# Post-COVID Efficiency of Small Finance Banks in India: An Empirical Study Using Data Envelopment Analysis

**Omkumar Munshi**
**Research Scholar,**
**Department of Economics**
**Sardar Patel University, Vallabh Vidyanagar, India**

**Vijay Jariwala**
**Professor,**
**Department of Economics,**
**Sardar Patel University, Vallabh Vidyanagar, Anand, Gujarat, India**

## Abstract:

The role of Small Finance Banks (SFBs) in financial inclusion in emerging economies is vital as they deliver financial services and credit to the unbanked and underbanked. It is important to evaluate their operations' efficiency after the COVID-19 pandemic to know their recovery and sustainability. “The aim of this study is to assess the efficiency of the selected SFB in post-COVID period for the financial year 2023-24 (using DEA Model). An output-oriented DEA model with variable returns to scale (BCC model) measures the efficiency of bank's use of branch assets for financial inclusion. The inputs are the number of branches and the outputs are the deposit account, loan account and total deposits. The results reveal that the performance efficiency varies from one bank to another, with some banks being efficient and operating on the efficiency frontier while the other one is capable of increasing outputs using the existing factor of production. The results show that expanding physical space is less effective for enhancing efficiency after COVID than outreach and improvement of existing space. This study is the latest evidence on the inclusion focus of SFBs and offers policy guidance for regulators and bank managers in emerging economies.

## Introduction:

Financial stability, competitiveness and sustainable intermediation have always been recognized to be closely linked to the efficiency of banking. Efficient banks are more likely to be able to draw in deposits, grant loans, and cope with economic downturns, especially in developing countries where financial systems play a pivotal role in economic growth. The theme of banking efficiency has gained a new lease on life in recent years with ever-growing regulatory initiatives, technological shifts and the new inclusive banking model for the unbanked and under-banked.

In India, Small Finance Banks (SFBs) are a specific type of financial institutions that are focused on the goal of financial inclusion and that target low-income people, small borrowers and micro enterprises. SFBs have a much greater outreach mandate than conventional commercial banks, and are heavily dependent on their branch network for providing basic banking services, collecting deposits and extending small-value credit. This means that considering their performance, traditional profitability ratios are not enough to assess their performance and efficiency analysis that reflects outreach and inclusion aspects is more relevant.

The COVID-19 pandemic caused unprecedented difficulties in the banking sector all over the world, affecting the economy, credit flows and repayment behaviour. The pandemic

exacerbated the operations risks and put under stress the sustainability of their business models for Small Finance Banks which focus mainly on vulnerable groups of customers. Given the current landscape in the post-COVID era, it is important to evaluate the effectiveness of SFBs in using the infrastructure they have in place to mobilize outreach and deposits in the process of recovery and sustainability.

Empirical results of the efficiency assessment of SFBs are limited, although there is a significant amount of literature to assess banking efficiency both using parametric and non-parametric techniques. The literature mostly is based on commercial banks or microfinance institutions or uses data from before the pandemic or efficiency measures based on costs. Furthermore, few studies explicitly consider output measures related to financial inclusion in efficiency analysis, namely deposit and borrower outreach. This is even more noticeable during the post-COVID recovery.

The present study focuses on using Data Envelopment Analysis (DEA) to analyze the efficiency of the selected SFB banks in India after the COVID pandemic. The study assesses through an output-oriented DEB model with variable returns to scale SFB's efficiency in turning their branch networks into financial inclusion outcomes. The analysis has been undertaken to give a recent indication of the operational performance of SFBs in a crucial period of the economic recovery process for 2023-24. The findings have significant policy implications for Indian banking and provides insights into the wider debate on inclusive banking and efficiency in emerging markets.

## Research Gap and Contribution of the Study:

The literature is still lacking in a number of significant aspects, although the research interest in banking efficiency and financial inclusion is on the rise. First, there is lack of research on Small Finance Banks, which have a special mandate, compared to the empirical studies conducted on commercial banks or public-sector banks. Second, efficiency studies typically focus on traditional financial outputs, and less on indicators of inclusion, e.g., deposit and loan account outreach. Third, empirical evidence of the efficiency of Small Finance Banks based on recent data is limited even more so in emerging economies in the context of COVID. This study fills these gaps and in many respects, it adds to the body of literature of banking and finance in the following ways. First, it offers an efficiency evaluation of Small Finance Banks in a post-COVID period as compared to the pre-COVID period, using recent data. First, it is one of the few efficiency evaluations using recent data for Small Finance Banks in the post-COVID period, instead of the pre-COVID period. Second, the study takes a financial inclusion

perspective, which includes variables related to financial outreach that would be more suitable to assess the performance of SFB than traditional profit measures. Third, the focus of the analysis explicitly looks at the scope for output expansion with the existing branch infrastructure, which is at the heart of the operational strategy of Small Finance Banks, by using an output oriented BCC DEA model. Last but not least, the findings provide policy-relevant recommendations for regulators and bank management in emerging economies interested in improving the banking system's inclusion but at the same time keeping the operations efficient.

## Review of Literature:

### Banking Efficiency: Theoretical Concepts and Empirical Evidence

Efficiency analysis has been a significant theme in banking and financial studies, and has shed light on the performance of financial institutions in applying their resources to services. The theoretical underpinning was first laid by Farrell (1957) who introduced two concepts: technical and allocative efficiency. In a bank, technical efficiency is the ability of a bank to use the least amount of resources to obtain the maximum output of products (deposits and loans), allocative efficiency is its ability to use the most cost effective mix of resources.

Further studies highlighted the need to undertake efficiency analysis in order to measure bank performance apart from the conventional financial ratios. Berger and Humphrey (1997) noted that efficiency measures provide a fuller picture of managerial performance, operational effectiveness and competitiveness than profitability measures. With the increasingly complex and competitive nature of banking systems, efficiency analysis became a necessary tool for financial stability and intermediary efficiency regulators and policymakers.

### Data Envelopment Analysis Applied to Banking and Finance

Data Envelopment Analysis (DEA) is one of the most popular techniques to evaluate bank efficiency, which is non-parametric and can incorporate more than one input and output. DEA was developed by Charnes, Cooper and Rhodes (1978) as a linear programming method of measuring the relative efficiency, and further extended by Banker, Charnes and Cooper (1984) to measure efficiency under variable returns to scale. This is an improvement specially adapted for banks of different sizes.

Banking research, both in developed and emerging countries, is widely used of DEA. Berger and Mester (2003) reported that DEA is effective in banking industry, where production process is complicated and difficult to model parametrically. DEA provides an efficiency analysis for emerging markets to examine the differences in efficiency stemming from ownership, regulation and development in markets.

Sathye (2003) used DEA to evaluate the efficiency of commercial banks in the Indian context, and concluded that there were significant differences between public banks, private banks and foreign banks. Further studies have validated these results, and showed that scale and managerial efficiency are important determinants of bank performance. Interestingly, researchers have postulated that the input- or output-oriented DEA approach should be adopted according to the banks' strategic concerns. Input oriented models are better suited for lower cost situations, while output oriented models are more appropriate to situations where banks seek to expand the provision of services and customers' reach (Coelli et al., 2005).

**Enhancing Financial Inclusion and Banking Efficiency**

Financial inclusion has been gaining prominence as a policy priority, particularly in the developing and emerging economies. Inclusive banking aims to provide low cost financial services to the under-served population and enhance economic development and social improvement. It has been pointed out by Beck, Demirgüç-Kunt and Martinez Peria (2007) that the relationship between access to banking and economic development and poverty reduction is positive.

There has been a surge in research interest on the topic of financial inclusion and banking efficiency. A few studies indicate that there may be trade-offs of lower transaction size and higher service delivery costs that may increase the cost of operating and/or reduce the efficiency of a bank that is targeting inclusion. However, emerging evidence and experience suggests that the challenges are surmountable by effective use of infrastructure. In their study on DEA, Kumar and Gulati (2014) noted that banks that have a wide spread are not necessarily the most efficient, highlighting the need for good management and strategic performance of banks.

Efficiency analysis based on financial inclusion, which incorporates outreach activities such as account opening and coverage of borrowers, is more suitable to assess performance for socially-oriented banks. This approach is particularly significant for specialized institutions which emphasize outreach and not profit.

**Study on Small Finance Banks and their Performance**

The aim of introducing Small Finance Banks in India was to improve financial inclusion and consolidate savings from the small borrower and unbanked sections of society. Due to their relative newness there is limited empirical research on SFBs. There is currently a focus on studies that focus on financial performance, asset quality and regulatory risk, and fewer on efficiency measurement.

While some research indicates that SFBs may have higher operating costs as a result of their outreach-oriented business models, other research has demonstrated that they also have experienced considerable growth in their collection of deposits and borrowers. There is some variation in the performance of SFBs suggested by a number of efficiency analyses, which depend on operational methods, geographic scope and scale. Yet, much of this evidence stems from the early years of operations or from before the pandemic, and the performance patterns of a recent period have not been carefully considered.

Moreover, the existing efficiency studies of Small Finance Banks tend to ignore output measures related to financial inclusion, which focus on balance-sheet measures. As a result, these analyses do not reflect the purpose of Small Finance Banks that is inclusion rather than the nature of regular commercial banks.

**Post-COVID banking performance and identified research gaps**

The banking sector saw significant changes worldwide due to the COVID-19 pandemic, and the pandemic's impact on credit availability, deposit behaviour and borrowers' ability to pay their loans had a significant impact. New evidence indicates that banks that are well organized and have varied funding sources tended to withstand the crisis and to recover from it after the pandemic more quickly (Demirgüç-Kunt et al., 2021).

Recent studies have focused on post COVID recovery in the asset quality and profitability of the Indian banking sector. Lack of systematic evidence, however, exists on the issue of efficiency after the pandemic, especially with respect to Small Finance Banks. The majority of the previous research either focuses on an overall indicator of banking performance or fails to include explicit efficiency measurement based on a non-parametric approach.

## Synthesis and Research Gaps:

From the above review, the following gaps are identified:

1. The current literature related to bank efficiency primarily deals with commercial and public sector banks, and a sparse amount of empirical studies in the case of small finance banks.

2. Financial inclusion measures such as deposit and borrower outreach are rarely explicitly included in few DEA based studies.

3. The majority of studies are based on pre-COVID or multi-year studies, while efficiency analysis of SFBs in the post-COVID era is still under-researched.

4. In an output oriented BCC DEA model, 4. Limited research assesses the performance of SFBs in the post-pandemic period in terms of their utilization of their branch infrastructure.

This study attempts to tackle these gaps and assess the efficiency of Small Finance Banks (SFB) in India after the onset of COVID-19 using an output oriented DEA approach with a focus on financial inclusion.

## Objectives of the Study:

The aims of the study are:

1. To analyse the efficiency of selected Small Finance Banks in India for the financial year 2023–24 and compare their efficiency.
2. To assess how well branch infrastructure supports achieving financial inclusion outcomes.
3. 3. To calculate the efficiency scores of banks and identify efficient or inefficient banks by the DEA efficiency scores.
4. To suggest policy measures which can improve Small Finance Banks' performance in the post-COVID era.

## Data and Methodology:

**Data Source and Sample Selection**

In this study secondary data has been taken from published annual reports of selected SFBs in India. It focuses on the FY 2023-24, a period considered to be the stage of recovery from the COVID-19 pandemic for the Indian banking sector. This focus is oriented towards evaluating the Small Finance Banks' capacity to regain its outreach and deposit mobilization in the wake of the COVID-19 issues.

The samples include five Small Finance Banks (SFBs): Ujjivan Small Finance Bank, AU Small Finance Bank, Equitas Small Finance Bank, ESAF Small Finance Bank and Capital Small Finance Bank. They were chosen because they had the most consistent and available data pertaining to their branch networks, deposit and loan accounts and deposits. These banks are collectively a significant part of the Small Finance Bank (SFB) industry in India, contributing significant financial inclusion in rural and semi-urban areas.

**Selection of Inputs and Outputs**

The choice of input and output variables is driven by the intermediation and financial inclusion approach of banking that considers banks as intermediaries that leverage physical and organizational resources to deliver financial services.

**Input Variable**

**Number of Branches**

Only the number of branches is taken into account as input variable in this study. Branches are the main channel of providing financial services for the Small Finance Banks, especially for those areas which are under-served and rural areas. The number of branches is an indicator of the physical size and the reach of a bank and its banking services.

**Output Variables**

The following output variables are used to reflect financial inclusion mandate of Small Finance Banks:

- **Number of Deposit Accounts**

  This variable is meant to measure the level of deposit outreach and the bank's capacity to tap savings from previously unbanked/underbanked segments of the population.
- **Number of Loan Accounts**

  Loan accounts provide information about borrower engagement and access to loan, particularly for small loans, micro-entrepreneurs and low-income households.
- **Total Deposits**

  The total deposits reflect the amount of money that the bank has collected from the public, demonstrating the trust of the public in the bank and ability of the bank to act as a financial intermediary.

Combined, these outputs present a full picture of banking performance in terms of outreach (account penetration) and scale (deposit mobilisation) and are therefore a measure of banking performance with a focus on inclusivity.

## Methodological Framework: Data Envelopment Analysis:

The study assesses the efficiency of Small Finance Banks with the help of a linear programming technique, which is non-parametric and known as Data Envelopment Analysis (DEA) and is extensively employed in banking and finance research. The DEA is a concept of relative efficiency in the context of decision making units (DMUs) with respect to weighted outputs and weighted inputs, and it doesn't need to specify an a priori functional form.

DEA is very appropriate for banking studies because banks produce several outputs from the common resource, so traditional ratio analysis is not enough to evaluate the performance of banks.

**Model Specification**

The study uses an output-oriented DEA model using variable returns to scale (VRS), or BCC model. Construct an explanatory figure for VRS. Small Finance Banks are of different sizes and stages of development. The constant returns to scale assumption might be subject to bias in efficiency estimates. The VRS assumption can be applicable to both growing and constant returns to scale and is appropriate for all sorts of banking institutions.

**Rationale for Output Orientation**

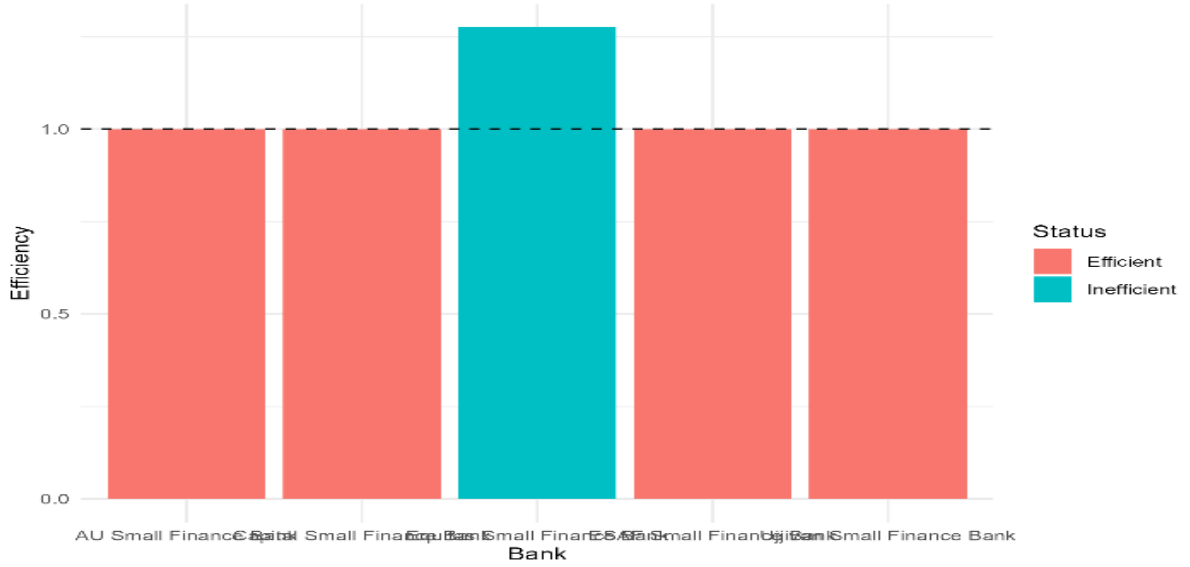
An output-oriented model is selected because the SFBs are primarily concerned with expanding their reach and creating financial inclusion by maximising their output with the existing infrastructure in the short term as compared to cutting down on the input. This strategy measures the proportional increase in output that banks can achieve for a given level of input, which is a good measure of their operational objectives, particularly for SFBs.

**DEA Efficiency Scores:**

The efficiency scores of selected Small Finance Banks for the year 2023–24, determined by the output-oriented BCC DEA model is presented in table 1. The results show that there are variations in efficiency between banks, with many of the banks being on the efficiency frontier and one bank being relatively inefficient.

**Table 1: DEA Efficiency Scores of Small Finance Banks (FY 2023–24)**

| Bank | DEA Efficiency Score | Rank |
|---|---|---|
| Ujjivan Small Finance Bank | 1.000 | Efficient |
| AU Small Finance Bank | 1.000 | Efficient |
| Equitas Small Finance Bank | 1.275 | Inefficient |
| ESAF Small Finance Bank | 1.000 | Efficient |
| Capital Small Finance Bank | 1.000 | Efficient |




## Results and Discussion:

### DEA Efficiency Results

Data Envelopment Analysis (BCC model) was used to evaluate the efficiency of the selected Small Finance Banks (SFBs) for 2023-24 based on the output approach and variable returns to scale (BCC model). The Output oriented approach fits well the mission of the Small Finance Bank to reach out to more people and mobilise more deposits using existing branch networks, without cutting down on inputs.

The DEA results indicate considerable differences between how efficient banks are. Ujjivan Small Finance Bank, AU Small Finance Bank, ESAF Small Finance Bank and Capital Small Finance Bank have efficiency scores of one, indicating that they operate at the best practice level of efficiency." On the other hand, Equitas Small Finance Bank shows efficiency score > 1, i.e. it is relatively less efficient based on the output-oriented approach.

Banks on the efficiency frontier act as a benchmark, translating bank infrastructure into outcomes of financial inclusion, like increased deposit mobilisation and borrower outreach. The fact that these banks have proven that growth through branches is not a must for reaching higher levels of outreach, but can be attained through operational efficiency is notable.

### Interpretation of Inefficiency

A lack of efficiency in Equitas Small Finance Bank means that it can increase its volume of products (deposits, loan accounts, deposit accounts) without having to open more branches. The output-based DEA approach is based on a score that exceeds one indicating that the bank could improve its financial inclusion outputs by maximising efficiency in its existing branches.

It does not indicate overall poor performance, but that the school is not performing as well as its best peers. This can be affected by various business strategies, geographic business focus, customer acquisition strategies and deposit mobilisation. Banks with a more customer-oriented approach and increased account productivity tend to do better on more output-oriented measures of efficiency.

**Efficiency, Business Models, and Financial Inclusion**

The results highlight the relevance of the efficient business model for the efficiency in Small Finance Banks. Efficient banks appear to be able to strike an effective balance between outreach and operational discipline, producing increased outcomes of inclusion per branch. This indicates that the efficient delivery of inclusive banking will not only rely on the physical presence, but also on how best to utilise the branches.

The results corroborate previous studies in the banking sector, which indicate that the effective use of managerial practices, product design and customer engagement approaches can boost output. For SFBs, efficiency benefits could be in terms of better deposit mobilisation, cross-selling of products and better utilisation of branch level resources.

**Post-COVID Implications**

The results show that as per a post-COVID perspective, a few SFBs have been able to adapt themselves in the new banking environment. Although the pandemic has posed challenges, banks that are on the efficiency frontier appear to have succeeded in getting back on track or even better to maintain their outreach and deposit mobilization. This means it was important for them to have the right operational structures in place and to adapt their business models, as part of the recovery from COVID.

However, if one bank is less efficient, it also indicates the disparity in the speed of recovery from the pandemic among banks. The findings highlight the importance of customizing efficiency gains to be more effective than general policy interventions. After COVID, the focus will be on enhancing outreach and uplifting the productivity of the branches.

**Discussion in the Context of Existing Literature**

The results support the literature on banking efficiency and show that there is a significant gap in efficiency even among banks that are of the same regulatory type. These efficiency differences have been found to be due to managerial effectiveness and/or strategic decisions, not only to scale, as evidenced by previous studies based on DEA. This study extends the previous one by demonstrating that for Small Finance Banks the outputs centred on financial inclusion prove useful to test the efficiency.

This study focuses on the post-COVID period, includes outreach indicators and provides new insights on the efficiency of inclusive banking. The results reflect the view that the assessment of efficiency should be consistent with the institutional objectives (particularly those of banks with a strong social and developmental role).

## Policy Implications:

This study's results are important policy implications for regulators, bank management and policy makers interested in inclusive banking and development of the financial sector in emerging economies.

There are several Small Finance Banks which operate efficiently; mere expansion of physical infrastructure is not enough to increase the performance of the banks. Policymakers should focus on strategies to maximize the productivity of existing branch networks, rather than on branch growth. This can be enabled by regulators by facilitating digital integration, simplifying branch operations and improving customer engagement, which are essential to increase outreach efficiency.

Secondly, the lack of efficiency seen in one sampled bank suggests that differences in operational approach and outreach programs are influential on efficiency measures. A supervisory lens that could be applied to DEA-based benchmarking is the use of it as an additional tool for measuring performance, allowing regulators to pinpoint institutions that would be capable of boosting their production at present levels. This will encourage learning from each other and sharing of good practices among Small Finance Banks.

Third, the results show that it is necessary to have goals of financial inclusion coincide with operational efficiency. While developing an inclusion-centric banking policy, policymakers should realize that inclusion does not guarantee the institution's efficiency, unless the institution uses its infrastructure well. Incentives that promote productivity in outreach efforts (such as greater account activation and deposit growth by branch) can improve both inclusion and effectiveness.

Fourth, at the bank management level, research points to the importance of focusing on the productivity and on customer-dependence strategies at the branch level. The results indicate that efficient banks are also more likely to achieve better inclusion scores by making effective use of their branch networks, which suggests significant efficiency gains that can be achieved without investing in new branches by focusing on deposit mobilization and cross-selling and customer relationship management.

The results show that specific policy interventions for each institution are more effective than standard policies in the post-COVID period. Some Small Finance Banks (SFBs) have demonstrated good recovery and effective management while others require targeted actions to enhance efficiency. Thus differentiated approaches to capacity building, technology transfer and managerial improvements may be the regulators' and development finance institutions' response to the performance of individual banks.

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