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FINANCIAL PERFORMANCE OF SELECTED BANKS USING CAMELS MODEL**Dr. S. RAJARAJESWARI****HEAD****DEPARTMENT OF BUSINESS ADMINISTRATION****SRI MEENAKSHI GOVERNMENT ARTS COLLEGE FOR WOMEN (A)****MADURAI****K. SRINIVASAN****RESEARCH SCHOLAR****MADURAI KAMARAJ UNIVERSITY****MADURAI****ABSTRACT**

Banking sector is one of the fastest growing sectors in India. Today's banking sector becoming more complex. Evaluating Indian banking sector is not an easy task. There are so many factors, which need to be taken care while differentiating good banks from bad ones. This paper examines the execution of certain private and public sector banks. Four banks from private sector viz. ICICI, HDFC, Axis and YES and four banks from public sector viz. SBI, BOI, Indian bank and Canara bank were chosen for this analysis. The data were collected for a period from 2007-2008 to 2016-2017 (10 years). To evaluate the performance of banking sector we have chosen the CAMELS model (Capital adequacy, Asset quality, Management efficiency, Earning quality, and Liquidity and sensitivity). Based on CAMELS rating, HDFC & AXIS Bank are considered as performing above average; whereas BOI & Indian Bank is seen as below average. Thus, it could be concluded that in all the parameters of the CAMELS Model, the performance of the private sector is found to be better than the public sector.

KEYWORDS

private and public sector banks, performance evaluation.

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INTRODUCTION

In any economy banking sector plays a vital role for overall development of agriculture, small business and different industries. In the pre-nationalisation period bank had been managed by few people who were serving their vested interest for their personal gains. Indian banking is the lifeline of the nation and its people. Banking has helped in developing the vital sectors of the economy and usher in a new dawn of progress on the Indian horizon. The sector has translated the hopes and aspirations of millions of people into reality. But to do so, it has had to control miles and miles of difficult terrain, suffer the indignities of foreign rule and the pangs of partition. Today, Indian banks can confidently compete with modern banks of the world. For the past three decades India's banking system has several outstanding achievements to its credit. The banks are the main participants of the financial system in India.

The banking sector offers several facilities and opportunities to their customers. The bank also offers investment and insurance products. As a variety of models for cooperation and integration among financial industries have emerged, some of the traditional distinctions between banks, insurance companies, and security firms have diminished. Before the establishment of banks, the financial activities were handled by money lenders and individuals. At that time the interest rates were very high. Again, there were no security for public savings and no uniformity regarding loans. So as to overcome such problems the organized banking sector was established, which was fully regulated by the government.

REVIEW OF LITERATURE

Prasad and Ravinder (2012) used CAMEL model for 20 nationalized banks based on the analysis Andhra Bank, Bank of Baroda & Sindh bank acquired the highest rank and central bank of India was ranked as last bank.

Mithraj and Ramya (2014) used CAMEL model analysed the performance of five private banks HDFC, Axis, ICICI, Kotak Mahindra and ING Vysya. Twenty variables related to the study was used and concluded that on comparing the performance of all fine private banks, all banks all succeeded in maintaining CAR at highest level and out of twenty factors Kodak Mahindra is the best in six ratios followed by HDFC (5 ratios).

Swati Sharma and Ajay Kumar Patel and (2019) have analyzed the performance of SBI group using CAMEL model for the period of 5 years and identified on the basis of averages of four ratios of capital adequacy SBBJ and SBH positioned first and second.

Panboli, Kiran Birda, (2019) have analysed the performance of private and public sector banks in India for five years. It is concluded the private sectors banks are performing better than the public sector banks.

Geetha Sharma, Amendeep Kaur Arora (2016) using CAMEL model analysed, 8 public and private sector banks for the year (2014-15) and concluded private performance have ranked better than public sector banks. IDBI and Central Bank of India took last position in their performance.

STATEMENT OF THE PROBLEM

Financial system for bankers has undergone various changes due to change in policy, norms, reputation of the Reserve Banks. Many researchers have carried out in this area of analyse the performance of Bankers on Profitability determinant and financial indicators. This study has been carried out to the analyse the financial performance based on the CAMELS model based on four selected public & private Bankers.

OBJECTIVES

1. To examine the financial performance of selective private and public sector banks by the CAMELS model
2. To rank them according to the parameter under the CAMELS model

RESEARCH METHODOLOGY**SCOPE OF THE STUDY**

The present study covers only four public sector banks and four private sector banks which is operates during the period of 2007 to 2017. This study has used financial ratios to investigate the Banking performance namely – capital adequacy ratio, asset quantity ratio, management efficiency ratio, earning quality ratios and liquidity ratios.

SOURCE

The data source was secondary. The performance of the bankers was taken from bank’s website, annual report, various sources and research paper on financial performance.

SAMPLING

The researcher has selected four public sector four private sector banks and the financial performance examiner uses CAMELS model. The prime four bankers each from public sector and private sector were taken for analysis of the study period of the studies. The work period is from 2007-2017

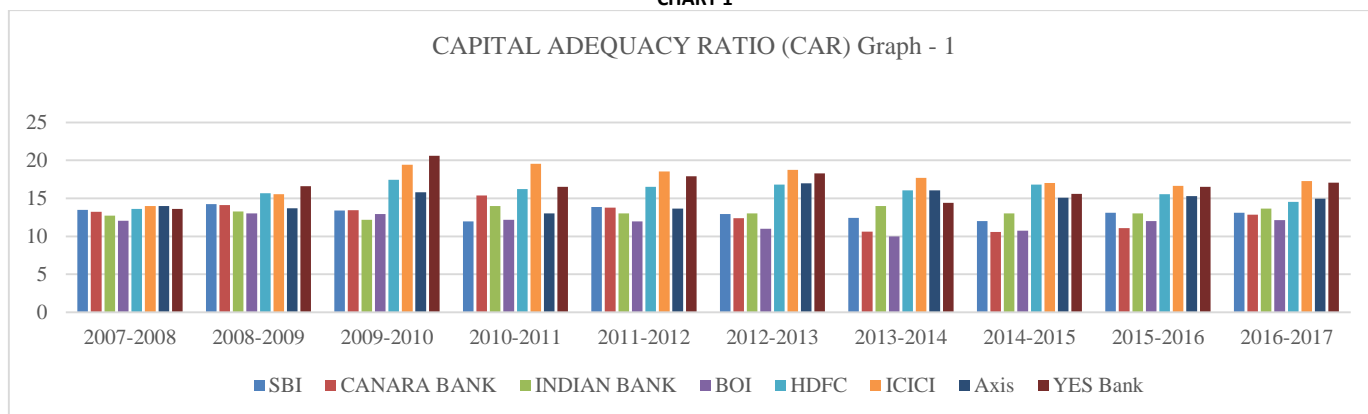
ANALYSIS AND INTERPRETATION

CAPITAL ADEQUACY RATIO (CAR)

TABLE 1

Bank / Year	SBI	CANARA BANK	INDIAN BANK	BOI	HDFC BANK	ICICI BANK	AXIS BANK	YES BANK
2007-2008	13.47	13.25	12.74	12.04	13.60	13.97	13.99	13.6
Rank	5	6	7	8	3	2	1	4
2008-2009	14.25	14.1	13.27	13.01	15.69	15.53	13.69	16.6
Rank	4	5	7	8	2	3	6	1
2009-2010	13.39	13.43	12.16	12.94	17.44	19.41	15.8	20.6
Rank	6	5	8	7	3	2	4	1
2010-2011	11.98	15.38	14.00	12.17	16.22	19.54	13.00	16.5
Rank	8	4	5	7	3	1	6	2
2011-2012	13.86	13.76	13.00	11.95	16.52	18.52	13.66	17.9
Rank	4	5	7	8	3	1	6	2
2012-2013	12.92	12.4	13.00	11.02	16.80	18.74	17.00	18.3
Rank	6	7	5	8	4	1	3	2
2013-2014	12.44	10.63	14.00	9.97	16.07	17.7	16.07	14.4
Rank	6	7	5	8	2	1	2	4
2014-2015	12	10.56	13.00	10.73	16.79	17.02	15.09	15.6
Rank	6	8	5	7	2	1	4	3
2015-2016	13.12	11.08	13.00	12.01	15.53	16.64	15.29	16.5
Rank	5	8	6	7	3	1	4	2
2016-2017	13.11	12.86	13.64	12.14	14.55	17.26	14.95	17.07
Rank	6	7	5	8	4	1	3	2

CHART 1



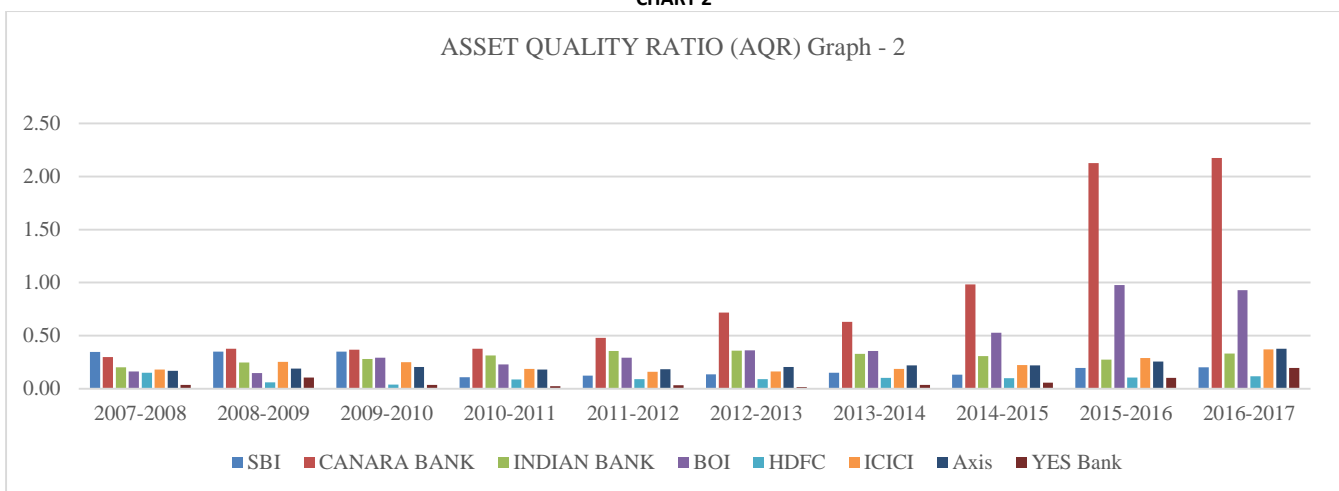
Year 2007 – 2008 The Capital Adequacy Ratio (CAR) value Axis Bank stands tall to take first rank among the list of banks analyzed with 13.99, followed by ICICI Bank with 13.97, next position taken by HDFC Bank 13.60, fourth rank is obtained by Yes Bank 13.60, last four ranks achieved by the public sector banks SBI with 13.47, Canara Bank 13.25, Indian Bank 12.74 and finally BOI with 12.04 in the last rank. During 2008 – 2009 CAR first rank is taken by 16.60, HDFC Bank stood the 2nd place 15.69, ICICI Bank stands in the 3rd rank with 15.53, SBI stands 4th rank 14.25, Canara Bank stood 5th place with CAR 14.10 and last three places taken by Axis Bank, Indian Bank and BOI (13.69, 13.27 & 13.01). In the year 2009 – 2010 Once again Yes Bank taken the first rank 20.60, followed by 19.41 (ICICI Bank) and HDFC Bank in the 3rd place with CAR (17.44). Last three places go to SBI, BOI and Indian Bank with CAR (13.39, 12.94 & 12.16). 2010 – 2011 ICICI Bank took the first place with CAR of 19.54, 2nd place to Yes Bank (16.50), 3rd rank to HDFC Bank 16.22, fourth rank taken by Canara Bank 15.38 and last three ranks by Axis Bank, BOI & SBI (13.00, 12.17 & 11.98). 2011 – 2012 ICICI Bank with the first place, CAR (18.52), 2nd rank Yes Bank with CAR (17.90), 3rd rank with HDFC Bank with CAR (16.52). In the year 2012 – 2013 ICICI Bank stands first again with CAR (18.74), Yes Bank stood 2nd with CAR (18.30), Axis Bank (17.00) in the 3rd rank, 4th Rank HDFC Bank (16.80), 5th rank Indian Bank (13.00), SBI with CAR (12.92), seventh rank Canara Bank (12.40) and the last place with BOI (11.02). 2013 – 2014 Again for this year ICICI Bank top the chart with CAR of 17.70, and Axis Bank & HDFC Bank followed with 16.07, 4th rank with Yes Bank (14.40), Indian Bank taken 5th place with CAR of 14.00, sixth place to SBI (12.44), seventh place to Canara Bank with CAR (10.63) and last slot to the BOI with CAR (9.97). 2014 – 2015 this year also CAR value was high with ICICI Bank (17.02) among the analyzed banks, second place held by HDFC Bank (16.79), third place to Yes Bank (15.60), fourth rank to Axis Bank (15.09), 5th rank to Indian Bank (13.00), 6th rank to SBI 12.0, 7th place to BOI with CAR of (10.73) and eight rank to Canara Bank (10.56). 2015 – 2016 Again ICICI Bank in the first rank (16.64), 2nd rank to Yes Bank (16.50), third rank with HDFC Bank (15.53), 4th ranks with Axis Bank (15.29), and last three ranks with the public sector banks Indian Bank, BOI and Canara Bank (13.00, 12.01, 11.08). 2016 – 2017 this time also private sector banks in top 4 ranks – ICICI Bank first rank with the CAR of (17.26), Yes Bank with (17.07), Axis bank 14.95 and HDFC with 14.55 and last four ranks with public sector banks Indian bank, SBI, Canara Bank and BOI, their CAR values are (13.64, 13.11, 12.86, 12.14)

ASSET QUALITY RATIO (AQR)

TABLE 2

Bank / Year	SBI	CANARA BANK	INDIAN BANK	BOI	HDFC BANK	ICICI BANK	AXIS BANK	YES BANK
2007-2008	0.35	0.30	0.20	0.16	0.15	0.18	0.17	0.03
Rank	1	2	3	6	7	4	5	8
2008-2009	0.35	0.38	0.25	0.15	0.06	0.25	0.19	0.11
Rank	2	1	4	6	8	3	5	7
2009-2010	0.35	0.37	0.28	0.29	0.04	0.25	0.20	0.04
Rank	2	1	4	3	7	5	6	8
2010-2011	0.11	0.38	0.31	0.23	0.09	0.19	0.18	0.02
Rank	6	1	2	3	7	4	5	8
2011-2012	0.12	0.48	0.36	0.29	0.09	0.16	0.18	0.03
Rank	6	1	2	3	7	5	4	8
2012-2013	0.13	0.72	0.36	0.36	0.09	0.16	0.20	0.02
Rank	6	1	3	2	7	5	4	8
2013-2014	0.15	0.63	0.33	0.36	0.10	0.19	0.22	0.03
Rank	6	1	3	2	7	5	4	8
2014-2015	0.13	0.98	0.31	0.53	0.10	0.22	0.22	0.06
Rank	6	1	3	2	7	4	5	8
2015-2016	0.20	2.13	0.27	0.98	0.11	0.29	0.26	0.10
Rank	6	1	4	2	7	3	5	8
2016-2017	0.20	2.17	0.33	0.93	0.12	0.37	0.38	0.19
Rank	6	1	5	2	8	4	3	7

CHART 2



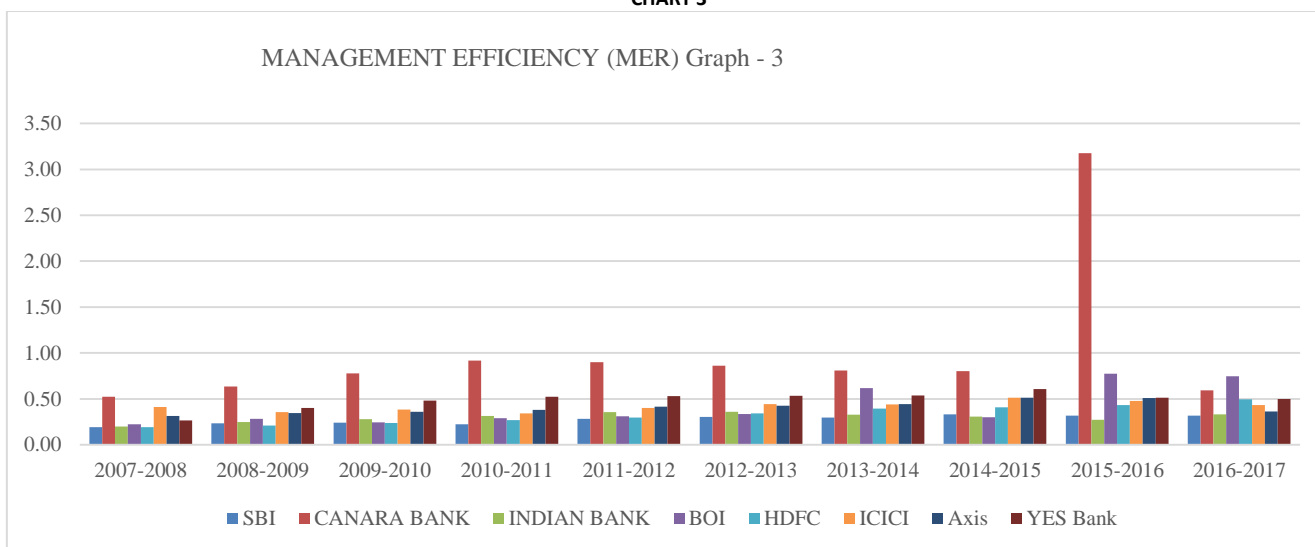
In the year 2007 – 2008 AQR SBI taken first rank (0.35), Canara Bank in the 2nd rank 0.30, Indian Bank AQR 0.20, 4th rank ICICI Bank 0.18, Axis Bank in the 5th rank with AQR (0.17), 6th rank BOI 0.16, 7th rank HDFC Bank 0.15 and 8th rank Yes Bank with AQR 0.03. 2008-2009 Canara Bank with the high rank 0.38, 2nd rank SBI 0.35, 3rd rank ICICI Bank with AQR of 0.25; and last three ranks BOI, Yes Bank and HDFC Bank (0.15, 0.11 & 0.06). 2009-2010 Canara Bank in the first rank with AQR (0.37), followed by SBI with AQR (0.35), in the 3rd rank BOI (0.29), 4th Indian Bank with AQR (0.28) and last three rank Axis Bank 0.20, HDFC Bank and Yes Bank 0.04. 2010-2011 AQR Canara Bank taken first rank 0.38, followed by Indian Bank and BOI with 0.31 & 0.23, and fourth rank ICICI Bank (0.19), 5th rank Axis Bank 0.18 and last three rank taken by SBI, HDFC Bank & Yes Bank (0.11, 0.09, 0.02). 2011-2012 Canara Bank stood first rank 0.48, followed by Indian Bank 0.36, BOI 0.29, fourth rank to AXIS Bank 0.18, 5th rank ICICI Bank 0.16, 6th rank SBI 0.12 7th rank HDFC Bank 0.09 and last rank Yes Bank with AQR of 0.03. In the 2012 – 2013 Canara Bank stand top among the banks analyzed with AQR 0.72, BOI followed 0.36, Indian Bank in the third place 0.36, Axis Bank in the 4th rank 0.20, fifth rank with ICICI Bank 0.16 and last three rank with SBI, HDFC Bank & Yes Bank (0.13, 0.09 & 0.02). During 2013-2014 Canara Bank stands first with 0.63, followed by BOI 0.36 and 3rd rank Indian Bank AQR 0.33, 4th rank to Axis Bank with AQR 0.22, and last three rank to SBI, HDFC Bank, Yes Bank (0.15, 0.10 & 0.03). 2014 – 2015 during this year Canara Bank stood first rank 0.98, followed by BOI with AQR 0.53 and Indian Bank with AQR 0.31 and last three rank taken by SBI, HDFC Bank and Yes Bank (0.13, 0.10 & 0.06). 2015-2016 Canara Bank with AQR of 2.13, followed by BOI with 0.98, ICICI Bank 0.29, Indian Bank with AQR in the 4th rank 0.27, Axis Bank in the 5th rank 0.26 and last three ranks to SBI, HDFC Bank and Yes Bank (0.20, 0.11 & 0.10). 2016-2017 Canara Bank with the AQR of 2.17, followed by BOI 0.93 and 3rd rank is AXIS Bank 0.38, 4th place ICICI Bank with AQR 0.37, and last three ranks to SBI, Yes Bank and HDFC Bank (0.20, 0.19 & 0.12).

MANAGEMENT EFFICIENCY RATIO (MER)

TABLE 3

Bank / Year	SBI	CANARA BANK	INDIAN BANK	BOI	HDFC BANK	ICICI BANK	AXIS BANK	YES BANK
2007-2008	0.19	0.52	0.20	0.22	0.19	0.41	0.32	0.27
Rank	8	1	6	5	7	2	3	4
2008-2009	0.24	0.64	0.25	0.28	0.21	0.35	0.35	0.40
Rank	7	1	6	5	8	3	4	2
2009-2010	0.24	0.78	0.28	0.24	0.24	0.38	0.36	0.48
Rank	7	1	5	6	8	3	4	2
2010-2011	0.22	0.92	0.31	0.29	0.27	0.34	0.38	0.52
Rank	8	1	5	6	7	4	3	2
2011-2012	0.28	0.90	0.36	0.31	0.30	0.40	0.42	0.53
Rank	8	1	5	6	7	4	3	2
2012-2013	0.30	0.86	0.36	0.33	0.34	0.44	0.42	0.54
Rank	8	1	5	7	6	3	4	2
2013-2014	0.30	0.81	0.33	0.62	0.40	0.44	0.44	0.54
Rank	8	1	7	2	6	5	4	3
2014-2015	0.33	0.80	0.31	0.30	0.41	0.51	0.51	0.61
Rank	6	1	7	8	5	3	4	2
2015-2016	0.32	3.18	0.27	0.78	0.43	0.48	0.51	0.51
Rank	7	1	8	2	6	5	4	3
2016-2017	0.32	0.59	0.33	0.75	0.50	0.43	0.36	0.50
Rank	8	2	7	1	4	5	6	3

CHART 3



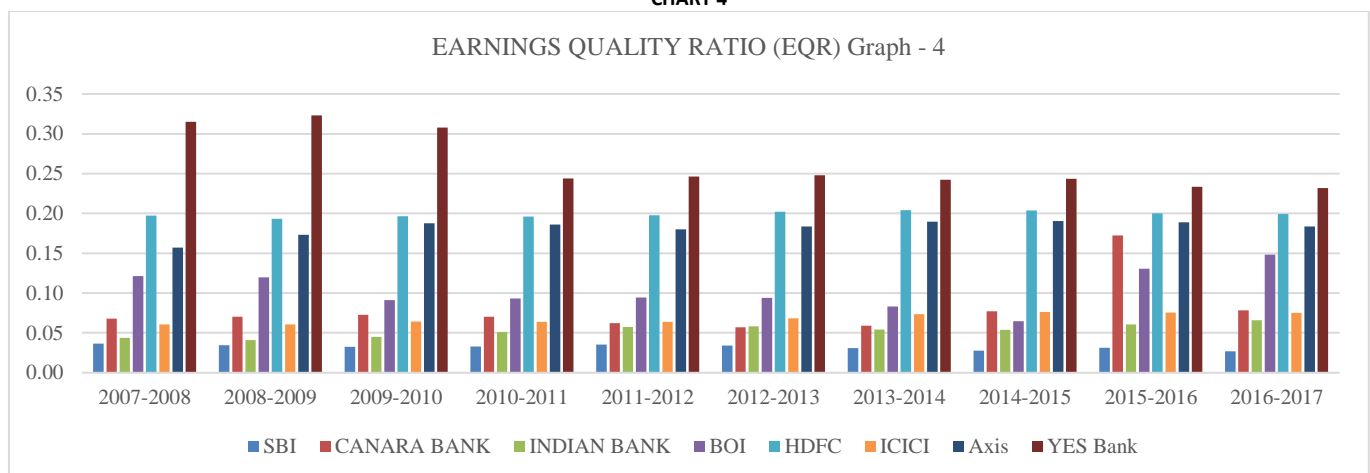
Canara Bank was at the top most position with Total Advances to Total Deposits of 0.52 times for the year 2007 - 2008, followed by ICICI Bank (0.41), and Axis Bank (0.32). At the same time Indian Bank with 0.20, HDFC Bank with 0.19 and SBI with lowest ratio of 0.19 standing at the last three positions as six, seven and eight. During 2008-2009 again Canara Bank tops the chat with 0.64, second place with 0.40 by Yes Bank, third place taken by ICICI Bank with the MER of 0.35, followed by Axis Bank with 0.35, final three positions are Indian Bank (0.25), SBI (0.24) and the last place taken by HDFC (0.24). In the year 2009 – 2010 Canara Bank taken first place, with 0.78 MER, second place taken by Yes Bank 0.48, third place ICICI Bank 0.38, Axis Bank with 0.36 MER in the fourth place and last three places 0.24 MER to BOI, SBI 0.24 and the last place taken by HDFC Bank (0.24). In 2010 – 2011, Canara Bank (0.92) with the first rank, followed by Yes Bank 0.52 and Axis Bank 0.38, ICICI Bank with 0.34 in the last three places taken by BOI 0.29, HDFC Bank 0.27 and finally SBI with MER 0.22. In the year 2011 – 2012 MER 0.90 achieved by Canara Bank, Yes Bank in the 2nd place 0.53, 3rd place taken by Axis Bank 0.42, fourth place of MER (0.40) ICICI Bank. And last three places are BOI (0.31), HDFC Bank (0.30) and SBI's MER (0.28). During the year 2012 – 2013 MER Canara Bank taken first place (0.86), Yes Bank and ICICI Bank taken 2nd and 3rd place (0.54 & 0.44), the last 3 ranks taken with minimum value difference 0.34, 0.33 & 0.30 by HDFC Bank, BOI and SBI. In the year 2013 – 2014 again Canara Bank stands first rank (0.81), BOI took the second place (0.62), Yes Bank taken 3rd place (0.54), Axis Bank & ICICI Bank (0.44) and last 3rd places taken by HDFC Bank, Indian Bank and SBI (0.40, 0.33 & 0.30). 2014 – 2015 Canara Bank stands first rank with 0.80, Yes Bank in the second rank with 0.61, ICICI Bank & Axis Bank with the MER (0.51), SBI, Indian Bank and BOI in the last three ranks of MER (0.33, 0.31 & 0.30). In the year 2015 – 2016 First rank taken by Canara Bank with MER of 3.18, followed by BOI with 0.78 and Yes Bank Axis Bank with 0.51. And last 3 places secured by HDFC Bank, SBI & Indian Bank (0.43, 0.32 & 0.27). In the year 2016 – 2017 the MER's ranking had changed with BOI (0.75) first, Canara Bank 2nd (0.59), Yes Bank & HDFC Bank with (0.50), ICICI Bank with (0.43), Axis Bank with 0.36, Indian Bank in the 7th rank with 0.33 and SBI with last rank (0.32).

EARNINGS QUALITY RATIO (EQR)

TABLE 4

Bank / Year	SBI	CANARA BANK	INDIAN BANK	BOI	HDFC BANK	ICICI BANK	AXIS BANK	YES BANK
2007-2008	0.04	0.07	0.04	0.12	0.20	0.06	0.16	0.32
Rank	8	5	7	4	2	6	3	1
2008-2009	0.03	0.07	0.04	0.12	0.19	0.06	0.17	0.32
Rank	8	5	7	4	2	6	3	1
2009-2010	0.03	0.07	0.04	0.09	0.20	0.06	0.19	0.31
Rank	8	5	7	4	2	6	3	1
2010-2011	0.03	0.07	0.05	0.09	0.20	0.06	0.19	0.24
Rank	8	5	7	4	2	6	3	1
2011-2012	0.04	0.06	0.06	0.09	0.20	0.06	0.18	0.25
Rank	8	6	7	4	2	5	3	1
2012-2013	0.03	0.06	0.06	0.09	0.20	0.07	0.18	0.25
Rank	8	7	6	4	2	5	3	1
2013-2014	0.03	0.06	0.05	0.08	0.20	0.07	0.19	0.24
Rank	8	6	7	4	2	5	3	1
2014-2015	0.03	0.08	0.05	0.06	0.20	0.08	0.19	0.24
Rank	8	4	7	6	2	5	3	1
2015-2016	0.03	0.17	0.06	0.13	0.20	0.08	0.19	0.23
Rank	8	4	7	5	2	6	3	1
2016-2017	0.03	0.08	0.07	0.15	0.20	0.08	0.18	0.23
Rank	8	5	7	4	2	6	3	1

CHART 4



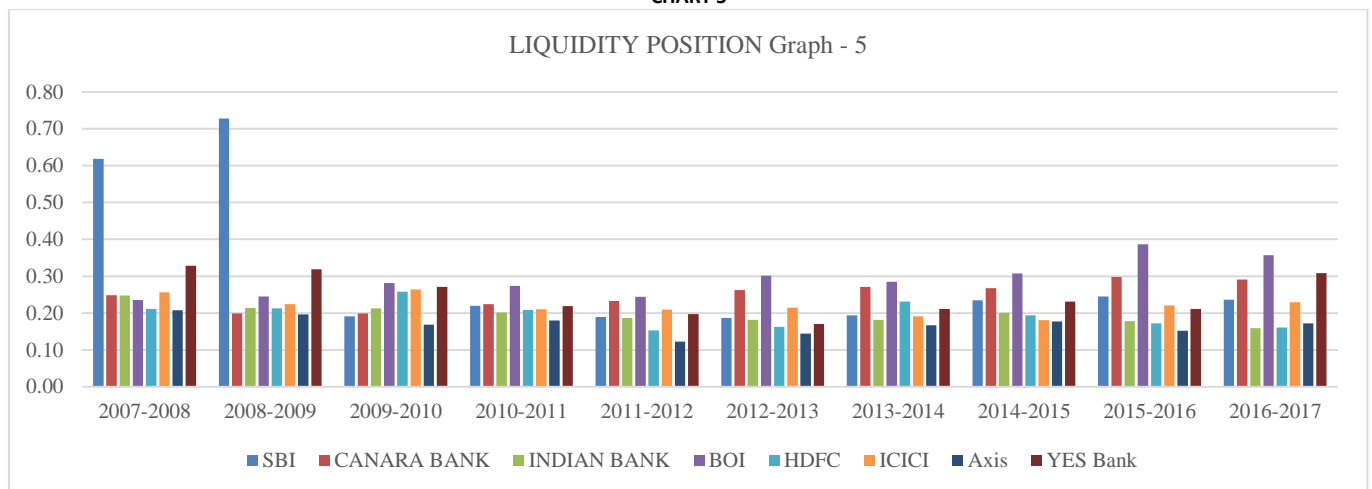
During the year 2007-2008 Earnings Quality Ratio Yes Bank stands first rank 0.32, followed HDFC Bank 0.20, third rank to Axis Bank with EQR 0.16, 4th rank to BOI (0.12), Fifth rank to Canara Bank (0.07), last three ranks to ICICI Bank, Indian Bank and SBI (0.06, 0.04 & 0.04). In the year 2008-2009 Yes Bank stand first with EQR (0.32), followed by HDFC Bank with EQR (0.19), third rank Axis Bank 0.17, fourth rank to BOI (0.12), Canara Bank next rank (0.07), last three ranks to ICICI Bank, Indian Bank and SBI (0.06, 0.04 & 0.03). 2009-2010 Yes Bank taken first rank 0.31, followed by second HDFC Bank 0.20, third rank to Axis Bank with EQR 0.19, fourth to BOI 0.09, Canara Bank taken 5th rank 0.07 and last three ranks to ICICI Bank, Indian Bank and SBI (0.06, 0.04 and 0.03). In the year 2010-2011 again Yes Bank stard first rank with Yes Bank EQR 0.24, followed HDFC Bank 0.20, third rank Axis Bank 0.19, fourth rank taken by BOI with EQR of 0.09, fifth rank to Canara Bank 0.07, ICICI Bank with sixth rank EQR 0.06, seventh rank to Indian Bank (0.05) and the last rank to SBI with EQR 0.03. 2011-2012 Yes Bank in first rank with EQR (0.18), followed by HDFC Bank (0.20), third rank Axis Bank with EQR of 0.18, fourth rank to BOI 0.09, fifth rank to 0.06, sixth rank to Canara Bank EQR 0.06, seventh Rank to Indian Bank with 0.06 and last rank to SBI 0.04. 2012-2013 this year also Yes Bank stood first rank with EQR 0.25, followed by HDFC Bank 0.20, Axis Bank with 0.18 EQR, fourth rank to BOI with 0.09, 5th rank to ICICI Bank with EQR 0.07, and last three ranks to Indian Bank, Canara Bank and SBI (0.06 & 0.03). 2013-2014 first rank with Yes Bank 0.24, 2nd rank HDFC Bank 0.20, 3rd rank to Axis Bank 0.19, 4th rank BOI with EQR 0.08, 5th rank to ICICI Bank with 0.07, sixth rank to Canara Bank 0.06, seventh rank to Indian Bank 0.05, and 8th rank to SBI 0.03. 2014-2015 Yes Bank in the first rank with EQR 0.24, HDFC Bank in 2nd rank in 0.20, Axis Bank with 0.19, 4th rank to Canara Bank 0.08, 5th rank to ICICI Bank EQR 0.08, 6th rank BOI with EQR 0.06, 7th rank to Indian Bank with EQR 0.05, SBI in 8th rank with 0.03. During the year 2015-2016 Yes Bank with first rank 0.23, HDFC Bank with EQR 0.20, 3rd rank Axis Bank 0.19, 4th rank Canara Bank 0.17, 5th rank to BOI 0.13, 6th rank ICICI Bank 0.08, 7th rank Indian Bank 0.06, and 8th rank to SBI with EQR 0.03. In the year 2016 – 2017 again Yes Bank taken 1st rank 0.23, HDFC Bank in the 2nd rank 0.20, Axis Bank in 3rd rank 0.18, 4th rank to BOI 0.15, 5th rank to Canara Bank with EQR 0.08, and last three ranks to ICICI Bank, Indian Bank and SBI (0.08, 0.07 and 0.03)

LIQUIDITY POSITION RATIO (LPR)

TABLE 5

Bank / Year	SBI	CANARA BANK	INDIAN BANK	BOI	HDFC BANK	ICICI BANK	AXIS BANK	YES BANK
2007-2008	0.62	0.25	0.25	0.24	0.21	0.26	0.21	0.33
Rank	1	4	5	6	7	3	8	2
2008-2009	0.73	0.20	0.21	0.24	0.21	0.22	0.20	0.32
Rank	1	7	5	3	6	4	8	2
2009-2010	0.19	0.20	0.21	0.28	0.26	0.26	0.17	0.27
Rank	7	6	5	1	4	3	8	2
2010-2011	0.22	0.22	0.20	0.27	0.21	0.21	0.18	0.22
Rank	3	2	7	1	6	5	8	4
2011-2012	0.19	0.23	0.19	0.24	0.15	0.21	0.12	0.20
Rank	5	2	6	1	7	3	8	4
2012-2013	0.19	0.26	0.18	0.30	0.16	0.21	0.14	0.17
Rank	4	2	5	1	7	3	8	6
2013-2014	0.19	0.27	0.18	0.29	0.23	0.19	0.17	0.21
Rank	5	2	7	1	3	6	8	4
2014-2015	0.23	0.27	0.20	0.31	0.19	0.18	0.18	0.23
Rank	3	2	5	1	6	7	8	4
2015-2016	0.25	0.30	0.18	0.39	0.17	0.22	0.15	0.21
Rank	3	2	6	1	7	4	8	5
2016-2017	0.24	0.29	0.16	0.36	0.16	0.23	0.17	0.31
Rank	4	3	8	1	7	5	6	2

CHART 5



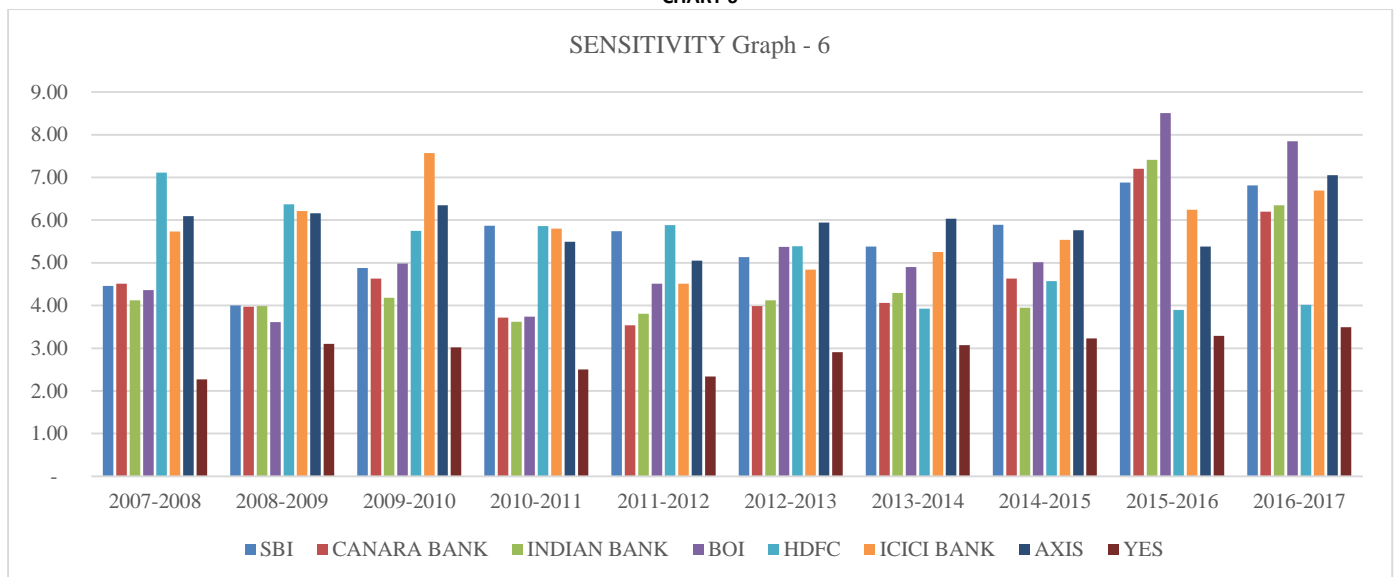
During the year 2007 – 2008 liquidity Ratio SBI sands first rank with 0.62, followed by Yes Bank 0.33, 3rd rank to ICICI Bank 0.26, 4th ranks Canara Bank 0.25, 5th rank Indian Bank with 0.25, and last three ranks to BOI (0.24), HDFC Bank (0.21) and Axis Bank (0.21). In the year 2008 – 2009 again SBI in the first rank 0.73, 2nd rank with Yes Bank 0.32, 3rd rank BOI with Liquidity Ratio with 0.24, and last three rank HDFC Bank 0.21, Canara Bank with 0.20 and finally Axis Bank with 0.20. 2009-2010 BOI in the first rank with Liquidity Ratio of 0.28, Yes Bank with 0.27 in second rank, 3rd rank with ICICI Bank 0.26, 4th rank with HDFC Bank 0.26, 5th rank Indian Bank 0.21 and last three ranks Canara Bank, SBI and Axis Bank (0.20, 0.19 & 0.17). In the year 2010 – 2011 BOI in the 1st with 0.27, followed by Canara Bank 0.22, and SBI & Yes bank 0.22 and last three ranks to HDFC Bank, Indian Bank and Axis Bank (0.21, 0.20 & 0.18). 2011-2012 1st rank BOI with LPR, BOI with 0.24, 2nd rank to Canara Bank with LPR 0.23, 3rd rank to ICICI Bank with 0.21, 4th rank to yes Bank with LPR 0.20, 5th rank SBI & Indian bank with 0.19, HDFC Bank in seventh rank 0.15, and 8th rank to Axis Bank 0.12. In the year 2012 – 2013 LPR's first rank taken by BOI with 0.30, Canara Bank 0.26 in the 2nd rank, ICICI Bank with 3rd rank (0.21), 4th rank with SBI 0.19, Indian bank 0.18 in 5th rank, 6th rank to Yes bank 0.17, 7th rank HDFC Bank 0.16, and last rank to Axis Bank with LPR 0.14. In the year 2013-2014 BOI taken first rank with LPR 0.29, Canara Bank with LPR 0.27, 3rd rank HDFC Bank 0.23, 4th rank to Yes Bank with 0.21, 5th rank SBI & ICICI Bank with LPR 0.19, and last 2 ranks to Indian Bank & Axis Bank (0.18 & 0.17). 2014-2015 BOI in the first rank 0.31, Canara Bank 0.27 in the 2nd rank and 3rd rank to SBI 0.23 and last three HDFC Bank, ICICI Bank & Axis Bank (0.19 & 0.18). In the year 2015 – 2016 first rank to BOI with LPR with 0.39, 2nd rank Canara Bank 0.30, 3rd rank SBI with 0.25, 4th rank ICICI Bank 0.22, 5th rank Yes Bank 0.21 and last 3 ranks Indian Bank 0.18, HDFC Bank 0.17 and Axis Bank in 8th place with 0.15. Year 2016 – 2017 BOI in the 1st rank 0.36, 2nd rank to Yes Bank with LPR of 0.31, 3rd rank Canara Bank LPR of 0.29, SBI in the 4th rank 0.24, ICICI Bank in 5th rank 0.23, Axis Bank in the 6th rank 0.17, 7th rank to HDFC Bank with LPR 0.16, and 8th rank to Indian Bank with LPR 0.16.

SENSITIVITY RATIO (SR)

TABLE 6

Bank / Year	SBI	CANARA BANK	INDIAN BANK	BOI	HDFC BANK	ICICI BANK	AXIS BANK	YES BANK
2007-2008	4.46	4.51	4.12	4.36	7.11	5.73	6.09	2.27
Rank	5	4	7	6	1	3	2	8
2008-2009	4.00	3.97	3.99	3.61	6.37	6.21	6.16	3.10
Rank	4	6	5	7	1	2	3	8
2009-2010	4.88	4.63	4.18	4.98	5.75	7.57	6.35	3.02
Rank	5	6	7	4	3	1	2	8
2010-2011	5.87	3.72	3.62	3.74	5.86	5.80	5.49	2.50
Rank	1	6	7	5	2	3	4	8
2011-2012	5.74	3.54	3.81	4.51	5.88	4.51	5.05	2.34
Rank	2	7	6	4	1	4	3	8
2012-2013	5.13	3.99	4.12	5.37	5.39	4.84	5.94	2.91
Rank	4	7	6	3	2	5	1	8
2013-2014	5.38	4.06	4.29	4.90	3.93	5.25	6.03	3.07
Rank	2	6	5	4	7	3	1	8
2014-2015	5.89	4.63	3.95	5.01	4.57	5.54	5.76	3.23
Rank	1	5	7	4	6	3	2	8
2015-2016	6.88	7.20	7.41	8.51	3.90	6.24	5.38	3.29
Rank	4	3	2	1	7	5	6	8
2016-2017	6.81	6.20	6.35	7.85	4.02	6.69	7.05	3.49
Rank	3	6	5	1	7	4	2	8

CHART 6



Sensitivity Ratio in the year 2007 – 2008 HDFC Bank stood first with (7.11), Axis bank with sensitivity second rank 6.09, ICICI Bank in the third rank (5.73), fourth rank secure by Canara Bank with sensitivity ratio 4.51 and last three ranks secured by BOI, Indian Bank and Yes Bank (4.36, 4.12 & 2.27). During the year 2008-2009 HDFC Bank stood first with the SR of 6.37, second secured by ICICI Bank 6.21, third place Axis Bank 6.16, fourth place to SBI 4.00 and last three place secured by Canara Bank, BOI and Yes Bank (3.97, 3.61 & 3.10). 2009 – 2010 ICIC Bank ranked first with 5.75 t with SR of 7.57, Axis Bank with 6.35, HDFC Bank with 5.75, BOI with 4.98 and with last three ranks with Canara Bank, Indian Bank and Yes Bank (4.63, 4.18 and 3.02). In the 2010-2011 SBI took the first place with 5.87, HDFC Bank with SR of 5.86, ICICI Bank (5.80) in the third rank, Axis Bank 5.49 with 4th rank and BOI in the 5th rank (3.74), and last three ranks to Canara Bank, Indian Bank and Yes Bank (3.72, 3.62 & 2.50). 2011-2012 HDFC Bank in the first rank 5.88, second rank with SBI 5.74, third rank with Axis Bank 5.05, 4th rank with ICICI Bank & BOI with SR 4.51, and last three ranks with Indian Bank 3.81, Canara Bank with SR value 3.54 and the 8th rank is Yes Bank 2.34. During the year 2012-2013 Axis Bank's SR stands first with 5.94, HDFC Bank with 5.39 in second rank. BOI in the 3rd rank with SR (5.37), 4th rank to SBI with SR value 5.13, ICICI Bank in fifth rank (4.84), Indian Bank stood in the sixth rank with SR value 4.12, 7th rank taken by Canara Bank 3.99 and the eight rank was taken by Yes Bank 2.91. In the year 2013-2014 Axis bank's SR with 6.03 in the first rank, followed by SBI with SR 5.38 and in the 3rd rank ICICI Bank 5.25, 4th rank BOI with SR value 4.90, 5th rank Indian Bank 4.29, Canara Bank in the 6th rank 4.06 HDFC Bank in the 7th rank 3.93 and 8th rank was Yes bank 3.07. During 2014-2015 SBI stand 5.89; Axis Bank in the 2nd rank 5.76; ICICI Bank with SR value 5.54 in 3rd ranks, 4th rank BOI 5.01, Canara Bank with 4.63 in 5th rank, HDFC Bank in 6th place with SR value 4.57, seventh rank Indian Bank 3.95 and 8th rank Yes Bank 3.23. 2015-2016 BOI stands in first rank 8.51, Indian Bank stood 2nd rank 7.41, Canara Bank in 3rd rank 7.20, SBI in the 4th rank with SR value of 6.88; ICICI Bank in the 5th rank 6.24, 6th rank Axis Bank with 5.38, seventh rank 3.90 and 8th rank Yes bank 3.29. 2016-2017 BOI taken first rank 7.85; 2nd rank Axis Bank 7.05; third rank taken by SBI 6.81, fourth rank ICICI Bank with the SR value of 6.69, and last three ranks for the year Canara Bank, HDFC Bank and Yes Bank (6.20, 4.02 & 3.49)

CONCLUSION

Economic development of any country is mainly influenced by the growth of the banking industry in that country. The current study has been examined the economic sustainability of eight banks in India using CAMELS model during the period 2007-17. The study reveals mixed results over these years. The private sector banks out played public sector banks in the some of the CAMELS parameters like in MER and AQR, Canara Bank stood top, in CAR, ICICI Bank raked high and Yes Bank tops in EQR and the bottom position in Rankings is taken up by Public Sector Banks, Indian Bank in many parameters of CAMELS and it is followed by BOI. There is scope of improvisation in Public Sector banks in terms of AQR and EQR.

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A STUDY ON FORECASTING OF SELECTED COMMODITY FUTURES PRICE USING ARTIFICIAL NEURAL NETWORK - AN EVIDENCE FROM INDIA**JAYASHREE S****MBA STUDENT****SCHOOL OF BUSINESS MANAGEMENT****CHRIST (DEEMED TO BE UNIVERSITY)****BANGALORE****Dr. SURESHA B****ASSOCIATE PROFESSOR****SCHOOL OF BUSINESS MANAGEMENT****CHRIST (DEEMED TO BE UNIVERSITY)****BANGALORE****ABSTRACT**

The fluctuations in the Commodity prices have a considerable amount of attention. This paper is built on the previous research and seeks to determine whether improvements can be made in the forecasting of ten most active commodities traded on MCX. Time series data is considered for the analysis. Forecasting accuracy is a major concern for the decision-maker and the policymakers; while using the traditional Econometrics model, the researchers were not successful in determining the accurate forecast. The performance of ARIMA Model was not in good agreement for forecasting the commodity prices accurately. This research paper makes an attempt to use the Artificial Neural Network Model, which has significantly forecasted the future prices. There can be fluctuations in the prices due to the ongoing pandemic, to which we can witness huge insignificant in the forecast.

KEYWORDS

ARIMA, Time Series data MCX Commodities, artificial neural network, forecast.

JEL CODES

E31, E37.

INTRODUCTION

It is evident that the Indian commodity market has undergone forceful changes in the last two decades due to factors like the demand of metals, Oil, coal, which has increased excessively, this has contributed to the economic development. Indian economy is based on commodities and more than 70% of the total population is committed to the primary sector directly or indirectly. We can also witness a small revolution in commodity derivatives and risk management in the Indian economy.

A commodity market refers to a house where investors can trade commodities like precious metals, crude oil, natural gas, energy, and spices.

PRICE DISCOVERY AND PRICE RISK MANAGEMENT

The future/ forward is not responsible for price advances. The Commodity Market serves as a medium for price discovery and price risk management. The actual demand and supply position, along with the market conditions, the estimate of the commodity is derived. Usually, Commodity prices are tested against the Index in understanding the unexplained variation in commodity prices. Price Discovery and Price Risk Management revolve around these factors like supply and demand, geo-political situations, Currency movement situations, economic growth, and government policies. Futures prices that are obtained on the exchanges are often used as a quotation for long term contracts indirect trade of commodity prices.

REVIEW OF LITERATURE

Commodities are known for diversification of portfolio. Determinates the commodity prices are mostly known for its risky investments propositions along with effects of market supply and demand. These adjustments in the market are due to the uncertainty which cannot be predicted.

(Peter L.M. Goethals, 2007) Facilitate for improved decision support, artificial neural networking models comes which less time are consuming and with high reliability. This paper contributes to the freshwater ecosystem conversation and restoration management. From the analysis, the authors understand this model doesn't have communication between human activities, physical environment and hydrology, also states that the decisions taken would be uncertain in nature which are derived from this model. The model development and application on the same is the collective aspects of 26 papers which has reported on Artificial Neural Networking.

Further, for more understanding on Artificial Neural Networking, (Ferlandito Jubelito Simuangkalit, 2013) conducted their study with an objective to design the decision support system by analysing the architecture of ANN. The authors had created a model which can be set as a base for the DSS, database and user interface and elements of knowledge by using the decision support systems. The purpose of the study is providing better decision making in the field of food price stabilization, trends in future prices and better planning for the planting schedule which will result in maximum profit. The conclusion of study stated that, due to lack of some facts the price fluctuations decreases in the performance of ANN model. Thereby ANN model is required to support better decision making.

On the other hand, for predictions using quantitative data using ANN (Aroshine Munasinghe, 2015) refers to existing ANN model which is termed as eminent model for predicting stock market which is dynamic in nature. For the purpose of the study closing prices of large cap sectors represented by the Swedish of OMX30 is considered. To identify the required configurations, the models which are constructed have to undergo extensive testing by statistical analysis and mean squared errors. As the result of the study, short term perspective is significant in nature from which reliable results can be drawn and no long-term perspective conclusions can be drawn due to lack of significance.

Eventually when researches had a thought to upgrade Artificial Neural Networking (Werner Kristjanpoller, 2016) brought in better improvement on forecasting oil prices volatility. The author uses hybrid model and taking financial variables into consideration. This paper covers several functions. The authors were successful in identifying ANN-GARCH model which might be successful in improvement of forecasts of volatility and spot price by replacing the traditional forecasting models. The results from the study also predicts ANN-GARCH model is 30.6% better than traditional method for forecasting prices. The author concludes, improved performance in arbitrage can be done through volatility of CoC more accurately.

Gradually predictions of Stock market prices was gaining importance, (Malav Shastri, 2018) study on predictions of stock price is an area of interest of fiscal market. For the predictions of stock prices, a technique by first calculating the sentiment scores through Naive Bayes classifier and later application of neural network on

sentiment scores and historical stock dataset. HIVE is proposed as extremely fast work and can help to simplify the work. To conclude from the observations, it has observed that accuracy was found up to 91% in the first case, and 98% in the other cases which indicated that stock price predictions model will be more effective for shorter data.

Counting on the contribution of researchers, (Siddiqui, 2019) represents his paper against the traditional econometrics models for carry out his study. He used Autoregressive Neural Network model for forecasting the daily gas price through which he believes there will be an improvement in the decision making of gas purchase using the price forecast. The authors were successful in setting a base for the improvement in significant terms in their decision making of the spot gas. Through the analysis, the author determined that longer term contracts and option prices serve as the underlying instrument is the spot price. The proposed decisions also stated that ARNN model shows around 33% improvement over the traditional ARIMA model while conducting cross validation study.

Understanding the need for forecasting the INR/USD Exchange rates, (K. Murali Krishna, 2020) Admits that exchange rates play an important role in international trade, stock and framing the imports and exports policies. The paper predicts the INR/USD exchange rates using Hybrid model which supports the ARIMA model and FFNN. The authors were successful in forecasting the INR/USD accuracy by using the developed models. From the conclusion we can understand that the predictions of exchange rates may vary between 70.8 and 71.39. Adding on we can also conclude that these predictions can help the government to frame policies for the upcoming future.

RESEARCH GAP

Usually, time series strategies are used for the predictions of various commodities in the Commodity market. There is some work that needs to be redesigned with the help of the econometrics issue, but the usage of multivariate strategies that go above traditional regression modelling, which are constrained work in nature. This paper integrates the dearth of Multivariate forecasting and system mastering developments to provide proof of idea for the use of Neural Networks in Multivariate Commodity Futures forecasting. The conclusions may be broadly empirical and may place the brood on this course for more in depth studies.

NEED FOR THE STUDY

In a developing country like India, Commodity serves as an important factor for generating income and the price movements in the commodities have major impact on the economic performance. Therefore, forecasting commodity prices serves as a key input for the economic development policy planning and formulations. Making attempts in forecasting various commodity prices using advanced economic models which were used for short to medium term actual commodity forecasting. It is also realized that these Commodity prices forecasts offer greater accurate predictions of the destiny course of Real Commodity charges relative to futures or other models.

OBJECTIVES OF THE STUDY

1. To forecast the commodity prices using Artificial Neural Networking (ANN) Model and Econometrics model.
2. To compare the model with real data for its accuracy.

METHODOLOGY

TYPE OF RESEARCH

This research paper is quantitative research. Quantitative analysis refers to the systematic empirical study of observable phenomena by mathematical, statistical, or computational techniques. The quantitative work desire is to establish and engage phenomena-related mathematical models, theories, and hypotheses. The measuring method is important to quantitative research because it provides the fundamental network to quantitative relationships between factual observation and mathematical expression.

PERIOD OF STUDY

Data were collected on a daily frequency from 01, April 2015 to 31, March 2020

TYPE OF DATA

The dataset consists of ten dependents on variables and ten independent variables. The ten dependent variables are the prices of the most active traded commodities in the MCX market and the independent variables are the MCX iCOMDEX index.

The variables can be grouped under the following factors:

NATURAL GAS: Depended variable – MCX Natural Gas Price Futures

Independent variable – MCX iCOMDEX Composite

SILVER MIC: Depended variable – MCX Silver Mic Futures

Independent variable – MCX iCOMDEX Silver

GOLD PETAL: Depended variable – MCX Gold Petal

Independent variable – MCX iCOMDEX Gold

GOLD: Depended variable – MCX Gold Futures

Independent variable – MCX iCOMDEX Gold

CRUDE OIL: Depended variable – MCX Crude Oil Futures

Independent variable – MCX iCOMDEX Crude Oil

GOLD MINI: Depended variable – MCX Gold Mini Futures

Independent variable – MCX iCOMDEX Gold

NICKEL: Depended variable – MCX Nickel Futures

Independent variable – MCX iCOMDEX Composite

COPPER: Depended variable – MCX Copper Futures

Independent variable – MCX iCOMDEX Copper

ZINC: Depended variable – MCX Zinc Futures

Independent variable – MCX iCOMDEX Composite

GOLD GUINEA: Depended variable – MCX Gold Guinea Futures

Independent variable – MCX iCOMDEX Gold

SOURCE OF DATA

The data were collected from reliable secondary sources.

TOOLS FOR ANALYSIS OF DATA

Artificial Neural Networking

An artificial neuron network (ANN) is referred to as a computational model based totally at the shape and capabilities of biological neural networks. The Statistics that has movement via the network influences the form of the ANN due to the fact a neural network change - or learns, in a feel - based mostly on that input and output. ANNs are considered nonlinear statistical information modelling tools wherein the complex relationships among inputs and outputs are modelled or patterns are determined. ANN is also referred to as a neural network. An ANN contains several blessings but, one of the maxima identified of those is the reality that it is able to certainly examine from observing information sets. In this way, ANN is used as a random function approximation device.

ARIMA

An autoregressive integrated moving average, or ARIMA, is a statistical analysis using time series data for better understanding the records set or to predict future developments. An autoregressive integrated moving average model is a regression analysis method that gages the intensity of one dependent variable in relation to other variables that change. The objective of the model is to predict economic market behavior by examining value discrepancy within the series rather than through real values. The ARIMA model can be interpreted by assigning each of its components as follows: -

- Autoregression (AR) refers to a model displaying a changing variable that regresses at its own lagged, or prior, values.
 - Integrated (I) reflects the distinction between the raw observations to enable the time series to become stationary, i.e., data values are replaced by the difference between the data values and the previous ones.
 - Moving average (MA) refers to the relation between an observation, and a residual error of the moving average model applied to lagging observations.
- All component functions as a parameter with a standard notation. For ARIMA models, a standard notation would be ARIMA with p, d, and q, where integer values substitute for the parameters to indicate the type of ARIMA model used. The parameters can be defined as: -
- p: number of lags in the model, also known as lags.
 - d: the number of times the raw observations differ, also known as the degree of differentiation.
 - q: the average moving window size; also known as the moving average volume.

STATISTICAL TOOLS FOR ANALYSIS OF DATA

1. Artificial Neural Network using MATLAB
2. ARIMA using Python

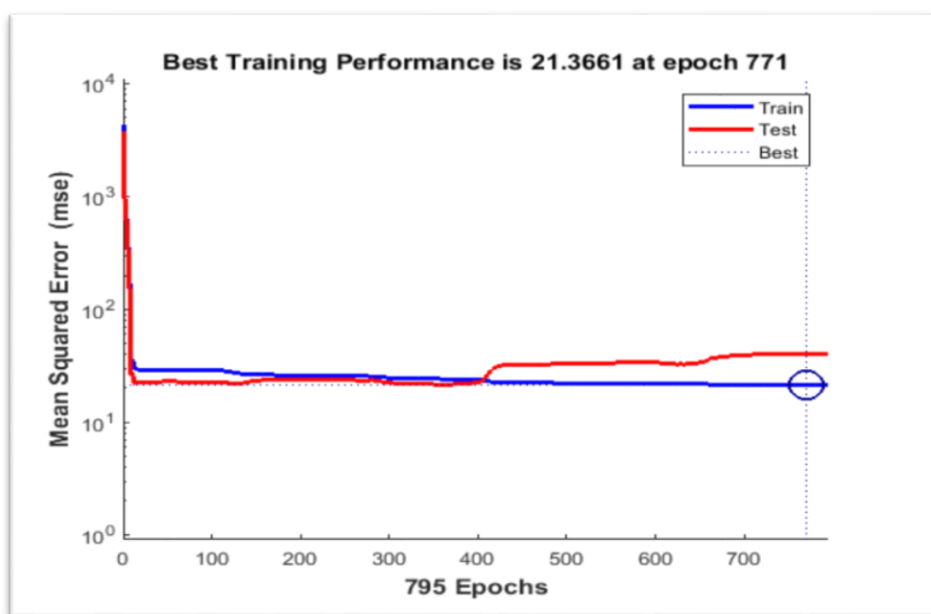
RESULTS AND DISCUSSIONS

ARTIFICIAL NETWORK MODEL ANALYSIS

ANN model Using MATLAB was performed with the above mentioned specification and the results are as follows:

NATURAL GAS

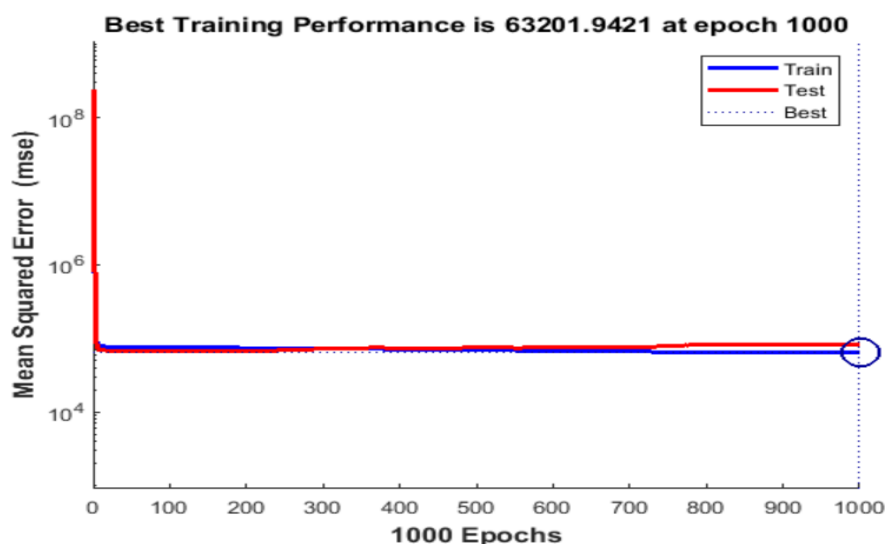
FIGURE 1 - NEURAL NETWORK OF PERFORMANCE OF NATURAL GAS



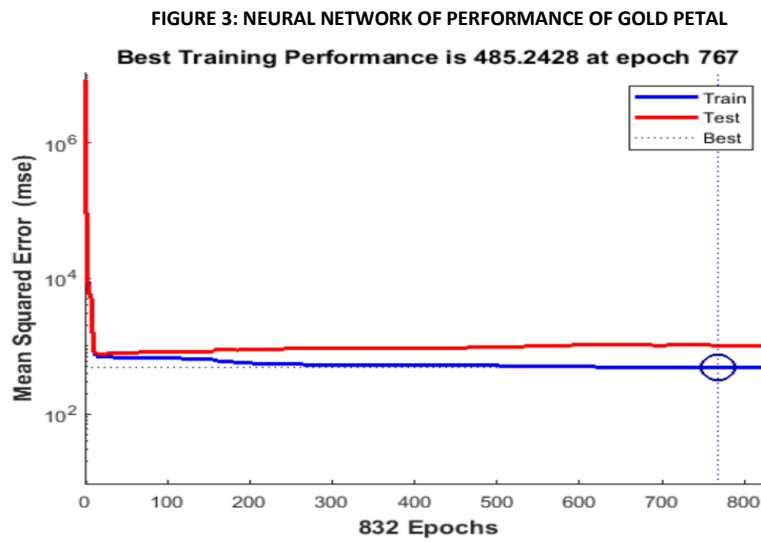
For every instance of prediction what was the amount of error observed and the least error instance is highlighted

SILVER MICRO FUTURES

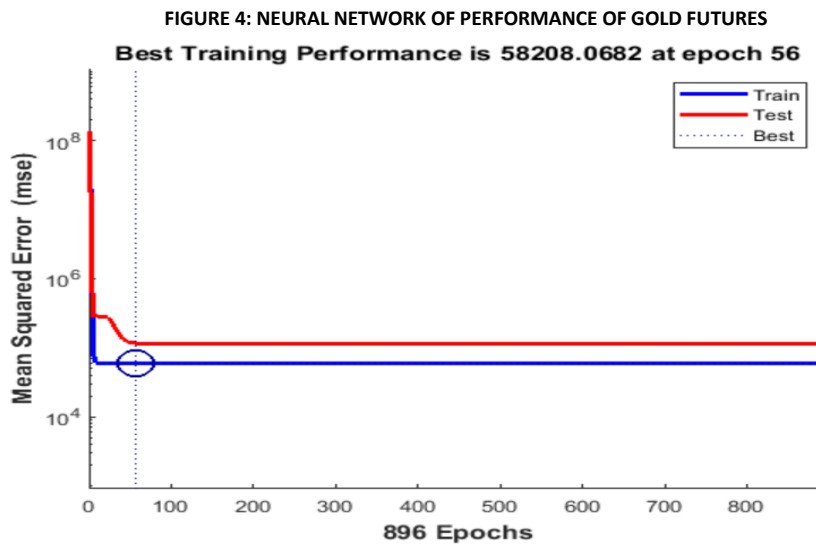
FIGURE 2: NEURAL NETWORK OF PERFORMANCE OF SILVER MICRO FUTURES



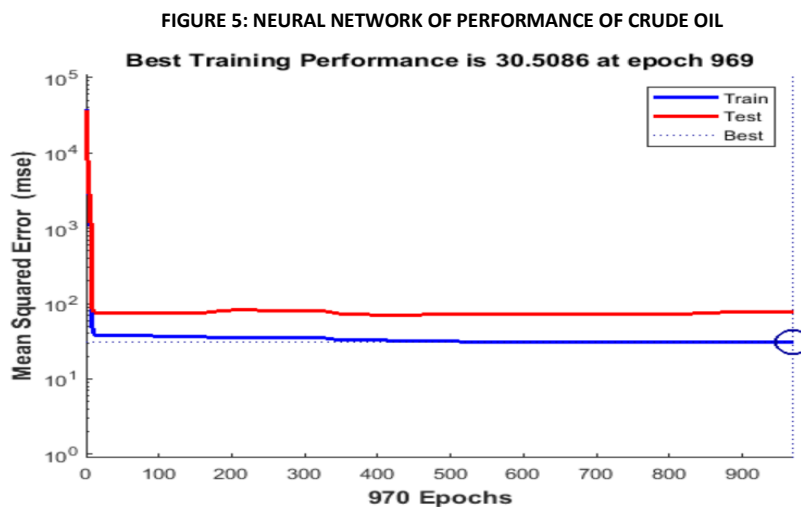
Indicates that for every instance of prediction what was the amount of error observed and the least error instance is highlighted



Every instance of prediction what was the amount of error observed and the least error instance is highlighted
GOLD

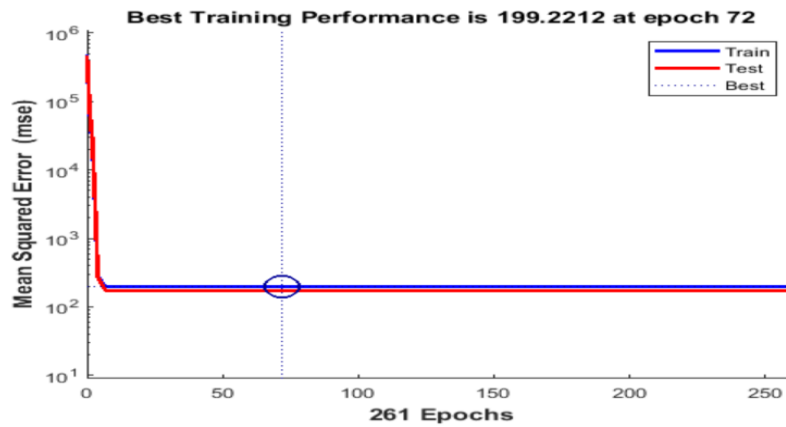


For every instance of prediction what was the amount of error observed and the least error instance is highlighted
CRUDE OIL



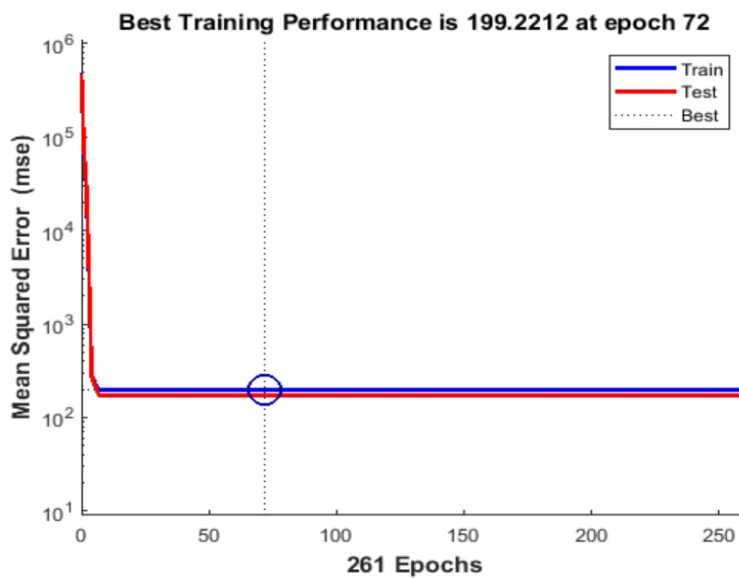
For every instance of prediction what was the amount of error observed and the least error instance is highlighted

FIGURE 6: NEURAL NETWORK OF PERFORMANCE OF GOLD MINI



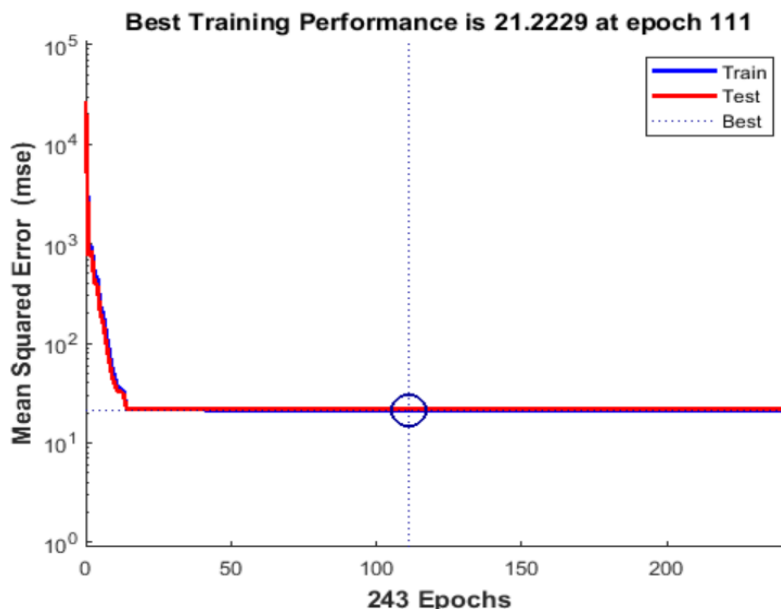
For every instance of prediction what was the amount of error observed and the least error instance is highlighted
NICKEL FUTURES

FIGURE 7: NEURAL NETWORK OF PERFORMANCE OF NICKEL FUTURE



For every instance of prediction what was the amount of error observed and the least error instance is highlighted
COPPER FUTURES

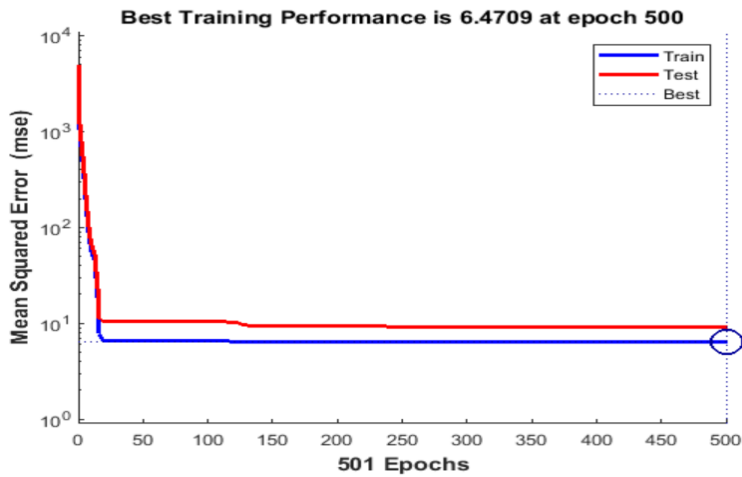
FIGURE 8: NEURAL NETWORK OF PERFORMANCE OF COPPER FUTURE



For every instance of prediction what was the amount of error observed and the least error instance is highlighted

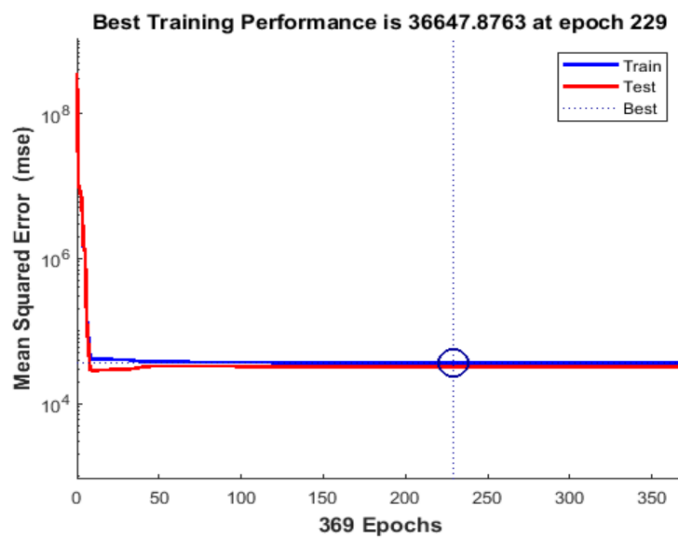
ZINC FUTURES

FIGURE 9: NEURAL NETWORK OF PERFORMANCE OF ZINC FUTURE



For every instance of prediction what was the amount of error observed and the least error instance is highlighted
GOLD GUINEA FUTURES

FIGURE 10: NEURAL NETWORK OF PERFORMANCE OF GOLD GUINEA FUTURE



For every instance of prediction what was the amount of error observed and the least error instance is highlighted
ARIMA

NATURAL GAS

TABLE 1: ARIMA RESULTS FOR NATURAL GAS

	Co efficient	Standard Error	z	P> z	[0.025	0.975]
Constant	-0.0001	0.001	-0.217	0.828	-0.001	0.001
AR (1)	0.0785	0.18	0.436	0.663	-0.275	0.432
MA (1)	-0.1749	0.177	-0.989	0.323	-0.521	0.172

TABLE 2: ARIMA GOODNESS OF FIT

AIC	-5960.96
BIC	-5940.33

SILVER MICRO FUTURES

TABLE 3: ARIMA RESULTS FOR SILVER MICRO FUTURES

	Co efficient	Standard Error	z	P> z	[0.025	0.975]
Constant	0.0011	0.001	1.922	0.055	-2.28e-05	0.002
AR (1)	0.3581	0.236	1.519	0.129	-0.104	0.820
MA (1)	-0.2607	0.243	-1.074	0.283	-0.736	0.215

TABLE 4: ARIMA GOODNESS OF FIT

AIC	-4340.430
BIC	-4321.845

GOLD PETAL

TABLE 5: ARIMA RESULTS FOR GOLD PETAL

	Co efficient	Standard Error	z	P> z	[0.025	0.975]
Constant	-0.0001	0.001	-0.217	0.828	-2.28e-05	0.002
AR (1)	0.0785	0.180	0.436	0.663	-0.104	0.820
MA (1)	-0.1749	0.177	-0.989	0.323	-0.736	0.215

TABLE 6: ARIMA GOODNESS OF FIT

AIC	-5960.955
BIC	-5940.331

GOLD

TABLE 7: ARIMA RESULTS FOR GOLD

	Co efficient	Standard Error	z	P> z	[0.025	0.975]
Constant	0.0007	0.000	1.662	0.097	-0.000	0.002
AR (1)	0.3943	0.170	2.318	0.021	0.061	0.728
MA (1)	-0.2909	0.176	-1.651	0.099	-0.636	0.054

TABLE 8 ARIMA GOODNESS OF FIT

AIC	-7549.144
BIC	-7528.523

CRUDE OIL

TABLE 9: ARIMA RESULTS FOR CRUDE OIL

	Co efficient	Standard Error	z	P> z	[0.025	0.975]
Constant	-4.86e-05	0.001	-0.076	0.939	-0.001	0.001
AR (1)	-0.2096	0.445	-0.471	0.638	-1.082	0.663
MA (1)	0.1777	0.447	0.397	0.691	-0.699	1.055

TABLE 10: ARIMA GOODNESS OF FIT

AIC	-5972.122
BIC	-5951.501

GOLD MINI

TABLE 11: ARIMA RESULTS FOR GOLD MINI

	Co efficient	Standard Error	z	P> z	[0.025	0.975]
Constant	0.0007	0.000	1.765	0.078	-7.58e-05	0.001
AR (1)	0.4267	0.205	2.080	0.038	0.025	0.829
MA (1)	-0.3654	0.210	-1.740	0.082	-0.777	0.046

TABLE 12: ARIMA GOODNESS OF FIT

AIC	-7567.087
BIC	-7546.462

NICKEL FUTURES

TABLE 13: ARIMA RESULTS FOR NICKEL FUTURES

	Co efficient	Standard Error	z	P> z	[0.025	0.975]
Constant	6.504e-05	0.001	0.130	0.897	-0.001	0.001
AR (1)	-0.2433	0.455	-0.535	0.593	-1.135	0.649
MA (1)	0.2094	0.458	0.457	0.648	-0.689	1.108

TABLE 14: ARIMA GOODNESS OF FIT

AIC	-6591.819
BIC	-6571.194

COPPER FUTURES

TABLE 15: ARIMA RESULTS FOR COPPER FUTURES

	Co efficient	Standard Error	z	P> z	[0.025	0.975]
Constant	-4.86e-05	0.001	-0.076	0.939	-0.001	0.001
AR (1)	-0.2096	0.445	-0.471	0.638	-1.082	0.663
MA (1)	0.1777	0.447	0.397	0.691	-0.699	1.055

TABLE 16: ARIMA GOODNESS OF FIT

AIC	-5972.122
BIC	-5951.501

ZINC FUTURES

TABLE 17: ARIMA RESULTS FOR ZINC FUTURES

	Co efficient	Standard Error	z	P> z	[0.025	0.975]
Constant	7.24e-05	0.001	0.142	0.887	-0.001	0.001
AR (1)	0.1124	0.379	0.296	0.767	-0.631	0.856
MA (1)	-0.1577	0.376	-0.419	0.675	-0.895	0.580

TABLE 18: ARIMA GOODNESS OF FIT

AIC	-6490.495
BIC	-6469.871

GOLD GUINEA FUTURES

TABLE 19: ARIMA RESULTS FOR GOLD GUINEA FUTURES

	Co efficient	Standard Error	z	P> z	[0.025	0.975]
Constant	0.4853	0.350	1.385	0.166	-0.202	1.172
AR (1)	0.9995	0.001	1607.534	0.000	0.998	1.001

TABLE 20: ARIMA GOODNESS OF FIT

AIC	-7602.434
BIC	-7586.963

TABLE 21: COMPARISON OF ARTIFICIAL NEURAL NETWORK_ROOT MEAN SQUARE ERROR AND ARIMA_ROOT MEAN SQUARE ERROR

Particulars	ANN_RMSE	ARIMA_RMSE
NATURAL GAS FUTURES	6.2222	0.028380093
SILVER MICRO FUTURES	331.5237	0.338046224
GOLD PETAL FUTURES	30.3786	0.028380093
GOLD FUTURES	283.6898	0.147425588
CRUDE OIL FUTURES	7.3276	0.102923815
GOLD MINI FUTURES	260.8521	0.102249587
NICKEL FUTURES	13.7177	0.099429405
COPPER FUTURE	4.5415	0.098054914
ZINC FUTURES	2.5031	0.080524871
GOLD GUINEA FUTURES	210.8252	0.072378927

Root Mean Square Error indicates the variance of the residuals. RMSE represents the absolute fit of the model to the data and it is the most important benchmark for fit if the objective of the model is prediction.

Artificial Neural Network: A figure showing for every instance of prediction what was the amount of error observed and the least error instance is highlighted. Plot regression (t, y): Represent an error graph which shows what is the target value and what we received and what was the error on data. This is done for all the 10 most active commodity on the MCX.

ARIMA: The time series reaches stationarity with two orders of Differencing. But on looking at the autocorrelation plot for the second differencing the lag goes into the far negative zone fairly quick, which indicates the series might have been over differenced. From the forecast of commodities, the Graph, the ARIMA (1, 1, 1) model seems to give a directionally correct forecast with a variation of less than 0.005 % and the actual observed values lie within the 95 % confidence level for all the trained data and same data tested but when we split train and test data we see a small variation of close to 0.1 % But each of the predicted forecasts is consistently below the actuals. Which means, by adding a small constant to our forecast, the accuracy will certainly improve. Therefore, there is significance in the plot.

SUMMARY OF FINDINGS

- Gold, Silver, Crude Oil, Natural Gas and Copper are the most traded commodities on the commodity market.
- Gold and silver are highly correlated in the commodities market.
- The US dollar index and Crude oil have an inverse correlation in the international commodities market.
- There are four variants in gold contracts which include Gold, Gold Mini, Gold Petal and Gold Guinea which are categorized based on lot size.
- Copper is a base metal that is significantly used in the field of infrastructure.
- Forecasting of commodities aids in evaluation to various sectors.
- India as a highest consumer of commodities like crude oil, gold and copper, the economy will have major impact due to the variation of such commodities.
- The demand for such essential commodities is expected to grow at a faster pace due to the economic growth.
- The global crisis due to the pandemic has given opportunity to various investors in the commodities market.

CONCLUSIONS AND SUGGESTIONS

Neural Network-based modelling proved better accuracy than regression and on par accuracy as ARIMA models. While considering the capacity of the model to follow changing tendencies inside the out-of-sample forecast, Neural Network became a clear champ. Neural network indicates good capability for use in multi-variate forecasting of Commodity price. The Neural Network models used on this study have been simple feed forward models. Adding on, advanced models like Recurrent Neural Networks (RNN) and lengthy short-time period memory (LSTM) neural network models can be used in the future. Recurrent Neural network and Lengthy short time period Memory may be more appropriate for time series forecasting due to their capability to recurrently take a look at beyond data points while studying new data points.

Theoretical version on this research paper assumed no inter-dependency of the independent variables and that the dependent variable did no longer have a consequence on the impartial variables. It is also believed that, a number of the monetary market variables are depending on commodity future prices. There are few commodity futures which are selected in the MCX market to prove the idea of forecasting using Neural Networks which might empirically paintings. There will be the ongoing growth in the work for a range of Commodity futures variables and performing characteristics selection. The benefit of the fine features would appreciate the accuracy of the model.

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COVID-19 AND LOCKDOWN: IMPACT ON MSMEs AND EXPECTATIONS FROM GOVERNMENT

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ABSTRACT

Like a lightning bolt, COVID-19 struck humanity and caught everyone in disbelief. Unprepared to face such an unprecedented and deadly virus, nations are grappling to find a solution and assure the masses, who are gripped in fear and uncertainty. The MSMEs known as the backbone of Indian economy. MSME sector employing total 40% of the country's workforce with almost 50% of exports and contributing close to 30% of India's GDP is struggling to survive. This sector had suffered three blows earlier with the demonetization, the GST, the burden of the economic slowdown and feels entirely derailed in the post lockdown scene. The shares of MSMEs related to export from during 2018-19 was 48.10 percent. On May 12, the Prime Minister, Mr. Narendra Modi, announced a special economic package of Rs 20 lakh crore (equivalent to 10% of India's GDP) with the aim of making the country independent against the tough competition in the global supply chain and to help in empowering the poor, labourers, migrants who have been adversely affected by COVID. Following this announcement, the Finance Minister, Ms. Nirmala Sitharaman, through five press conferences, announced the detailed measures under the economic package.


KEYWORDS

MSME, Atmanirbhara bharath.

JEL CODES

I15, I18, H25.

INTRODUCTION

 Small and Medium Enterprises (SMEs) contribute to economic development in various ways such as creating employment opportunities for rural and urban population, providing goods & services at affordable costs by offering innovative solutions and sustainable development to the economy as a whole. SMEs in India face a number of problems - absence of adequate and timely banking finance, non-availability of suitable technology, ineffective marketing due to limited resources and non-availability of skilled manpower. The Micro, Small and Medium Enterprises (MSME) sector contributes significantly to manufacturing output, employment and exports of the country. It is estimated that in terms of value, the sector accounts for about 45 % of the manufacturing output and 40% of total exports of the country. To make this sector to become more vibrant and significant player in development of the Indian economy the Government of India has taken various initiatives. The MSMEs need to be educated and informed of the latest developments taking place globally and helped to acquire skills necessary to keep pace with the global developments. It also aims at motivating the companies to follow TQM principles in future.

Micro, Small and Medium Enterprises (MSMEs) play a pivotal role in creating employment opportunities. These are more vibrant in countries like India where population is more and labour-intensive manufacturing establishments are huge in number. In general, these firms are established in rural and economically backward regions, thereby a regional balance may be achieved through the equal distribution of wealth. MSMEs are considered complementary to heavy industries as subsidiary units and provide enormous socio-economic development to the nation. MSMEs contribute about 8 per cent of the country's GDP, with 45 per cent of manufacturing yield and 40 per cent of exports. After the agricultural sector, MSMEs provide lion's share of employment for the jobless. Further, they provide a diverse range of goods and services that satisfy the needs of local, national and international supply chains.

The Covid-19 Pandemic has taken a severe toll on the MSMEs Sector in Goa and has already affected the livelihood of the Goans. In this difficult situation it is urge to ensure sustenance, support and livelihood allowance to self-employed goans such as taxi drivers, rickshaw drivers, motorcycle pilots etc. in order to help them tide over these challenging days which have threatened their livelihood. The Government of Goa must consider granting insurance aid, bank installment waiver and such other measures which would go a long way in helping hardworking goan entrepreneurs. The above issue need to be addressed by the government on humanitarian ground urgently and necessary remedial action must be carried out in the interest of the State of Goa and the people.

ATMANIRBHAR BHARAT ABHIYAN

The Atmanirbhar Bharat Abhiyan (meaning self-reliant India scheme) was announced in four tranches by the Union Finance Minister Nirmala Sitharaman in May 2020. The economic stimulus relief package announced by the government is touted to be worth Rs.20 Lakh crores. This includes the already announced Rs 1.70 lakh crore relief package, as the PMGKY, for the poor to overcome difficulties caused by the coronavirus pandemic and the lockdown imposed to check its spread.

IMPORTANT FACTS ABOUT ATMANIRBHAR BHARAT SCHEME

1. The Prime Minister announced that an Atmanirbhar Bharat or a self-reliant India should stand on the following five pillars:
 - A. Economy
 - B. Infrastructure
 - C. 21st century technology driven arrangements and system
 - D. Demand
 - E. Vibrant Demography
2. The 20 lakh crore worth package is almost 10% of the GDP of the country.
3. The package emphasises on land, labour, liquidity and laws.
4. The package includes measures across many sectors such as MSME, cottage industries, middle class, migrants, industry, etc.
5. Several reforms are announced to make India a self-reliant economy and mitigate negative effects in the future. Some of the reforms are:
 - A. Simple and clear laws
 - B. Rational taxation system
 - C. Supply chain reforms in agriculture
 - D. Capable human resources
 - E. Robust financial system

OBJECTIVES OF THE STUDY

1. To understand the present scenario of MSME's in India.
2. To study the problems of MSME's during the period of Covid 19.
3. To study the decisions taken by government for the growth of MSME's sector under the Atma- Nirbhar Bharat Abhiyan.

4. To understand the impact of covid 19 on MSME's.
5. To understand the how MSME's survive during the pandemic period.

METHODOLOGY

The present paper is based on secondary data. Most of the information's are collected from various journal, newspaper and magazine. Also the report published by government under their annual report.

NEED OF THE STUDY

Micro, small and medium enterprises have been identified as the stepping stones for industrialization all over the world. MSME's are not only a source of basic livelihood for many but are also a source of improving the standard of living of many families. In the light of their significance in the economic development and progress, it seems of utmost importance to understand the factors that hinders the growth of this sector. There are many initiatives and policies launched by the government to help MSME's in different ways but still the problems continue to persist in the development of this sector.

REVIEW OF LITERATURE

The Hindu¹⁴ reported that as per the recent survey of 5000 MSMEs conducted by the All India Manufacturers¹⁵ Organisation, it was found that 71% of them could not pay salaries to their employees in the month of March. Reports from across the country similar findings of how these enterprises are unable to meet their immediate financial and capital requirements. The report published by „The Hindu“ stated that as per the study commissioned by All India Manufacturers Organisation, at present India is home to over 75 million MSMEs and around 25 per cent of these firms will face closure, if the lockdown imposed due to the COVID-19 goes beyond four weeks while a whopping 43 per cent will shut shop if panic extends beyond eight weeks. Unfortunately, the lockdown period is continuing which will lead the situation to become more worsen than ever before. MSME is generally recognised as the backbone of the Indian economy and it is also one of the most crucial sectors that let the economy to grow and develop. Therefore, correctives and supportive actions are required to hold and support the enterprises in this sector which is the home to employment over 114 million people and contributes to more than 30 percent of the GDP. Outlook in their study reported that as per the Confederation of All India Traders (CAIT) which represents 70 million traders in India and the majority of them are MSME says that the trade impact for India due to this pandemic is estimated to be around Rs 380 lakh and the chemical sector is likely to have a big hit of Rs 12 crore 90 lakh. The enterprises in the MSME sector which was already under huge distress firstly because of demonetization, secondly due to the poorly implemented GST, then by the prolonged economic slowdown and lastly, the biggest of all - the COVID-19 which is going to aggravate the crisis in this specific sector further.

CONCEPT OF MSME'S AND ATMANIRBHARA BHARATHA YOJANA

We all are aware that our honorable Prime Minister has called for 'AATMA NIRBHAR BHARAT' which is a big leap of faith taken by him to announce 20 Lac crore Economic Package; which is third largest in the world; which has something for every sector of economy.

Our Finance Minister has given details of "AATMA NIRBHAR YOJANA- PART-1" on 13.05.2020. We are focusing over here on MSME perspective, for that we have to understand the meaning of MSME & what are the benefits given to them.

As per the 'Atmanirbhar Bharat' scheme announced on 13th May, 2020-

- Definition of MSMEs will be revised
- Investment limit will be revised upwards
- Additional criteria of turnover also being introduced.
- Distinction between manufacturing and service sector to be eliminated.
- Necessary amendments to law will be brought about

Coronavirus pandemic and the nationwide lockdown has dealt a grievous blow to the country's economy. In a bid to restore it, PM Narendra Modi announced an incentive package of ₹20 lakh crore as part of the Atma Nirbhar Bharat Abhiyan. This approach to growth had indeed turned towards internal strength with the slogan, vocal for local to make it global.

A self-reliant India or the Atma Nirbhar Bharat will stand on five major foundations: 'economy', which brings in the quantum rise and not incremental change; 'infrastructure'; 'system', based on 21st-century technology-driven arrangements; 'dynamic demography', which is the source of energy for a self-reliant India; and 'demand', wherein the strength of our supply chain should be utilised to full capacity. Micro, Small and Medium Enterprise (MSME) sector in India can play a crucial role by standing, robust on all the five pillars, thus achieving the vision of self-reliant India.

EXISTING AND REVISED DEFINITION OF MSME'S

TABLE 1

Existing classification of MSME's			
Criteria :Investment in Plant & Machinery or Equipment			
Classification	Micro	Small	Medium
Manufacturing Enterprises	Investment<Rs. 25 Lakh	Investment<Rs. 5 crore	Investment<Rs. 10 crore
Service Enterprises	Investment<Rs. 10 Lakh	Investment<Rs. 2 crore	Investment<Rs. 5 crore

REVISED MSME'S CLASSIFICATION

TABLE 2

Composite criteria : Investment and Turnover			
Classification	Micro	Small	Medium
Manufacturing & Service	Investment<Rs. 1 crore & Turnover < 5 crore	Investment<Rs. 10 crore & Turnover < 50 crore	Investment<Rs. 20 crore & Turnover < 100 crore

SIGNIFICANCE OF MSME'S

- It can be noted from the fact that after agriculture, MSME is the second-largest employment provider in India.
- Presently, there are nearly 56 million such enterprises in various industries, employing close to 124 million people. Of these, almost 14% are women-led enterprises, and close to 60% are based in rural areas.
- In all, the MSME sector accounts for 45% of merchandise exports 8% of India's GDP.
- Due to this, the MSME sector is called the growth engine of the nation. Strengthening them would have multiple impetuses boosting economy and employment as well as mitigating issues of migrating skilled, unskilled workers and professionals to metro cities.

The MSME sector is the most dynamic industrial sector contributing significantly to the GDP and export while employing around 40 per cent of the workforce in India. The Prime Minister has also underlined that the MSME sector will act as the bedrock for economic regrowth. Therefore, to get the MSME sector back on its track, the Prime Minister announced the MSME sector to be within the purview of the Atma-Nirbhar Bharat Abhiyan (ANBA).

DECISIONS TAKEN BY GOVERNMENT FOR THE GROWTH OF MSME SECTOR UNDER THE ATMA- NIRBHAR BHARAT ABHIYAN

The much-awaited economic package of the government has led MSMEs to heave a sigh of relief amid the growing tensions of economic slowdown in the coronavirus crisis. The relief package is expected to infuse fresh life into the country's micro, small and medium enterprises (MSMEs), which account for almost 30 percent of the national GDP and 45 percent of the total manufacturing output.

The growing clamour for fiscal support has led the government to introduce measures for MSMEs that have been hit by the lockdown. With a series of encouraging announcements, the Finance Minister outlined the government's plan to raise the morale of the industry and the MSME sector in particular. Under the Atmanirbhar Bharat Abhiyan, the minister announced several measures for MSMEs that are expected to help 45 lakh business units resume their operations. Here are the key announcements for MSMEs.

1. Collateral Free Loans

- Rs. 3 Lakh crores to collateral free automatic loans for businesses, including MSMEs
- This scheme is implemented by Department of Financial Services.
- Borrowers with upto Rs. 25 Cr. Outstanding and Rs. 100 Cr. Turnover eligible.
- Loans to have 4 year tenor.
- 12 months moratorium on principal repayment.
- Interest to be capped.
- Interest rate 9.25% to 9.75% from banks
- Interest rate 14% from NBFCs.
- 100% credit guarantee cover to banks and NBFCs on principal.
- Scheme can be availed till **31st Oct, 2020**.

All businesses/MSMEs are eligible

2. Debt for Stressed MSMEs

- Rs. 20,000 crores subordinate Debt for stressed MSMEs
- Functioning MSMEs which are NPA or are stressed will be eligible
- Govt will provide a support of Rs. 4000 crore to CGTMSE
- CGTMSE will provide partial credit Guarantee support to Banks
- Promoters of the MSME will be given debt by banks, which will then be infused by promoter as equity in the unit.

3. Equity Infusion For MSMEs

- Rs. 50,000 crores equity infusion for MSMEs through Fund of Funds
- Will provide equity funding for MSMEs with growth potential and viability
- Funds of fund will be operated through a Mother Fund and few daughter funds
- Will help to expand MSME size & capacity, encourage MSMEs to get listed on main board of Stock Exchanges.

4. New Definition of MSMEs

- Distinction between manufacturing and service sector to be eliminated
- Composite criteria: Annual Turnover and Investment for manufacturing & service sector
- **Micro:** Investment < Rs. 1 cr. and Turnover < Rs. 5 cr.
- **Small:** Investment < Rs. 10 cr. and Turnover < Rs. 50 cr.
- **Medium:** Investment < Rs. 50 cr. and Turnover < Rs. 250 cr.

5. Global Tenders to be disallowed upto Rs. 200 cr.

- Global Tenders will be disallowed in government procurement tenders upto Rs. 200 cr.
- This will be a step towards self-Reliant India and support Make In India.
- This will help MSMEs to increase their business.

COVID-19 IMPACT ON MSME'S

The corona virus crisis has spelt crisis across the world as several countries now focusing on curbing the rapid spread of the virus while dealing with the economic ramifications. With governments around the world imposing lockdown and social distancing becoming the new norm, the post-pandemic world will wake up to a new trading culture. On the home grounds, the COVID-19 pandemic has battered all sectors of the economy, with the micro, small and medium enterprises (MSMEs) among the worst-hit.

Considered as the growth engine of the nation, the MSME sector accounts for 33.4% of India's manufacturing output, employing about 120 million and generating 45% of India's export. However, the pandemic outbreak and the consequent stoppage of economic activities have triggered panic across the nation, with businesses facing extinction risks. Although some business activities within the 'non-essential category' were resumed as the lockdown extended, economic activity, except for agriculture and essential activities, remains halted.

The MSME sector, the majority of which relies on day-to-day business to stay afloat, continues to be the most vulnerable owing to the lockdown and a decrease in demand. According to a survey covering 5000 MSMEs, conducted by the All India Manufacturers' Organisation (AIMO) has revealed that 71% of the businesses weren't able to pay salaries in March. The survey further revealed that a whopping 43% would shut shop if panic extends beyond eight weeks. Considering the stoppage of economic activity over the past few weeks, it is unfathomable that a vast number of MSMEs will be choked, perhaps to the point of permanent closure.

HOW MSMEs CAN SURVIVE DURING POST EPIDEMIC

The business environment during post pandemic will be totally different from today's business environment specially MSMEs. The following changes we can expect in field of MSMEs sector.

1. Digital practice: India has 63 million MSMEs but only 32% of them are digitally engaged and 68% are too far to adopt digital practices. The untapped portion of MSMEs must change their strategy and digitize their business processes to survive in long run. To adopt digital practice is really difficult for some MSMEs but without adopting digital practice it will be very difficult to survive during post epidemic as people will continue to avoid meeting and social gathering.
2. High credit support and available of working capital.
3. Adopting more sustainability practice which leads to environment conscious.
4. MSMEs should give more emphasis on innovation. Of course innovation in MSMEs business is amazed but innovation will be indispensable for MSMEs after this epidemic, other they cannot exist.
5. Cross train staff practice will be helpful to some extent in the business premises, so that they will be able to perform variety of roles in business.
6. Giving more emphasis on working capital management. Quick collection from receivable will be helpful to meet wage and salary expenses.

SUGGESTIONS

1. Central government package should reach the MSMEs immediately.
2. Supplementary restoration term loans with a government surety on nonpayment, up to 25%. 3. Extend the 3 months suspension time given by RBI to 6 months for MSMEs.

3. Increase net worth of Mudra Bank and other MSMEs- focused financial institutions.
4. Expedite U.K. Sinha Committee suggested fund of funds for MSMEs to support VC/PE firms investing in the MSME sector.
5. Pay all unpaid government payments to MSMEs, including payments for supply for Goods and services to PSUs by MSMEs, GST refunds, various states and central government subsidies for MSMEs.
6. All outstanding on account of goods and services supplied by MSMEs to PSUs should be cleared immediately, both at the central and state levels.
7. Payments for goods and services supplied to PSUs, henceforth should be made within 15 days, instead of the current limit of 45 days.
8. Monitor payment delays by CPSUs to MSMEs closely through a portal for complaints and ensure necessary funds are provided and utilised for this purpose.
10. In case of other relief measures, CII has asked for delays in discharging, social security liabilities may be condoned without any penal actions for next 6 months.

CONCLUSION

The financial incentives introduced by the government will rescue MSMEs reeling under the impact of the lockdown and provide much-needed liquidity to the sector. Increase in credit guarantees, subordinate debts, clearing of outstanding dues and a broader definition would go a long way to revive the growth of MSMEs and boost the efforts to make the country self-reliant.

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EVALUATING THE PERFORMANCE OF PRIVATE SECTOR BANKS USING CAMEL MODEL

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ABSTRACT

In the recent years, the financial systems especially the banks have undergone numerous changes in the form of reforms, regulations and norms. Undoubtedly, being tech-savvy and full of expertise, private banks have played a major role in the development of Indian banking industry. In the process they have jolted public sector banks out of complacency and forced them to become more competitive. At present, Private Banks in India includes leading banks like ICICI Banks, Axis Bank, Kotak Mahindra Bank, HDFC Bank and International Bank, etc. Private Banks such as Axis Bank and ICICI Bank are posting a rapid increase in their asset base every year as compared to public sector. The study is mainly a comparison of the functioning and the performance of the two private banks taken into study - ICICI bank and Axis Bank. It also portrays how the banks use their deposits and advances in lending loans and making investments. It also extends to have a study of ratios. With the advances in financial tools, a comprehensive system of performance evaluation has evolved over a period of time covering all aspects of the organisation, known as CAMEL approach. Many studies have been done to analyse the performance of private banks on profitability determinants and financial indicators. However, this study will use financial ratios to analyse the bank performance based on the CAMEL model on two private sector banks, namely, ICICI bank and Axis bank for a period of nine financial years from 2010-11 to 2018-19.

KEYWORDS

ICICI bank and Axis bank, capital adequacy, asset quality, management efficiency, earnings equality, liquidity position.

JEL CODES

G20, G21.

INTRODUCTION - BANKING INDUSTRY INDIA

The Indian banking system consists of 27 public sector banks, 21 private sector banks, 49 foreign banks, 56 regional rural banks, 1,562 urban cooperative banks and 94,384 rural cooperative banks, in addition to cooperative credit institutions as of January 2020. In FY17- 18, total lending increased at a CAGR of 10.94 per cent and total deposits increased at a CAGR of 11.66 per cent. India's retail credit market is the fourth largest in the emerging countries. It increased to US \$ 281 billion in December 2017 from US \$ 181 billion in December 2014.

Undoubtedly, being tech-savvy and full of expertise, private banks have played a major role in the development of Indian banking industry. In the process they have jolted public sector banks out of complacency and forced them to become more competitive. At present, Private Banks in India includes leading banks like ICICI Banks, Axis Bank, Kotak Mahindra Bank, HDFC Bank and International Bank, etc. Private Banks such as Axis Bank and ICICI Bank are posting a rapid increase in their asset base every year as compared to public sector.

SIGNIFICANCE OF THE STUDY

The study is mainly a comparison of the functioning and the performance of the two private banks taken into study - ICICI bank and Axis Bank. It also portrays how the banks use their deposits and advances in lending loans and making investments. It also extends to have a study of ratios. With the advances in financial tools, a comprehensive system of performance evaluation has evolved over a period of time covering all aspects of the organisation, known as CAMEL approach.

STATEMENT OF THE PROBLEM

In the recent years, the financial systems especially the banks have undergone numerous changes in the form of reforms, regulations and norms. Many studies have been done to analyse the performance of private banks on profitability determinants and financial indicators. However, this study will use financial ratios to analyse the bank performance based on the CAMEL model on two private sector banks, namely, ICICI bank and Axis bank for a period of nine financial years from 2010-11 to 2018-19.

OBJECTIVES OF THE STUDY

The objectives of the study are as follows:

1. To analyse the capital adequacy of ICICI bank and Axis bank.

2. To assess the asset quality of ICICI bank and Axis bank.
3. To evaluate the management efficiency of ICICI bank and Axis bank.
4. To determine the earnings equality of ICICI bank and Axis bank.
5. To identify the liquidity position of ICICI bank and Axis bank.

METHODOLOGY

TYPE OF THE STUDY

The study can be termed as empirical in nature because of acquiring deeper insight into the various significant aspects of the problem as relativity of the objectives of the study. The facts and information available in various secondary sources are utilized to make critical evaluation and thus from this point of view, the nature of the study will also become analytical.

AREA OF THE STUDY

The study analyses the financial performance of ICICI Bank and Axis Bank.

PERIOD OF THE STUDY

A period of nine financial years from 2010-2011 to 2018-2019 have been taken for the study.

SOURCES OF DATA

The study is based on the published data. The data was extracted from the various journals and magazines. Moreover, research methodology books were used for testing the hypothesis. Websites particularly Axis Bank, ICICI Bank and RBI has been extensively used for data extraction. Graphs and tables have also been used wherever required to depict statistical data during the study period.

DATA COLLECTION METHOD

This study has been carried out with the help of secondary data only. Values used in the calculation of ratios are taken from the financial statements of the banks. All the data has been collected from the various sources such as websites and annual reports of ICICI Bank and Axis Bank and compiled as said by the need of the study.

STATISTICAL TOOLS

The financial tool used for analyzing the study is Ratio Analysis. The ratios taken into study fall under the following parameters of CAMEL Model:

- C - Capital Adequacy Ratios
- A - Asset Quality Ratios
- M - Management Efficiency Ratios
- E - Earnings Quality Ratios
- L - Liquidity Ratios

SCOPE OF THE STUDY

- This study will pave the way to the academic as well as general public about the overall efficiency at which the largest private banks are serving.
- This study will throw light on the different aspects where the ICICI Bank and Axis Bank excel and how the banks will provide an opportunity in balancing its activities to achieve the best performance.
- A properly conducted profitability analysis also provides invaluable evidence concerning the earnings potential of the banks and the effectiveness of management.

LIMITATIONS OF THE STUDY

Due to constraints of time and resources, the study is likely to suffer from certain limitations. Some of these are mentioned here under so that the findings of the study may be understood in a proper perspective. The limitations of this study are:

- The study is based on the secondary data and the limitation of using secondary data may affect the performance.

The secondary data was taken from the annual reports of the AXIS and ICICI Bank. It may be possible that the data shown in the annual reports may be window dressed which does not show the actual position of the banks.

REVIEW OF LITERATURE

Kumar V and Malhotra B (2017) in their study, "A CAMEL Model Analysis of Private Banks in India" attempted to evaluate the performance and financial soundness of selected Private Banks in India using CAMEL Model for the period 2007-2017. The private banks taken into study were Axis Bank, HDFC Bank, ICICI Bank, Kotak Mahindra and IndusInd Bank. Composite Rankings, Average, and Covariance has been applied here to reach conclusion through the comparative and significant analysis of different parameters of CAMEL. The researchers concluded that Axis bank is at the top position as assessed by the CAMEL MODEL compared to other banks under the study. Axis bank has strong performance in case of Asset Quality, Management efficiency and Earnings Ability while it lags in case of Capital Adequacy.

Sharma S and Chopra I P (2018) conducted, "A Comparative Study of Public and Private Banks in India using CAMEL Model". The main objective of the study was to evaluate and compare the financial performance of the selected public and private sector banks (top 15 public and private sector banks each). Data related to CAMEL Model indicators were collected from Indian banking association website and the bank's website for the period of 4 years from 2014 to 2017. Ranking, t-test and Mann-Whitney U test were used to meet the objectives. The results of the study indicated that the private sector banks performed better than the public sector banks on all other parameters of CAMEL Model except Management Efficiency.

DATA ANALYSIS AND INTERPRETATION

CAMEL MODEL

The CAMEL rating is a supervisory rating system originally developed in the U.S. to classify a bank's overall condition. It is basically a ratio-based model for evaluating the performance and soundness of banks. The various ratios forming CAMEL Framework are listed below:

TABLE 1: RATIOS CALCULATED UNDER CAMEL MODEL

Capital Adequacy	Assets Quality	Managerial Efficiency	Earnings Quality	Liquidity
Capital Adequacy Ratio	Net NPA To Total Asset	Return On Assets	Operating Profit To Total Assets	Liquid Asset To Total Assets
Debt-Equity Ratio	Gross NPA To Total Asset	Return On Equity	Spread Or Net Interest Margin	Liquid Asset To Total Deposit
Advances To Total Assets	NPA To Net Advance	Profit Per Employee	Interest Income To Total Income	Credit Deposit Ratio
	Total Investment To Total Asset	Business Per Employee	Non-Interest Income to Total Income	Cash Deposit Ratio

COMPOSITE CAPITAL ADEQUACY

The Composite Capital Adequacy table is constructed based on the individual rankings obtained from the sub-parameters of Capital Adequacy which indicates the financial strength and financial stability of the banks. The average of the ranking in the individual parameters has been taken.

Lower composite rank is better, indicating a more financially stable, less at-risk bank.

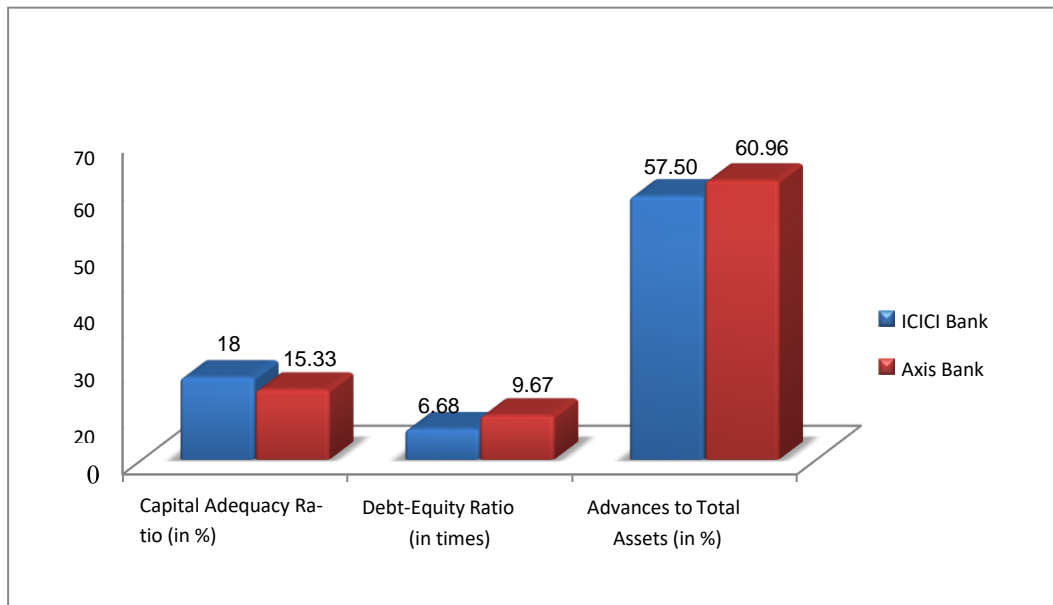
TABLE 2: COMPOSITE CAPITAL ADEQUACY

BANK	Capital Adequacy Ratio		Debt-Equity Ratio		Advances to Total Assets		Group Rank	
	Mean (%)	Rank	Mean (Times)	Rank	Mean (%)	Rank	Mean	Rank
ICICI Bank	18	1	6.68	1	57.50	2	1.33	1
Axis Bank	15.33	2	9.67	2	60.96	1	1.67	2

Source: Compiled from Annual Reports of selected banks

On the basis of group average of three ratios of Capital Adequacy expressed in Table 2, it is evident that the group average of ICICI Bank (1.33) is lower than Axis bank (1.67) for the study period. This implies that **ICICI Bank scores over Axis Bank in terms of Capital Adequacy** due to better performance in Capital Adequacy Ratio and Debt-Equity Ratio.

CHART 1: COMPOSITE CAPITAL ADEQUACY



COMPOSITE ASSET QUALITY

The Composite Asset Quality table is constructed based on the individual rankings obtained from the sub-parameters of Asset Quality which indicates the financial strength and financial stability of the banks. The average of the ranking in the individual parameters has been taken.

Lower composite rank is better, indicating a more financially stable, less at-risk bank.

TABLE 3: COMPOSITE ASSET QUALITY

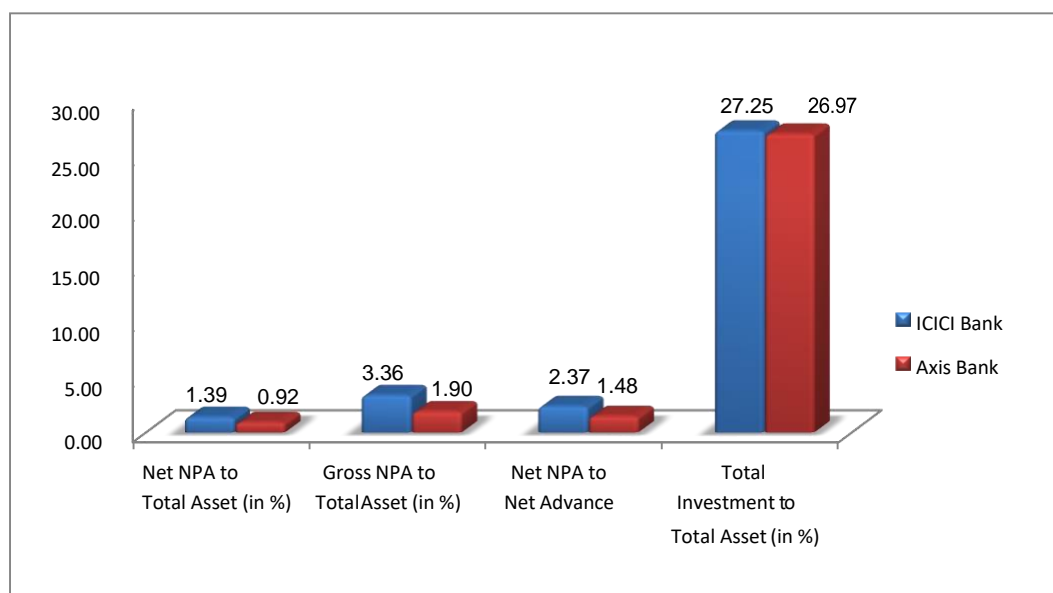
BANK	Net NPA to Total Asset		Gross NPA to Total Asset		Net NPA to Net Advance		Total Investment to Total Asset		Group Rank	
	Mean (%)	Rank	Mean (%)	Rank	Mean (%)	Rank	Mean (%)	Rank	Mean	Rank
ICICI Bank	1.39	2	3.36	2	2.37	2	27.25	2	2	2
Axis Bank	0.92	1	1.90	1	1.48	1	26.97	1	1	1

Source: Compiled from Annual Reports of selected banks

INTERPRETATION

On the basis of group average of four ratios of Asset Quality expressed in Table 3, it is evident that the group average of Axis Bank (1) is lower than ICICI bank (2) for the study period. This implies that **Axis Bank scores over ICICI Bank in terms of Asset Quality** due to better performance in all the sub-parameters.

CHART 2: COMPOSITE ASSET QUALITY



COMPOSITE MANAGEMENT EFFICIENCY

The Composite Management Efficiency table is constructed based on the individual rankings obtained from the sub-parameters of Management Efficiency which indicates the stability of the bank’s management. The average of the ranking in the individual parameters has been taken.

Lower composite rank is better, indicating a more financially stable, less at-risk bank.

TABLE 4: COMPOSITE MANAGEMENT EFFICIENCY

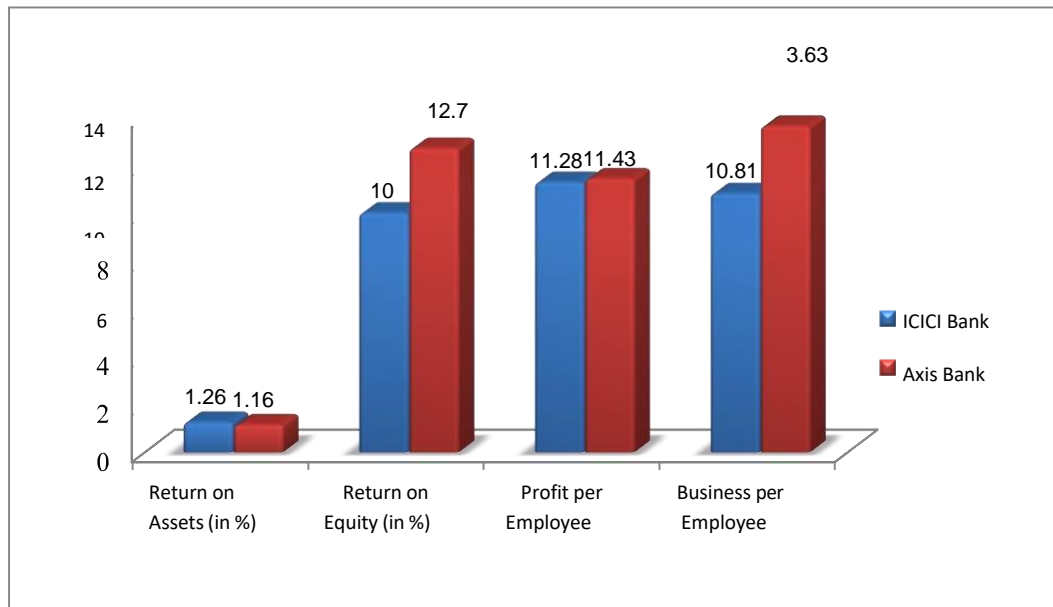
BANK	Return on Assets		Return on Net Worth		Profit per Employee		Business per Employee		Group Rank	
	Mean (%)	Rank	Mean (%)	Rank	Mean (Rs. in lakhs)	Rank	Mean (Rs. in crores)	Rank	Mean	Rank
ICICI Bank	1.26	1	10.00	2	11.28	2	10.81	2	1.75	2
Axis Bank	1.16	2	12.7	1	11.43	1	13.63	1	1.25	1

Source: Compiled from Annual Reports of selected banks

INTERPRETATION

On the basis of group average of four ratios of Management Efficiency expressed in Table 4, it is evident that the group average of Axis Bank (1.25) is lower than ICICI bank (1.75) for the study period. This implies that **Axis Bank scores over ICICI Bank in terms of Management Efficiency** due to better performance in Return on Equity, Profit per Employee and Business per Employee.

CHART 3: COMPOSITE MANAGEMENT EFFICIENCY



COMPOSITE EARNINGS QUALITY

The Composite Earnings Quality table is constructed based on the individual rankings obtained from the sub-parameters of Earnings Quality which indicates the financial stability of the banks. The average of the ranking in the individual parameters has been taken. **Lower composite rank indicates a more financially stable, less at-risk bank.**

TABLE 5: COMPOSITE EARNINGS QUALITY

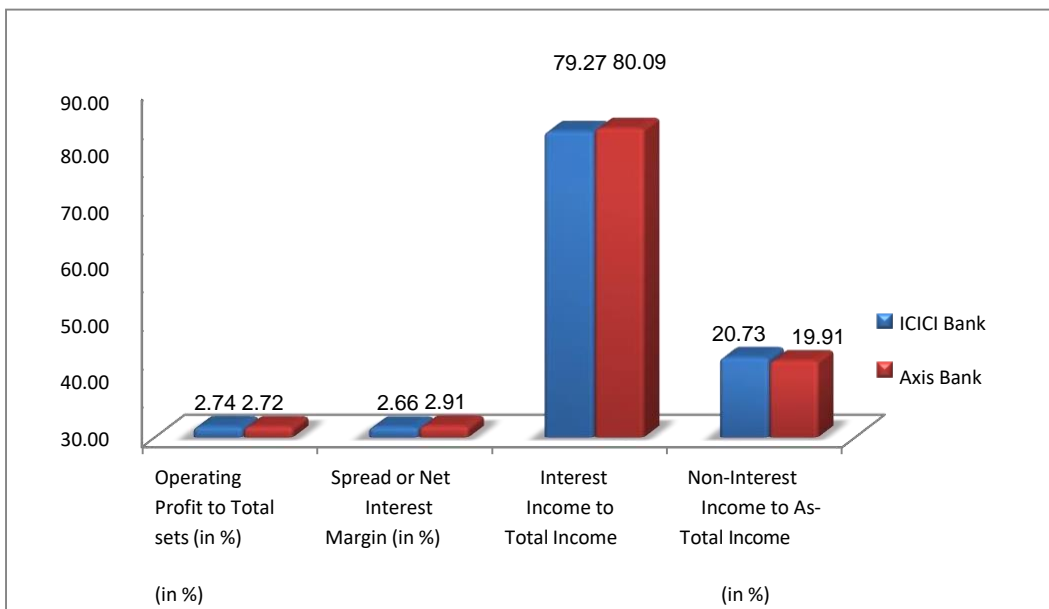
BANK	Operating Profit to Total Assets		Spread or Net Interest Margin		Interest Income to Total Income		Non-Interest Income to Total Income		Group Rank	
	Mean (%)	Rank	Mean (%)	Rank	Mean (%)	Rank	Mean (%)	Rank	Mean	Rank
ICICI Bank	2.74	1	2.66	2	79.27	2	20.73	1	1.50	0.5
Axis Bank	2.72	2	2.91	1	80.09	1	19.91	2	1.50	0.5

Source: Compiled from Annual Reports of selected banks

INTERPRETATION

On the basis of group average of four ratios of Earnings Quality expressed in Table 5, it is evident that the group average of both the Banks is equal (1.50) and hence **both ICICI Bank and Axis Bank stand on par in the Earnings quality parameter.**

CHART 4: COMPOSITE EARNINGS QUALITY



COMPOSITE LIQUIDITY

The Composite Liquidity table is constructed based on the individual rankings obtained from the sub-parameters of Liquidity which indicates the financial strength and financial stability of the banks. The average of the ranking in the individual parameters has been taken.

Lower composite rank is better, indicating a more financially stable, less at-risk bank.

TABLE 6: COMPOSITE LIQUIDITY

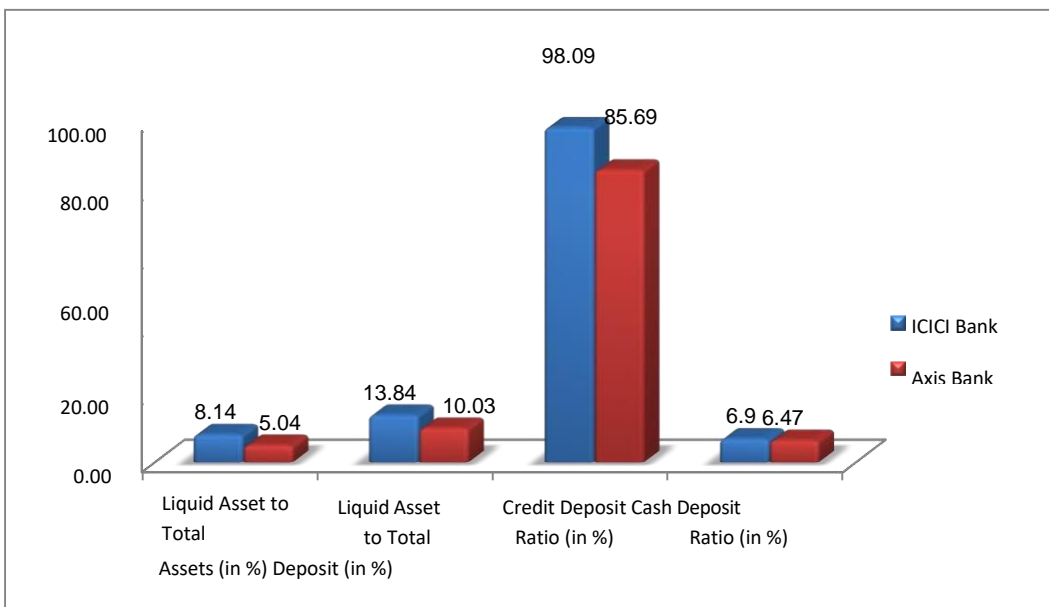
BANK	Liquid Asset to Total Assets		Liquid Asset to Total Deposit		Credit Deposit Ratio		Cash Deposit ratio		Group Rank	
	Mean (%)	Rank	Mean (%)	Rank	Mean (%)	Rank	Mean (%)	Rank	Mean	Rank
ICICI Bank	8.14	1	13.84	1	98.09	1	6.90	1	1	1
Axis Bank	5.04	2	10.03	2	85.69	2	6.47	2	2	2

Source: Compiled from Annual Reports of selected banks

INTERPRETATION

On the basis of group average of four ratios of Liquidity expressed in Table 6, it is evident that the group average of ICICI Bank (1) is lower than Axis bank (2) for the study period. This implies that **ICICI Bank scores over Axis Bank in terms of Liquidity** due to better performance in all the sub-parameters.

CHART 5: COMPOSITE LIQUIDITY



COMPOSITE RANKING (OVERALL PERFORMANCE) OF BANKS

The composite ranking (overall performance) is determined by taking an average of the group ranking of all parameters under study (CAMEL) of both ICICI Bank and Axis Bank.

TABLE 7: OVERALL RANKING

BANK	C	A	M	E	L	Average	Rank
ICICI BANK	1.33	2	1.75	1.5	1	1.52	2
AXIS BANK	1.67	1	1.25	1.5	2	1.48	1

Source: Compiled from Annual Reports of selected banks

INTERPRETATION

Table 7 shows the overall performance of banks on Capital Adequacy, Asset Quality, Management Efficiency, Earnings Quality and Liquidity – CAMEL parameters for the period 2011-2019.

It is found that under the **Capital Adequacy parameter**, ICICI Bank is ranked first followed by Axis Bank. Under the **Asset Quality parameter**, Axis Bank is ranked first followed by ICICI Bank. Under the **Management Efficiency parameter**, Axis Bank is ranked first followed by ICICI Bank. Under the **Earnings Quality parameter**, both ICICI Bank and Axis Bank are on par with each other. Under the, **Liquidity parameter**, ICICI Bank is ranked first followed by Axis Bank

Taking a consolidated view, it can be observed that **Axis Bank is ranked first** because of its strong performance in Asset Quality and Management Efficiency followed by **ICICI Bank in the second position**.

FINDINGS**I. CAPITAL ADEQUACY**

- **ICICI Bank ranked first** with a **higher mean Capital Adequacy Ratio** of 18% followed by Axis Bank with a mean of 15.33% which reveals that ICICI Bank has performed better than Axis Bank in maintaining minimum capital to mitigate risks.
- **ICICI Bank ranked first** with a **lower mean Debt-Equity ratio** of 6.68 times followed by Axis Bank with a mean of 9.67 times which clearly indicates that Axis Bank has maintained a higher level of Debt-Equity ratio than that of ICICI Bank for the entire study period.
- **Axis Bank ranked first** with a **higher mean Advance to Total Assets ratio** of 60.96% followed by ICICI Bank with a mean of 57.50% which shows the growth in investment of Axis Bank.
- **ICICI Bank** performed better than Axis Bank in **Capital Adequacy parameter**. This is evident from the overall group mean of ICICI Bank (1.33) which is lower than Axis Bank (1.67) indicating that ICICI Bank has a good risk management system and has greater capacity to meet its additional capital needs.

II. ASSET QUALITY

- **Axis Bank ranked first** with a **lower mean Net NPA to Total Asset ratio** of 0.92% followed by ICICI Bank with a mean of 1.39% which reveals efficient management of assets by Axis Bank.
- **Axis Bank ranked first** with a **lower mean Gross NPA to Total Asset Ratio** of 1.90% followed by ICICI Bank with a mean of 3.36% which indicates that Axis Bank's assets are in good shape.
- **Axis Bank ranked first** with a **lower mean Net NPA to Net Advance ratio** of 1.48% followed by ICICI Bank with a mean of 2.37% which shows that Axis Bank has powerful strategies to employ advances in secured hands.
- **Axis Bank ranked first** with a **lower mean Total Investment to Total Asset ratio** of 26.97% followed by ICICI Bank with a mean of 27.25% which demonstrates that Axis Bank is adopting an aggressive policy and focussing on advancing the money rather than investing for future growth of business.
- **Axis Bank** performed better than ICICI Bank in **Asset Quality parameter**. This is evident from the overall group mean of Axis Bank (1) which is lower than ICICI Bank (2) indicating that Axis Bank has managed its assets and NPA's in a better way and has invested their assets at the right place.

III. MANAGEMENT EFFICIENCY

- **ICICI Bank ranked first** with a **higher mean Return on Assets** of 1.26% followed by Axis Bank with a mean of 1.16% which reveals that ICICI Bank is generated more revenue by efficiently managing its assets.
- **Axis Bank ranked first** with a **higher mean Return on Equity** of 12.70% followed by ICICI Bank with a mean of 10% which indicates that Axis Bank is maximising the wealth of its shareholders by earning huge profits.
- **Axis Bank ranked first** with a **higher mean Profit per Employee** of Rs. 11.43 Lakhs followed by ICICI Bank with a mean of Rs. 11.28 Lakhs which shows a higher efficiency of the employees and management of Axis Bank.
- **Axis Bank ranked first** with a **higher mean Business per Employee** of Rs. 13.63 Crores followed by ICICI Bank with a mean of Rs. 10.81 Crores which demonstrates that the manpower resources of Axis Bank are more efficient.
- **Axis Bank** performed better than ICICI Bank in **Management Efficiency parameter**. This is evident from the overall group mean of Axis Bank (1.25) which is lower than ICICI Bank (1.75) indicating that Axis Bank has greater productivity and good working management.

IV. EARNINGS QUALITY

- **ICICI Bank ranked first** with a **higher mean Operating Profit to Total Assets ratio** of 2.74% followed by Axis Bank with a mean of 2.72% which reveals that ICICI Bank has utilised its assets to its fullest capacity.
- **Axis Bank ranked first** with a **higher mean Net Interest Margin** of 2.91% followed by ICICI Bank with a mean of 2.66% which indicates that Axis Bank is effectively utilising its assets.
- **Axis Bank ranked first** with a **higher mean Interest Income to Total Income ratio** of 80.09% followed by ICICI Bank with a mean of 79.27% which shows that Axis Bank has invested in approved securities to earn interest and given more advances to its customers.
- **ICICI Bank ranked first** with a **higher mean Non-Interest Income to Total Income ratio** of 20.73% followed by Axis Bank with a mean of 19.91% which demonstrates that ICICI Bank is generating a higher proportion of fee-based income.
- Both **Axis Bank and ICICI Bank stand on par with each other** in terms of **Earnings quality parameter**. This is evident from the equal overall group mean of both the banks (1.50) indicating that both the banks have capacity to earn regular cash inflows and can earn better profits in future so as to sustain in the market.

V. LIQUIDITY

- **ICICI Bank ranked first** with a **higher mean Liquid Asset to Total Asset ratio** of 8.14% followed by Axis Bank with a mean of 5.04% which reveals that ICICI Bank is more solvent and has sufficient working capital.
- **ICICI Bank ranked first** with a **higher mean Liquid asset to Total Deposit ratio** of 13.84% followed by Axis Bank with a mean of 10.03% which indicates the greater capacity of ICICI Bank to fulfil the demand and advance money to people.
- **ICICI Bank ranked first** with a **higher mean Credit Deposit ratio** of 98.09% followed by Axis Bank with a mean of 85.69% which shows that a larger percentage of deposits mobilised has been lent to different sectors leading to an improvement in the profitability of ICICI Bank.
- **ICICI Bank ranked first** with a **higher mean Cash Deposit ratio** of 6.90% followed by Axis Bank with a mean of 6.47% which demonstrates that ICICI Bank has created more cash assets from the mobilised deposits instead of accumulating idle cash.
- **ICICI Bank** performed better than Axis Bank in **Liquidity parameter**. This is evident from the overall group mean of ICICI Bank (1) which is lower than Axis Bank (2) indicating that ICICI Bank has invested its cash in high return securities and has good amount of working capital.

SUGGESTIONS**I. CAPITAL ADEQUACY**

- To boost the confidence of creditors and depositors, **Axis bank** should increase equity or reduce debts in their capital structure.
- **ICICI Bank** should increase its advances in order to earn more interest resulting in profitability.

II. ASSET QUALITY

- **ICICI bank** should reformulate its credit appraisal techniques in order to avoid the risk of default on loans.
- **ICICI Bank** should also manage its NPA's and assets in a better way and focus on advancing their money rather than investing for future purpose.

III. MANAGEMENT EFFICIENCY

- **Axis bank** should generate more revenue by efficiently managing its assets.

- **ICICI bank** should generate more profits for maximizing the wealth of its shareholders, for the betterment of its employees and its manpower resources.

IV. EARNINGS QUALITY

- **Axis bank** has to completely utilize their assets to the full capacity and also need to add more fee-based products and services in its portfolio.
- **ICICI bank** should be able to increase their interest earning capacity in order to give in more advances to its customers, which further more will increase the interest income.

V. LIQUIDITY

- **Axis bank** should formulate an appropriate strategy of liability and assets management in order to meet the demand of its liability holders.
- **Axis bank** should also optimally use its mobilised deposits and create more cash and loan assets in order to maintain liquidity and increase profitability.

CONCLUSION

CAMEL analysis is a risk based monitoring approach that is used by supervisors to determine credit ratings for banks and the robustness of the banking system. This supervision approach which gained popularity since the financial crisis provides a simplistic, reader friendly version of presenting complex data regarding performance of a set of players in the banking industry. The ranking system also makes analysing and judging of the financial data of banks much simpler for the common man.

The current study and discussion thereon, certainly reveals the financial performance of Axis Bank and ICICI Bank. With all the challenges, we concluded that both the banks performed well on the Earnings Quality parameter. ICICI Bank performs well on the Capital Adequacy and Liquidity parameter whereas Axis Bank performs well on the Asset Quality and Management Efficiency parameter. Also, Out of the 19 ratios used in the CAMEL model, the average figures of Axis Bank is the best for 10 ratios followed by ICICI Bank (9 ratios). Thus it is established that the overall performance of Axis Bank is better compared to ICICI Bank.

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