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Financial Performance of Microfinance Institutions in ASEAN-5 Countries: An Application of Data Envelopment Analysis (DEA)

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Abstract

Difficulties of commercial banks to serve the poor demonstrates their failure to supply the essential capital to the less fortunate sector in the society. Establishment of microfinance institutions (MFIs) with the distinctive characteristics of outreach to the poor and financial sustainability provides alternative tools for global poverty alleviation. Performance of MFIs is one of the most crucial aspects to assess in the effort to provide continuous financial services to the poor. The original objective of MFIs was to eradicate poverty as a social objective. However, the commercialization of MFIs in the 1990s led to their financial independence, as they had previously been funded by the government. Therefore, it is not appropriate to rely the performance of MFIs exclusively based on their social objective. They must align with the financial objective to ensure the long-term stability of MFIs in delivering financial products. This study seeks to determine the financial efficiency of MFIs in the ASEAN-5 countries. The sample is made up of data from 168 MFIs in Southeast Asia, which span five countries between 2011 and 2017. A nonparametric Data Envelopment Analysis (DEA) method is used to determine financial efficiency score. The study discovered the MFIs in the ASEAN-5 countries are financially efficient thus enable to maintain operations over the long term. The study concluded in order for MFIs in the ASEAN-5 countries to continue offering financial services to the poor over the long term, they must be financially stable.

Keywords: Financial Efficiency, Microfinance Institutions, Data Envelopment Analysis, Poverty Reduction

Introduction

Microfinance institutions (MFIs), which existed since the late 1970s, began the operation in rural areas of Bangladesh before expanding to other countries around the world. The MFIs

provide credit in the form of small loans, insurance, and savings accounts to the poor who have difficulty acquiring financial services from conventional financial institutions. Main issues appear when the poor poses unstable incomes, lack of collateral assets, and poor credit records. Therefore, these low-income people can use the credit offered by MFIs to start their own businesses and make money to survive.

Furthermore, the microfinance has been regarded as one of the most important tools for lifting people out of poverty (Banerjee & Jackson, 2017). This can be proved when Muhammad Yunus was awarded the Nobel Peace Prize in 2006 for his remarkable contribution towards Grameen Bank. Microfinance institutions were originally financed by grants and donor subsidies, with the primary goal of social mission through outreach to the poor (Jasmi, 2021). This led to a substantial reliance on subsidies and grants from donors, governments, and other development agents.

Nonetheless, by the late 1990s, MFIs had become commercialised. In accordance with Deb (2018), the commercialization of MFIs has freed them from a sector that was dependent on subsidies, thus allowed them to generate their own revenue by providing a wide range of banking products. Navin and Sinha (2021) believe that the commercialised microfinance industry is better able to serve the poor people because the profit drives them to be more efficient and sustain the operation in the long run.

With the rapid growth of the microfinance sector, there have been changes in the business environment, such as increased competition, the involvement of more commercial banks offering microfinance services, and advancements in banking technology, all of which have impact on the operation of MFIs (Githaiga, 2022). Due to this, there is growing discussion about the need for sustainable MFIs that can recoup their operating costs through a more efficient deployment of scarce resources (Remer & Kattilakoski, 2021).

In order to fulfil the double bottom line goal of MFIs, two performance indicators had been recognised which are: financial efficiency and social efficiency (Ahmad, Lensink & Mueller, 2020). Moreover, it is important for MFIs to be financially efficient since they are no longer subsidy recipient and thus need to sustain in the long run. Therefore, it is essential performance of MFIs aligned with their financial objective. This is to assure their long-term viability as providers of financial products to low-income people. However, little research has been conducted to evaluate the financial efficiency of MFIs, as majority of the studies only focused on the banks. In addition, there is dearth of research in ASEAN-5 countries particularly when the number of microfinance providers grows over time and most of those countries have a significant number of poor populations. Technical efficiency serves as the foundation for financial efficiency in MFIs. The MFIs are deemed to have financial efficiency if they have increased productivity and according to their capacity to make a profit as well as generate revenue from their financial activities in order to support the operations.

This study aimed to determine the financial efficiency of MFIs from five Asian countries: Cambodia, Indonesia, Malaysia, Philippines and Thailand. The financial efficiency of the MFIs was measured by using non-parametric Data Envelopment Analysis (DEA) method. The current study may contribute to the body of knowledge, particularly in the microfinance industry, as it provides additional information to assess the performance of MFIs by examining their financial sustainability. Evaluation of the efficiency of MFIs is crucial in the modern era, as they pursue both social and financial objectives simultaneously. The overall findings also should provide management, investors, and the government with deeper insights into the efficiency of MFIs, thereby assist the poor to escape poverty.

The study is organised as follows: Section 2 reviews the related literature, Section 3 discusses the methods and variables used in this study, Section 4 depicts the research findings, and Section 5 concludes and makes recommendations to various parties.

Literature Review

Recently, there has been an increase in the number of literatures that have been discussed on the issue of financial efficiency. It emphasises the importance of MFIs being financially stable in order to provide continuous financial services to poor people thus reduce poverty, as this is the primary role of MFIs. In contrast to banking institutions, the term financial sustainability from the perspective of the MFIs refers to the ability to generate their own income and no longer rely on subsidies to operate the business. According to Chikwira, Vengesai and Mandude (2022), the primary goal of MFIs is to provide financial assistance to the poor or low-income people. However, in order to provide the better services, the MFIs must record a consistent higher profit. According to Rizkiah (2019) MFIs should shift their focus from solely on social welfare to the development of their economies in order to improve financial performance and stability in this industry, hence consistent in providing a quality service for public outreach and poverty reduction.

In fact, according to Widiarto and Emrouznejad (2015), MFIs must perform a dual role on reducing poverty and enhancing financial performance in order to ensure stability in providing financial services to the most vulnerable sections of society. To compare the social and financial efficiency of Islamic and conventional MFIs, their study concentrated on the Pacific, South Asia, and MENA regions. The findings made it clearly to provide evident that traditional MFIs place a higher focus on generating income, which causes them to be more financially efficient than socially efficient in order to maintain appropriate funding for infrastructure and the welfare of the poor.

Research on MFIs in Eastern Europe and Central Asia (ECA) region by Khan and Shireen (2020) discovered that the MFIs' priorities have changed from eradicate the poverty to maximise profitability, demonstrate that the primary focus of MFIs is on financial rather than social efficiency. The same finding about increased financial efficiency relative to social efficiency in Vietnamese MFIs was also observed by another study (Lebovics, Hermes & Hudon, 2016). In light of implicit subsidies from the government and foreign donors, financial and social efficiencies are not mutually incompatible, but greater financial efficiency aids MFIs in achieving their welfare-related objectives.

Hussain et al (2020) investigated the impact of competition freedom on the efficiency of MFIs in five Asian countries between 2011 and 2017. Overall, the findings indicate that financial efficiency is significantly greater than social efficiency. Furthermore, the inefficiency of MFIs from both social and financial mainly due to managerial incompetent, which is measured by pure technical inefficiency, indicating that the management of institutions is not fully utilise the resources.

Similar conclusions were obtained by Zainal, Md Nassir, Kamarudin and Law (2020) in regard with the financial and social efficiency of MFIs. The study investigated the impact of banking regulation and supervision on the financial and social performance of MFIs in Southeast Asian countries. In general, they discovered the financial efficiency of MFIs was much higher than the social efficiency, indicating that the MFIs were more concerned with achieving financial stability.

Research Methodology

Secondary data were collected from 168 MFIs in five Asian countries which include Cambodia, Indonesia, Malaysia, Philippines, and Thailand from 2011 to 2017 due to majority of these countries among developing countries with higher access to MFIs (Dushime et al., 2022). The data for all determinants of MFIs used in the efficiency analysis were obtained from the World Bank Open Data Catalogue (https://databank.worldbank.org/source/mix-market). The World Bank database, a platform with extensive financial data on worldwide MFIs, was widely discussed in the microfinance literature (Widiarto and Emrouznejad, 2015).

Currently, 3237 MFIs from eight distinct global areas are included in the database (The World Bank, 2022). To ensure the accuracy of the data, the market created a diamond rating system, which expresses the quality and transparency of the data collected from the MFIs. On a scale from 1 to 5, the more diamonds represent the higher degrees of transparency and data quality (Reichert, 2018).

Data Envelopment Approach (DEA)

Recent years have witnessed the emergence and widespread adoption of two innovative methods for measuring the efficiency of economic units. The methods include the parametric method which is Stochastic Frontier Analysis (SFA) and the mathematical programming method, commonly known as Data Envelopment Analysis (DEA). Since DEA constructs the best practise production function exclusively based on observable data, there is minimal chance of making a mistake while defining the production function (Xu et al., 2020). Instead, DEA uses general functional forms to estimate firm's efficiency.

Furthermore, DEA is preferable to stochastic frontier analysis for measuring efficiency because it can account for factors such as variable return to scale and numerous variables without the need for input and output prices (Anouze & Bou-Hamad, 2019). It is a generalisation of efficiency that Farrell introduced in 1957. Also, DEA is the result of further refinements and expansions to the original model by researchers such as (Charnes et al., 1978); Banker et al., 1984).

DEA have been widely used in analysing the efficiency of financial institutions, as evidenced by studies such as Dar et al (2021); Kedzo & Sjaus (2021); Shawtari et al (2018) which used DEA to measure various aspects of efficiency in the banking industry. Meanwhile DEA was used to measure the efficiency of microfinance institutions by (Kar & Deb, 2017; Nourani et al., 2021).

The use of conventional financial ratios to assess MFI performance can be misleading because MFIs can perform well in some ratios while falling short in others, making it challenging to compare their overall performance. Separate ratios cannot account for the simultaneous effects of several inputs and outputs during the transformation process. As a result, it is suggested in this study that efficiency can be applied to the MFIs with various inputs and outputs in order to benchmark the overall performance of MFIs.

The production approach has been widely utilised in the literature to identify variables for financial efficiency evaluation. Under the production approach, MFIs perform as a production unit and produce services (output) by utilising (input) personnel, technology, and operating expenses. In this study, three input variables were used to determine the score of financial efficiency namely: total assets, personnel costs, and operating costs, while the output variable was financial revenue.

In the analysis, the efficiency scores were generated to examine the financial efficiency of MFIs under variable return to scale (VRS) because the constant return to scale (CRS)

assumption is only suitable when all decision-making units (DMUs) are running at optimal scale (Banker et al., 1984). In order to account for scale efficiency (SE), which is the difference between technical efficiency (TE) and pure technical efficiency (PTE), it was important to compute efficiency under VRS. Table 1.1 provides information on the input and output variables used to assess the financial efficiency of MFIs.

Table 1.1
Input Variables and Output Variables for Financial Efficiency

Variable	Unit	Description
Input Variables		
Total Assets	USD	Total wealth that MFIs have access to in the form of money and loans for their transformation process. It serves as an input for the production approach's capital.
Operating Costs	USD	Operational costs including depreciation and amortisation costs, and administrative costs. It is employed as an input in the production process because if outputs were created at high costs, the production process would not be sustainable over the long term, hence it needs to be managed to prevent waste.
Personnel Costs	USD	All personnel of MFIs, whether or not they are recognised on the organisation's employment roster, including contract workers and advisors, are referred to as the labour input.
Output Variable		
Financial revenue	USD	Earnings from the loan portfolio, including the margin rate. It serves as an output in the production process and a proximate for sustainability because MFIs that cannot generate enough income will not be able to sustain over the long term.

(Widiarto & Emrouznejad, 2015; Wijesiri et al., 2015)
Notes: All sources from World Bank database (www.databank.worldbank.org)

Results and Discussion

Table 1.2 below provides a summary of the descriptive statistics for the input and output variables use in the DEA model to build the efficiency frontier for the MFIs' financial efficiency. The average financial revenue for MFIs in the ASEAN 5 countries was USD 7.959 million between 2011 and 2017. Meanwhile the average asset value is USD 52.200 million, the average operating cost is USD 4.035 million, and the average personnel cost is USD 2.220 million.

This study adheres the guideline of Cooper, Seiford and Tone (2000) on the amount of input and output variables before moving on to the discussion of financial efficiency scores. The choice of variables is legitimate and adheres to the rule of thumb because the total number of DMUs in this study, 168 MFIs, is higher than the number of inputs and outputs variables in the financial efficiency model 15(3 x 1). This validates each variable in Table 1.2 used to gauge the efficiency of DMUs.

Table 1.2
Summary Statistics of Output Variables and Input Variables for Financial Efficiency of Microfinance Institutions in DEA Model

Variables	Mean	Minimum	Maximum	Standard deviation	No. of observation
Output of MFIs					
Financial revenue (in million USD)	7.959	0.000	474.000	28.700	1176
Inputs of MFIs					
Total assets (in million USD)	52.200	0.005	4720.000	258.000	1176
Operating costs (in million USD)	4.035	0.003	174.000	11.800	1176
Personnel costs (in million USD)	2.220	0.001	105.000	7.097	1176

According to Table 1.3, the mean TE scores demonstrate a stagnation trend when the value falls between 60% and 70% over the estimated period. As can be seen, the TE scores in 2011 were 68.10%, decreased slightly to 66.50 % in 2014, and increased to 67.90% in 2017.

In 2011 and 2016, the MFIs reported highest TE at 68.10% in Table 1.3. According to the findings, MFIs in the ASEAN-5 countries could provide the same quantity of outputs using only 68.10% of the inputs. These findings demonstrate the MFIs were functioning at the appropriate scale of operation in 2011 and 2016, but they were not managerially efficient to fully utilise their resources (where PTIE=26.70% > SIE=6.90% in year 2011 and PTIE=25.20% > SIE=8.80% in year 2016).

In the meantime, as stated in Table 1.3, the TE minimum score of MFIs in year 2013 equal to 64.80%. This result illustrates the MFIs in the ASEAN-5 countries may provide the same amount of outputs with only 64.80% of the inputs. Despite functioning at the optimal scale of operation (where PTIE=28.40% > SIE=9.10%), the MFIs have not fully utilised their resources due to managerial inefficiency.

Panel H of Table 1.3 shows the mean TE for MFIs in the ASEAN 5 countries is 67.10% as overall, with an input wastage of 32.90% from 2011 to 2017. According to the findings, MFIs in the ASEAN-5 countries could create the same quantity of outputs using only 67.10% of the inputs. In other words, the MFIs might produce the same number of outputs while reducing the quantity of inputs by up to 32.90%. Although MFIs are functioning at an optimal scale of operation (where PTIE=26.40% > SIE=8.70%), they are not managerially efficient enough to fully harness their resources.

In conclusion, the average TE of 67.10% suggests that the financial efficiency of MFIs in the five ASEAN countries from 2011 to 2017 is reasonably high as a whole. Consequently, there is still opportunity for development in terms of managerial efficiency in order to fully utilise their resources. As shown in Table 1.3, the MFIs in the ASEAN-5 countries exhibit a low standard deviation or dispersion of efficiency.

Table 1.3
Summary Statistics of Financial Efficiency Score of Microfinance Institutions in ASEAN 5

Efficiency Measures	No. of DMU	Mean	Minimum	Maximum	Standard deviation
Panel A: All Firms 2011					
Technical Efficiency	168	0.681	0.029	1.00	0.179
Pure Technical Efficiency	168	0.733	0.046	1.00	0.180
Scale Efficiency	168	0.931	0.296	1.00	0.122
Panel B: All Firms 2012					
Technical Efficiency	168	0.678	0.000	1.00	0.174
Pure Technical Efficiency	168	0.742	0.001	1.00	0.178
Scale Efficiency	168	0.911	0.000	1.00	0.131
Panel C: All Firms 2013					
Technical Efficiency	168	0.648	0.132	1.00	0.160
Pure Technical Efficiency	168	0.716	0.228	1.00	0.167
Scale Efficiency	168	0.909	0.278	1.00	0.119
Panel D: All Firms 2014					
Technical Efficiency	168	0.665	0.138	1.00	0.165
Pure Technical Efficiency	168	0.738	0.228	1.00	0.174
Scale Efficiency	168	0.905	0.313	1.00	0.115
Panel E: All Firms 2015					
Technical Efficiency	168	0.664	0.120	1.00	0.164
Pure Technical Efficiency	168	0.730	0.154	1.00	0.177
Scale Efficiency	168	0.913	0.442	1.00	0.104
Panel F: All Firms 2016					
Technical Efficiency	168	0.681	0.146	1.00	0.169
Pure Technical Efficiency	168	0.748	0.228	1.00	0.171
Scale Efficiency	168	0.912	0.298	1.00	0.109
Panel G: All Firms 2017					
Technical Efficiency	168	0.679	0.146	1.00	0.165
Pure Technical Efficiency	168	0.746	0.228	1.00	0.167
Scale Efficiency	168	0.912	0.313	1.00	0.107
Panel H: All Years					
Technical Efficiency	1176	0.671	0.000	1.00	0.168
Pure Technical Efficiency	1176	0.736	0.001	1.00	0.173
Scale Efficiency	1176	0.913	0.000	1.00	0.116

The findings from Table 1.4 illustrate the financial efficiency score of MFIs for each country in the ASEAN 5, particularly between 2011 and 2017. Additionally, the table includes each country's overall financial efficiency score for all years (refer Panel H of Table 1.4).

From Table 1.4, it can be seen that the Philippines' financial efficiency score ranges from 65.70% in 2011 to 61.50% in 2013. The financial efficiency score is consistently high across all years which equal to 63.40%. All MFIs in Philippines from 2011 to 2017 are financially efficient and competent in providing financial services to the poor over the long term.

The financial efficiency score in Thailand ranged from 41.80% in 2017 to a minimum of 39.30% in 2013. The overall financial efficiency score for all period considerable low (40.70%).

This shows that from 2011 to 2017, all MFIs in Thailand were unable to manage sustainability of the operation thus affect their mission to eradicate poverty.

In Indonesia, the financial efficiency score ranged from 74.10% in 2013 to 78.20% in 2017. The overall financial efficiency score of 76.90% is high for all years. This explains that all MFIs in Indonesia from 2011 to 2017 were financially secure and could operate continuously over time to help the underprivileged.

Malaysia obtained the maximum financial efficiency score of 27.10% in 2017 and the lowest score of 22.60% in 2011. Overall, the financial efficiency score for all years is low across all years (25.40%). This suggests that from 2011 to 2017, the Malaysian MFIs were not financially efficient and unable to sustain their long-term banking services for the poor.

Lastly, the highest score of financial efficiency for Cambodia was 62.00% in 2016 and the lowest score was 57.40% in 2013. Overall, the financial efficiency score for all years is considerably high (60.20%). This indicates that from 2011 to 2017, all MFIs in Cambodia were financially viable and capable of delivering financial products to the disadvantaged for the long term.

With the highest mean TE score in financial efficiency (76.90%) among other countries, Indonesia is shown to be the most financially efficient. According to the study by Rosengard (2022), Bank Rakyat Indonesia (BRI) was one of the biggest and most successful MFIs in the world. The BRI's principal tasks include mobilising funds and offering credit to underprivileged business owners in rural and urban communities. The study also noted that the growth of microloans and micro savings over time was the primary factor in BRI's success.

However, Malaysia appears to be the country where MFIs perform the worst, as their financial efficacy score (25.40%) was the lowest of all countries. The possible reason to explain the scenario is low demand for financial products of MFIs. Malaysia is one of the ASEAN-5 countries with the most developed banking systems and is considered to be a higher middle-income country. Since most Malaysians have individual incomes that are considered middle to high levels in comparison to those of other countries, there is less of a market for the products offered by MFIs.

A wide range of financial products from commercial banks have also been made available to the majority of Malaysians, providing them with additional benefits and advantages. Therefore, the MFIs by nature unable to compete with the established commercial banks which lower the demand for microfinance products (Vanroose & D'Espallier, 2013). The notion of market failure, which defines the circumstance when a supply does not fulfil a demand, also lead to this scenario.

Table 1.4
Financial Efficiency Score of Microfinance Institutions for Specific Countries in ASEAN-5

Country Name	**Philippines**	**Thailand**	**Indonesia**	**Malaysia**	**Cambodia**
No. of Observation	602	14	413	14	133
Panel A: Year 2011					
Technical Efficiency	0.657	0.407	0.764	0.226	0.604
Pure Technical Efficiency	0.686	0.763	0.820	0.411	0.702
Scale Efficiency	0.960	0.641	0.929	0.516	0.880
Panel B: Year 2012					
Technical Efficiency	0.641	0.411	0.780	0.249	0.602
Pure Technical Efficiency	0.684	0.766	0.846	0.459	0.714
Scale Efficiency	0.938	0.641	0.926	0.522	0.814
Panel C: Year 2013					
Technical Efficiency	0.615	0.393	0.741	0.270	0.574
Pure Technical Efficiency	0.656	0.761	0.812	0.483	0.715
Scale Efficiency	0.940	0.627	0.914	0.547	0.823
Panel D: Year 2014					
Technical Efficiency	0.627	0.414	0.764	0.268	0.597
Pure Technical Efficiency	0.676	0.764	0.833	0.438	0.755
Scale Efficiency	0.931	0.645	0.917	0.599	0.813
Panel E: Year 2015					
Technical Efficiency	0.617	0.400	0.772	0.235	0.612
Pure Technical Efficiency	0.675	0.403	0.818	0.371	0.782
Scale Efficiency	0.920	0.990	0.947	0.604	0.802
Panel F: Year 2016					
Technical Efficiency	0.643	0.410	0.780	0.259	0.620
Pure Technical Efficiency	0.682	0.766	0.848	0.386	0.772
Scale Efficiency	0.941	0.640	0.919	0.656	0.817
Panel G: Year 2017					
Technical Efficiency	0.640	0.418	0.782	0.271	0.603
Pure Technical Efficiency	0.681	0.766	0.847	0.402	0.755
Scale Efficiency	0.940	0.647	0.921	0.668	0.809
Panel H: All Years					
Technical Efficiency	0.634	0.407	0.769	0.254	0.602
Pure Technical Efficiency	0.677	0.712	0.832	0.421	0.742
Scale Efficiency	0.939	0.690	0.925	0.587	0.823

Conclusion

The MFIs are characterised differently from other financial institutions due to their dual concentration on social and financial goals. In order to maintain operation while continuing the social mission of eradicating poverty, MFIs nowadays place equal emphasis on their social and financial goals.

The findings show that financial efficiency has a high mean of 67.10%. This suggests that MFIs in the ASEAN-5 countries are financially effective enough to maintain operations over the long term in order to provide financial services to the underprivileged. The study also found that there is less input waste in the financial production of MFIs. Managerial

incompetence to properly utilise their resources was shown to be one of the causes of financial inefficiency. However, the findings demonstrate that all MFIs in the ASEAN-5 countries are performing at their highest levels of efficiency.

The findings need to emphasise the crucial point, which is the MFIs' initial goal was to eradicate poverty. However, it demonstrates the MFIs in the ASEAN-5 countries have shifted away from their original goal of eradicating poverty in favour of concentrating more on the creation of financial products in order to generate higher revenue, which in turn results in a higher score for financial efficiency.

After the commercialisation of MFIs, they are no longer in a subsidised industry and must produce their own funds by supplying banking products to the poor. Unfortunately, the MFIs in the ASEAN-5 countries are inconsistent in balancing their social and financial performance, as they tend to prioritise financial sustainability to ensure their long-term viability, while neglecting the social mission to eradicate poverty.

Consequently, based on the information gained from the study, appropriate steps might be taken in order for MFIs to attain equal focus among financial and social goals. First, governments and policymakers should develop strong national policies and plans. The effective regulations and approaches might benefit to MFIs in expanding their operations and extend financial aid or loans to the underprivileged. Second, this research could help investors to monitor and comprehend the financial performance of MFIs. Failure to do so on investment decisions could result in financial losses for the investors.

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