high earning potential appears as the only ray of hope over the horizon in years to come.

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Annexure 1: Data Sources

Sr. No	Particulars
1	HDFC Bank Annual Report 2017-18, 2018-19, 2019-20
2	AXIS Bank Annual Report 2017-18, 2018-19, 2019-20
3	YES BANK Annual Report 2017-18, 2018-19, 2019-20
4	KOTAK Bank Annual Report 2017-18, 2018-19, 2019-20
5	ICICI Bank Annual Report 2017-18, 2018-19, 2019-20
6	www.rbi.org.in
7	www.moneycontrol.com
8	www.economictimes.com
9	www.business-standard.com