Measurement Accuracy of Inputs and Outputs for Financial Efficiency of Islamic Banks

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SPECIAL ISSUE ARTICLE

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Abstract

This paper aims to conduct a systematic literature review on the measurement accuracy of Inputs and Outputs for the financial efficiency of Islamic Banks. Generally, financial efficient literature has lengthy discussions of various input and output measurements, but the research findings are still arguably among scholars. Therefore, this paper highlighted the significance of input and output that reflects the accuracy of the financial efficiency measurement. The data of this study was derived from a review of empirical literature comprising 33 articles published between 2013 and 2023. The sample articles on the Islamic Banks' financial efficiency measurement were located through a Scopus database keyword search, and then the systematic literature review approach was conducted. Based on the relevant literature review evaluation, the discussion on the best measurement of inputs and outputs of financial efficiency is considered inconclusive and needs further insight and testing.

Keywords: Financial efficiency, Inputs and outputs, Islamic Banks

1. Introduction

In the field of finance, efficiency refers to the ability of a bank to produce a given level of output with the minimum amount of inputs. Financial efficiency is important for banks because it can help them to reduce costs, increase profits, and improve their competitive position. By being more efficient, banks can better serve their customers and contribute to the overall health of the economy (Robin et al., 2018). The financial efficiency of a bank can be measured by many methods, including DEA (Data Envelopement Analysis), SFA (Stochastic Frontier Analysis), and others. DEA is most commonly used than the others.

The DEA may estimate three form of efficiency 1, cost efficiency; 2, revenue efficiency; and 3, profit efficiency. The estimation process entails identifying or determining the suitable inputs and outputs to gauge the efficiency level for an organization. Generally previous studies has sufficiently produce the efficiency studies on both Islamic an conventional banks. However, assessing the financial efficiency of Islamic banks necessitates a sophisticated methodology that goes beyond conventional banking indicators. Although profitability remains a

crucial factor, the distinct principles and structures of Islamic finance require extra factors to be taken into account (Saputri, 2020).

Measuring financial efficiency in Islamic banks presents a unique challenge, distinct from the methods employed for conventional banks. The existing studies on conventional bank efficiency can offer valuable insights, applying them directly to Islamic institutions often proves insufficient. The nature of Islamic banking, with its emphasis on profit sharing and ethical principles based on The Qur'an and Sunnah, necessitates a more nuanced approach to defining and measuring both inputs and outputs. This paper proposes a novel mechanism for evaluating the efficiency of Islamic banks, one that takes into account their specific operating model and regulatory environment. Accurate measurement is paramount in this endeavor, as it will provide crucial data for Islamic banks to optimize their operations, enhance competitiveness, and ultimately contribute to a more robust and sustainable Islamic financial sector (Iqbal & Yunianita, 2020).

In the production theory, inputs can be define as resources used by a firm to create goods or services, and outputs can be define as goods or services produced by a firm using its inputs. All these inputs-outputs used to evaluate financial efficiency through DEA.

Prior research on financial efficiency measurement, such as Wasiaturrahma et al. (2020), Iqbal & Yunianita (2020), Nurbayani & Fitrianti (2021), Wulandari & Hidayat (2022); has employed a diverse array of inputs and outputs indicators. This heterogeneity, however, raises concerns about the credibility and comparability of efficiency scores, as different indicators can yield varying results. Existing literature reveals an inconclusive landscape regarding the impact of indicator selection on efficiency measurements. Therefore, this study proposes a systematic literature review to unravel the mechanisms underlying various inputs and outputs selection methodologies. The critically analyzing from the arguments employed in past studies than aim to establish a robust framework for selecting appropriate indicators tailored to specific financial efficiency assessments.

2. Literature review

2.1. Financial efficiency

Financial efficiency is a bank's ability to generate the maximum possible output with the minimum possible inputs. Banks need to be efficient because it allows them to reduce costs, maximize profits, and become more competitive. Banks can improve their efficiency by operating more effectively and meeting the needs of their customers (Robin et al., 2018; Awais et al., 2022).

There are three critical aspects of financial efficiency: cost efficiency, revenue efficiency, and profit efficiency (Adongo, 2005). Cost efficiency measures how close a bank's expenses are to a best-practice bank that produces the same outputs with the same inputs. Revenue efficiency measures how well a bank performs relative to other banks in generating revenue from the same outputs. Profit efficiency measures how well a bank performs relative to other banks in generating profit from the same outputs (Bader et al., 2008).

In 1978, Charnes, Cooper, and Rhodes invented DEA. Subsequently, the utilization and advancement of this DEA have gained momentum, embracing a diverse range of applications within the banking sector. One of the main benefits of Data Envelopment Analysis (DEA) in comparison to regression analysis is its ability to avoid the need for making a priori assumptions regarding the analytical form of the production function. Consequently, DEA imposes minimal structure on the shape of the efficient frontier. Instead, it formulates the optimal production function only based on empirical data, mitigating the risk of unaccounted manufacturing technology (Charnes et al., 1978).

2.2. Production theory

Production theory is a branch of economics that studies the relationship between inputs and outputs in the production process (Naumenko & Nejad Moosavian, 2016). It is concerned with how firms combine different factors of production, such as labour, capital, and land, to produce goods and services (Rusydiana & Firmansyah, 2018).

A critical concept in production theory is the production frontier curve. This curve shows the maximum possible output produced with a given set of inputs. The production frontier curve helps analyze the efficiency of producers. A producer is considered to be efficient if it is operating on the production frontier curve.

The production process includes three input-output interactions: Constant Return to Scale (CRS), Increasing Returns to Scale, and Decreasing Returns to Scale. Constant returns to scale (CRS) is a production scenario in which the increase in output is directly proportional to the increase in production factors. The concept of Increasing Returns to Scale refers to a situation where the expansion of all inputs in the manufacturing process results in a proportionally more significant increase in output. The

concept of Decreasing Return to Scale refers to a situation where the increase in output is relatively smaller than the percentage increase in all factors of production.

3. Methodology

This paper aims to conduct a systematic literature review on the measurement accuracy of inputs and outputs for the financial efficiency of Islamic banks. The search was conducted on the Scopus database using the keywords "financial efficiency," "Islamic banks," "inputs and outputs measurement," and "Data Envelopment Analysis."

A total of 33 papers were selected for the review, published between 2013 and 2023. Relevant information was extracted from each paper, including the issue, data source, object of study, total sample, research method, variables for inputs and outputs, and primary findings.

4. Result and discussion

4.1. Approach used in the papers

Based on Table 1, 54 per cent of the papers used the DEA approach, 21 per cent used the SFA approach, and the rest used other approaches (interviews, panel, operational efficiency, MEA, etc.)

4.2. Variable for inputs and outputs used in the papers

Many variables were used in the papers to represent inputs and outputs for financial efficiency. Some of them can be seen in Table 2.

Table 1. The various approach used in the papers.

Approach	Study	%
DEA	Abbas et al. (2015); Abdul-Wahab & Haron (2017); Alber (2017); Alqahtani et al. (2017); Kamarudin et al. (2019); Rusydiana & Marlina (2019); Liao (2020); Musa et al. (2020); Anagnostopoulos et al. (2020); Rani and Kassim (2020); Banna & Alam (2020); Noor et al. (2020); Uddin et al. (2022); Lantara et al. (2022); Endri et al. (2022); Srairi et al. (2022); Masrizal et al. (2022); Chaity & Islam (2022)	54%
SFA	Louati & Boujelbene (2015); Othman et al. (2017); Robin et al. (2018); Abid et al. (2019); Izzeldin et al. (2021); Hersugondo et al. (2021); Yusuf et al. (2021)	21%
Others	Beck et al. (2013); Asmild et al. (2019); Mawardi et al. (2020); Saleh et al. (2020); Husnain et al. (2021); Awais et al. (2022); Boubaker et al. (2023); Polyzos et al. (2023)	24%

Table 2. Inputs and outputs used in the papers.

Category	Variables	Number of Paper
Input Revenue-Output Cost	Deposit	10
Input Revenue	Short Term Funding	1
Input Cost	Cost of Funds	1
Input Revenue-Input Cost-Input Profit	Labour Costs/Numbers	9
Input Cost	General and Administration Expenses	1
Input Cost	Deposit and Staff Expenses	1
Input Revenue-Input Cost-Input Profit	Fixed Assets	5
Input Cost	Fixed Capital	1
Input Profit	Total Assets	4
Input Cost	Capital Intensity	1
Input Cost	Equity	2
Input Cost-Input Profit-Output Revenue-Output Cost-Output Profit	Leverage	1
Output Revenue-Output Cost-Output Profit	Total Financing	3
Output Revenue-Output Cost-Output Profit	Loans	8
Output Revenue-Output Cost-Output Profit	Total Earning Assets	2
Output Cost	Income from Islam Financial Activities	3
Output Cost	Other Operating Income	4
Output Profit	Revenue	3
Output Revenue-Output Cost-Output Profit	Other Earning Assets	3
Output Cost	Investment	3

5. Conclusion

Generally, financial efficient literature has lengthy discussions of various input and output measurements, but the research findings are still arguably among scholars. Therefore, this paper highlighted the significance of inputs and outputs that reflect the accuracy of the financial efficiency measurement. This study aims to enhance the understanding of Islamic Banking to evaluate financial efficiency using Shariah rules.

From the literature review that has been carried out previously, it can be concluded that, in general, of the various variables used, three essential variables are most often used to represent input and output. For inputs, first, labour represents total expenditures on employees (personnel expense); second, fixed assets represent the sum of physical capital and premises; third, total funds for total deposit plus total borrower funds. For outputs, first, total loans for the total of short-term and long-term loans; second, total earning assets for the sum of investment securities, inter-bank funds sold, and loans to particular sectors (directed lending); third, off-balance sheet items for the value of the off-balance sheet activities.

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