Basel III: Cost-Benefit analysis for Indian Banks

Siddharth Shukla[1]
Dr. Akash Patel[2]

Abstract

Ever since the global financial crisis hit the world economy in 2008, Basel Committee on Banking Supervision (BCBS) has been instrumental in suggesting regulations which will largely enhance the banking system's ability to absorb economic upheavals. The suggested Basel-III regulations are an improved version of the earlier Basel-II banking regulations. It primarily emphasizes the need for additional capital, liquidity maintenance and leverage ratio requirements. The requirement of additional capital is associated with the cost of capital. This paper is an effort to carry out a cost-benefit analysis of Basel-III implementation for Indian banks.

The first part of this paper provides a brief background of Basel regulations. Earlier studies carried out in this field are reviewed and presented in the subsequent sections. Based on the past trend and suggested Basel-III accord, the paper quantifies the additional capital required by Indian banks by March-2019. The possible losses are quantified in terms of possible loss in GDP in case a financial crisis hits the economy as on date. The findings, scope for further research and limitations of the study are mentioned in the concluding part of the paper.

Key words: *Basel-III, Cost-Benefit analysis, Financial Crisis*

1 Ph.D. Student at School of Petroleum Management, Pandit Deendayal Petroleum University, Gandhinagar, Gujarat
2 Professor - School of Petroleum Management, Pandit Deendayal Petroleum University, Gandhinagar, Gujarat

Introduction

The international financial markets were badly hit in 1974 due to the Herstatt Bank incident. On account of making wrong bets on the US Dollar, the Herstatt Bank had accumulated losses of Deutsche Mark (DM) 470 million by June, 1974 against capital of only DM 44 million. This caused the German regulators to stop operations of the bank on June 26, 1974. The bank had received payments in Deutsche Mark which were to be delivered in New York in US Dollars; however, due to termination of operations of the bank on closure of business hours at 16:30, the Herstatt Bank could not complete this transaction although it was 10:30 hours in New York. Thus, counterparty banks could not receive their US dollar payments.

This incident can be considered as the root for the development of a system to regulate international payments. In 1974, the G10 countries formed a committee under the sponsorship of Bank for International Settlement (BIS), called the Basel Committee on Banking Supervision (BCBS). The committee consists of Governors of Central Banks of the respective member countries and has its secretariat at Basel in Switzerland. The prime objective of the committee is to enhance understanding of key supervisory issues and improve the quality of banking supervision worldwide.

Some of the core functions of the Basel Committee are to standardise banking regulations across different countries, to ensure proper supervision of banks by the respective regulatory authority of the member country and to promote uniform capital requirements across banks. However, the original aim of the Basel Committee was to enhance financial stability by improving supervisory knowledge and quality of banking supervision; later, the committee's focus shifted to monitoring and ensuring capital adequacy of the banking system.

In 1988, BCBS advocated the first accord on banking regulation in the form of Basel-I by giving due consideration to risk-based capital adequacy. The main focus area for Basel-I was to manage credit risk prevailing in the banking industry. The Basel-I accord categorised assets of financial institutions under five categories and assigned them different risk weights viz: 0%, 10%, 20%, 50% and 100%. Under this accord, the profile of the borrower was not given due consideration while assigning risk weights to assets i.e. irrespective of credit ratings, all the loans to corporates were assigned risk weight of 100%. However, the 'one-size-fits-all' approach of this accord failed to keep pace with banking innovations and focus on credit risk only rendered the Basel-I accord less effective and gradually obsolete.

Basel-II accord introduced in 2004 was aimed at addressing most of the shortcomings of Basel-I. Besides imposing minimum capital requirement according to technological advancements, Basel-II was expected to incorporate enhanced supervisory review and greater disclosure as a part of market discipline. Basel-II was expected to provide a more risk sensitive approach while maintaining the overall level of capital for the banks. The three pillars introduced under Basel-II viz: (1) Minimum capital requirement (2) Supervisory process review and (3) Market discipline provided enough room for the development of banks' internal risk management methodologies and more incentives to enhance their efficiency in risk management. In the Basel-II accord, operational risk was also given due weightage, in addition to credit and market risks. However, the basic structure was kept intact i.e. Capital Adequacy Ratio was specified to be maintained at more than or equal to 8 percent, the credit worthiness of the borrowers was given due weightage instead of the earlier approach of common risk weight across the given category of borrowers.

The financial crisis of 2008, which affected global markets, raised the question of effectiveness and efficiency of Basel-II accord to manage the changing banking scenario. Some reasons cited by researchers for failure of the Basel-II accord are – it didn't provide stricter controls on capital buffers; there was excessive reliance on ratings given by external agencies and omission to give due consideration to some of the probable avenues for high risks. In an effort to make up for the loopholes under Basel-II, BCBS introduced Basel-III accord under which due consideration is given to quality of capital and liquidity along with introduction of capital buffers.

This paper is an attempt to conduct cost-benefit analysis of Basel-III implementation for Indian banks.

The major recommendations under Basel-III as suggested by BCBS are as follows:

1) Tier-I Capital: It is a core measure of a bank's financial strength from the regulator's point of view. It primarily consists of common stocks, disclosed reserves and may also include non-redeemable non-cumulative preference stocks. Tier-I capital consists of two components i.e. Common Equity Tier-I (CET-1) and Additional Tier-I (AT-1). Equity is considered as the main component to absorb the loss in any business; on a similar logic, in order to absorb the loss, common equity and retained earnings are declared as the predominant form of Tier-I capital i.e. CET-1, and have been stipulated to be maintained at 4.5 per cent of risk weighted assets, which was allowed as low as 2 percent under Basel-II. Additional Tier-1 capital consists of capital instruments which are continuous in nature and have no fixed maturity like preference shares and high contingent convertible securities. Total capital of the bank consists of Tier-1 and Tier-2 capital collectively wherein Tier-2 capital consists of revaluation reserves, undisclosed reserves, hybrid instruments and subordinated term debts. The ratio of different forms of Capital to Risk Weighted Assets gives the measure of different ratios viz: Common Equity Tier-1 capital ratio, Tier-1 capital ratio and Total Capital ratio.

2) Capital Conservation Buffer: It is designed to ensure that banks build up capital buffers during normal working periods which can be drawn as losses occur (if any) during a period of stress. It is simply based on the principal of capital conservation. In addition to Capital Adequacy Ratio (CAR) to be maintained at 8 percent, Capital Conservation Buffer to the extent of 2.5 per cent of risk weighted assets has been introduced, which is to be maintained in the form of Tier-I common equity.

3) Counter-Cyclical Buffer: Counter Cyclical Buffer aims to ensure that the banking sector's capital requirements consider the macro financial environment in which banks operate. It will be deployed at the instructions of the national regulators when excessive credit growth is judged to be associated with a build up of system wide risk. In order to control excessive growth during a boom period and to maintain sustainable growth during an economic downfall, Counter Cyclical Buffer (CCB) has been introduced. CCB is to be maintained up to 2.5% of risk weighted assets as per Basel-III.

4) Leverage Ratio: It is the ratio of capital measure to exposure measure, or in simple terms, how much of the capital comes in the form of debt. Exposure measure includes sum of the exposures of all assets and non-balance sheet items. The ratio is specified to be maintained in excess of 3% under Basel-III. One of the underlying causes of the global financial crisis was build-up of excessive on and off balance-sheet exposures. Given this fact,

although the leverage ratio is a non-risk based ratio, it is supposed to work as a credible supplementary measure to risk-based capital requirements.

5) Liquidity Coverage Ratio (LCR): LCR refers to highly liquid assets held by financial institutions to meet short term obligations. In order to meet short term obligations, the financial institutions are supposed to maintain sufficient High Quality Liquid Assets (HQLA). LCR is defined as follows by BCBS.

   LCR = (Stock of HQLA) / (Total net cash outflows over the next 30 calendar days)

   >= 100%

   This ratio may serve as a generic stress test which aims to anticipate market wide shock. The purpose of introduction of this ratio is to ensure that banks are sufficiently equipped to handle short term liquidity disruptions.

6) Net Stable Funding Ratio (NSFR): NSFR is a quantitative measure of availability of sources of funding i.e. liabilities over the requirement for funding i.e. assets. NSFR is defined as follows by BCBS.

   NSFR= (Available amount of stable funding) / (Required amount of stable funding)

   >= 100%

   This ratio calculates the proportion of long term assets funded by long term liabilities. Available stable funding is defined as the portion of capital and liabilities expected to be reliable over the time horizon considered by the NSFR, which extends to one year. Typically Available Stable Funding (ASF) is the sum of customer deposits and long term wholesale funding (available from interbank market) and equity. The long term requirement or the denominator includes 100 percent loans longer than one year, 85 percent and 50 percent of loans to retail clients and corporate clients respectively with balance tenure shorter than one year, 20 percent of government and corporate bonds and off-balance sheet exposure.

Literature Review

Considerable research has been done on Basel-III and its probable impacts considering various parameters. One such research study by Vigneshwara Swamy (2013) estimated the impact of Basel-III implementation on Indian banks in terms of loan spread, additional capital required and cost-benefit analysis of Basel-III implementation. Other research in this subject is discussed below.

IMF (2009), using 88 banking and 222 currency crises across the world, found the cost of a financial crisis at 10 percent peak loss of output with a 10 percent loss in output in the long run.

BCBS (2010a) finds that one percent increase in capital requirement is associated with 260 basis points (bps) reduction in probability of a financial crisis. Additional one percent increase in capital ratio will further decrease the probability by 160 bps. BCBS finds that peak and long term losses in output are nine percent and six percent respectively. In addition, the 100 bps increase in capital ratio raises loan spread by 13 bps.

Yan, Hall and Turner (2011) analysed Basel-III and carried out long-term cost-benefit analysis for United Kingdom considering the capital and liquidity requirements as proposed by BCBS. The research concluded that Basel-III reforms will have a significant net positive effect on the United Kingdom economy. The estimated benefits derived from research were much larger than the average estimates of BCBS.

Roger and Vlcek (2011) calculate that 200 bps increase in capital ratio increases the loan spread by 200 bps in the short run and 15 bps in the long run. Further 100

bps increase in risk weighted capital requirement causes 10 bps drop in steady state output in the economy. Miles et al., (2013) find that 100 bps increase in capital requirement causes increase in lending spread by 0.8 bps.

In European Commission's report of the year 2012, the macro economic impact of setting Minimum Capital Requirement (MCR) at different levels in European Union (EU) countries was analysed. In this report, Systematic Model of Banking Originated Losses (SYMBOL- developed by JRC, DG MARKT, and experts of banking regulations) is used to estimate reduction in probability of a systematic banking crisis and recapitalization estimates are obtained from the year 2009. One of the two major findings from the research work was that reduction in probability of a systematic banking crisis depends mainly on the bank's initial level of capital and additional capital required to comply with Basel-III norms. The other finding was with respect to macro economic impacts i.e. the net benefit of implementation of Basel-III is always positive and almost always larger in case capital conservation buffer is introduced.

The report published by Reserve Bank of New Zealand (2012) states that the key benefit of higher capital ratios as suggested by BCBS is reduced probability of a financial crisis. Higher capital ratios will increase Inland Revenue share of foreign banks' global tax payments and reduce expected government payments to foreigners in case of a bank bailout scenario. In the initial phase, the cost of increased capital requirement will be covered by increasing the lending rates; however, this effect will be temporary and the benefits so derived in terms of prevention in decline of Gross Domestic Product (GDP) are fully justifiable for the cost incurred by the banks.

In his paper, Aosaki Minoru (2013) carried out cost-benefit analysis of Basel-III implementation across different economies of the world viz: United States, Japan and European Union. He compared and analysed economic cost-benefit analysis under different economic environments considering factors such as size of the banking sector in financial intermediation, size of banks' assets compared to GDP, additional capital required, methods used by banks to raise capital ratio and cross-border bank activities. The report recommended that implementation of Basel-III should be complimented with additional measures to stabilise financial markets. Additionally, policy level recommendations were made to ensure benefit and reduce cost of implementation of Basel-III.

Kupie Paul (2013), in his paper, states that community based banks will find it difficult to raise additional capital as specified under Basel-III and there is no proven evidence that enhanced capital will provide stability to the system. The requirement of counter cyclical buffer is also questioned on the basis that its governance lacks transparency. The paper states that Basel-III rules are too complex to be effectively implemented and these will prove ineffective in controlling large bank risks.

Brooke et al. (2015), using a smaller set of countries, estimated the effect of a financial crisis on economic output and found peak and long term output losses of 5 percent and 4 percent respectively as compared to the pre-crisis level.

Romer and Romer (2015), using 24 events for member countries of Organization for Economic Co-Operation and Development (OECD), found that peak and long term losses in output due to a financial crisis were 4 and 3 percent respectively.

Angelini et al., (2015), using 13 different models across different jurisdictions, found that 100 bps increase in risk weighted capital requirement causes 2 to 35 bps drop in steady state output.

Fender Ingo and Lewrick Ulf (2016), in their paper, used a simple conceptual framework to assess macroeconomic impact of Basel-III reforms including leverage ratio surcharge for Global Systematically Important Banks (G-SIBs). The paper states that impact of Basel-III implementation on lending and GDP need not be always negative. The paper further cites some studies regarding positive relationship between enhanced capital base and loan volume. The paper concludes that Basel-III reforms are expected to yield sizable net marginal macroeconomic benefits. Additionally, given the conservative approach (i.e. generally researchers overestimate the associated costs), there is enough scope for the authorities to increase regulatory capital requirement.

Gambacorta and Shin (2016), in their working paper series, state that 100 bps increase in equity to total capital ratio decreases cost of debt by 400 bps and loans grow by 60 bps. Additionally, 100 bps increase in capital ratio is associated with decrease in cost of funds by two to three bps.

Shakdwipee P. and Mehta M., (2017), using secondary data, did a descriptive analysis of the various requirements to be fulfilled by Indian banks to comply with Basel-III norms. The study concludes that implementation of Basel-III norms will make the Indian banking system much safer. However, the implementation of Basel-III is a costly affair. In the long run, the macroeconomic benefits will outweigh the costs associated with implementation.

Giordana G.A. and Schumacher I, (2017) studied how parameters specified under Basel-III regulations i.e. Capital Adequacy Ratio, Net Stable Funding Ratio and Liquidity Coverage Ratio are going to affect banks' profitability (i.e. ROA), capital levels and default. The study concludes that the regulations will reduce the risk of bank defaults and improve the banking sector's soundness. The associated cost to adhere to Basel-III regulations is around 75 basis points decline in a bank's ROA.

Sachar A. and Roberts D. (2018) examined liquidity creation per unit of assets of the bank subject to compliance with liquidity coverage ratio using liquidity measure i.e. Liquidity Mismatch Index. They found that post 2013, there has been lower liquidity creation by LCR compliant banks, which is not offset by LCR non-compliant banks. They also noted a sharper decline in commercial and residential real estate finance by LCR compliant banks. Thus, there has been lower liquidity creation in the banking system which is in line with the objective of LCR.

Miller and Sowerbutts (2018) model assesses the interaction between banks' liquidity regulation and banks' funding cost. They state that while forcing banks to hold more liquid assets affects their profit, it also allows banks to pay less for their funding; thus, it offsets some costs associated with complying with the liquidity regulations. Further, the benefits of complying with liquidity regulations depend on the level of the bank's capital as well, and no benefits occur if the capital ratio is below a certain level.

Most research work is based on developed countries. Some of the recent research work is done on liquidity measures specified under Basel-III regulations which only present a microeconomic picture. In most of the literature reviewed, it is assumed that cost of additionally required capital is passed on to the borrowers by increasing the lending rates. In this paper, the cost of capital for additionally required capital (i.e. Return on Equity as expected by investors) is also considered and thus, the present value of the additionally required capital gives a clear view of associated cost of implementation of Basel-III accord. However, some analysis has been done to work out the cost-benefit analysis, but that is not in absolute numerical terms. In any case, Basel-III regulations are

yet to be fully implemented in India which makes it important to study the associated costs and probable benefits that could be derived from these regulations.

Research Methodology

This study mainly focuses on quantifying the cost of capital required by Indian banks to comply with specified Basel-III parameters in terms of Common Equity Tier (CET)-1 ratio, Tier-1 ratio and Total Capital Ratio.

The amount of capital available with various banks for the year 2016 as reported in their Basel-III disclosure document was considered as the base. Indian banks are required to achieve CET-1, Tier-1 and Total Capital ratio at 5.5%, 7% and 9% respectively by year 2019. Indian banks are also required to maintain Capital Conservation Buffer (CCB) in the form of common equity to the tune of 2.5 percent of risk weighted assets. The annual growth in Risk Weighted Assets (RWAs) of the banks is assumed at 16% in this study. Additionally required capital is calculated as the difference between present level of capital and capital required by 2019 to maintain specified CET-1, Tier-1 and Total Capital Ratio. The present value of additional capital required is calculated to give a better estimation of additional capital required as on date.

The benefits are quantified in terms of prevention in fall of Gross Domestic Product (GDP) due to presence of Basel-III regulations. As per the study conducted by International Monitory Fund (IMF) in 2009, the effect of a financial crisis lasts for 7 years. For the first five years, reduction in GDP is by 10 percent and for the remaining two years, by 2.5 percent. For this study, the assumed growth in GDP is considered as 8 percent in absence of a financial crisis. Further, the opportunity cost (i.e. difference between expected growth in GDP in absence of a financial crisis and actual growth/ retardation in GDP due to presence of a financial crisis) is calculated to give a clear view of merits of implementation of Basel-III accord.

Present Value (PV) approach has been used in the study because it gives a better estimation for comparing the additional cost associated with implementation of Basel-III accord and future benefits which could be derived from the implementation of Basel-III. The cost of capital for discounting purpose is taken as 8 percent (chosen based on other similar studies).

Data source and sample size

The data required for this research work was taken from the database of Reserve Bank of India (RBI) and financial statements of various banks published periodically. The details of Risk Weighted Assets (RWAs), CET-1, Additional Tier (AT)-1, Tier-2 capital and relevant ratios were considered for 21 public sector banks, State Bank of India group and 19 private sector banks for year 2016. The data collected for the purpose of this study is shown below.

ISSN: 0971-1023 | NMIMS Management Review
Volume XXXVI | Issue 3 | October 2018

Table 1: Details of Risk Weighted Assets (RWAs), CET-1, Additional Tier (AT)-1, Tier-2 capital

(Values for RWA, CET-1, AT-1 and Tier-2 in INR million)

S.N.	Name Of Bank	Total RWA	CET1	AT1	Total Tier-1	Tier-2	Sum of Tier-1 and Tier-2	CET-1 Ratio	TIER-1 Ratio	Total Capital Ratio
1	Allahabad Bank	1573842	134110	1684	135794	41029	17682	0.0852	0.0863	0.1124
2	Andhra Bank	1356430	106157.9	14113.6	120271.5	37674.4	15795	0.0783	0.0887	0.1164
3	Bank Of Baroda	3958675	426755.4	20059.2	446814.6	92787.4	53960	0.1078	0.1129	0.1363
4	Bank Of India	35035500	2700087	600840	3300930	1121620	442255	0.0771	0.0942	0.1262
5	Bank Of Maharashtra	1016903	80094	11679.3	91773.5	22216.1	11399	0.0788	0.0902	0.1121
6	Bharatiya Mahila Bank Ltd*	3749.1	10000	0	10122.6	3.5	1013	2.6673	2.7	2.7009
7	Canara Bank	3351643	276979.4	20870.1	297849.5	76594.9	37444	0.0826	0.0889	0.1117
8	Central Bank Of India	2031987	163259	3395	166654	44793	21145	0.0803	0.082	0.1041
9	Corporation Bank	1498843	119758	13639	133397	36272	16967	0.0799	0.089	0.1132
10	Dena Bank	876163.5	62543.7	12736.2	75279.9	21073.3	9635	0.0714	0.0859	0.11
11	Idbi Bank Limited	2958496	238456.2	27192.8	265649	82383.8	34803	0.0806	0.0898	0.1176
12	Indian Bank	1250637	147980.7	4968.1	152948.8	14032.5	16698	0.1183	0.1223	0.1335
13	Indian Overseas Bank	1943650	127336.5	14510	141846.5	54595.7	19644	0.0655	0.073	0.1011
14	Oriental Bank Of Commerce	1685989	143685.1	9728.8	153413.9	44838.3	19825	0.0852	0.091	0.1176
15	Punjab And Sind Bank	586143.6	54447.1	0	54447.1	9500	6395	0.0929	0.0929	0.1091
16	Punjab National Bank	4580216	388315.8	76720.8	465036.6	137057	60209	0.0848	0.1015	0.1315
17	Syndicate Bank	1730706	121398.2	12775.6	134173.8	58961.3	19314	0.0701	0.0775	0.1116
18	Uco Bank	1299491	97778	1380	99158	25990	12515	0.0752	0.0763	0.0963
19	Union Bank Of India	2750057	218986.5	5279.7	224266.2	66423.6	29069	0.0796	0.0815	0.1057
20	United Bank Of India	730794.4	56697.3	1371.8	58069.1	15725.4	7379	0.0776	0.0795	0.101
21	Vijaya Bank	838832	69735	9558.3	79293.3	26210.6	10550	0.0831	0.0945	0.1258
22	Sbi	17726840	1714292	35504.8	1749797	540343	229014	0.0967	0.1292	0.0987

S.N.	Name Of Bank	Total RWA	CET1	AT1	Total Tier-1	Tier-2	Sum of Tier-1 and Tier-2	CET-1 Ratio	TIER-1 Ratio	Total Capital Ratio
23	Axis Bank	4125114	518053	2523	520576	115224	63580	0.1256	0.1541	0.1262
24	Catholic Syrian Bank Ltd	70930.1	6919.8	0	6919.8	565.4	749	0.0976	0.1055	0.09756
25	City Union Bank Limited	200824.2	30294	0	30294	985.7	3128	0.1508	0.1558	0.15085
26	Dcb Bank Limited	134298.7	17181.7	0	17181.7	1768.5	1895	0.1279	0.1411	0.12794
27	Dhanlaxmi Bank	6704.8	4102.9	0	4102.9	934.9	504	0.6119	0.7514	0.61193
28	Federal Bank	584293.6	79805.4	0	79805.4	3544.6	8335	0.1366	0.1427	0.13658
29	Hdfc Bank	5604256	738753.8	342.9	739096.7	127012	86611	0.1318	0.1545	0.13188
30	Icici Bank	6707621	867270.4	13390.9	880710.6	232887	111360	0.1293	0.166	0.1313
31	Indusind Bank	1162875	173497.6	0	173497.6	6695.6	18019	0.1492	0.155	0.1492
32	Jammu & Kashmir Bank Ltd	601557.9	63771.8	0	63771.8	7278.8	7105	0.1060	0.1181	0.10601
33	Karnataka Bank Ltd	347873.4	36751.8	0	36751.8	5100.6	4185	0.1056	0.1203	0.10565
34	Karur Vysya Bank	360989.9	40644.3	0	40644.3	3295.2	4394	0.1126	0.1217	0.11259
35	Kotak Mahindra Bank Ltd**	1986187	319907.4	95.8	320003.2	17076.2	33708	0.1611	0.1697	0.16111
36	Lakshmi Vilas Bank	180457.1	15685	0	15685	3568.9	1925	0.0869	0.1067	0.08692
37	Nainital Bank	33951.8	5178.8	0	5178.8	151	533	0.1525	0.157	0.15253
38	Rbl	267609.7	29715	0	29715	4915.4	3463	0.1110	0.1294	0.11104
39	South Indian Bank	371993.4	36569.5	0	36569.5	7417.2	4399	0.0983	0.1182	0.09831
40	Tamilnad Mercantile Bank Ltd	240261.1	29222.4	0	29222.4	1427.7	3065	0.1216	0.1276	0.12163
41	Yes Bank Ltd.	1328553	137221	5679	142900	76101	21900	0.1033	0.1648	0.10756

Source: Reserve Bank of India statistical tables relating to banks in India, Basel-III disclosures by various banks and authors' own calculations
**Data for year 2014, **including financials of Ing Vysya Bank Limited*

Cost Calculation

As per RBI directives, banks in India are required to maintain CET-1 ratio, Tier-1 ratio and Total capital ratio at 5.5 percent, 7 percent and 9 percent respectively, in addition to Capital Conservation Buffer (CCB) of 2.5 percent, by year 2019. The Risk Weighted Assets figures for year 2016 as given in Table 1 were considered and multiplied by 1.561 (i.e. assuming 16 percent growth in Risk Weighted Assets per annum) for computing the amount of Risk Weighted Assets for year 2019. The required amount of CET-1, Tier-1 Capital and Total Capital was calculated by multiplying the expected figure of Risk Weighted Assets with 0.08, 0.095 and 0.115 respectively. The quantum of additionally required CET-1, Tier-1 and Total Capital was calculated as the difference between available amount of CET-1, Tier-1 and Total Capital (as shown in Table 1).

Table 2: Calculation of additional CET-1, Tier-1 and Total Capital required to comply with Basel-III regulations

(All Values in INR million)

S.N.	Name Of Bank	Risk Weighted Assets By 2019=1.561*Rwa As On 31.03.2016	Req Cet-1 + Ccb @ 8%	Req Tier-1 + Ccb @ 9.5%	Req Total Cap + Ccb @ 11.5%	Additional Cet-1 Required	Additional Total Tier-1 Cap Req	Required Additional Total Capital
1	Allahabad Bank	2456452.6	196516.2	233363	282492	62406.2	97569	105669
2	Andhra Bank	2117115.2	169369.2	201125.9	243468.2	63211.3	80854.4	85522.3
3	Bank Of Baroda	6178699.3	494295.9	586976.4	710550.4	67540.5	140161.8	170948.4
4	Bank Of India	54683408.4	4374672.7	5194923.8	6288592	1674585.7	1893993.8	1866045.2
5	Bank Of Maharashtra	1587181.9	126974.6	150782.3	182525.9	46880.6	59008.8	68536.3
6	Bharatiya Mahila Bank Ltd -2014	7873.1	629.8	747.9	905.4	-9370.2	-9374.7	-9220.7
7	Canara Bank	5231244.6	418499.6	496968.2	601593.1	141520.2	199118.7	227148.7
8	Central Bank Of India	3171525.3	253722	301294.9	364725.4	90463	134640.9	153278.4
9	Corporation Bank	2339394.2	187151.5	222242.4	269030.3	67393.5	88845.4	99361.3
10	Dena Bank	1367516	109401.3	129914	157264.3	46857.6	54634.1	60911.1
11	Idbi Bank Limited	4617620.2	369409.6	438673.9	531026.3	130953.4	173024.9	182993.5
12	Indian Bank	1951994.1	156159.5	185439.4	224479.3	8178.8	32490.6	57498
13	Indian Overseas Bank	3033649.55	242692	288196.7	348869.7	115355.5	146350.2	152427.5
14	Oriental Bank Of Commerce	2631492.3	210519.4	249991.8	302621.6	66834.3	96577.9	104369.4
15	Punjab And Sind Bank	914852.9	73188.2	86911	105208.1	18741.1	32463.9	41261
16	Punjab National Bank	7148801.3	571904.1	679136.1	822112.1	183588.3	214099.5	220018.5
17	Syndicate Bank	2701286.1	216102.9	256622.2	310647.9	94704.7	122448.4	117512.8
18	Uco Bank	2028245.6	162259.6	192683.3	233248.2	64481.6	93525.3	108100.2
19	Union Bank Of India	4292289.4	343383.2	407767.5	493613.3	124396.7	183501.3	202923.5
20	United Bank Of India	1140623.9	91249.9	108359.3	131171.7	34552.6	50290.2	57377.2
21	Vijaya Bank	1309249	104739.9	124378.7	150563.6	35004.9	45085.4	45059.7

ISSN: 0971-1023 | NMIMS Management Review
Volume XXXVI | Issue 3 | October 2018

S.N.	Name Of Bank	Risk Weighted Assets By 2019=1.561*Rwa As On 31.03.2016	Req Cet-1 + Ccb @ 8%	Req Tier-1 + Ccb @ 9.5%	Req Total Cap + Ccb @ 11.5%	Additional Cet-1 Required	Additional Total Tier-1 Cap Req	Required Additional Total Capital
22	Sbi	27668045.8	2213443.7	2628464.3	3181825.3	499151.9	878667.7	891685.3
23	Axis Bank	6438477.9	515078.2	611655.4	740425	-2974.8	91079.4	104625
24	Catholic Syrian Bank Ltd	110707.7	8856.6	10517.2	12731.4	1936.8	3597.4	5246.2
25	City Union Bank Limited	313446.4	25075.7	29777.4	36046.3	-5218.3	-516.6	4766.6
26	Dcb Bank Limited	209613.4	16769.1	19913.3	24105.5	-412.6	2731.6	5155.3
27	Dhanlaxmi Bank	10464.9	837.2	994.2	1203.5	-3265.7	-3108.7	-3834.3
28	Federal Bank	911965.5	72957.2	86636.7	104876	-6848.2	6831.3	21526
29	Hdfc Bank	8747123.4	699769.9	830976.7	1005919.2	-38983.9	91880	139810.1
30	Icici Bank	10469254.7	837540.4	994579.2	1203964.3	-29730	113868.6	90366.4
31	Indusind Bank	1815015.6	145201.2	172426.5	208726.8	-28296.4	-1071.1	28533.6
32	Jammu & Kashmir Bank Ltd	938911.6	75112.9	89196.6	107974.8	11341.1	25424.8	36924.2
33	Karnataka Bank Ltd	542960.8	43436.9	51581.3	62440.5	6685.1	14829.5	20588.1
34	Karur Vysya Bank	563433	45074.6	53526.1	64794.8	4430.3	12881.8	20855.3
35	Kotak Mahindra Bank Ltd	3100039.9	248003.2	294503.8	356504.6	-71904.2	-25499.4	19425.2
36	Lakshmi Vilas Bank	281657.4	22532.6	26757.5	32390.6	6847.6	11072.5	13136.7
37	Nainital Bank	52992	4239.4	5034.2	6094.1	-939.4	-144.6	764.3
38	Rbl	417685.2	33414.8	39680.1	48033.8	3699.8	9965.1	13403.4
39	South Indian Bank	580607.3	46448.6	55157.7	66769.8	9879.1	18588.2	22783.1
40	Tamilnad Mercantile Bank Ltd	374999.5	30000	35625	43124.9	777.6	6402.6	12474.8
41	Yes Bank Ltd.	2073605.5	165888.4	196992.5	238464.6	28667.4	54092.5	19463.6
	Total					**3484456.1**	**5186790.1**	**5565977**

Source: Authors' calculations

Thus, the total capital required for complying with Basel-III Accord by 2019, is INR 5.56 trillion. The present value of the said required capital by 2019 is INR 4.79 trillion considering cost of capital 8 percent.

Benefit Calculation

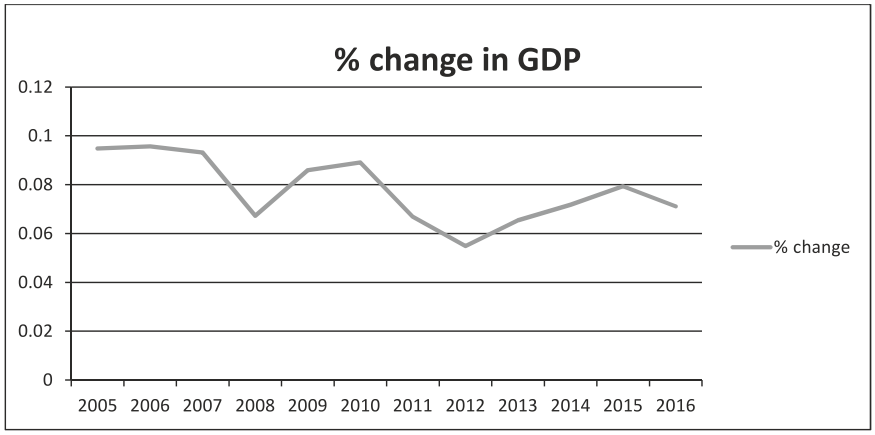
As per IMF study, the loss in GDP is calculated for the next 7 years considering 10 percent downfall for the first 5 years and 2.5 percent for the next 2 years. The data for GDP is presented in Table 3.

Table 3: GDP (absolute value in INR trillion) and % change in GDP from 2005 to 2017

Year	GDP at 2004-05 price	GDP at 2011-12 price	Percentage change
2005	29.71		
2006	32.53		0.0948
2007	35.64		0.0957
2008	38.96		0.0932
2009	41.58		0.0672
2010	45.16		0.0859
2011	49.18	49.18	0.0891
2012	52.47	87.36	0.0669*
2013	54.82	92.15	0.0548
2014	57.47	98.17	0.0654
2015		105.22	0.0718
2016		113.57	0.0793
2017		121.65	0.0711

Source: Reserve Bank of India statistical tables relating to estimate of Gross Domestic Product and authors' own calculations
(from this year onwards, percentage change is calculated on the basis of GDP at 2011-12 price base)*

Figure 1: Percentage change in GDP from year 2006 to 2017



The actual GDP till year 2017 is as shown in column (B). Column (C) shows the expected figures of GDP in absence of any financial crises whereas column (D) shows figures for GDP in case of a financial crisis in year 2017 i.e. from year 2017 onwards for the next 5 years, GDP reduces by 10% and subsequently for the next 2 years, it reduces by 2.5% each year. Opportunity loss i.e. difference of expected GDP in absence of any financial crises and GDP due to a crisis in year 2017 is shown in column (E). The actual loss i.e. difference between GDP in 2017 and reduced GDP due to a crisis as shown in column (D) is shown in column (F). Column (G) and (H) show the present value of actual GDP and expected GDP loss respectively. The discount rate considered here is 8%.

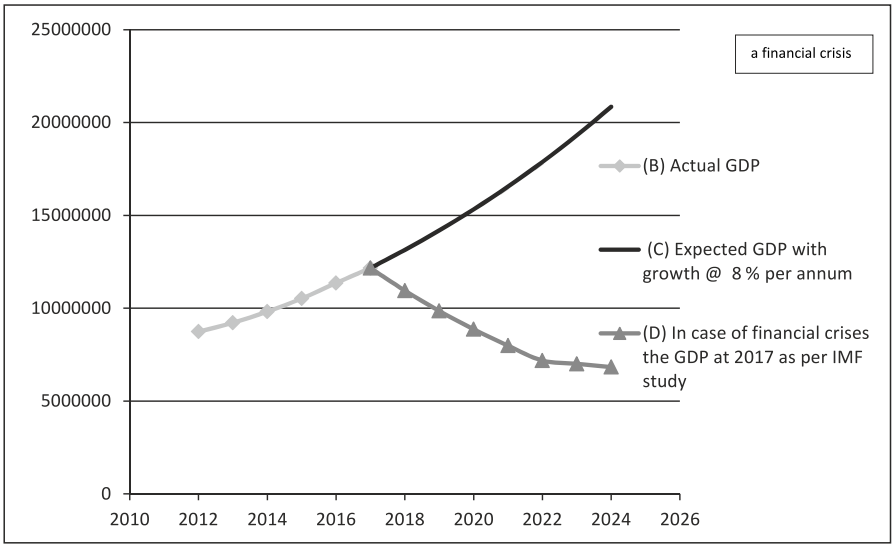
Table 4: Calculation of loss in actual GDP and expected GDP due to a financial crisis

(All values in INR trillion)

(A) Year	(B) Actual GDP	(C) Expected GDP with growth @8 % per annum	(D) GDP in case of a financial crisis the GDP in 2017 as per IMF observations	(E) Opportunity loss in GDP due to a financial crisis	(F) Actual loss from 2017	(G) Present value of actual loss	(H) Present value of Opportunity cost due to a crisis @8%
2012	87.36			-	-	-	-
2013	92.15			-	-	-	-
2014	98.17			-	-	-	-
2015	105.22			-	-	-	-
2016	113.57			-	-	-	-
2017	121.65	121.65	121.65	-	-	-	-
2018		131.38	109.48	21.89	12.16	12.16	21.89
2019		141.89	98.54	43.35	10.94	10.13	40.14
2020		153.25	88.68	64.56	9.85	8.44	55.35
2021		165.51	79.81	85.69	8.86	7.04	68.02
2022		178.75	71.83	106.91	7.98	5.86	78.58
2023		193.05	70.04	123.01	1.79	1.22	83.71
2024		208.49	68.28	140.20	1.75	1.10	88.35
Total				585.64	53.36	45.98	436.08

Source: Authors' calculations

Figure 2: Expected GDP growth at 8 percent per annum and effect of a financial crisis on GDP



Findings

Table 2 indicates that the amount of additionally required capital to comply with Basel-III regulations is INR 5.5 trillion and its present value is INR 4.78 trillion. Table 4 indicates the total loss in GDP for the next seven years is INR 53.36 trillion and its present value is INR 45.98 trillion. Thus, implementation of Basel-III regulations and incurred cost for implementation of the said regulations is justifiable.

If we consider the opportunity loss as well, we get the total loss in GDP due to a financial crisis as INR 585.64 trillion and the present value of the said loss in GDP is INR 436.08 trillion. Thus, implementation of Basel-III regulations is justified in terms of associated costs and benefits expected to be derived.

Conclusion

As is evident from data analysis, implementation of Basel-III accord for Indian banks will require additional capital of INR 5.56 trillion by year 2019. The present value of the said required capital is INR 4.78 trillion which is substantial as far as the Indian economy is concerned.

However, if we look at the benefits, it is observed that implementation of Basel-III accord can save a probable loss in GDP by INR 53.36 trillion (present value INR 45.98 trillion).

Thus, the implementation of Basel-III accord is justifiable in the given circumstances. However, as a promoter of Public Sector Banks (PSBs), the Government of India (GOI) may find it quite difficult to set aside such a huge amount of capital for all PSBs. As a logical measure, the GOI may decide to dilute the equity through various measures and infuse capital to the extent of its shareholding post equity dilution. The option of consolidation of a few weaker banks with larger and stronger banks in terms of capital can also be explored, which can reduce the amount of capital contribution from the Government.

Private sector banks seem to be well placed in terms of capital requirement, but there is a larger possibility that those private banks which become unsuccessful in terms of infusion of additional capital as required under Basel-III may become targets for takeover or forced merger.

Managerial Application And Applicability To Other Economies

This study is an effort to conduct a cost-benefit analysis associated with implementation of Basel-III accord. The cost associated with raising additional capital is worked out based on least expected average return by investors. Further, the benefits are based on loss of output in the economy due to a financial crisis. This cost-benefit analysis is expected to help the decision makers to make a well-informed decision while going ahead with the implementation of Basel-III norms. Based on the findings mentioned in the concluding part of the study, the decision makers can get the details of cost and associate benefits in absolute terms rather than a correlation between increase in capital ratio and loan spread like in most of other studies. Thus, this study will be helpful for decision makers to get a broad idea of net benefits to be derived from Basel-III implementation in the Indian context.

The model used in this study is Present Value (PV) approach, which is a considerably simpler model. Using the same approach, Cost-Benefit analysis for Basel-III implementation can be carried out for other economies as well. This study shows long term economic impact of Basel-III implementation in terms of prevention in fall in GDP in the Indian context. By replacing the country specific parameters like correct estimation of cost of capital, expected growth in GDP and present level of banks' capital, the same model can be used to see cost effectiveness for other economies.

Adoption Of Basel-III Accord In The Indian Context

Compliance with Basel-III norms is expected to reduce the possibility and severity of a financial crisis for the banking industry and enhance financial stability of the system. India needs a robust banking system as it is one of the fastest growing economies of the world. A well-functioning and efficient banking system is the basic need for the accomplishment of the recent initiatives like financial inclusion, Direct Benefit Transfer (DBT), etc. taken by the GOI. Compliance with globally accepted standards will help Indian banks to remain competitive internationally. Suggested guidelines under Basel-III such as maintaining a specified amount of shock absorbing capital, ensuring enough liquidity and control over excessive debt build-up during the boom period will enable the Indian banking system to withstand challenges, if any, in future.

The Indian banking system is presently passing through a critical phase of excessive Non-Performing Assets (NPAs) pile up which amounts to approximately INR 10.36 trillion. Compliance with globally accepted Basel-III regulations would not only keep the lending activities under strict control, but also serve the purpose of capital conservation. These regulations are expected to provide micro level resilience to individual banks in the time of stress and being pro cyclical in nature, on the macro front, these will address system wide risks.

Limitations Of The Study

In this study, cost-benefit analysis of implementation of Basel-III accord was carried out considering that fall in GDP in the economy due to a financial crisis to be 10 percent for the first five years and 2.5 percent for the remaining two years. Thus the effect of a financial crisis lasts for seven years as per a study carried out by IMF in year 2009. However, in a practical sense, there may be longer / shorter effects in varying amounts. This study can be repeated after studying the effects of a financial crisis on the GDP based on actual past data which can give better results.

Data for this study is taken from the public domain which is published data by the Reserve Bank of India (RBI) and respective banks' published financial statements at various points of time. Any possible omission in published data can be a source of error in

the outcome of this study.

GDP data for this study from year 2006 to 2017 and RWAs data for financial year ending March 31, 2016 was considered. For a better approach, the GDP data for an extended period of time can be considered.

Scope For Further Research

This research work can be extended by considering other macro economic factors like Government policies, sector specific growth rates, inflation, etc. which affect the GDP. For all these factors, suitable percentage contribution can be decided for each of them. The percentage contribution derived for the financial sector and Government policies can be further used to estimate the effect of a financial crisis on GDP instead of relying on some other research work (like IMF-2009). On the cost front, various available avenues for banks to raise capital and the cost associated with each of them can be worked out (which is taken as 8 percent in this research paper). The weighted average cost with due consideration to each option associated for raising additional capital will give a better estimation of the cost which banks have to bear to comply with Basel-III norms. Thus, if this research work is extended with the modifications as stated above, it will give a much clearer picture of the cost-benefit analysis of Basel-III implementation for Indian banks.

References

- Aosaki Minoru. (2013). Implementation of Basel III Economic impact and policy challenges in United States, Japan and the European Union, the Walter H. Shorenstein Asia-pacific Research Centre, working paper. https://aparc.fsi.stanford.edu/publications/implementation_of_basel_iii_economic_impacts_and_policy_challenges_in_the_united_states_japan_and_the_european_union
- Angelini, P., Clerc, L., Cúrdia, V., Gambacorta, L., Gerali, A., Locarno, A., Motto, R., Roeger, W., Van den Heuvel, W and Vlček, J. (2015). Basel III: Long-term impact on economic performance and fluctuations, The Manchester School 83(2), pp 217-251. https://onlinelibrary.wiley.com/doi/abs/10.1111/manc.12056
- Basel Committee for Banking Supervision. (2011). A Global Regulatory Framework for More Resilient Banks and Banking Systems, Bank for International Settlements, publications. Retrieved from https://www.bis.org/publ/bcbs189.htm
- Basel Committee on Banking Supervision. (2010). An assessment of the long term economic impact of stronger capital and liquidity requirements, Bank for International Settlements, publications. Retrieved from https://www.bis.org/publ/bcbs173.htm
- Basel Committee on Banking Supervision. (2010). Accessing the macroeconomic impact of the transition to stronger capital and liquidity requirements, Bank for International Settlements, publications, December 2010. Retrieved from https://www.bis.org/publ/othp12.pdf
- Brooke, M., Bush, O., Edwards R., Ellis J., Francis B., Harimohan, R., Neiss, K. and Siegart, C. (2015). Measuring the macroeconomic costs and benefits of higher UK bank capital requirements, Financial Stability Paper No. 35. Retrieved from https://www.bankofengland.co.uk/financial-stability-paper/2015/measuring-the-macroeconomic-costs-and-benefits-of-higher-uk-bank-capital-requirements
- Duvvuri Subbarao. (2012). Basel-III in International and Indian Contexts: Ten Questions We Should Know the Answers for, Inaugural Address by Governor, Reserve Bank of India at the Annual FICCI-IBA Banking Conference,

Mumbai. Retrieved from https://rbidocs.rbi.org.in/rdocs/Speeches/PDFs/BSI04092012F.pdf

- Gambacorta, L., Shin, H.S. (2016). Why bank capital matters for monetary policy', BIS Working Paper No 558. Retrieved from https://www.bis.org/publ/work558.htm
- Gioradana G.A. and Schumacher I. (2017). An Empirical study on the Impact of Basel III Standards on Banks' Default Risk: The case of Luxembourg, Journal of Risk and Financial Management, April 2017. Retrieved from www.mdpi.com/1911-8074/10/2/8/pdf
- IMF. (2009). What's the damage? Medium-term output dynamics after financial crises, World Economic Outlook, October. Retrieved from https://www.imf.org/en/Publications/WP/Issues/2016/12/31/Whats-the-Damage-Medium-term-Output-Dynamics-After-Banking-Crises-23389
- Indian Banks' Association. (2013). Indian Banking Year Book 2013, The Publications Department, IBA, Veer Nariman Road, Mumbai.
- Indian Institute of Banking & Finance. (2015). Master Circular on Basel III Capital Regulations. Retrieved from http://iibf.org.in/documents/BASEL-III.pdf
- Ingo Fender, Ulf Lewrick. (2016). Adding it all up: the macroeconomic effect of Basel III and outstanding reform issues. Bank for International Settlements, publications. Retrieved from https://www.bis.org/publ/work591.htm
- Pogach Jonathan. (2016). Literature review on macroeconomic Impact of Capital Requirements. Retrieved from https://www.fdic.gov/about/learn/board/hoenig/2016-05-12-lr.pdf
- Marchesi Massimo, Guidici Marco Petraco, Cariboni Jessica, Zedda Stefano, Compolongo Francesca.
- (2012). Macroeconomic cost-benefit analysis of Basel III minimum capital requirements and of introducing Deposit Guarantee Schemes and Resolution Funds. European Commission, Joint Research Centre, Institute of Protection and Security of Citizen, Ispra, Italy. Retrieved from https://www.researchgate.net/profile/Stefano_Zedda/publication/264052635_Macroeconomic_cost-benefit_analysis_of_Basel_III_minimum_capital_requirements_and_of_introducing_Deposit_Guarantee_Schemes_and_Resolution_Funds/links/0c96053ccc7ac62e64000000/Macroeconomic-cost-benefit-analysis-of-Basel-III-minimum-capital-requirements-and-of-introducing-Deposit-Guarantee-Schemes-and-Resolution-Funds.pdf
- Miller S. and Sowerbutts R. (2018). Bank Liquidity and the Cost of Debt. Staff Working Paper No. 707, Bank of England. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3118309
- Reserve Bank of India. (2016). Consolidated balance sheet of scheduled commercial banks. Retrieved from http://dbie.rbi.org.in/DBIE/dbie.rbi?site=publications
- Reserve Bank of New Zealand Bulletin. (2012). Regulatory impact assessment of Basel III Capital requirements in New Zealand. Retrieved from https://www.rbnz.govt.nz/-/media/ReserveBank/Files/regulation-and-supervision/banks/policy/4932427.pdf
- Roger, S. and Vlcek, J. Macroeconomic costs of higher capital and liquidity requirements.
- IMF Working Paper. Retrieved from https://www.imf.org/external/pubs/ft/wp/2011/wp11103.pdf
- Romer, C. and Romer, H. (2015). New evidence on the impact of financial crises in advanced countries. NBER Working Paper. Retrieved from www.nber.org/papers/w21021
- Sarkar A. and Roberts D. Bank Liquidity Provision and Basel Liquidity Regulations.
- Federal Reserve Bank of New York Staff Report No. 852. Retrieved from https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr852.pdf

- Shakdwipee P. and Mehta M. (2018). From Basel I to Basel II to Basel III. International
- Journal of New Technology and Research. pp 66-70. Retrieved from https://www.ijntr.org/download_data/IJNTR03010033.pdf
- V.R.Iyer. (2015). Risk Management & Regulation in Indian Banking Sector - New Paradigm, Bank Quest, The Journal of Indian Institute of Banking & Finance Vol.86 No.3 July-September (2015), pp. 17-23
- Vighneswara Swamy. (2013). Basel-III Implications for Indian Banking, Research Report published by Indian Institute of Banking and Finance, Mumbai. Retrieved from http://www.iibf.org.in/documents/reseach-report/Report-25.pdf
- Yan, M., Hall, M. and Turner, P. (2015). A cost-benefit analysis of Basel III: some evidence from the UK. International Review of Financial Analysis 25, pages 73-82. Retrieved from https://www.sciencedirect.com/science/article/pii/S1057521912000622

Siddharth Shukla *is a post graduate in Business Management and Certified Associate of Indian Institute of Bankers, Mumbai. He has more than 13 years of managerial experience in the banking industry. He has worked with various departments of a bank like retail branch operations, collection, clearing, etc. besides handling branch administration. He is perusing his Ph.D. in the field of Banking Regulations from Pandit Deen Dayal Petroleum University Gandhinagar, Gujarat. His areas of interest are banking laws and practices, credit and risk management in banks, security measures for alternate banking channels and internal control for banking operations. He can be reached at siddharth_elect@yahoo.co.in*

Akash Patel *is an Associate Professor working with Pandit Deen Dayal Petroleum University, Gandhinagar, Gujarat. He has earned his doctorate degree from Hemchandracharya-North Gujarat University in 2007. He has published a number of research papers in national and international research journals. His areas of interest are Banking, Business Finance and Financial Management for the Organization. Recently, his paper titled "Micro-finance in India: Strategies to Overcome Operational Issues and Challenges" was published in International Journal of Advanced Research in Management and Social Sciences. He can be reached at akash.patel@spm.pdpu.ac.in*