Efficiency of Public and Private Banks in India:
An Empirical Analysis

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Abstract: *Economic growth and development of any country depend upon a well sound financial system. Indian financial system comprises a set of sub-systems of financial institutions, financial markets, financial instruments and services which help in the formation and dissemination of capital. Indian financial system helps to play a significant role in the economic growth of our country through banking industry. The central bank is the apex bank in banking structure of any country. The Central Bank controls the flow of currency in the economy. It regulates the other banks in the country. Here, the analysis of efficiency of Indian banks is the first step in understanding the banks' performance. This has been the main motivation to choose this topic.The efficiency scores, two groups ofbanks that is, selected publicly owned and privatelyowned aremeasured. Data was downloaded from RBI profile of banks (MS Excel) for the numerical values. The date were scrubbed using MS excel macros and specific algorithms were developed to obtain individual banking efficiencies in the year 2019. The algorithm used for arriving at efficiency scores was Data Envelopment Analysis (DEA). As a result of the calculation, each bank obtained an efficiency score of 1 (efficient) or less than 1 (not efficient). This analysis depends on 2:3 ratios of input and output. That means, here 2 outputs and 3 inputs have been used for efficiency calculation. The outputs used are advances and investments. Inputs used are deposits, borrowings and other liabilities. The DEA analysis helps to find out the most efficient banks in India .Once the efficiency scores were obtained, banks were graded into quartiles of efficiency clusters of <0.25, 0.25-0.50, 0.50-0.75 and >0.75. Observations and analysis were made on the efficiency quartiles obtained by the DEA analysis.*

Keywords:*CRR model, Data Envelopment Analysis, Decision Making Unit, Technical Efficiency.*

I. Introduction

A sound financial system is crucial for an indispensable and vibrant economy. Thus, the performance of any economy to a large extent is dependent on the performance of the banking sector as it being the predominant component of the financial service industry. The Indian banking sector went through structural changes since its independence keeping in view its financial linkages with the rest of the economy and to meet the social and economic objectives of development (Kumbhakar and Sarkar, 2005). Consequently, the sector was initially following strict controls on interest rates, as well as stringent regulations relating to branch licensing, directed credit programs, and mergers. However, the closed and strict regulated environment started showing adverse effect on the sector, resulting in under-performance of the banks over the years. As a result, Indian banking sector underwent

radical changes through its liberalization policy in early 1990s with implementation of a series of reforms with an objective to make the banking sector more productive and efficient by limiting the state intervention and enhancing the role of market forces.

Investigating the efficiency of the financial system and in particular banks has gained a lot of popularity in recent times for several reasons. First, the efficiency of banks is directly linked to the productivity of the economy. Banking system assets constitute a substantial proportion of total output (Bauer Paul et al, 1992). Banks provide liquidity, payments and safekeeping for depositors' and channel these funds into investment and working capital requirements. In addition, banks are supposed to play a special role in funding small businesses that often have very limited access to other sources of external finance. Banks also play a major role in ensuring a smoothly functioning payment system, which allows financial and real resources to flow freely to their highest-returns uses. A basic benefit of enhanced efficiency is a reduction in spreads between lending and deposit rates. This is likely to stimulate both greater loan demands for industrial investment (and thus contribute to higher economic growth) and greater mobilization of savings through the banking system. Banks in most developing countries operate with relatively wide spreads. Although government policies and regulations are considered major causes of such wide spreads, studies on banking efficiency has pointed at operating inefficiencies as one other possible source that needs to be investigated. Wide spreads affect intermediation and distort prices thus impairing the role of the financial system in contributing to rapid economic growth (Ikhide. S, 2000).Indian financial services industry is dominated by the banking sector and the banking structure in India is broadly classified into public sector banks, private sector banks and foreign banks. The public sector banks continue to dominate the banking industry, in terms of lending and borrowing, and it has widely spread out branches which help greatly in pooling up of

resources as well as in revenue generation for credit creation.

The Indian financial sector reform of 1991 has greatly changed the face of Indian Banking system. In addition to the nationalized banks, several private Banks were newly founded or created by previously extant financial institutions. India has also seen the entry of over two dozen foreign banks since the beginning of financial reforms. In the face of increased competition, the banks have to operate more efficiently in order to sustain and perform better. In the context of increased competition and the importance of banks in financial markets, it becomes very much essential to evaluate whether these banks operate efficiently. Primarily, there are two chief reasons to measure the efficiency of banking institutions. Firstly, this assists to identify the most efficient banks and benchmarks the relative efficiency of individual banks against the most efficient banks. Secondly, it helps to evaluate the impact of various policy measures on the performance of banks.

Statement of the problem

Banks are answering towards the commercial issues in a different way. The efficiency of banks be contingent upon the functioning level due to the changes in business operations and make profits more or less with respective of total income received and total expended paid for various activities with effective utilization of bank resources do play a key role in the maximizing the banking efficiency. Therefore the present study focus on the efficiency of banking sector in India.

II. Review of literature

Several studies have been conducted by many academicians and researchers inthe area of performance analysis of public sector and private sector banks in India. Some of these literatures are shown below: Goel and Rekhi (2013) attempted to measure the relative performance of Indian public sector and private sector banks. They concluded that the efficiency and profitability are interrelated and the performances of private sector banks are better than public

sector banks in India. Karri, et al. (2015) analysed the performance of banks on the basis of important parameters like capital adequacy, asset quality, management efficiency, earning ability and liquidity with the help of CAMEL model. Nagarkar (2015) examined the performance of major five public, private and foreign sector banks with the help of principle component analysis technique. He found that commercial banks mostly depend on deposits for providing credit. So, Commercial banks need to check their credit appraisal process to reduce the non-performing assets and regain the faith of depositors as key to banks' success. Balaji and Kumar (2016) examined and compared the overall financial performance of selected public and private sector banks in India during the period 2011-12 to 2015-16 with help of mean and T-Test . They concluded that public sector banks must redefine their strategies by considering their strengths, weakness and operating market.Sathye (2001) studied the relative efficiency of Indian banks in the late 1990's and compared the efficiency of Indian banks with that of the banks in other countries. He found that the public sector banks have a higher mean efficiency score as compared to the private sector banks in India, but found mixed results when comparing public sector banks and foreign commercial banks in India. He also found that most banks on the efficient frontier are foreign owned.

Gurmeet and .Ravi (2016) in their studies titled Observed that the privatesector banks which were established somewhat better earlier in comparison to others have reported better capital adequacy, better management efficiency, and better liquidity position and new entrants have displayed lagged performance both in the area of capital adequacy and liquidity.Tina and Wang (2014) investigated the productive efficiency of Chinese banks with the help of DEA and MPI and observed that public sector banks in China are less efficient than private sector banks. Also, the main reason of inefficiency was found to be scale rather than pure technical inefficiency. Arjomandi et al. (2012) analyzed the efficiency and productivity of banks

in Iran and observed a downfall in productivity after the introduction of regulatory changes.

Golany and Storbeck (1999) discussed multi period data envelopment analysis (DEA) study of the efficiencies of selected branches of a large US bank (which we will call Big Bank) over six consecutive quarters. Paid attention to the interface with the end users and, in particular, developed presentation tools to make the outcomes of the analysis available to managers at different levels of the bank. Nkegbe andUstarz, (2015) discussed the issues of data availability and methodological problems that occur when trying to obtain realistic local and global efficiency indicators for banks. Kumar (2013) assessed the average and overtime efficiency of those banks based on their size, age, and region using static and dynamic panels. The findings suggest that there are no significant differences between the overall efficiency results of conventional versus Islamic banks.

Mittal (2017) tried to compare the performance of public sector banks with that of private sector banks in India for the period 2005 to 2016. The main aim of the study was to measure the health of the banking industry with respect to the size of non-performing assets. The study found that the extent of non-performing assets was comparatively more in public sector banks.Adwani (2018) tried to compare the productivity of employees of top public and private sector banks for the year 2016-17. The study evaluated different ratios for these banks to analyze the efficiency of employees. It was observed that for Indian banks, public sector banks had higher business per employee but poor profit per employee as compared to private sector banks.

III. Objectives of the study

- To analyse the efficiency on the private and public banks in India.
- To classify the banks according to their efficiency.
- To analyze efficiencies of banks and find opportunities for improvement.

IV. Research methodology

This research analyses the efficiency of selected five public and private sector banks on the DEA analysis. The banks are selected on the basis of Purposive sampling technique based on the values of deposits and advances. The banks are

Sl. No	Public bank	Private bank
1	Canara Bank	ICICI Bank
2	BOB	Axis bank
3	SBI	HDFC bank
4	PNB	Katak Mahindra Bank
5	BOI	Federal Bank

DEA (Data Envelopment Analysis) is the tool which used for the efficiency calculation of Indian banks. DEA is a decision making tool and used for decision making in banking, hospitality and service industries. It is commonly used to evaluate the efficiency of a number of producers. Under DEA analysis, a producer is known as decision making unit. The 2 outputs and 3 inputs have been used for efficiency calculation. The outputs used are advances and investments. Inputs used are deposits, borrowings and other liabilities. The DEA analysis helps to find out the most efficient one from the selected number of producers major aim of this analysis is to find out the best virtual producer from the real producer.

The question of "How to measure the banks efficiency and how to classify banks according to performance"? Here, DEA (Data Envelopment Analysis) has been used for efficiency calculation and Charnes, Cooper, and Rhodes model for efficiency calculation has been utilized. Apart from this, Seiford and Thrall, Ali and Cook models could also have been used but this all mainly using for manufacturing firms efficiency. For service industries most suitable method is Charnes, Cooper and Rhodes. DEA is commonly used to evaluate the efficiency of number of producers and it's a typical statistical approach is characterized as central tendency approach. Under DEA, it compares each producer with only the best one in that particular sector.

In this method, a producer is known as DMU (Decision Making Units). DEA method having a number of producers and the production process for each producer is to take a set of inputs and produce a set of outputs. Which producer can produce maximum or same output that produced by the competitor with less input it will be the efficient one in that sector. This analysis just depends on 2:3 ratios of input and output. That means, here 2 outputs and 3 inputs have been used for efficiency calculation. The outputs used are advances and investments. Inputs used are deposits, borrowings and other liabilities. The DEA analysis helps us to find out the most efficient one from the selected number of producers.

Efficiency score = 0.75 to 1 "most efficient"
Efficiency score = between 0.50 to 0.75 "average"
Efficiency score = below 0.50 "laggards"

Data envelopment analysis (DEA) is a non-parametric linear programming technique that measures the efficiency of decision making units (DMUs) which use multiple inputs to produce multiple outputs and has been applied by various research communities across a wide range of industries.

Types of banks

All types of Banks in India are regulated and the activities monitored by a standard bank called

the Reserve Bank of India that stands at the apex of the banking structure. It is also called the Central Bank, as major banking decisions are taken at this level. The other types of banks in India are placed below this bank in the hierarchy. The major types of banks in India are as follows:

Public sector banks in India - All government owned banks fall in this category. Besides the Reserve Bank of India, the State Bank of Indiaand nationalised banks, all comprises of the public sector banks. Many of the regional rural banks that are funded by the government banks can also be clubbed in this genre. Under public sector banks, there are two classifications: Nationalised banks and SBI group.

Private sector banks in India - A new wave in the banking industry came about with the private sector banks in India. With policies on liberalization being generously taken up, these private banks were established in the country that also contributed heavily towards the growth of the economy and also offering numerous services to its customers. Some of the most popular banks in this genre are: South Indian Bank, Axis Bank, Federal Bank, HDFC Bank, ICICI Bank, ING Vysya Bank and Kotak Mahindra Bank.

Table 1: Private Banks Efficiency FY2019

Bank	Advances	Investments	Deposits	Borrowings	Other Liabilities	Efficiency Score
AXIS	439650	153876	453622	148016	26245	0.491
ICICI	512395	202994	560975	182858	30196	0.563
HDFC	658333	242200	788770	123104	45763	0.443
KOTAK	169717	64562	192643	25154	9652	0.560
FEDERAL	91957	30781	111992	11533	2577	1.000

Source: Compiled from Handbook of Statistics on Indian Economy

In this category of private banks federal bank has scored between 0.75 and 1.00. This bank came under the category of most efficiently working banks. This bank was able to achieve a score of 1.The second category is average efficiency score between 0.50 and 0.75.The first bank coming under this category was, ICICI bank. This bank got a score of 0.57 and Kotak bank got the score of 0.56. Axis bank and HDFC bank are under the category of laggards.

Table 2: Public Banks Efficiency FY2019

Bank	Advances	Investments	Deposits	Borrowings	Other Liabilities	Efficiency Score
CANARA	91957	30781	111992	11533	2577	0.983
BOB	427431	163184	591314	62571	22718	0.881
SBI	1934880	1060986	2706343	362142	167138	0.934
PNB	433734	200305	642226	60850	21678	0.883
BOI	431380	137111	520854	43588	9591	1.000

Source: Compiled from Handbook of Statistics on Indian Economy

In the public sectorbanks, all banks worked efficiently. The bank having the least score was BOB and PNB. These bank havethe score of 0.88 and this could be due to sub-optimal use of their resources owing to large business and large number of transactions. BOI, SBI and CANARA have scored between 0.75 and 1.00. These bank came under the category of most efficiently working banks.

V. Conclusion

In the aftermath of the global financial crisis, the Indian banking industry has been appreciated and applauded internationally for its resilience to

withstand the crisis. A number of factors attributed to its success such as stringent and prudent regulations which resulted in improved productivity and efficiency of banks made them healthier and stronger. Against this backdrop, it has become evident that the banks have to be prepared not only for various domestic challenges such as more inclusive growth with simultaneous focus on other massive financing needs of important sectors, but also for challenges thrown by the developments in the international arena. In the ensuing period, it is expected that there will be unprecedented volume of business for the Indian financial system as the economy continues to grow at rapid pace. Within the banking industry, the public sector banks (PSBs) are expected to gain much of the larger share as they account for more than 70 percent of loans of the total scheduled commercial bank credit.During the past two decades, PSB's have shown their dynamism in adopting the advanced technology, refining their products, providing alternative delivery channels and others. They have undergone a massive transformation to not only become as efficient as their private sector counterparts but have also improved their core competencies to their advantage. Apart from the regulatory impetus and capital support, the skill and agility of PSB employees to respond to these challenges has been a crucial factor.

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