



Faculty of Economics and Business

**Efficiency and Effectiveness of Islamic Microfinance
toward Poverty Alleviation In Indonesia**

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Efficiency and Effectiveness of Islamic Microfinance toward
Poverty Alleviation in Indonesia

Arif Rahman Hakim

A thesis submitted

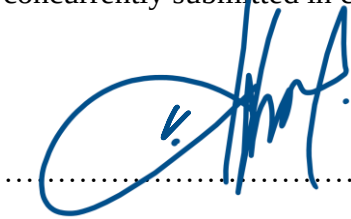
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DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Malaysia Sarawak. Except where due acknowledgements have been made, the work is that of the author alone. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

A handwritten signature in blue ink, consisting of a large loop followed by several vertical strokes and a final flourish.

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ABSTRACT

In the past few decades, Islamic microfinance has become pivotal in mitigating poverty, making it crucial to explore its operational effectiveness and performance within Muslim-majority nations. This research is centered on examining the efficiency and impact of Islamic microfinance in alleviating poverty across Indonesia. Employing a quantitative approach, the study utilizes Data Envelopment Analysis (DEA) to evaluate efficiency and panel data regression to determine effectiveness, drawing on data from 144 Islamic rural banks across 21 provinces. Initially, the results indicate that only 12 of these banks are performing efficiently, with the remaining banks showing variable efficiency levels across different provinces. Factors influencing efficiency include urban infrastructure, the density of microfinance institutions (MFIs), regional disparities, and the size of the Muslim population. Furthermore, the study underscores a stronger emphasis on financial performance over social performance among Indonesian MFIs. Despite variations in scale, the narrow gap between financial and social performance underscores the institutions' dedication to both sustainability and social objectives, aligning with the institutionalist perspective that influences sector practices in the region. Additionally, the analysis of effectiveness reveals critical insights. A notable inverse relationship between Total Financing (TF) and poverty levels highlights the importance of enhancing financial inclusion and expanding access to credit. Moreover, the management of Non-Performing Financing (NPF) emerges as crucial, correlating directly with rising poverty levels. The study also notes regional variations in how Financial Efficiency (FE) impacts poverty, emphasizing the need for targeted inflation management to support sustainable poverty reduction efforts.

Keywords: Efficiency, Effectiveness, Islamic Microfinance, Poverty

***Kecekapan dan Keberkesanan Kewangan Mikro Islam terhadap Pengurangan
Kemiskinan di Indonesia***

ABSTRAK

Dalam beberapa dekad yang lalu, kewangan mikro Islam telah menjadi sangat penting dalam mengurangkan kemiskinan, menjadikannya penting untuk mengeksplorasi keberkesanan operasi dan prestasi dalam negara-negara majoriti Muslim. Kajian ini tertumpu kepada pemeriksaan kecekapan dan impak kewangan mikro Islam dalam mengurangkan kemiskinan di seluruh Indonesia. Menggunakan pendekatan kuantitatif, kajian ini menggunakan Analisis Data Envelopment (DEA) untuk menilai kecekapan dan regresi data panel untuk menentukan keberkesanan, dengan mengambil data dari 144 bank desa Islam di 21 provinsi. Awalnya, hasil menunjukkan hanya 12 daripada bank-bank ini yang berprestasi cekap, dengan bank-bank yang lain menunjukkan tahap kecekapan yang berbeza di seluruh provinsi yang berlainan. Faktor-faktor yang mempengaruhi kecekapan termasuk infrastruktur bandar, ketumpatan institusi kewangan mikro (MFI), perbezaan serantau, dan saiz populasi Muslim. Selanjutnya, kajian menekankan lebih kepada prestasi kewangan berbanding prestasi sosial di kalangan MFI Indonesia. Walaupun terdapat perbezaan skala, jurang kecil antara prestasi kewangan dan sosial menegaskan dedikasi institusi terhadap kedua-dua kelestarian dan objektif sosial, selaras dengan perspektif institusionalis yang mempengaruhi amalan sektor di rantau ini. Tambahan pula, analisis keberkesanan mengungkapkan wawasan kritikal. Hubungan songsang yang ketara antara Pembiayaan Total (TF) dan tahap kemiskinan menonjolkan kepentingan untuk meningkatkan inklusi kewangan dan memperluas akses kepada kredit. Selain itu, pengurusan Pinjaman Tidak Berprestasi (NPF) muncul sebagai sangat penting, berkorelasi langsung dengan peningkatan tahap kemiskinan. Kajian juga mencatat variasi serantau

dalam bagaimana Kecekapan Kewangan (FE) memberi kesan kepada kemiskinan, menekankan keperluan untuk pengurusan inflasi yang ditargetkan untuk mendukung usaha pengurangan kemiskinan yang lestari.

Kata kunci: *Kecekapan, Keberkesanan, Kewangan Mikro Islam, Kemiskinan*

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LIST OF ABBREVIATIONS

ASA	Association Social Advancement
AIM	Amanah Ikhtiar Malaysia
BCC	Banker–Charnes–Cooper
BPS	Badan Pusat Statistik (Statistic Indonesia)
BMT	Baitul Maal Wa Tamwil
BPR	Bank Perkreditan Rakyat
BPRS	Bank Pembiayaan Rakyat Syariah
BRAC	Bangladesh Rural Advancement Committee
BRI	Bank Rakyat Indonesia
CCR	Charnes, Cooper and Rhodes
DID	Difference in Difference
CRS	Constant Return to Scale
DEA	Data Envelopment Analysis
DMU	Decision Making Unit
FE	Fixed Effect
FE	Financial Efficiency
GDP	Gross Domestic Product
IRB	Islamic Rural Bank
IMFIs	Islamic Microfinance Institutions
IBBL	Islami Bank Bangladesh Limited
IBF	Islamic Banking and Finance
IRS	Increase Return to Scale
IMF	International Monetary Fund
KUR	Kredit Usaha Rakyat

MFI	Microfinance Institutions
MMU	Masalah Mursalah lil Ummah
MoCSME	Minister of Cooperatives and Small and Medium-sized Enterprises
NGO	Non-Government Organization
OJK	Otoritas Jasa Keuangan (Indonesia Financial Authority)
PSM	Propensity Score Matching
PTE	Pure Technical Efficiency
POJK	Peraturan Otoritas Jasa Keuangan
P2SK	Pengembangan dan Penguatan Sektor Keuangan
RDS	Rural Development Scheme
RE	Random Effect
RTS	Return to Scale
SDGs	Sustainable Development Goals
SE	Social Efficiency
SE	Scala Efficiency
TE	Technical Efficiency
TF	Total Financing
VRS	Variable Return to Scale
ZISWAF	Zakat Infaq Sadaqah Waqf

CHAPTER 1

INTRODUCTION

1.1 Introduction

The World Bank (2022) highlighted that 1.4 billion adults in developing countries have no proper access to essential financial services to support their living and this condition is referred to as unbankable. Without financial access, the poor cannot improve their socio-economic status and remain below the poverty line. The United Nations (UNDP & OPHI, 2020) stated that poverty could be reduced by increasing access to finance for people experiencing poverty as part of the Sustainable Development Goals (SDGs) plan.

Enhancing economic development via accessible financial services holds significant importance for the socio-economic well-being of households, particularly those with lower incomes. Financial services, such as loans, empower individuals in poverty to generate income, stimulate local transactions and foster the demand and supply of goods and services within the domestic economy (Ben & Abdelkader, 2013). Nevertheless, the impoverished are still denied access to many financial institutions due to their inability to repay loans, resulting in minimal profits earned from this demographic (Rokhman, 2013). Consequently, impoverished households encounter financial hardships, perpetuating a cycle of poverty.

In the last few decades, the emergence of microfinance had shown promise in addressing the primary economic challenge of poverty (Tammili et al., 2017; Rokhman, 2013; Ben & Abdelkader, 2015) by bolstering the economy at its grassroots level, particularly in developing nations. Yunus (2004) pioneered this concept through the Grameen Bank in Bangladesh, offering credit to rural communities, with a notable majority of borrowers being women. This approach has notably improved local economic welfare and

alleviated poverty in Bangladesh, showcasing a successful instance of financial inclusion through microfinance.

Microfinance institutions (MFIs) play a crucial role in expanding financial inclusion, enabling access for the impoverished and contributing to community welfare enhancement and poverty reduction (Littlefield et al., 2003; Berhane & Gardebroek, 2011). These institutions demonstrate agility and adaptability in responding promptly to the specific needs of impoverished communities (A. U. F. Ahmad & Rafique Ahmad, 2009). They encompass various entities, including rural banks, cooperatives and non-governmental organisations (Nimrah Karim et al., 2008).

MFIs, particularly banks, often impose specific prerequisites, such as collateral, typically in the form of land and other assets (Flaming, 2019). This requirement poses a significant barrier for rural individuals with limited resources and hinders their access to finance, especially in obtaining loans to improve their livelihoods. Access to financial institutions holds critical importance as it profoundly influences the economy of the poor and contributes to various social impacts, such as improved education, health and housing (Hermes & Lensink, 2011).

Microfinance poses a dilemma for Muslim countries and populations due to the ethical and moral conflicts arising from the practice of interest (*riba*)¹ (Rahim Abdul Rahman, 2010). The prohibition of interest in Islam has presented a significant challenge within the microfinance sphere. In response, Dr. Ahmad El-Naggar pioneered Islamic

¹ *Riba* is by way of excess over and above the quantity of the commodity advanced by the lender to the borrower. The prohibition of *riba* in the Quran can be classified into four stages: the first stage is the moral denunciation of *riba* in ar-Rum verse 39; the second stage is on comparing *riba* with the Jews in an-Nisa' verse 61; the third stage is the legal prohibition in Ali-Imran verse 130–132; and finally, the fourth stage is on *al-bay'* (trading) as the alternative to *riba* in al-Baqarah verse 275–281.

microfinance as an alternative solution. Notably, he established the Mit Ghamr Savings Bank in Egypt in 1963 and introduced a local bank model based on profit-sharing principles, marking the inception of Islamic banks worldwide (Rokhman, 2013).

This innovative institution aligns with the objectives of microfinance rooted in Islamic principles (Tamanni & Besar, 2019). Abdul Rahman et al. (2015) emphasised that Islamic microfinance upholds principles, such as providing collateral-free loans and embracing risk-sharing to support the entrepreneurial endeavours of impoverished individuals. Moreover, the author highlighted that while conventional microfinance functions as both a financial and development institution, it often fails to substantially uplift impoverished communities, underscoring the crucial role of Islamic microfinance for poor Muslims.

Microfinance represents a financial strategy geared towards providing small-scale loans to individuals who are facing poverty, particularly those historically excluded from mainstream financial services. This approach is designed to cater for the distinct needs and situations of these individuals (Mahmood et al., 2015). Advocates of microfinance argue that it has significantly contributed to poverty alleviation, increased access to education and the proliferation of many small businesses. It serves as a viable avenue for microentrepreneurs who are ineligible for conventional bank loans or are deemed unbankable by traditional financial institutions.

A notable illustration of this approach is the Grameen Bank in Bangladesh, established in response to a severe famine in 1974. The Grameen model operates under the premise that expertise of the impoverished can be utilised, offering an alternative lending solution for individuals deemed non-creditworthy by conventional banks. This model prioritises delivering financial services to people instead of requiring them to approach banks

(Armendariz De Aghion & Morduch, 2006).

Nevertheless, it is crucial to acknowledge that microfinance encounters a delicate balance between upholding sustainability and its mission to serve individuals from the middle to lower-income brackets. As highlighted by Nugroho (2015), Indonesia's microbanks face a trade-off between profitability and outreach goals when catering for the impoverished. Despite being considered an alternative funding source for the poor, the operational aspects of microfinance institutions often align with the prudent standards of commercial financial institutions, aiming for profitability.

Morduch (2020) put forth the notion that a widespread consensus exists, suggesting that microfinance systems, particularly those emphasising profitability through high interest rates, can significantly contribute to alleviating poverty. Nevertheless, this consensus often diverges from practical implementation, as certain MFIs prioritise social impact over profits, relying on subsidies, and thus raising concerns about their sustainability. Therefore, it becomes imperative to uphold a diverse range of fundamental objectives within microfinance, encompassing both socially driven and profit-centric approaches to consistently enhance the well-being of impoverished communities.

In comparing Islamic and conventional microfinance, both share similarities in their focus on economic development and social objectives. Their aim is to enhance the overall livelihood of communities, foster diversified income streams, bolster entrepreneurship and encourage risk-sharing. According to Obaidullah (2008), entrepreneurial endeavours should actively involve the impoverished. Islamic MFIs ought to inclusively cater for the poor to ensure sustainability within a profit-oriented market approach. Naturally, such a system must be executed with efficiency and transparent reporting. Additionally, it should emphasise capacity building integrated with microfinance and adhere to official regulations

(Obaidullah, 2008). Notably, there are key differences between conventional and Islamic microfinance, as outlined in Table 1.1.

Table 1.1 Differences between Conventional and Islamic Microfinance

Category	Conventional Microfinance	Islamic Microfinance
Category of poor	One category	Two levels: 1. Very poor with no access to loans, only through social safety nets and <i>zakat</i> 2. Poor who can access loans for micro-enterprises and would be better off getting them
Based on financing	The debt-based and interest-based approach	Profit and loss sharing (PLS) approach, free of interest (<i>riba</i>) and uncertainty (<i>gharar</i>)
Sources of fund	External funds, saving of clients	External funds, saving of clients, an Islamic charity.
Dealing with default	Group/centre pressure and threats	Group/centre/spouse guarantee and Islamic ethics.
Social Development Programme	Secular	Religious (behaviour, ethics and social

Source: Obaidullah (2008); (Ahmed, 2002)

This study focuses on Islamic microfinance, especially Islamic rural banks, which only account for 2.5% of total Islamic bank assets in Indonesia, however, Islamic rural banks play an important role in serving micro-enterprises (Trinugroho, 2018). It should be noted that 99% of businesses in Indonesia are small and micro businesses, which contribute significantly (42%) to the country's gross domestic product (GDP) (Shaban et al., 2014). In addition, Indonesia has a large number of Islamic rural banks spread across various regions (provinces), a unique characteristic that may not be found in other countries. This unique

condition offers an opportunity to take advantage of regional (provincial) and temporal differences, which allows the use of panel data analysis to explore the performance and effectiveness of Islamic rural banks in addressing poverty-related problems (Risfandy & Pratiwi, 2022).

1.2 Background of Study

Islamic microfinance has proliferated alongside conventional developments in recent decades. It aims to enhance the well-being of the impoverished by generating income, boosting expenditure and elevating living standards through adherence to Shariah principles (Ahamad et al., 2016). This form of microfinance represents the convergence between microfinance and Islamic finance, both experiencing significant growth as industries in Indonesia. Practically, substantial potential exists to merge microfinance with Islamic principles of supporting the poor and extremely poor, extending financial service accessibility to these demographics.

Estimates indicate that the Islamic microfinance industry possesses total assets of at least US\$500.5 billion. As per the survey by the Consultative Group to Assist the Poor (CGAP), Islamic MFIs serve approximately 300,000 clients through 126 agencies operating across 14 countries. Additionally, within Indonesia's cooperative network, Islamic MFIs cater for an estimated 80,000 clients. Nonetheless, the presence of these institutions is concentrated primarily in a few countries, with 80% focusing on Afghanistan, Bangladesh and Indonesia (ZahidMahmood et al., 2017).

Seibel (2008) observed that Indonesia exhibits a distinctive banking and microfinance landscape as compared to other developing nations worldwide. As of December 2022, Indonesia boasted 106 commercial banks with 25,377 offices and 1,441 rural banks operating across 6,044 offices (Table 1.1). The Ministry of Cooperatives and

Micro, Small and Medium Enterprises (MoCMSMEs) of the Republic of Indonesia released data, indicating the supervision of 130,354 formal savings and loan cooperatives in 2022 (Otoritas Jasa Keuangan, 2022; Kementerian Keuangan Republik Indonesia, 2022).

1.2.1 Microfinance in Indonesia

Indonesia has a diverse range of financial institutions, including a significant number that operate according to Islamic principles. According to recent data from 2022, the country's Islamic financial sector consists of 13 Islamic commercial banks with 1,995 branches, 33 conventional banks with Islamic business units encompassing 380 branches, and 167 Islamic rural banks (see Table 1.2). Additionally, by 2022, there were 3,912 Shariah-compliant savings and loan cooperatives regulated by the Ministry of Cooperatives and Micro, Small, and Medium Enterprises (MoCMSMEs) of the Republic of Indonesia.

Indonesia has both conventional and Islamic microfinance institutions. Microfinance institutions (MFIs) in Indonesia are governed by Law Number 1 of 2013, which defines microfinance as financial institutions established to provide business development services and community empowerment, either through loans or financing to micro-enterprises and individuals, managing deposits, and offering business development consulting services. These institutions operate on either conventional or Islamic principles, without a profit-oriented focus. Therefore, MFIs function as financial intermediaries with the dual purpose of generating profit and achieving social goals, such as community development (Akbar & Nabiha, 2019)

Table 1.2 Indonesia's Financial Institutions in December 2022

No.	Types	Total Institutions	Total Office Network
1	Conventional Institution		
	a. Commercial Banks	106	25,377
	b. Rural Banks	1,441	6,044
	c. Cooperatives	130,354	130,354
	Total	131,391	161,775
2	Islamic Institution		
	a. Islamic Commercial Banks	13	1,995
	b. Conventional bank with Islamic business unit	33	380
	c. Islamic Rural Banks	167	668
	d. Islamic Cooperatives	4,046	4,046
	Total	4259	7089

Source: Indonesia Financial Services Authority (2022); MoCSME Republic of Indonesia (2022)

In Indonesia, microfinance programs are managed by formal, semi-formal, and informal institutions. Formal microfinance institutions are those regulated under Indonesian banking law and supervised by the Financial Services Authority of Indonesia (OJK). The legal entities of formal microfinance institutions include private enterprises, cooperatives, or regional companies. Specifically, Islamic microfinance institutions are regulated under Law Number 21 of 2008, which stipulates that the legal entity must be a private enterprise. The supervision and oversight of formal microfinance institutions are conducted by OJK.

Formal microfinance institutions are categorized into commercial banks with

microfinance units (such as Bank BRI Unit and Bank Mandiri Micro Banking Unit) and microfinance banks (Rural Banks or Bank Perkreditan Rakyat), operating either on conventional principles or Islamic principles (BPRS). Thus, in Indonesia, conventional microfinance is represented by Rural Banks (BPR), while Islamic microfinance institutions are known as Islamic Rural Banks (BPRS). Both are classified as formal microfinance institutions (Usman et al., 2004; World Bank, 2005; Financial Services Authority of Indonesia, 2018).

Semi-formal microfinance institutions, on the other hand, are regulated by either the central or local government. Their legal entities can be private businesses, regional governments, or regional government companies. The supervision and oversight of these semi-formal institutions are carried out by the Financial Services Authority of Indonesia (OJK) and the Ministry of Cooperatives and Small and Medium Enterprises. Informal microfinance institutions, such as pawnshops, Village Credit Agencies (BKD), Savings and Loan Cooperatives (KSP), and Baitul Maal Wa'atamwil (BMT), are not regulated by specific laws, making them operate without legal recognition (Baskara, 2013; Haryanto, 2011; Martowijoyo, 2000; Mujiono, 2013; Nelson, 2011; Susila, 2007; Usman et al., 2004; World Bank, 2005; Financial Services Authority of Indonesia, 2018).

1.2.2 The Difference between conventional Rural Banks (BPR) and Islamic Rural Banks (BPRS)

In the present context, Islamic finance operates in parallel with the conventional financial system in Indonesia. For instance, rural banks, such as Bank Perkreditan Rakyat (BPR) and Bank Pembiayaan Rakyat Syariah (BPRS), as illustrated in Table 1.1, serve micro and small enterprises (MSEs) and communities in both rural and urban areas (Trinugroho et al., 2018; Akbar & Nabiha, 2019). Approximately 99% of Indonesia's companies fall under

the small and medium enterprises (SMEs) category (Shaban et al., 2014). Consequently, both traditional microfinance banks, BPR and BPRS, play a crucial role in Indonesia's current economy (Trinugroho et al., 2018).

BPRS (Islamic Rural Banks) are not only financial institutions with a dual mission (financial and social), but they also function as religious institutions that carry out their role in Islamic propagation (dakwah) (Wediawati et al., 2018). The financial benefits provided by BPRS aim to strengthen the Islamic economy, particularly for economically disadvantaged communities in both rural and urban areas. Additionally, they seek to increase employment rates by supporting the growth of Micro, Small, and Medium Enterprises (MSMEs) through capital assistance from Islamic microfinance institutions (Akbar & Siti-Nabiha, 2022). The financial performance of both BPR (conventional rural banks) and BPRS is often measured by indicators such as return on equity (ROE), profit margin, return on assets (ROA), operational self-sufficiency (OSS), and financial self-sufficiency (FSS) (Hermes & Hudon, 2019; M A Mobin et al., 2017; Rama, 2019; Schreiner, 2002)

In terms of social performance, BPR and BPRS are commonly evaluated based on factors such as the average loan size relative to the target population's income, the number of borrowing clients, total loans and savings accounts, the number of branches established, and the proportion of loans directed to female borrowers (Hermes & Hudon, 2019; Purwanto et al., 2018). However, the primary distinction between BPRS and BPR lies in their organizational objectives. The goals of BPRS are rooted in Sharia principles (maqasid Sharia), which seek to achieve a balance between worldly goals (financial and social) and spiritual goals, with the ultimate aim of obtaining blessings from Allah SWT in all organizational activities (Wediawati et al., 2018). As a result, the financial performance of BPRS emphasizes profit and loss sharing based on contracts such as mudharabah and

musyarakah (Mobin et al., 2017; Purwanto et al., 2018; Wediawati et al., 2018).

A musyarakah contract is a partnership where two or more parties share both profits and losses. Instead of charging interest as traditional creditors do, investors receive returns based on a pre-agreed ratio of the actual profits earned. However, unlike traditional creditors, investors also share in any losses incurred. On the other hand, a mudharabah contract is a partnership in which one party provides capital and the other contributes labor or expertise. The capital provider is known as the Rab Al-Mal, while the other party is referred to as the Mudarib. This is considered a trust-based contract, meaning that the Mudarib is not held responsible for any losses unless there is a breach of trust (Fersi & Boujelbéne, 2016).

A key aspect of social performance in BPRS is the provision of zakat to the poor, with funding sources that come from zakat, waqf, and qard al-hasan. These sources are unique to Islamic financial institutions and are not present in conventional microfinance institutions. These three instruments play a central role in poverty alleviation efforts within Islamic finance (Fersi & Boujelbéne, 2016; Mobin et al., 2017). As a Sharia-based financial institution, BPRS's objectives must align with the broader goals of Islamic principles (maqasid Sharia). This alignment ensures a balance (Falah) between worldly (financial and social) and spiritual goals, ultimately seeking the blessings of Allah SWT (Wediawati et al., 2018). In essence, BPRS aims to achieve both financial and social performance simultaneously (Abdelkader & Salem, 2013; Fersi & Boujelbéne, 2016; Mobin et al., 2017; Wediawati et al., 2018).

BPRS provides financial intermediation services using Islamic financial instruments, accepting funds from investors and other stakeholders and channeling these funds, with or without profit, to micro, small, and medium enterprises (MSMEs) and low-income households. To complete the Islamic microfinance cycle, a model consisting of several key

components is required: funding, Islamic microfinance institutions, Islamic financial instruments for fund disbursement, borrowers, and repayment. This model is what differentiates BPRS from conventional institutions (Mobin et al., 2017). At BPRS, Islamic charity instruments such as zakat and waqf serve as special sources of funding. However, when it comes to external funds and savings as sources of capital, both BPRS and conventional rural banks (BPR) operate similarly. The detailed characteristics and differences between BPRS and BPR are summarized in Table 2.

Table 1.3 Difference Between Conventional Rural Banks and Islamic Rural Banks

Aspect	Conventional Rural Banks	Islamic Rural Banks
Source of funds	Saving of clients and external funds	Saving of clients, external funds and Islamic charity funds
Asset (type financing)	Interest based	Profit loss sharing (Islamic instrument)
Financing to poorest	Poorest in urban and rural area	Poorest are included by integrating zakah with microfinancing in a urban and rural area
Target group	Family, Micro and Small Medium Enterprises (SMEs)	Family, Micro and Small Medium Enterprises (SMEs)
Social development programme	Secular – behavioural, ethical, and social development	Religious (includes behaviour, ethics and social)
Work incentives of employees	Monetary	Monetary and religious
Guidance and supervision	Financial Service Authority (OJK)	Financial Service Authority (OJK) and Board of Shariah Supervision

Source: (Akbar & Nabiha, 2019)

1.2.3 Development of Islamic Rural Banks in Indonesia

The development of the financial sector is believed to enhance production, boost economic competitiveness and dynamically stimulate the labour market (Levine, 2005). Many studies indicated that countries with well-developed financial sectors tend to experience increased economic growth, reduced income inequality and lower poverty rates (Zhang & Ben Naceur, 2019). The following shows the development of Islamic rural banks in Indonesia in the last decades, including total assets, amount of financing, profit performance, number of customers and BPRS.

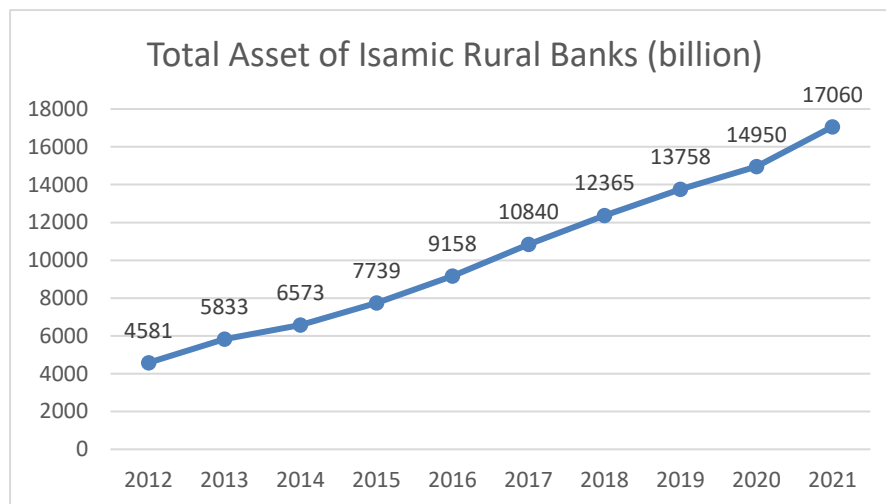


Figure 1.1 Total Asset of Isamic Rural Banks in Indonesia 2012-2021

Source: Indonesia Financial Authority (2022)

The Assets illustrates in figure 1.1 a consistent upward trend in the total assets of BPRS from 2012 to 2021. This growth is indicative of the increasing financial strength and capacity of Islamic Rural Banks to serve their customers. The rise in assets—from IDR 4,581 billion in 2012 to IDR 17,060 billion in 2021—suggests that BPRS has become a more prominent player in Indonesia's banking sector, capable of supporting the financial needs of small and rural businesses. This steady asset accumulation reflects the overall growth in

customer deposits and the increased ability of BPRS to leverage these resources for further expansion. The robust asset growth also signals trust and confidence in Sharia-compliant banking, attracting more capital from investors and customers alike.

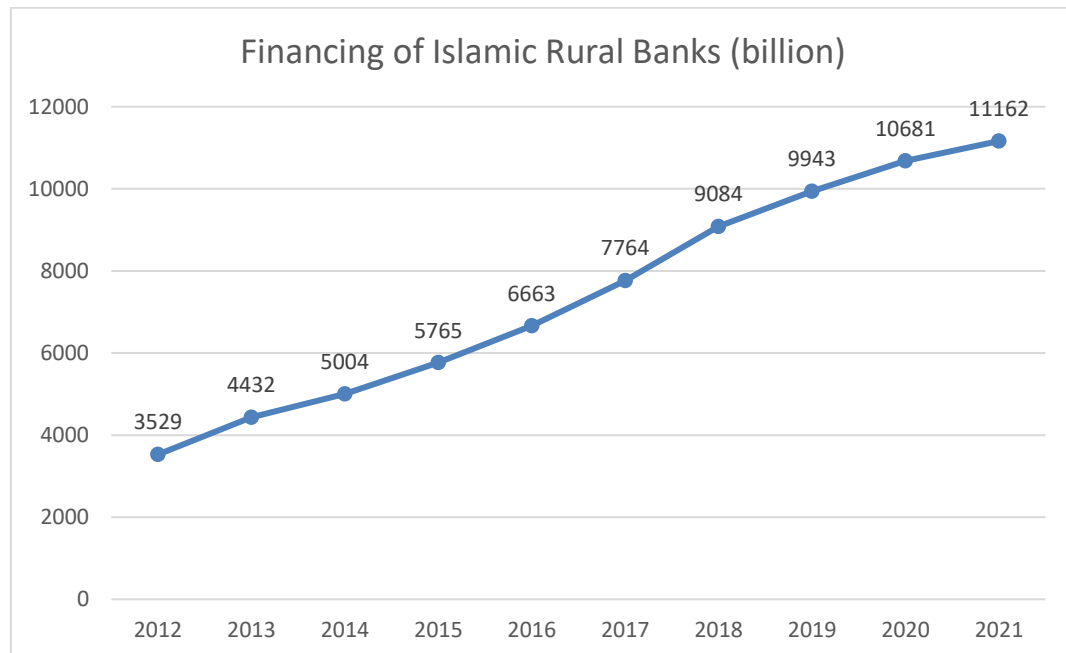


Figure 1.2 Financing of Islamic Rural Banks in Indonesia 2012-2021

Source: Indonesia Financial Authority (2022)

Figure 1.2 demonstrates an equally important upward trend in the financing provided by BPRS. Starting at IDR 3,529 billion in 2012, the total financing reached IDR 11,162 billion by 2021, although growth appears to have slightly slowed in the final years. This gradual increase in financing underscores the pivotal role of BPRS in supporting micro, small, and medium enterprises (MSMEs) and low-income individuals. The plateau in the financing curve from 2020 to 2021 may be attributed to economic disruptions caused by the COVID-19 pandemic, which likely affected both the demand for loans and the risk appetite of these banks. Nevertheless, the significant financing provided by BPRS during this period highlights its commitment to fostering economic growth, particularly in underserved rural areas.

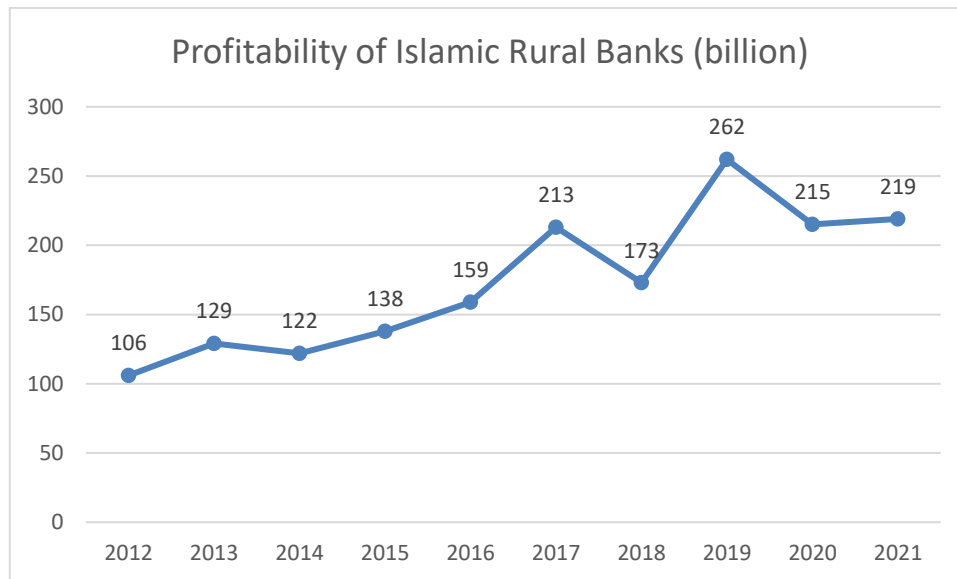


Figure 1.3 Profitability of Islamic Rural Banks in Indonesia 2012-2021

Source: Indonesia Financial Authority (2022)

Figure 1.3 presents a more nuanced picture, with noticeable fluctuations in profitability over the period. After a peak in 2019 with IDR 262 billion in profit, BPRS experienced a slight decline, ending at IDR 219 billion in 2021. The variation in profits may reflect the challenges faced by Islamic banks in balancing financial sustainability with social and ethical obligations. The decline in profit in 2020 and 2021 could also be linked to external factors such as the pandemic, which likely impacted the ability of borrowers to repay loans, as well as restrictions on economic activity. Despite these challenges, BPRS's profitability shows resilience, and its long-term ability to generate income remains a critical indicator of its sustainability in the financial sector.

The Number of Customers (see figure 1.4) a remarkable increase in the number of customers served by BPRS, growing from 787,923 in 2012 to 2.29 million in 2021. This dramatic rise in customer numbers highlights the growing demand for Sharia-compliant financial products and services, particularly among Indonesia's rural population. The increase also suggests that BPRS is successfully reaching underserved communities that may

have previously lacked access to conventional banking services. The growing customer base is likely driven by BPRS's focus on small-scale entrepreneurs, rural households, and individuals seeking ethical financial solutions. The expansion in customer numbers is a testament to the effectiveness of BPRS's outreach efforts and its role in promoting financial inclusion

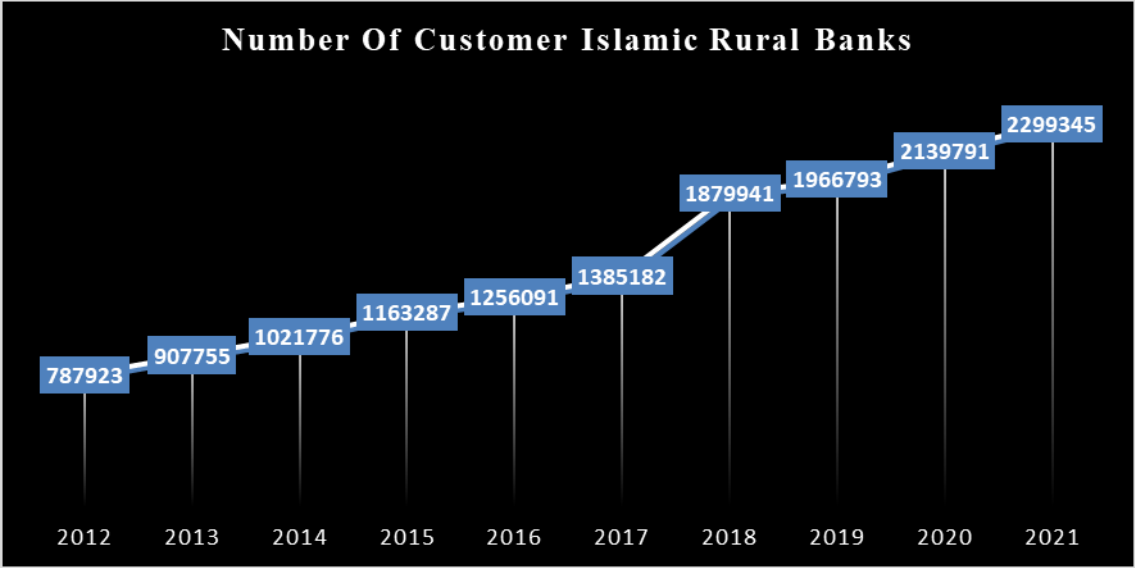


Figure 1.4 Number Of Customer Islamic Rural Banks

Source: Indonesia Financial Authority (2022)

The figure 1.5 depicting the number of Islamic Rural Banks (IRBs) in Indonesia from 2012 to 2021 shows a steady increase from 156 banks in 2012 to a peak of 167 banks in 2017 and 2018, followed by slight fluctuations and a stabilization at 164 banks by 2021. This trend reflects the initial growth in demand for Sharia-compliant financial services in rural areas, possibly driven by increased financial inclusion efforts and the appeal of Islamic banking. The plateau and minor fluctuations in the later years could indicate a market reaching maturity, where growth is tempered by factors such as market saturation, regulatory changes, or economic conditions, suggesting that the sector might have achieved a balance between expansion and sustainable operation within the given economic and regulatory

environment.

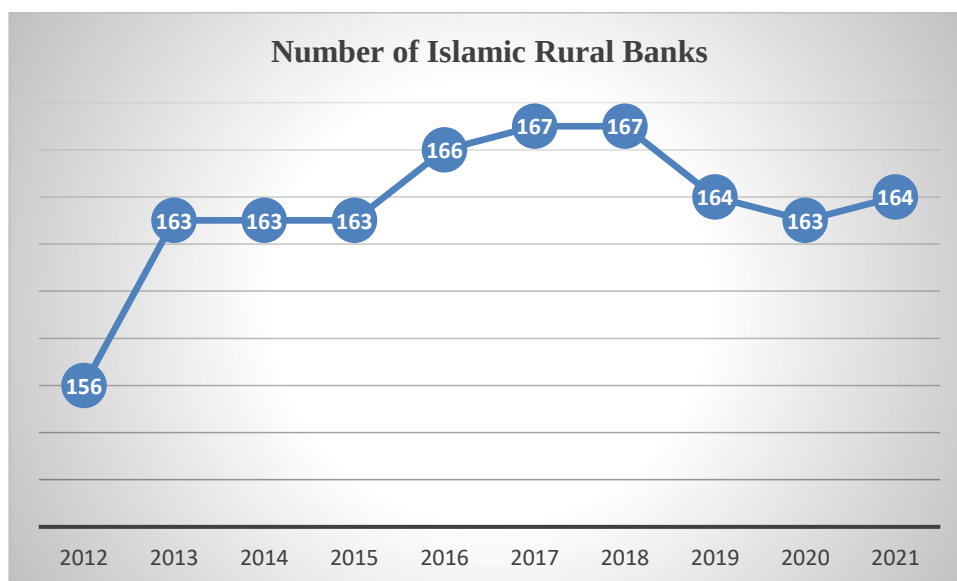


Figure 1.5 Number of Islamic Rural Banks in Indonesia 2012-2021

Source: Indonesia Financial Authority (2022)

1.2.4 Poverty and the Role of Islamic Microfinance in Indonesia

Poverty statistics in Indonesia are assessed twice a year, which is in March and September. As shown in Figure 1.6, the trend in the poverty rate has shown a yearly decline, except for specific instances, such as September 2013, March 2015, March 2020 and September 2020. The increase in poverty rates in September 2013 and March 2015 was influenced by rising staple goods prices due to increased fuel oil prices. Conversely, the rise in poverty rates in March 2020 and September 2020 was attributed to the onset of the COVID-19 pandemic, followed by a slight decline in March and September 2021.

According to the data provided by the Statistics Indonesia (2022), the urban poverty rate in March 2021 stood at 7.89%, declining slightly to 7.60% by September 2021. Meanwhile, the rural poverty rate decreased from 13.10% in March 2020 to 12.53% in September 2021. The highest concentration of impoverished individuals was observed in the Maluku and Papua Islands, accounting for 20.65% of the population living in poverty.

Conversely, the lowest poverty rate was recorded on the island of Kalimantan at 6.16%. In terms of sheer numbers, the highest number of impoverished individuals resides on the island of Java, totalling 14.75 million people, while the lowest number of individuals living in poverty is found in Kalimantan, with approximately 1.02 million people.

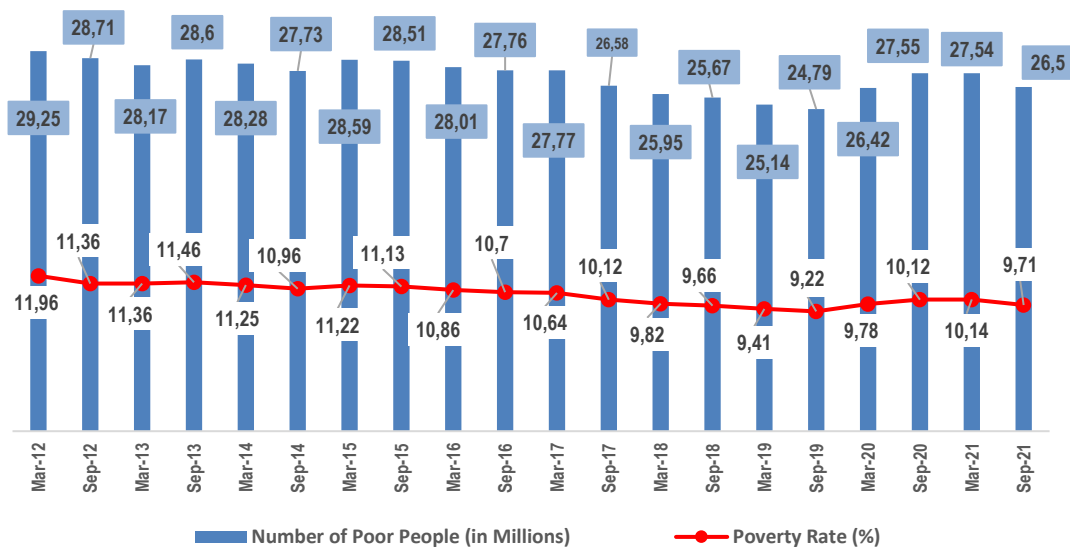


Figure 1.6 Number and Percentage of Poor People of Indonesia in 2012–2021

Source: Statistic Indonesia (2022)

Based on Figure 1.7, Indonesia’s economy demonstrated a consistent growth, ranging from 5%–6% from 2012 to 2021, with a downward trend. Nevertheless, according to the Central Bureau of Statistics (2022), a sharp decline occurred in 2020, marking a negative growth rate of -2.07%, a stark contrast to the 5.02% growth recorded in 2019. This decline was the most severe since the 1998 crisis, which saw a contraction of -13.16%. The negative impact of the COVID-19 pandemic significantly affected Indonesia’s economic growth, leading to an increase in poverty from 9.32% in 2019, after a steady decrease from 11.6% in 2012. Conversely, inequality exhibited a downward trend from 0.41% in 2012 to 0.38% in 2021.

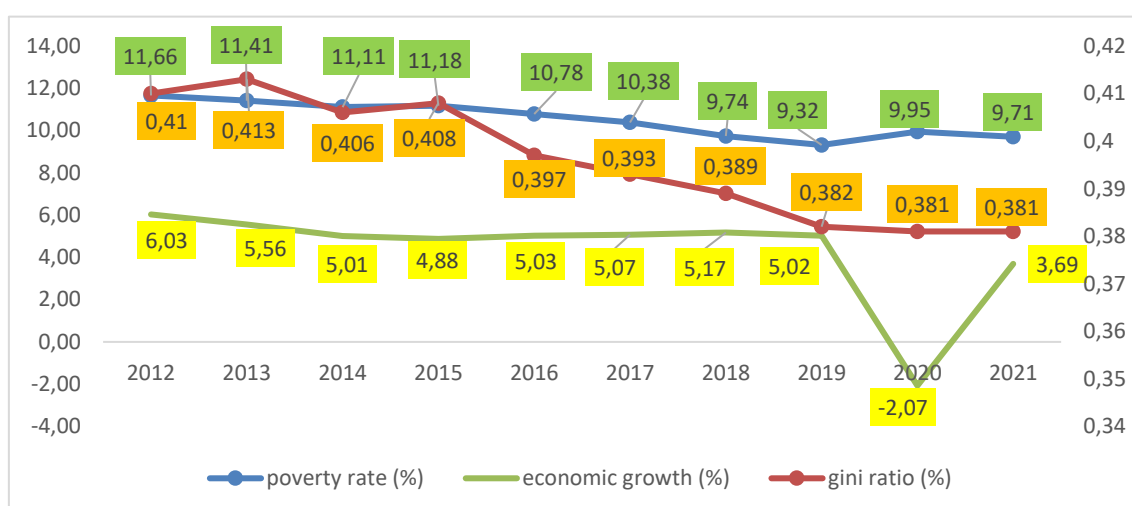


Figure 1.7 Economic Growth, Poverty and Inequality in Indonesia 2012–2021

Source: Statistic Indonesia (2022)

The role of the financial sector in addressing poverty and inequality remains a subject of debate. While increased financial facilities can potentially provide more significant loans and aid in reducing inequality (Galor & Moav, 2004), financial institutions often prioritise middle to upper-income groups, resulting in greater benefits for the wealthy (Clarke et al., 2006; Rajan & Zingales, 2003).

Approximately 50% of adults in developing countries lack proper access to essential financial services, rendering them unbanked² (World Bank, 2022). This absence of financial access impedes social and economic advancement, keeping the poor below the poverty line. Recognising this challenge, the United Nations (UN) aims to combat poverty by enhancing financial service accessibility through the Sustainable Development Goals (SDGs). Amongst the aims of the SDGs are to eradicate poverty and ensure universal financial access, which are crucial objectives for many developing countries, including Indonesia. Improved financial service access empowers the poor with necessary resources, enabling effective

² Individuals who are old enough and do not have a bank account (Central Bank of Indonesia).

utilisation of their physical resources and achieving economic independence.

Enhancing financial inclusion, particularly in developing nations, is a critical global agenda. Meeting the agenda of universal financial access by 2030 necessitates the crucial role of financial institutions, particularly MFIs, in extending their services to reach rural areas (World Bank, 2022; Beck et al., 2015). Microfinance is considered a viable solution for poverty alleviation, contributing positively to people's welfare by facilitating long-term income generation for the poor. Studies have indicated that providing credit access to MSEs offers practical solutions in poverty reduction, especially for those near the poverty line. This situation enables greater economic independence and breaks the cycle of poverty. By leveraging its unique characteristics aligned with Islamic values, Islamic microfinance holds promise in aiding the poor, enhancing access to credit and reducing poverty levels by improving living standards.

The main programs implemented by Islamic Microfinance Institutions (IMFIs) to combat poverty in Indonesia include several financing schemes: 1) Qard ḥasan financing for education, health, and economic needs (necessities) of members; 2) Micro-enterprise financing based on zakat beneficiaries (*mustahiq*); 3) Financing for Micro, Small, and Medium Enterprises (MSMEs); and 4) Group liability financing schemes. These programs have had significant impacts on the community, such as: a) Improving the welfare of financially disadvantaged members; b) Reducing clients' debts to moneylenders; c) Empowering economically vulnerable women; d) Increasing the income of rural populations. Additionally, these initiatives have contributed to poverty alleviation among micro and small entrepreneurs, evidenced by the reduction in the number of impoverished micro and small business owners, the enhancement of their bargaining power, and the increase in their independence. Furthermore, the programs have provided economic, social,

and spiritual benefits, supporting Indonesia's economic and social growth, which has positively impacted financial inclusion and poverty reduction.(Martiana & Rahmanto, 2021)

The poverty alleviation programs described above are further supported by additional complementary initiatives, such as multifunctional assistance for businesses financed by IMFIs. Social empowerment and the fostering of fraternal relationships between client partners and IMFIs are also emphasized to enhance religious capacities, which can serve as part of IMFIs's risk management strategy. Islamic ethical values are instilled in IMFIs activities through mentoring, training, and religious study forums. In social finance activities, IMFIs manages collections, customer relations, financial and accounting processes, and the utilization of resources to ensure the success of these programs.

1.3 Problem Statement

Poverty remains a significant and pressing issue in developing nations, including Indonesia. With a population of 237.53 million people in 2021, Indonesia represents one of the largest populations globally and the largest Muslim population, with around 86.9% categorised within the developing country bracket (Central Bureau of Statistics, 2022). Barrientos et al. (2003) highlighted that developing countries grapple with insufficient per capita income to meet their citizens' welfare needs, leading to a range of social problems, such as poverty, unemployment, inadequate education and substandard healthcare services.

Addressing poverty stands as a priority agenda within Indonesia's National Long-Term Development Plan (2005–2025). This aligns with the Millennium Development Goals, which later evolved into the SDGs, adopted by 189 countries in response to the 2000 Millennium Summit in New York. The SDGs encompass 17 goals with 169 targets aimed at promoting sustainable development across economic, social and environmental dimensions, with the overarching ambition of eradicating poverty by 2030 (Alisjahbana &

Murniningtyas, 2018).

In achieving the 2030 SDGs, which align with the principle of *maslahah* aimed at eradicating poverty, numerous studies suggest that the best solution lies in the implementation of Islamic Microfinance Institutions. These institutions have proven to be effective tools for poverty alleviation by improving livelihoods, welfare, and the economic development of the poor. Previous research highlights that the impact of Islamic microfinance aligns closely with the goals of sustainable development in addressing poverty. This is further demonstrated by institutions like Amanah Ikhtiar Malaysia (AIM), which reported that borrowers who participated in Islamic microfinancing programs experienced improvements in their social and economic conditions.

Islamic microfinance is a sub-system of Islamic finance, with *maslahah* (public benefit) as its primary motivation. The concept of *maslahah*, which guides Islamic microfinance, dictates that Sharia law is Allah's directive for humanity, with the ultimate goal of achieving welfare for all. This aligns well with the goals of the 2030 SDGs, emphasizing that Islamic microfinance programs should incorporate the principle of *maslahah* to effectively target poverty alleviation and reduce inequalities. Given this foundation, Islamic microfinance institutions present a strong alternative for combating poverty, as their programs are consistently rooted in the welfare and benefit of the community.

Consequently, many studies suggest that Islamic finance has the potential to make significant contributions to achieving the SDGs. Through Islamic microfinance, several SDG targets—particularly those related to eradicating poverty, hunger, unemployment, and financial deprivation—can be met. Islamic microfinance is thus positioned to play a pivotal role, with its innovative products and instruments offering impactful solutions in the pursuit

of sustainable development goals.

Within its 2011–2020 medium-term development plan, the Indonesian government established a target to reduce the country's poverty rate to 8%–10% (Perdana, 2014). Indonesia's poverty alleviation policies can be categorized into three main clusters, each addressing different target groups and needs. Cluster 1 focuses on programs targeting low-income households. This cluster includes social assistance programs designed to provide immediate relief and improve living conditions. The Raskin program, for instance, offers subsidized rice to poor households, ensuring food security. The PKH (*Program Keluarga Harapan*) provides conditional cash transfers to families, incentivizing education and healthcare for children. The BSM (*Bantuan Siswa Miskin*) is aimed at educational assistance for poor students, reducing barriers to education access. Finally, Jamkesmas (*Jaminan Kesehatan Masyarakat*) offers subsidized healthcare, ensuring that low-income individuals have access to basic medical services. These programs collectively aim to provide direct support to households, improving their quality of life while encouraging long-term investments in human capital.

Cluster 2 focuses on programs targeting communities, with the PNPM (*Program Nasional Pemberdayaan Masyarakat*) as its centerpiece. PNPM is a community-driven development initiative aimed at empowering local communities by giving them control over development projects that directly address their needs. The program encourages participation from the community in the planning and implementation of projects, ensuring that resources are used in ways that benefit the local population. These projects may include infrastructure development, improving local governance, or enhancing access to social services. By empowering communities, PNPM not only promotes poverty reduction but also fosters social cohesion and local ownership of development efforts.

Cluster 3 targets Micro, Small- and Medium-sized enterprises (MSMEs), recognizing the role of entrepreneurship in poverty alleviation. The government provides a credit guarantee scheme known as *Kredit Usaha Rakyat* (KUR), which offers accessible financing to MSMEs. By facilitating access to credit, KUR helps small businesses grow, create jobs, and stimulate local economies. This cluster of policies aims to reduce poverty by empowering small business owners, fostering innovation, and expanding economic opportunities for low-income individuals. Together, these three clusters form a comprehensive strategy to tackle poverty through direct household support, community empowerment, and economic development.

Indonesia's microfinance landscape encompasses two distinct schemes: conventional microfinance employing an interest rate model and Islamic microfinance operating on a profit-loss sharing (PLS) system. Most micro and small credit providers in Indonesia rely on interest rate-based microfinance programmes, including non-governmental organisation-based (NGO), commercial-based, government-based and informal setups. Conversely, PLS-based financing is predominantly adopted by Islamic MFIs like *Baitul Mal wat Tamwil* (BMT). The significant difference between the Shariah system (based on Islamic law) and conventional approaches lies in the sharing system, where businesses share either profits or losses (Yasin, 2020).

In Indonesia, various financial institutions provide microfinance services, such as commercial banks, state-owned pawnshops, secondary banks, cooperatives and NGOs (Takahashi et al., 2010). In contrast to microfinance pioneer countries like Bangladesh and Bolivia, whereby NGOs predominantly drive microfinance with a focus on poverty alleviation, the Indonesian government primarily oversees microfinance activities through

rural banks³, according to the Organisation for Economic Cooperation and Development (OECD) (Kondo, 2007). Nevertheless, microfinance in Indonesia tends to involve lower-middle-income communities, potentially leading to challenges in implementation, particularly concerning the trade-off between ensuring sustainability and fulfilling social objectives, as noted by Nugroho (2015).

Targeting the lower-middle-income group is a suitable focus for microfinance in Indonesia, as it aligns with the objectives of financial inclusion and poverty alleviation. However, to better serve this segment without compromising the sustainability of Microfinance Institutions (MFIs), the current approach needs refinement. Islamic Microfinance Institutions (IMFIs) can address this challenge by utilizing Sharia-compliant principles that emphasize both ethical finance and social welfare. By leveraging these principles, IMFIs can offer an approach that is more equitable and socially conscious, which better aligns with the needs of lower-middle-income communities.

IMFIs can resolve these issues through several strategies. First, they use profit-sharing models (*mudharabah* and *musyarakah*) that distribute financial risk between the institution and the borrower, alleviating the burden on clients while promoting mutual benefit. IMFIs also emphasize social welfare through principles like *maslahah* (public good), integrating *qard al-hasan* (benevolent loans) and *zakat* into their financial offerings to support the most vulnerable. Additionally, IMFIs can mitigate risk by utilizing Islamic social funds, such as *zakat*, *waqf*, and *sadaqah*, for social programs that benefit lower-income clients. Furthermore, they can develop flexible, Sharia-compliant financial products like

³ Rural bank is defined as a private/local government institution that, since 1988, has focused its banking business on rural areas in Indonesia. Its formal financial institutions that offer microfinance services are supervised by the Indonesia Financial Services Authority.

micro-insurance and savings plans tailored to the unique needs of this group. Finally, IMFIs can adopt a holistic approach by combining financial services with community development programs, such as training and mentorship, to enhance the economic productivity of lower-middle-income clients.

There is a delicate balance for MFIs in Indonesia, whereby they must fulfil their role in poverty alleviation while ensuring good business performance. Often, banks prioritise profit generation, leading to relatively high interest rates to cover operational costs and mitigate default risk associated with collateral liabilities. This dynamic creates a tension between social and business objectives.

Islamic IMFIs are established to cater for the Muslim community's needs, operating based on Shariah principles in Islam⁴. This convergence of microfinance and Islamic finance responds to the rapid growth of both sectors. Microfinance plays a crucial role in supporting the economy of individuals at the bottom of the socio-economic pyramid, offering financial access to those in need. Islamic finance, governed by Shariah principles, strictly prohibits *riba* (fixed interest), presenting a distinct identity within the Islamic economic system (Consultative Group to Assist the Poor [CGAP], 2007; Ben & Abdelkader, 2013; Mobin et al., 2017).

IMFIs share similar goals with conventional MFIs in providing financial services to the financially excluded. Therefore, IMFIs are expected to simultaneously achieve social objectives while maintaining economic sustainability (Hermes & Hudon, 2019; Mobin et al., 2017). Established based on Shariah principles, these institutions emphasise social goals,

⁴ Shariah refers to is an economic system based on shariah principles. There is a strict prohibition of *riba* and it does not allow the application of fixed interest. This prohibition of *riba* is a well-known identity of the Islamic economic system.

particularly in promoting equality to ensure a decent standard of living for those in the lower social strata. Considering Indonesia's status as the largest Muslim country globally, with a significant Muslim population, implementing IMFIs in Indonesia holds considerable potential for public acceptance and market penetration. Therefore, IMFI implementation could significantly contribute to poverty alleviation by fulfilling their social objectives. Nevertheless, the challenge lies in the unsatisfactory performance of IMFIs in Indonesia as compared to conventional MFIs concerning market share and both financial objective and social performance.

One key challenge for IMFIs in Indonesia is the balancing of their dual mission: achieving financial sustainability while also fulfilling social and ethical objectives. Unlike conventional MFIs that primarily focus on maximizing financial returns, IMFIs must also adhere to Sharia principles, which prohibit interest (riba) and emphasize profit-sharing and ethical investments. This constraint can limit the financial flexibility of IMFIs and may contribute to lower profitability. As evidenced by the profit data from 2012 to 2021, IMFIs in Indonesia, such as BPRS, have experienced fluctuations in profitability, with a noticeable dip in recent years. This variability in profits can be linked to both external factors (like the COVID-19 pandemic) and internal limitations (such as the need for more robust governance structures and financial innovations).

Another area where IMFIs may lag conventional MFIs is in their operational and financial outreach. Although IMFIs like BPRS have shown impressive growth in terms of the number of customers and assets, they may not be reaching the same scale as conventional MFIs. This is particularly important when evaluating performance from a social impact perspective. While IMFIs emphasize financial inclusion and poverty alleviation through their Sharia-compliant products, their ability to provide wide-reaching and efficient services

may be hindered by the additional administrative and operational costs associated with adhering to Islamic principles. This can result in lower financial returns and, in some cases, higher transaction costs for clients compared to conventional MFIs.

Moreover, IMFIs often face regulatory and institutional challenges that limit their performance. In Indonesia, the regulatory framework for IMFIs is still developing, and there is often a lack of standardization in how Islamic financial institutions are supervised and monitored. This can result in inefficiencies, inconsistencies in service delivery, and weaker governance structures compared to conventional MFIs, which have more established regulatory frameworks. Additionally, IMFIs may struggle with access to capital, which is critical for scaling their operations and improving their financial performance. Without adequate access to funding, IMFIs may find it difficult to compete with conventional MFIs, which often have better-established networks of investors and more diversified sources of capital.

To address these challenges, several steps could be taken to improve the performance of IMFIs in Indonesia. First, there needs to be a stronger focus on developing innovative Sharia-compliant financial products that can meet the diverse needs of clients while also ensuring financial sustainability. This may involve leveraging digital financial services to reduce costs and improve outreach, especially in rural areas. Second, improving governance structures and enhancing regulatory oversight could help ensure that IMFIs operate more efficiently and are better able to compete with conventional MFIs. Finally, increasing financial literacy and awareness among potential clients, particularly in Muslim communities, could help boost demand for Sharia-compliant financial products, leading to greater financial inclusion and, ultimately, better performance for IMFIs.

A crucial aspect of social performance for IMFIs is their role in providing charity to

the poor, funded through *zakat*, *waqf* and *qard hasan*, areas whereby traditional microfinance organisations typically lack emphasis. These charitable funds play a vital role in poverty eradication for Islamic financial institutions (Fersi & Boujelbéne, 2016; Mobin et al., 2017). The objectives of Shariah-based financial institutions, such as *Baitul Mal wat Tamwil* (BMT) and Islamic rural banks (BPRS), must align with the principles of Shariah law (*Maqasid al-Shariah*). This alignment ensures a balance in life (*falah*) between worldly material, financial and social objectives and spiritual goals for the hereafter in service of Allah SWT (Wediawati et al., 2018)

BPRS, being an IMFI, is expected to fulfil its goals simultaneously in terms of financial success and social performance (Abdelkader & Salem, 2013; Fersi & Boujelbéne, 2016; Mobin et al., 2017; Wediawati et al., 2018). These institutions act as intermediaries, receiving funds from investors and stakeholders while disbursing funds, sometimes with profits, to micro, small and medium-sized businesses, as well as low-income households. The Islamic microfinance process involves fundamental components, such as funding, Islamic financial instruments for fund disbursement, borrowers and repayment, creating a distinctive model compared to traditional microfinance organisations (Mobin et al., 2017).

Islamic rural banks have encountered challenges and struggled to fulfil their missions due to several reasons. Firstly, they face difficulties related to inadequate capital, limited access to borrowers and managerial issues. Secondly, the nature of Islamic microfinance products, based on profit and loss-sharing models, results in substantial transaction costs. These costs include oversight, investigation and enforcement expenses, primarily stemming from informational challenges within rural financial markets. The imposition of significant administrative fees, often with fixed prices, makes small loans costly for borrowers (Riwajanti, 2013; Ginanjar & Kassim, 2020; Akbar & Nabiha, 2019, 2019; Wasiaturrahma

et al., 2020).

Indonesia has struggled to effectively implement MFIs to achieve substantial growth and development (Risfandy et al., 2016). Presently, the market share of Islamic finance in Indonesia stands at only 9.68%, as illustrated in Table 1.1 amongst the financial institutions (OJK, 2022). These challenges indicate that the Islamic finance sector in Indonesia faces barriers that hinder its expansion and efficient operation within the financial landscape.

Several factors may contribute to this situation. First, regulatory challenges and lack of standardization in the Islamic finance sector may limit the ability of IMFIs to operate efficiently and expand their services. Regulatory frameworks that do not fully support the unique needs and operational models of IMFIs can slow down growth and limit their competitiveness against conventional MFIs. Second, lack of awareness and financial literacy among the general population could be another barrier. Many potential clients, particularly in rural areas, may not fully understand the benefits of Sharia-compliant financial products or how these products can be utilized to improve their financial well-being. Additionally, operational inefficiencies within IMFIs, such as higher transaction costs or difficulties in scaling up operations, may make them less appealing compared to conventional institutions, especially when their financial products and services are perceived as more complex or less flexible.

The performance of Islamic microfinance stands as a crucial agenda in the realm of microfinance studies, impacting the sustainability of microfinance programmes. The design of microfinance initiatives should ensure their long-term viability in serving impoverished communities. Therefore, exploring the efficiency and effectiveness of IMFIs in poverty alleviation within Indonesia becomes an intriguing avenue for investigation.

While prior studies have delved into Islamic microfinance practices in Indonesia and their correlation with reducing poverty (Adnan & Ajija, 2015; Bin Mislan Cokro Hadisumarto & Ghafar, 2010; Fianto et al., 2018), they tend to present limitations by focusing on specific areas. This creates a challenge for future research efforts (Hassan & Aliyu, 2018). The existing studies have been constrained by their restricted scope, often examining observations within limited regions, be it a single district, province or a few areas. Consequently, the outcomes derived from these studies might lack generalisability across the diverse Indonesian landscape, comprising 34 provinces and 514 cities and districts characterised by distinct cultures and local contexts. Furthermore, past research mainly evaluated the performance of Islamic microfinance at the provincial level in Indonesia without thoroughly assessing the effectiveness of these institutions in mitigating poverty. Bridging this gap serves as the primary contribution of this study. As such, this research aims to fill this void by conducting a comprehensive analysis of the efficiency and effectiveness of Islamic microfinance in combating poverty throughout Indonesia, contributing substantially to the existing literature on this subject matter.

1.4 Objective of the Study

The general objective of this study is to investigate the efficiency and effectiveness of Islamic microfinance towards poverty alleviation in Indonesia. The specific objectives of the study are stated as follows:

- i. To decompose technical efficiency, pure technical efficiency and scale efficiency of Islamic microfinance in Indonesia.
- ii. To compare the financial efficiency and social efficiency performance of Islamic microfinance in Indonesia.

- iii. To investigate the effectiveness of Islamic microfinance towards poverty alleviation in Indonesia.

1.5 Significance of the Study

In the current body of literature exploring the correlation between Islamic microfinance and poverty alleviation, a significant void exists in comprehensive studies, scrutinising the efficiency or performance of Islamic rural banks and their impact on poverty reduction. This study serves as a pioneering effort aimed at addressing these crucial aspects. Moreover, it contributes to the advancement of the Islamic rural bank concept as an Islamic microfinance institution (IMFI), drawing upon insights and perspectives from scholarly experts.

This study gains depth by delineating the technical efficiency of each IMFI and subsequently contrasting this efficiency amongst double bottom MFIs in terms of financial and social performance within each decision-making unit (DMU) and across various provinces, spanning an extended period. While some studies have compared the technical efficiency of MFIs within certain countries or geographic regions, previous research has primarily focused on singular time points rather than analysing changes in technical efficiency over a longer duration, such as a ten-year period.

Furthermore, there remains a shortage of empirical research conducted within the realm of Islamic rural bank settings. Only a handful of papers, authored by Trinugroho et al. (2017; 2018) and Wasiaturrahma et al. (2020), specifically investigated Islamic rural banks. Nevertheless, none of these studies specifically delve into the performance and effectiveness of these institutions in mitigating poverty. Therefore, the findings of this research will yield a significant contribution to the current literature in this field.

1.6 Scope of the Study

Indonesia has developed an Islamic finance industry with distinct characteristics and a unique developmental basis, setting it apart from countries like Malaysia and those in the Gulf Cooperation Council (GCC). While Malaysia and GCC countries have focused more on investment banking and Islamic financial markets/instruments, Islamic banking and finance in Indonesia are more complex, encompassing a broader spectrum of the financial services industry and being more oriented toward the retail segment.(Fithria et al., 2021)

Indonesia has introduced specific features that highlight its unique Islamic financial characteristics, such as Islamic rural banks or *Bank Pembiayaan Rakyat Syariah* (BPRS) (OJK, 2015). BPRS primarily targets rural communities and small and medium enterprises (SMEs) as its customers. The growth of BPRS has been remarkable, starting with only four BPRS in 1992 and expanding to 167 BPRS by the end of November 2017 (OJK, 2017). In 2020, the total assets and total loans of BPRS increased by 10.56% and 10.49%, respectively (OJK, 2022). In Indonesia, BPRS are classified not only as banks but also as Islamic microfinance institutions (IMFIs) with a profit-seeking purpose. Additionally, BPRS contribute to the development of the social and economic aspects of society (Irfan, 2020). Therefore, given the significance of BPRS's role, it is essential to examine the effectiveness of their performance.

The figure 1.8 depicts the distribution and number of Islamic Rural Banks (BPRS) across various provinces in Indonesia as of 2022. The map illustrates that the highest concentration of BPRS is found on the islands of Java and Sumatra. In Java, Central Java leads with 28 BPRS, followed by East Java with 25, and West Java with 27, indicating that the central and eastern regions of Java have a significant presence of Islamic rural banking institutions. DKI Jakarta, despite being the capital, hosts only one BPRS, whereas other

regions, such as Banten, have 8 BPRS, reflecting the geographical diversity in the distribution of these financial institutions.



Figure 1.8 Distribution and Number of Islamic Rural Banks

Source: Indonesia Financial Authority (2022)

On the other hand, in provinces outside Java, such as Sumatra and Sulawesi, the number of BPRS is relatively lower. For instance, North Sumatra has 6 BPRS, while South Sumatra and Lampung have 1 and 3, respectively. Some provinces, such as Kalimantan and Papua, have very few or no BPRS at all, indicating an uneven spread of Islamic rural banking institutions across the archipelago. This uneven distribution may point to economic or regulatory factors influencing the establishment of BPRS in different regions, with a noticeable concentration in more densely populated or economically active areas like Java.

The data on Islamic Rural Banks (BPRS) in Indonesia from 2012 to 2021 shows significant growth across various key indicators. Assets, measured in billions of Indonesian Rupiah, have steadily increased from IDR 4,581 billion in 2012 to IDR 17,060 billion in 2021, demonstrating robust expansion in the financial capacity of BPRS over the period.

This growth highlights the increasing role of Islamic financial institutions in supporting rural and small-scale economies in Indonesia.

In terms of financing, BPRS also exhibited consistent growth, with total financing rising from IDR 3,529 billion in 2012 to IDR 11,162 billion in 2021. Although the growth in financing is substantial, the year 2021 showed a slight deceleration in growth compared to the previous years, potentially due to the economic impact of the COVID-19 pandemic. Meanwhile, profit figures for BPRS fluctuated, with a dip in 2014 followed by recovery, reaching IDR 219 billion in 2021. This reflects challenges in maintaining profitability amidst market dynamics, though the overall trend remains positive.

The number of customers grew significantly from 787,923 in 2012 to over 2.29 million by 2021, underscoring the increasing demand for Sharia-compliant banking services. Despite this, the number of BPRS institutions remained relatively stable, starting with 156 banks in 2012 and ending with 164 banks in 2021, reflecting consolidation and stabilization within the sector as it matured. This suggests that while fewer institutions are operating, the remaining ones are likely expanding in size and influence.

This study encompasses a comprehensive evaluation of the efficiency or performance of Islamic rural banks, examining various aspects such as input, process and output parameters. The input variables considered are operating costs and assets, while the output variables involve measuring both financial and social performance. Financial performance is assessed through indicators, such as profits from financing, whereas social performance incorporates attributes like total financing. These internal variables, along with total financing, serve as key components to evaluate the role of Islamic microfinance in addressing poverty. Additionally, external variables at the macro level, such as regional economic growth and inflation rates for each province, are considered in the analysis.

Focused on one of Indonesia's formal MFIs, the Islamic rural bank, this study adheres to the guidelines outlined in the Indonesian Government Regulation Number 10 of 1998, which stipulates that Bank Pembiayaan Rakyat Syariah (BPRS) conducts its operations based on Shariah principles and is supervised by the Indonesia Financial Services Authority (OJK, 2022). As of December 2022, 167 Islamic rural banks were operating across 21 provinces in Indonesia. The scope of the study encompasses all Islamic rural banks with accessible financial reports, totalling 144 institutions distributed across 21 provinces. With a dataset covering 10 years and comprising 144 institutions, this study accumulates a total of 1,440 observations for analysis.

The study spans a substantial observation period of 10 years, from 2012 to 2021. This extended timeframe is crucial for comprehensive analysis as it allows for capturing the evolution of various phenomena and differences that manifest over time. By covering a more extended period, the study can better accommodate the developmental changes and disparities that occur over time within the subject matter. The research focuses on financial institutions that operate under the regulation and supervision of a reputable and authoritative body, the Indonesia Financial Services Authority. Utilising data from such credible institutions enhances the reliability and validity of the findings. Moreover, reliable data from esteemed sources like the Statistic Indonesia contribute significantly to the completeness of this study. The data include crucial information, such as poverty headcount, regional economic growth rates and inflation rates at the provincial level, thereby enriching the depth and breadth of the analysis by providing comprehensive coverage across various provinces.

1.7 Organisation of the Study

The study is structured across five chapters. Chapter 1 sets the stage with an introduction, outlining the research context, problem statement and objectives of the study.

Chapter 2 delves into an extensive review of existing literature, discussing theoretical studies and defining key concepts, such as poverty, microfinance and Islamic microfinance. This chapter also examines empirical studies that explore the impact of IMFIs on poverty alleviation and the relation between them.

Chapter 3 elucidates the research materials and methods employed in this study. It offers an overview of the framework, highlighting the utilisation of quantitative methods. Additionally, the chapter details the quantitative analysis method, employing Data Envelopment Analysis (DEA) and panel data techniques to assess the efficiency and effectiveness of Islamic microfinance in tackling poverty.

Chapter 4 provides an in-depth analysis of the efficiency and effectiveness of Islamic microfinance in addressing poverty in Indonesia. It discusses the outcomes of the study objectives based on the data analysis conducted using DEA with MaxDEA and Panel Data Regression with Stata. This section includes an interpretation of the findings, accompanied by extensive discussion.

Finally, Chapter 5 encapsulates the study with a conclusion and recommendations drawn from the research findings. This section serves to summarise the key outcomes and implications derived from the study, offering recommendations for further actions or considerations based on the results.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Poverty, an enduring and intricate issue documented throughout history, manifests itself across diverse levels of society irrespective of available resources, cultural backgrounds or developmental stages. Given these diverse circumstances, the conceptualisations of poverty within literature exhibit considerable variation. Consequently, to comprehend poverty thoroughly, it is imperative to contextualise it within the pertinent social, cultural and historical frameworks, as emphasised in scholarly studies (Lister, 2004; Sen, 2005).

Nevertheless, it remains widely acknowledged that formulating specific policies aimed at effectively alleviating poverty and ensuring their efficacy is a complex undertaking. This process necessitates a precise understanding of poverty, accompanied by consistent measurement metrics. Such clarity is pivotal in devising practical and effective approaches for poverty alleviation (Haughton & Khandker, 2009).

2.2 Definition of Poverty

2.2.1 Conventional Perspective

The conventional definition of poverty encompasses two widely recognised approaches that most policymakers adopt. The first is the narrow perspective, which defines poverty solely in material (monetary) terms. The second is the broader approach, positing that poverty extends beyond economic constraints to encompass non-monetary necessities. More recently, discussions on poverty definitions have expanded to include the capability approach. This approach scrutinises individuals' capabilities to live and function within

society, considering a broader spectrum of human needs, including concepts of justice and freedom within specific communities. The evolution of these approaches is closely linked to poverty measurement extensively practised in prior research.

The narrow approach defines poverty as an inadequate income for basic subsistence. A seminal study by Seebohm Rowntree in 1899 is considered one of the initial research projects on poverty within this narrow concept. Rowntree's study defines a household as poor when its income is insufficient to provide access to minimum necessities to maintain physical well-being (Chimhowu et al., 2010). This viewpoint finds support amongst various experts and scholars (Renes & Hagenaars, 1989; Todaro, 1989), defining poverty simply as the lack of adequate income to meet basic needs. In this approach, poverty measurement involves comparing individuals' income/consumption with a predefined standard (poverty line). An individual falling below this standard is considered poor, while the aggregate poverty index illustrates the poverty condition within an area (Ravallion, 1997). The narrow perspective is often considered the most straightforward approach to understanding poverty due to its clear and objective differentiation between the poor and non-poor, as highlighted by Haughton and Khandker (2009), who noted its continued use in initial poverty analyses.

Conversely, while the narrow approach focuses on monetary income standards, the broad approach expands the scope of poverty measurement. It encompasses an individual's possession of various consumption goods/services and considers fulfilling fundamental needs like shelter, healthcare and education. Chimhowu et al. (2010) highlighted that the broad approach critiques the narrow system by arguing that increasing household income might not enhance welfare if it remains inadequate to meet multidimensional needs. In this non-monetary approach, a household may live in poverty if it lacks proper access to essential needs like decent shelter, healthy food, clean water, adequate healthcare and education

(Yunus, 2004). Experts often employ the Human Development Index (HDI) to measure poverty within this framework (Sen & Anand, 1997).

The recent extension of the broad approach culminates in the emergence of the capability approach, spearheaded by Nobel laureate Amartya Sen. This approach posits that societal well-being stems from the community's capability to function. Poverty is thus understood as the absence of fundamental capabilities necessary for individuals to participate in society (Alkire, 2005), leaving them deficient and lacking resources to support their existence in the community (Allardt, 2003; Anand & Sen, 1997). Poverty under this approach is viewed as a deprivation of capabilities and the absence of multiple freedoms individuals value or have reasons to appreciate (Alkire, 2005). Indicators of these deficiencies signalling poverty include inadequate income, limited education, poor health, low self-confidence and a sense of powerlessness (Robeyns, 2005).

In contrast to other perspectives on poverty, the capability approach presents a compelling argument regarding the definition of poverty. It contends that poverty assessments should emphasise the welfare benefits of income rather than solely considering its utility aspect. In this context, an individual's standard of living is not solely about the quantity of resources possessed. For example, having access to quality education, nutritious food and the freedom to make choices signify a better living standard than simply being wealthy but experiencing significant health issues (Chimhowu et al., 2010). Capability poverty is a multidimensional circumstance largely dependent on the societal values in place, offering various alternative avenues for addressing poverty issues. Reflecting this viewpoint, the United Nations developed the Multidimensional Poverty Index, widely regarded as a measure of capability poverty.

Conversely, global institutions generally tend to define poverty differently. On the

one hand, the World Bank defines poverty as a state of deprivation in well-being (World Bank, 2001). On the other hand, the United Nations describes poverty as a condition whereby individuals lack continuous or chronic access to options, abilities, power and security required to enjoy an adequate standard of living, encompassing civil, cultural, economic, political and other social rights (Chimhowu et al., 2010). Similar definitions are proposed by other international agencies. Nevertheless, these perspectives on poverty are often considered complementary as they coexist and are utilised in various contemporary poverty studies (Gordon, 2004).

Apart from the mentioned poverty concepts, policymakers often classify poverty into absolute poverty and relative poverty. Absolute poverty refers to a situation whereby an individual or household lives below the poverty line, typically determined by specific national or international standards. Consequently, the threshold for absolute poverty may vary. Conversely, relative poverty is commonly understood as the extent to which an individual or household income falls below the average income within a given area. In practice, relative poverty is often viewed as an indicator of inequality within a society (Ravallion, 1997).

Furthermore, poverty levels are frequently categorised into chronic and non-chronic (transitory) poverty. Chronic poverty refers to a scenario whereby an individual or household remains in poverty over a long term. In contrast, non-chronic (transitory) poverty describes situations whereby individuals intermittently fall below the poverty line due to unforeseen events. For example, individuals who typically live above the poverty line might temporarily dip below it due to economic crises, poor agricultural seasons and so on. Additionally, factors like disabilities, lack of social networks, discrimination and social exclusion can contribute to non-chronic poverty (Hulme & Mosley, 1996). Calvo and Dercon (2013)

asserted that vulnerability signifies exposure to risks and the likelihood of failing to attain minimum income levels or specific welfare standards. Recognising vulnerability as a key aspect of poverty research is crucial, as it poses a threat to future poverty.

2.2.2 Islamic Perspective

Islam emphasises the importance of maintaining both vertical and horizontal relations. Vertically, believers are encouraged to foster a strong connection with Allah (*hablu min Allah*), while horizontally, they are urged to cultivate positive relationships with others (*hablu minannas*). Within Islamic teachings, the principle of *Maqasid al-Shariah* outlines five fundamental objectives: preserving faith (*din*), human life (*nafs*), intellect (*'aql*), lineage (*nasl*) and wealth (*mal*) to ensure the welfare of people. Furthermore, the concept of happiness, considered an integral part of *Maqasid al-Shariah*, is crucial for attaining ultimate success (Chapra, 2008). According to Chapra (2000), everlasting happiness can only be achieved by managing one's affairs effectively and attaining both physical and spiritual contentment.

In analysing the relation between *Maqasid al-Shariah* and poverty, it becomes apparent that one of the central aims of Shariah principles is the enrichment of the self (*nafs*). Consequently, poverty stands in contradiction to this objective (Obaidullah, 2008). According to Pramanik (1993), all human endeavours, economic pursuits included, should be guided by the pursuit of God's blessings in both present life and the hereafter. He emphasised the significance of integrating Shariah principles into economic activities, striving for optimal results while placing priority on the welfare of the public. This distinction highlights a fundamental divergence between conventional and Islamic approaches. Traditional economic perspectives often concentrate solely on specific aspects, potentially neglecting broader societal elements, whereas the Islamic framework seeks a

balanced fulfilment of various factors, making it more comprehensive in its approach. difference between conventional and Islamic economics. While conventional economics often focuses solely on one aspect, potentially disregarding other societal elements, the Islamic approach aims for a balanced fulfilment of various factors. Consequently, the Islamic concept appears to be more comprehensive than the traditional conventional understanding.

The Islamic view of economic activity (*muamalah*) emphasises the creation of a fundamental concept, with justice as one of the main points of thought, as stated in the Quran Surah al-Hadid verse 25:

“We sent a foretime Our Messenger with Clear Signs, and sent them down with them the Book and the balance (of right and wrong), that men may stand forth in justice.”

The verse underscores the principal mission of the Messenger, emphasising the pursuit of justice for all humanity. Building upon this, Chapra (1992) highlighted Islamic economics’ strong focus on “socio-economic justice”, advocating for an economic system rooted in “moral values” and an “amoral filter”. Conversely, proponents of conventional economics argued that their objectives can be achieved without consideration for moral factors (Chapra, 2008). They asserted their commitment to achieving development alongside justice. However, Chapra (2008) contended that achieving material progress with justice is unattainable without concurrent moral development. This necessitates the effective and equitable utilisation of all resources, which cannot be realised without integrating moral values into economic endeavours. This compelling argument supports the Islamic perspective on economic development, embedding several unique positive aspects of moral values absent in conventional economic approaches.

Naqvi (2013) corroborated Chapra’s assertions by portraying Islam as a

comprehensive way of life that, when integrated into an individual's being, cultivates enhanced values, a heightened sense of social justice and a willingness to aid those in need, aligning with the concept of Khilafah (God's stewardship on Earth) as mentioned in the Quran Surah al-Baqarah verse 30. Therefore, Islam advocates for poverty alleviation as welfare inequality signifies an injustice, implying the inadequate application of Islamic principles in people's lives.

Furthermore, Chapra (1992) argued that achieving justice (*'adl*) involves four aspects: meeting people's fundamental needs, motivating individuals to work towards fulfilling these needs, attaining income and wealth equality, and pursuing optimal economic growth while ensuring financial stability. From an Islamic viewpoint, addressing poverty extends beyond the material realm to encompass moral considerations. Chapra (2008) asserted that ethical dimensions like spirituality, peace, happiness and social harmony are indispensable components for a just life and the fostering of brotherhood amongst people, irrespective of gender, race or ethnicity. While there might not be a precise definition of poverty in Islamic teachings, Muhammad Baqir al-Sadr, cited by Chapra (1992), attributed poverty and deprivation to unfair distribution and the absence of a moral framework in the relation between the affluent and the impoverished.

Naqvi's (2013) comprehensive explanation illuminated three dimensions of poverty beyond the economic realm: moral, as it diminishes self-esteem; social, as it alienates the poor from their community; and political, as it tends to widen societal stratification. Chapra (1992), supported by El-Ashker and Wilson (2006), contended that Islam advises against severe inequality and poverty.

Chapra (1992) debated that resources are dedicated to all humans, as mentioned in the Quran Surah al-Baqarah verse 29 (2:29):

“It is He Who created for you everything that is on Earth.”

Therefore, there is an imbalance in this matter. The world may imply that humans are not doing well at resource distribution.

Chapra (1992) asserted that ensuring material welfare necessitates addressing poverty by fulfilling basic needs for all individuals, striving for equality of opportunity and achieving an equitable distribution of income and wealth. Siddiqi (1996) elucidated that Islamic principles underscore the importance of aiding the poor in fulfilling their basic needs and emphasise the elimination of poverty. Moreover, Pramanik (1993) compared economic systems, highlighting Islamic economics' superior capability in attaining equity goals and fair distribution. Consequently, despite some similarities between Islamic and conventional views on inequality and poverty, an ontological distinction is visible.

While Islamic ideology derives from the Quran and Hadith, other perspectives rely primarily on rationality. In addressing poverty, Islam mandates the rich to fulfil their essential duty to the poor through *zakat* and *waqf*, which are regarded as a crucial “social support mechanism” (Ahmed, 2007). Sadeq (1997) emphasised the role of collective social responsibility (*fardhu kifayah*) of a country in assisting the poor. Similarly, Chapra (1992) asserted that societal welfare remains the government's principal responsibility, underlining four key obligations: to God and the people, to align all policies with the Quran, ensure equality and combat corruption. This underscores the significance of collaborative efforts between the populace and the government in effective poverty alleviation through sound management.

Examining the root cause of poverty, Obaidullah (2008) accentuated the critical need for the poor to access financial services, particularly microcredit, to manage periodic

expenses, urgent situations and investment activities. The lack of financial access often compels them to seek loans from informal sources, burdening them with exorbitant interest rates and worsening their predicament. Consequently, Obaidullah (2008) argued that a pivotal aspect of overcoming poverty is fostering wealth creation through micro-enterprise development. Islam promotes economic empowerment by facilitating suitable access to resources that cater for the needs of the impoverished. This act involves transforming idle assets into income-generating sources, building capacity and implementing robust performance assessments (Obaidullah, 2008). Emphasising the comprehensive nature of poverty, Obaidullah (2008) highlighted Islam's more inclusive approach compared to conventional methods in poverty alleviation. It advocates for a sustainable and successful microfinance framework, blending wealth creation with compassion for the most vulnerable, employing mission-based and market-based approaches supporting cooperative models, in contrast to systems perpetuating debt.

The implementation of Shariah-compliant microcredit in business endeavours holds promise in mitigating poverty. Recently, microfinance has demonstrated significant potential in enhancing employment and self-employment, warranting considerable priority and support in Muslim nations. Lastly, drawing from the CGAP best practices, Obaidullah (2008) contended that microfinance serves as a potent tool in combating poverty.

2.3 Definition of Microfinance

2.3.1 Microfinance

Khan (2008) suggested that microfinance programmes stand out due to their concise duration, straightforward procedures and the necessity for collateral, often involving property or collective guarantees from groups. These programmes are commonly

administered by microfinance organisations, cooperatives and NGOs (Obaidullah & Khan, 2008). The primary funding for such initiatives typically comes from members' savings, supplemented by secondary funding from donations provided by NGOs. Additionally, modern microfinance has expanded its scope to encompass not only the most impoverished, but also individuals facing financial exclusion, defined as inadequate access to financial services (Carbo et al., 2005).

Christen (1997) defined microfinance as offering an array of services, including savings, insurance, money transfers and credit. Nevertheless, attempting a universal application of a singular approach proves unfeasible. The evolution of the microfinance sector in the 1990s was shaped by two distinct methods: the financial system and the poverty lending approaches (Robinson, 2005). An ongoing debate revolves around the characteristics of MFIs based on these lending approaches.

Levine (2005) elaborated on these traits. The financial system approach stresses broad outreach to economically active impoverished individuals and emphasises institutional self-sufficiency as the viable means to meet the global demand for accessible financial services. In contrast, the poverty lending approach focuses on poverty alleviation through credit, often coupled with basic services like skill training and literacy education, funded by credits from donors or governments targeting impoverished borrowers to help them escape poverty and achieve empowerment.

MFIs that adopted the poverty lending approach faced sustainability challenges due to their low interest rates insufficient to cover recovery costs. Conversely, the financial system approach, centred on commercial financial intermediaries, attains full sustainability by leveraging savings, commercial debt and diverse for-profit investments to cover reasonable costs. Moreover, Robinson (2005) contended that the poverty lending approach

largely uses subsidies to fund loan portfolios, while the financial system approach primarily employs subsidies to disseminate best practices (Beck et al., 2007)

Conversely, Counts (2008) argued against the divide between commercial and pro-poor microfinance. He advocated for a platform approach rather than a specific product, ensuring long-term profitability while aiding impoverished individuals. This model prioritises high volumes over high margins and includes private benefit limits, comprehensive performance standards and third-party certification to ensure MFIs meet both financial and social objectives (Counts, 2008). Establishing various subsidiaries under the holding company serves as a strategy to deliver social services through this platform. Despite being profitable, these endeavours can be costly, indicating that immediate profit maximisation might not be the optimal approach.

Microfinance studies gained traction after Professor Muhammad Yunus and Grameen Bank received the Nobel Prize. The Grameen Bank model focuses on women's groups, usually comprising five members mutually guaranteeing each other's loans. Each group designates a leader responsible for motivating and overseeing the group. The key feature of the model is group-based and graduated financing, replacing collateral to mitigate default and delinquency risks (Obaidullah & Khan, 2008).

Morduch (1999) outlined three key attributes of a strong microfinance institution. Firstly, it should cater for the appropriate target demographic. Secondly, the services provided should not only meet demand but also demonstrate a tangible positive impact on the lives of customers. Thirdly, a robust institution should maintain financial stability, resilience and soundness. Additionally, Armendariz De Aghion and Morduch (2006) promoted the concept of "smart subsidies" in sustainable microfinance, arguing that these subsidies can enhance social benefits while reducing distortions and misallocation.

In a more comprehensive study conducted by Ledgerwood (1999), she delineated seven essential characteristics, defining a robust microfinance institution. These seven dimensions offer deeper insights into the strength of associated institutions, covering aspects such as vision, delivery methods of financial services, organisational structure, human resources, administrative and financial mechanisms, management information systems, institutional viability, outreach and financial sustainability.

2.3.2 Islamic Microfinance

Microfinance extends beyond just offering small credit; it encompasses savings and micro-insurance, serving as a development tool for its customers (Armendariz De Aghion & Morduch, 2006). Since its inception, particularly with the establishment of the Grameen Bank in Bangladesh, microfinance has achieved significant success. Nevertheless, it has also faced substantial criticism due to higher costs imposed on customers, contrary to its objective of reducing costs and enhancing transparency. From an Islamic perspective, the imposition of fixed high-interest rates that trap the poor in debt is disapproved (Obaidullah, 2008). Paradoxically, instances have emerged, whereby the impoverished have been forced to relinquish their assets to repay debts (Ahmed, 2002). Therefore, Islamic microfinance advocates for an approach centred on assets rather than debt.

Grounded in Islamic values derived from the Quran and Hadith (sayings of the Prophet), Islamic microfinance offers financial and non-financial services to uphold justice for all individuals. Given Islam's inclination towards community-based activities (Quran Surah al-Maidah verse 2), the operational nature of MFIs is shaped by a community-based approach and joint liability, aligning with Islamic values and principles. Nonetheless, there is a need to ensure that the spirit of Islamic MFIs is effectively implemented, bridging the gap between theory and performance.

While Islam permits debt, it only condones it as a last resort for funding (Quran Surah al-Araf verse 31 and al-Isra verse 26–27). Prophet Muhammad SAW cautioned against the perils of extensive debt and strongly advocated for full and timely repayment (Obaidullah, 2008). Unity and cooperation are fundamental principles in Islam (Quran Surah al-Maidah verse 2). Based on these principles, group-based financing and mutual guarantees within the group are sanctioned (Obaidullah, 2008). All business contracts in Islamic MFIs must adhere to Shariah principles, devoid of *riba* (interest) and *gharar* (excessive uncertainty). Consequently, there is no conflict between the best practices of Islamic MFIs and poverty alleviation initiatives (Obaidullah, 2008).

The similarities and differences between Islamic and conventional microfinance stem from distinct values, concepts and instruments. Asutay (2010) delineated Islamic banking and finance (IBF) with unique characteristics derived from Islamic moral values ingrained in the financial system. IBFs are mandated to adhere to Islamic values, as part of the Islamic Moral Economy (IME) to achieve both economic and social goals. The IME, fundamental to IBF, emphasises human-centred economic development to achieve societal objectives (Asutay, 2010).

In practice, IBF faces criticism for operating similarly to conventional banking within a business environment, hampering its ability to fulfil social responsibilities (Asutay, 2010). Nevertheless, the objective of microfinance as a development tool aligns well with Islamic values. Asutay (2010) recommended incorporating Islamic social banking and microfinance (IMF) within the IME practice in IBF, highlighting the significance of IME and IBF integration for effective implementation.

Islamic microfinance heavily relies on Islamic values and principles. Criticism has surfaced regarding borrowers burdened with high-interest rates leading to debt traps, which

challenges conventional microfinance (Asutay, 2010). In response, Islamic finance advocates for a principled approach utilising profit and loss sharing (PLS) models like *musharakah* and *mudarabah* to mitigate risks associated with debt traps (Asutay, 2010). By adopting an asset-based approach, IMF becomes more suitable for micro-level enterprises, considering the unpredictability of business profits.

Islamic microfinance services at the micro-level are delivered through various channels, including informal sectors involving individuals, member-based organisations, NGOs and formal institutions (Obaidullah & Khan, 2008). Shariah regulations dictate the operations of the individual informal sector, emphasising repayment of the loan amount without interest (*qardh hasan*), fee-based agreements (*ujrah*) or Shariah-compliant pawn brokering (*rahn*) (Obaidullah & Khan, 2008). Conversely, this sector has drawbacks, such as high costs, limited flexibility, heightened risks, potential corruption, poor management and environmental issues (Obaidullah & Khan, 2008). Membership-based organisations encompass rural banks, credit groups, NGOs, financial cooperatives and community self-help groups. NGOs focus on charitable objectives (*zakat* and *sadaqah*), while Islamic banks, as formal institutions, aim for an inclusive financial system with significant potential.

Islamic microfinance adopts an asset-based strategy rather than relying on debt, making it more suitable for micro-level enterprises whose business profits are typically challenging to forecast. Below are explanations of Islamic microfinance products, as outlined by Dhumale and Sapcanin (1998):

Mudarabah Model: In this model, the relation between the MFI and the micro-entrepreneur functions as a partnership. Nevertheless, implementing *mudarabah* poses constraints and practical difficulties. Micro-entrepreneurs often lack the necessary record-keeping for profit-sharing arrangements. This model is intricate for IMFIs to manage and

requires training on partnership-related issues. It seems better suited for larger businesses with longer profit cycles than micro-enterprises.

Murabahah Model: This model operates on a sale and purchase contract, whereby IMFI purchase goods and sell them to micro-entrepreneurs at a profit. The clients then repay the cost of the goods plus administrative fees, often in instalments according to a predefined schedule.

Berg and Kim (2014) elucidated that the prohibition of *riba* (usury) in Islamic finance does not impede the marketing of Islamic microfinance products. Conversely, the influence of Islamic values might enhance the reputation of the products in the market, potentially leading to higher repayment rates, a comprehensive approach to supporting business activities, more effective resource mobilisation and a better society overall. Nevertheless, misconceptions often arise when people believe in something without understanding the theoretical and practical justifications, particularly concerning religious issues.

Poverty alleviation within the Islamic framework emphasises the necessity of avoiding *riba*, *gharar*, *jahl* and *darar* (Khan, 2008). This principle aligns with the core values of Islamic ethics, particularly those of cooperation and solidarity. The holy Quran, in Surah al-Maidah verse 2, underscores this principle:

“And cooperate in righteousness and piety, but do not cooperate in sin and aggression. And fear Allah; indeed, Allah is severe in penalty.” (5:2).

The Prophet’s teachings further reinforce the importance of cooperation and mutual assistance amongst believers. The Prophet likened a person who believes (*mukmin*) and collaborates with other believers (*mukmin*) to a cohesive building whereby each part reinforces the others. Islamic microfinance programmes, by fostering partnerships between

service providers and micro-entrepreneurs, aim to build trust and deeper understanding, establishing a mutually supportive relation (Obaidullah & Khan, 2008).

2.4 Theoretical Studies

2.4.1 Microfinance

Microfinance lacks a well-established theoretical ob, drawing from various aspects of mainstream finance literature, particularly concerning financial development and intermediation theories. These theoretical models demonstrate how financial markets, institutions and instruments can evolve to mitigate transaction and information costs. The evolution of financial arrangements helps reduce market friction, affecting the incentives and constraints faced by economic agents (Beck et al., 2007).

A separate body of literature on financial exclusion highlights that despite advancements in financial institutions, specific societal segments, notably the impoverished, encounter credit rationing and exclusion from the mainstream financial system. In response, microfinance has emerged to address the information, enforcement, and transaction costs related to providing financial services to the poor, aiming to alleviate the constraints they face.

The unique funding structure of microfinance institutions has led to the establishment and examination of various financial theories, such as Agency Theory, Profit-Incentives Theory, Trade-off Theory and Life-Cycle Theory, which are briefly discussed below.

The Agency Theory posits that one party acts as the principal while another acts as an agent, carrying out the principal's wishes (Jensen & Meckling, 1976). Nevertheless, conflicts of interest arise as donors, acting as principals, prioritise their welfare mission, while the managers of MFIs focus on profitability for the financial health of the institution. Literature

has explored the cost-efficiency dilemma, as examined by Kyereboah-Coleman (2007), Mersland and Øystein Strøm (2009) and Dawar (2014).

The Profit-Incentives Theory, akin to the venture capitalist model, comes into play when MFIs pivot from donor funding to commercial finance to serve the needs of the impoverished while maintaining financial viability. Issues with donor funds, including quantity limitations and operational constraints, have been reported, leading to constraints on MFI efficiency (Hudon & Traca, 2011; Vanroose & D’Espallier, 2013; Nawaz, 2010).

Myers’s (1984) Trade-off Theory delves into the decision-making process, weighing the costs and benefits of leverage programmes. In the realm of microfinance, this theory revolves around balancing outreach and profitability, considering the social and financial goals of an institution. Previous studies by Cull et al. (2007), Tsegaye (2009) and Hermes et al. (2011) have extensively debated these mission drift challenges.

The Life-Cycle Theory pertains to the growth of MFIs, marking the transition from reliance on grants and social investor support towards seeking private capital (Sousa-Shields et al., 2004; Tchakoute Tchuigoua, 2015). Initially, MFIs focus on their social mission, relying on donor grants and social investments. As they mature, they pivot towards attracting private capital to ensure financial sustainability. This study employs the Trade-off Theory to evaluate supporting the impoverished and advancing institutional financial stability based on analyses of these theories.

The microfinance sector grapples with difficulties in catering for the extremely poor while ensuring sustainability. It is commonly believed in microfinance operations that a trade-off exists between outreach and sustainability (Rosenberg et al., 2009). Conversely, this belief is challenged as certain situations may seemingly put these goals at odds. Some

borrowers lack a steady income or the opportunity to initiate micro-businesses, posing challenges for loan repayment. Lending to those unlikely to repay is not financially viable. Moreover, serving remote, thinly populated areas incurs high administrative costs, necessitating higher interest rates to cover expenses (Rosenberg et al., 2009). Nonetheless, assuming that outreach and sustainability are conflicting objectives is not entirely accurate.

Expanding outreach is not inherently a barrier to sustainability and vice versa (Paxton, 2002). While financial sustainability is not a primary goal, it remains crucial for providing sustained care to clients beyond what donor agencies and governments can support (Helms, 2006). Increasing outreach and sustainability are seen as complementary objectives (Christen et al. 1995; Rhyne & Otero, 2006; Drake, 2003; Mersland & Strøm, 2010) as serving more clients aids MFIs in achieving economies of scale and cost reduction. In contrast, some argue that catering to the poorest segments may conflict with financial viability due to higher transaction costs for smaller loans compared to larger ones (Presland, 1997; Conning, 1999; Zeller & Meyer, 2002).

The trade-off between outreach and financial sustainability in microfinance is primarily due to the substantial transaction costs associated with assessing the creditworthiness of low-income consumers (Navajas et al., 2000). Larger and more efficient MFIs that achieve self-sustainability tend to avoid focusing on the extremely poor as serving these demographic increases loan sizes and enhances efficiency metrics, while MFIs catering to the most vulnerable populations are more reliant on donor funding (Navajas et al., 2000). Nonetheless, MFIs can still be profitable and support those in need by charging adequate interest rates or operating with high efficiency.

Outreach in microfinance refers to an MFI's capacity to provide quality financial services to a significant number of clients, particularly the underprivileged (Lariviere &

Martin, 1999). It encompasses depth and breadth, wherein depth signifies the societal value placed on individual clients' net gain, while breadth denotes the total number of active borrowers reached by an MFI (Schreiner, 2002). Depth is often associated with smaller loan sizes or shorter timeframes, indicating a focus on the poorest clients, while breadth is measured by the total number of poor individuals an MFI serves through its operations (Bhatt & Tang, 2001; Cull et al., 2007; Schreiner, 2002; Lensink et al., 2008)

Financial sustainability assesses the ability of an institution to generate sufficient income from its services to cover operational expenses. Foster et al. (2003) classified financial sustainability into operational and financial self-sustainability, whereby the former refers to an organisation meeting its expenses through earned revenue but still relying on partially or fully subsidised capital (Forster et al., 2003). Operational self-sufficiency is often quantified using the operational sufficiency index, computed as total operating income minus total operating expenses.

There exists a debate in literature regarding the trade-off between financial sustainability and reaching out to the impoverished. Some argue that striving for financial sustainability might reduce an MFI's impact on poverty reduction, while others contend that catering to the underprivileged and maintaining a strong financial base are interdependent, allowing MFIs to achieve economies of scale and cost savings through a larger clientele (Zerai & Rani, 2011).

Theories of financial development suggest that financial institutions, markets and tools can evolve to mitigate information, enforcement, monitoring and transaction costs inherent in market imperfections (Merton, 2004; Beck et al., 2007). These developments can enhance resource allocation by improving information availability and investor trust, though financial intermediaries cannot completely eliminate these costs, resorting to various

screening tools such as credit rationing and collateral usage to address information asymmetry issues (Stiglitz & Weiss, 1981).

Jaffee and Russell (1976) presented a credit market model distinguishing between dishonest borrowers, prone to default when default costs are low and honest borrowers, who take loans only when they believe they can repay. The bank, aware of the mix of honest and dishonest borrowers in the market, limits loan amounts to encourage self-selection and decrease default risks, opting for credit restrictions over high-interest rates (Stiglitz & Weiss, 1981).

Williamson (1986; 1987; 1988) proposed a model justifying why banks ration credit to minimise monitoring costs by limiting loans to projects needing substantial credit. Since such projects require significant equity, borrowers are more prudent, choosing lower-risk ventures. Banks secure loans by using collateral, retaining ownership until full repayment and the right to sell the asset in case of default (Bernanke & Gertler, 1989; 1990)

Zeller and Meyer (2002) highlighted the interconnected elements—outreach, impact and financial sustainability—as critical to microfinance success. Nonetheless, numerous microfinance institutions, especially in Asia, struggle to expand due to financial constraints, limiting investment in systems and human resources for growth (Sharma et al., 2009). Microfinance faces information asymmetry, lacking accurate financial data on the poor's repayment capacity. Ahmed (2012) underscored the importance of specialised MFIs, providing both social and financial intermediation to benefit clients and institutions alike.

The role of microfinance in poverty alleviation can only be sustained if microfinance institutions (MFIs) are financially sustainable (Khawari, 2004; Ek, 2011), a condition that remains elusive for many MFIs in the Southern African Development Community (SADC)

region (Karim et al., 2011). Nyamsogoro (2010) emphasized the importance of financial sustainability (FS), arguing that it is better not to have an MFI at all than to have one that is unsustainable. FS ensures a consistent supply of credit to clients, reinforcing efforts to combat poverty. Financially sustainable MFIs are able to take advantage of economies of scale, operate cost-efficiently, utilize new lending techniques, and control issues like adverse selection and moral hazard. This allows them to offer lower interest rates to poor communities (Paul, 2010; Paxton, 2002). The overwhelming support for FS as a factor in improving both efficiency and outreach (Brau & Woller, 2004) has spurred a strong movement towards achieving financial sustainability in MFIs (Hallway et al., 2011). However, unlike other financial institutions, MFIs are unique in that they operate with two primary goals. FS for MFIs has a unique meaning, as it is not merely an end goal (Rhyne, 1998) but also incorporates their social mission. So, what exactly is financial sustainability?

Financial sustainability (FS) refers to the ability of MFIs to operate viably, covering both their operational and financial costs (achieving success while doing good—Brau & Woller, 2004). Khandker (1996) noted that FS can only be achieved when the interest charged on loans exceeds the cost of raising capital for those loans. Otero & Rhyne (1994), as cited by Von Pischke (1996), define FS as "the lender's capacity to operate over an extended period, measured in decades, independent of subsidies or altruistic support." MFIs that pursue FS charge commercial interest rates on loans, utilize commercial funding, and operate independently of donations, thereby increasing their outreach capacity (Sekabira, 2013). FS aligns with the Institutional Paradigm (Gonzalez-Vega, 1994), which prioritizes the survival of institutions as central to the long-term provision of financial services to the poor. Therefore, institutional survival is defined by charging market interest rates on loans as a way to increase revenues that cover operational and financial costs while generating a

profit.

Morduch (2000) suggests that microfinance operates with a dual purpose: combating poverty while ensuring institutional capacity through the development of cost-effective lending mechanisms. This allows microfinance to become self-sustaining, as surplus funds generated are used to support further outreach on a permanent basis (CGAP, 2004). Although some evidence links FS to mission drift (Quayes, 2012; Ek 2011), certain MFIs have demonstrated the ability to operate without donor funding (Bogan, 2012). Manos & Yaron (2009) identify a short-term positive correlation between outreach and FS, with long-term sustainability tied to operational scale and innovation in lending practices. Proponents of FS argue that as MFIs grow, so do their clients, and at the stage of integration, the loans provided will no longer be small. Thus, mission drift will no longer be associated with loan size. Importantly, more clients are served by financially sustainable MFIs.

2.4.2 Efficiency

The evaluation of microfinance institution performance is a common topic in microfinance literature. One approach to gauge performance is by using a productivity ratio, which measures the relation between outputs and inputs. The higher this ratio, the more efficient the firm is in converting inputs into outputs. Microeconomic theory defines producers as any firm and identifies inputs as production elements that contribute to the production function, determining the maximum output achievable with specific combinations of production factors (Pindyck & Rubinfeld, 2013).

Producers aim to optimise output by utilising inputs effectively given the existing technology, known as effective productivity. Efficiency, therefore, refers to the optimal utilisation of resources to achieve desired outcomes (Abbas et al., 2015). Nevertheless,

external factors sometimes hinder producers from reaching their objectives, leading them away from the optimal output frontier (Kumbhakar & Lovell, 2000). Technical efficiency measures a company's ability to operate at the optimal production frontier (Haq et al., 2010), distinguishing technically efficient firms operating below the frontier.

While a company may be technically efficient, scale economies can further enhance its productivity. This suggests that to align its productivity with the production frontier, the firm needs to adjust its operational scale (Coelli et al., 1998). In this study, the technical efficiency of specific IMFs is assessed to analyse performance, determining the required economies of scale for improvement. Once firms achieve efficiency, they can target a state of welfare, which links happiness to resource allocation, if it does not adversely impact the welfare of another company.

A Pareto optimum, conceptualised by Vilfredo Pareto, represents the peak welfare level in an economy, whereby any alteration in output or exchange to improve one person's welfare would not be possible without affecting someone else's benefit (Pearce, 1986). The concept of efficiency prices was introduced when Carter and Koopmans (1952) expanded welfare economics, integrating production economics. According to the Pareto-Koopmans definition, an entity's performance is efficient if it cannot enhance any input or output without affecting others (Cooper et al., 2007), often referred to as Pareto-Koopmans efficiency.

Technical inefficiency signifies waste, hindering the improvement of the microfinance industry, which has become increasingly vital to society and governments. This inefficiency is likely due to limited individuals with microfinance expertise, inefficient fund utilisation for generating outreach and misaligned incentives influencing employee behaviour. Policy distortions, poor regulation and inappropriate donor initiatives contribute

to inefficiency, preventing the technical efficiency frontier from advancing (Gonzalez-Vega, 2003). This thesis focuses on technical efficiency to utilise inputs effectively for inclusive financial services, concentrating on both breadth (numbers) and depth (poverty) of outreach.

Efficiency has garnered attention in companies seeking improved performance through increased revenue and reduced costs. Berger and Mester (1997) defined cost efficiency as the proximity of actual lending expenses to the MFI's optimal performance level for given output and conditions. Microfinance efficiency refers to how well an institution allocates inputs like staff, assets and subsidies to produce outputs, such as credit amounts, financial adequacy, profitability and poverty reduction (Balkenhol, 2007a). Annim (2012) defined efficiency as optimising staff time, number of staff and operating costs to maximise credit and customers. Gonzalez-Vega (2003), cited in Martinez-Gonzalez (2008), underscored the need for technical training for microfinance staff and proper funding allocation. Improvement in the sector is futile in the presence of waste (Martínez-González, 2008). According to Kokkinou (2010), MFIs function similarly to production units, aiming for both financial and social goals while operating efficiently in technical and economic aspects.

Institutionalist thinking emphasises financial aspects, self-sufficiency and sustainability (Gutiérrez-Nieto et al., 2009). Cull et al. (2007) suggested that MFIs concentrating on healthier customers might enhance profitability but at the cost of limited outreach or addressing poverty. This finding suggested a trade-off between financial and social performance, as supported by Gonzalez (2007), indicating that efficiency improvements may not increase the number of loans per staff but increase average loan sizes, targeting the poorest customers. Hartarska et al. (2013) argued that MFIs act as price takers in input markets, competing for financial capital and a qualified workforce.

MFIs aim to provide financial access to the poor but must ensure sustainable profitability. Discussions often overlook financial challenges (Morduch, 1999), indicating that MFIs must be effective in both social and financial realms to achieve comprehensive efficiency. The evaluation of MFIs often focuses primarily on financial elements. Yaron (1994) introduced a framework focusing on social performance, emphasising reach and sustainability, with Chaves and Gonzalez-Vega (1996) noting sustainable strategies used by MFIs to enhance profits while considering opportunity costs.

Efficiency in production theory refers to the optimal use of inputs to generate outputs, focusing on achieving the maximum output with the least input to minimize waste. Farrell (1957) expanded this concept to relative efficiency, which measures how an organization's actual use of resources to produce a certain output compares to the optimal use of those resources (Bhagavath, 2006). He further classified efficiency into three types: technical, allocative, and economic (cost) efficiency. Technical efficiency relates to how well inputs are used to generate outputs relative to best-practice organizations with similar characteristics (Bhat et al., 2001; Emrouznejad & Anouze, 2010), with waste measured during the transformation process (Masiye et al., 2006). It is influenced by managerial practices and operational scale (Thanassoulis, 2001).

Allocative efficiency assesses whether resources are used in a way that maximizes output value at the lowest possible cost (Masiye et al., 2006; Thanassoulis, 2001). Economic efficiency, a combination of technical and allocative efficiency, measures the organization's ability to eliminate waste and allocate resources efficiently (Coelli et al., 2005; Masiye et al., 2006). An organization is economically efficient when it is both technically and allocatively efficient (Thanassoulis, 2001). Since input and output prices in microfinance are not easily determined, this study focuses on technical efficiency. Additionally, scale

efficiency evaluates whether an organization is operating at its most productive size, comparing current production scale to the optimal scale size (Coelli et al., 2005; Thanassoulis, 2001).

Efficiency in microfinance refers to the ability of microfinance institutions (MFIs) to convert inputs into outputs by either maximizing outputs with a given set of inputs or minimizing inputs to achieve a particular output. This concept has been a topic of increasing discussion (Balkenhol, 2007). As MFIs expand their reach to poor communities worldwide, it becomes crucial to understand the dynamics of efficiency in providing financial services to the underprivileged. Gaining deeper insights into MFI efficiency will also help governments and donors make more informed funding decisions (Wijesiri et al., 2015). In contrast, effectiveness in this study refers to the extent to which interventions achieve their intended outcomes. Analyzing effectiveness involves examining the entire intervention process, from mobilizing inputs to organizing necessary activities, producing outputs, and ultimately achieving the desired outcomes.

The logical connection between the elements of microfinance is as follows: if inputs such as initial capital and labor are available, certain activities can be organized. If activities like group formation and member training are conducted, outputs such as the number of clients, borrowers, and loan portfolios will be generated. Ultimately, if these outputs are realized, the desired outcomes—particularly poverty alleviation—can be achieved (Nghiem, 2005). Understanding this relationship is critical for ensuring that MFIs operate efficiently and effectively in their mission to reduce poverty.

2.4.3 Microfinance And Poverty

The realm of poverty alleviation through microfinance has attracted considerable

attention from various stakeholders globally. Nevertheless, differing perspectives exist when evaluating its effectiveness. One approach, known as ‘institutionalists’, evaluates the performance of microfinance based on the institution administering it. Meanwhile, ‘welfarists’ assess the impact starting from the target recipients of financing, often the customers or clients. This divergence is seen as a conflict by some (Morduch, 1999), while others argue that although many financial institutions attempt to adopt both perspectives, disparities persist, making effective communication challenging.

Institutionalists predominantly focus on establishing financial entities that cater to clients within a formal financial system. Their emphasis lies in achieving financial self-sufficiency and extending services to a larger number of people (breadth) rather than focusing on the depth of poverty or the level of benefits received by individuals. They believe that microfinance primarily aims to fortify financial systems and create a distinct financial intermediation structure for impoverished communities. According to Cornee (2007), institutionalists evaluate performance based on the institution’s viewpoint, placing finance as a criterion for fulfilling its societal objectives.

Schreiner (2002) noted that institutionalists advocate for a self-sufficiency approach by targeting individuals in poverty as their primary clients while striving to reduce reliance on subsidies. They argue that financial self-sufficiency is intricately linked with generating adequate profits. Schreiner (2002) reinforced this by stating that institutionalists perceive success in poverty reduction as reliant on substantial profits. In achieving such substantial returns, financial resources well beyond those provided by NGOs and donor aid are deemed necessary. Institutionalists emphasise that the success of microfinance institutions should be measured by their ability to achieve sustainable financial independence (Engels, 2009). From their perspective, microfinance’s success is determined by generating substantial returns for

investors, enabling business expansion, offering extensive services to clients and effectively reducing poverty.

As previously highlighted, institutionalists and welfarists share a common objective: poverty reduction. Conversely, they diverge in defining poverty and articulating different visions on how access to microfinance services can assist the poor. According to Woller et al. (1999), these disparities in definition arise due to three key factors: the demographics served, the range of services offered and the structure of institutions and their funding.

Institutionalists advocate that effectively addressing poverty necessitates significant scale and substantial external financial resources from donors. Charitonenko (2004) expressed concerns amongst institutionalists regarding donor funding, citing limitations to the sustainable expansion of microfinance services when reliant on donor stipulations. Basu et al. (2004) suggested that the withdrawal of donors collectively poses a concern for institutionalists, as donors play a pivotal role in fostering the growth of microfinance. They argued that relying on external funding sources is not sustainable for expanding financial services to the majority of the unbanked population.

Woller (1999) debated on integrating microfinance with formal systems like *zakat* and *waqf* to align it with the logic of the monetary market, thereby enhancing sustainability through increased efficiency and productivity. Institutionalists emphasise self-sufficiency in funding and stress the need for both national and international financial sources to achieve large-scale investments. Morduch (1999) echoed this perspective, emphasising the importance of economic self-sufficiency management to access the money market effectively, often targeting micro-entrepreneurs near the poverty line. Nonetheless, this approach faces criticism for its high interest fees imposed on these micro-entrepreneurs, as noted by de Briey (2005).

Contrastingly, welfarists prioritise the depth aspect, focusing on the quality of benefits provided to the poor (Christen, 2001). Engels (2009) highlighted that welfarists emphasise variables that underscore social impact or aim to improve their members' welfare. Woller (1999) noted that welfarists are less concerned with utilising financial services to reduce poverty levels and are more open to accepting subsidies for sustaining their services. Bisen (2012) added that welfare-oriented institutions diverge from traditional banking by aiming to enhance the economic system, targeting economically active micro-entrepreneurs to empower them and improve the living conditions of those struggling to access financial services, particularly rural and remote communities.

Hudon and Traca (2011) argued that welfarists tend to serve impoverished communities predominantly located in rural areas with limited infrastructure, high transportation costs and low population density, focusing on building resilient communities. Welfarists diverge from institutionalists, prioritising a commitment to serving the poor. According to Woller (1999), welfarists underscore the importance of mitigating poverty by prioritising the depth of poverty over the breadth of the poor population. While recognising the necessity of increased financial self-sufficiency, welfarists are often reliant on donations, grants and soft loans to bridge the financial gap in microfinance operations.

Certainly, according to Schreiner (2002) and Engels (2009), welfarists leverage a form of equity offered by social investors who are willing to forgo minimal profits from their microfinance investments. These funds are directed towards supporting social initiatives, often including grants. Moreover, welfarists are concerned about certain threats posed by institutional approaches. As noted by Woller (1999), these threats include the potential commercialisation of microfinance, meeting the selfish demands of external investors that might undermine the social mission, fear that commercialisation will deviate from the

foundational ethos guiding the movement, resulting in an initiative lacking conscience, the risk of donor withdrawal due to programme failures and the stifling of innovation and service delivery systems for the most impoverished through overly planned microfinance strategies.

Regarding welfare considerations, Mayoux (1998) suggested improving the welfare of the impoverished by advocating for strategies that measure the impact of microfinance or microcredit on the living standards of the target audience. This recommendation involves assessing changes in the welfare and quality of life experienced by the recipients. Welfarists prioritise understanding the poverty levels of their clients, seeking to enhance their living conditions and providing subsidies. Nonetheless, criticisms have been raised about the welfare approach. For instance, Labie (1996) pointed out that the welfarist method heavily relies on subsidies, often resulting in funding that covers less than 50% of operational costs. This insufficiency can lead to the failure and eventual disappearance of microfinance initiatives. It is argued that microfinance should not be equated with charity but seen as a tool for socio-economic development. Therefore, it is recommended that charity be directed towards low-income families or those who are unable to generate sufficient cash flow to repay loans.

To generate higher profits, commercial banks typically focus on expanding their networks and branches in capital-oriented areas or large cities. They tend to overlook regions with low income or low population density, which results in neglecting the poor, who have limited access to financial services and products. Ayyagari, Demirgüç-Kunt, and Maksimovic (2008) argue that the lack of access to finance exacerbates poverty in communities. Microfinance offers a solution to this limited access by specifically targeting the poor in low-income and rural areas, providing them with financial services and products at affordable rates (Armendáriz & Morduch, 2010).

Burgess and Pande (2005) observed a 60% reduction in rural poverty in India between 1977 and 1990 when the Indian government implemented policies encouraging banks to open branches in areas previously underserved by commercial banks. Morduch (2000) discusses the “welfarist” school of thought, which suggests that the introduction of microfinance institutions (MFIs) enhances the ability to assist the poor by offering low-interest loans, small loans without collateral, and services tailored to impoverished clients. Thus, MFIs contribute significantly to social development activities and poverty reduction. Based on this, we formulate our hypothesis: the presence of microfinance institutions reduces poverty.

2.5 Empirical Studies

2.5.1 Empirical Studies in Microfinance

As per Nghiem and Laurenceson’s (2005) study, the data from NGO programmes in Vietnam were analysed to evaluate the efficiency and effectiveness of microfinance institutions. The study’s premise suggested a trade-off relation between social development and financial stability in early microfinance stages, transitioning to synergy in its mature phase. By using a mix of qualitative and quantitative methods, particularly DEA analysis, the research concluded with an average technical efficiency score of 81% from a social standpoint and 80% from a financial perspective. When separately considering social and financial factors, the findings indicated the relatively efficient performance of most microfinance schemes.

Microfinance programmes aimed at reducing global poverty have benefited millions of borrowers worldwide. Initial studies linked microfinance to poverty and related issues. Some studies disputed the significance of microcredit for low-income households. For instance, Banerjee et al. (2015) found that group lending in India had short-term benefits for

small business investment and durable goods spending; however, had no notable effects on women's empowerment, education or health. Other studies by Angelucci et al. (2015), Tarozzi et al. (2015) and Banerjee et al. (2015) raised doubts about microfinance's transformative effects.

Despite enhancing credit access significantly, Angelucci et al. (2015) and Tarozzi et al. (2015) showed modest effectiveness of microfinance, with limited evidence of improvements in micro-entrepreneurship, income, labour market, consumption, social status, subjective well-being, schooling or empowerment. Although microcredit facilitates investment and risk management, its broader access minimally aids women in escaping debt traps and has moderate effects on female decision-making, trust and business size (Angelucci et al., 2015).

Crépon et al. (2015) emphasised borrower characteristics as the major influencers of microcredit effects, noting increased investment in self-employment assets and boosted household profits amongst those with higher borrowing capacity. Ngo and Wahhaj (2012) highlighted that access to microloans favours women's welfare and household decisions under specific conditions, such as funding profitable joint ventures and allocating a substantial part of the household budget to purchase public goods.

Another focus of literature discusses access to microfinance as a measure of MFI social performance. According to Vanroose and D'Espallier (2013), MFIs excel in reaching low-income consumers in nations with limited access to traditional financial systems. They also exhibit impressive social performance in countries with advanced financial systems, reducing the risk of mission drift. Studies by Cornée and Szafarz (2014), Louis et al. (2013) and Lebovics et al. (2016) revealed that social and financial performance are not mutually exclusive and may have positive relations over the short term. In contrast, D'Espallier et al.

(2013) suggested that the lack of subsidies contributes to mission drift, compromising MFIs' social performance. Various strategies to tackle this trade-off include increasing interest rates or modifying borrower profiles to compensate for reduced public subsidies.

Bocher et al. (2017) found that those with land ownership, larger households and more funds are more likely to receive microcredit, implying that specific MFIs might not prioritise the most vulnerable people. Canales (2014) examined how MFIs balance the need for local responsiveness with financial efficiency. They noted that decentralised MFI branches tend to perform better by addressing local needs, which benefits the organisation and unbanked local individuals, particularly in handling missing payments. According to Augustine (2012), the transparency of MFIs' corporate governance procedures is crucial, suggesting that clearly defined social orientation leads to better MFI performance due to community commitments generated by public statements about the MFI's direction.

2.5.2 Empirical Studies on Islamic Microfinance

Islamic microfinance has shown promising outcomes, as highlighted by Obaidullah (2008), who asserted that the Islami Bank Bangladesh Ltd. (IBBL) Rural Development Scheme (RDS) outperformed renowned traditional microfinance leaders like Grameen Bank, Association for Social Advancement (ASA) and BRAC in terms of growth (12.5%), dropout rates (5%) and operational efficiency (Bangladesh Rural Advancement Committee). This form of microfinance benefits the impoverished by charging lower return rates (10% with a 2.5% refund for on-time payments) compared to other microfinance options (16% to 22.5%) (Obaidullah, 20). Additionally, it offers an active spiritual development programme, a feature not commonly found in traditional microfinance, aiming to enhance members' awareness of their social rights and responsibilities for better societal relations (Obaidullah, 2008).

Seibel (2005) presented a contrasting view, suggesting that Islamic microfinance in Indonesia faces challenges, including lower assets than conventional banking due to the absence of regulatory and supervisory elements aligned with Islamic values. He proposed two solutions: focusing on establishing branch networks with Islamic microfinance products and reevaluating the potential of Islamic rural banks and cooperatives (Seibel, 2005). Nonetheless, Obaidullah (2008) argued otherwise, highlighting the success of BMT (*Baitul Mal wat Tamwil*/Islamic Cooperative) in Indonesia as an exemplary linkage programme between microenterprises, BMT and Islamic Banks. BMT has proven effective in assisting the local poor, demonstrating a promising institution model (Ascarya & Sanrego, 2007).

The impact of Islamic microfinance can be categorised into economic and social dimensions. Overall, it is expected that providing financial resources to impoverished individuals will empower them to increase income, build assets, reduce vulnerabilities and contribute to development (Obaidullah, 2008). Recent empirical studies on IBBL's influence on rural poverty, such as Rahman and Ahmad (2010), indicated significant positive impacts on household wages, agricultural and livestock output, disbursement and employment. They reported a 33% increase in family income, a 50% rise in healthcare expenditure, an increase in working members per family from 1.91% to 2.1% and growth in various other assets, based on a survey of 1,024 respondents.

Furthermore, Ahmed's (2002) examination of three Islamic Microfinance Institutions in Bangladesh underscore the substantial economic impact. His study revealed that this impact is evident in several aspects, such as the increase in time spent on productive activities by beneficiaries and their family members, enhanced economic output leading to an improvement in goods and services, innovation in product offerings and the growth of assets and other properties. These financial factors suggest that Islamic microfinance yields

significant benefits. Nonetheless, certain issues within this domain still require resolution.

Aliyu et al. (2017) proposed that IMFIs, guided by moral considerations in their financing contracts, can enhance sustainability and community well-being by reaching out to the underprivileged. The case study of Amanah Ikhtiar Malaysia (AIM) by Bakar et al. (2020) supported the positive effects of IMFI's accountability and collection procedures on sustainability. Ben Abdelkader and Mansouri's (2019) research on the IMFI presence in MENA countries during regional crises emphasised its integration of financial and social activities.

In Tanzania, Said et al. (2019) highlighted critical aspects influencing IMFI sustainability, such as staff responsibilities, regular financial policy evaluations, member coaching, employee-management cooperation and staff training. They also underscored the significant impact of relying solely on membership fees as a funding source on IMFI viability. Conversely, Shaik Mohammed and Waheed (2019) focused on Indian IMFIs, identifying liquidity risks, insufficient service coverage for underserved populations, challenges with Shariah compliance, issues with group savings plans and financing contract concerns as prominent challenges. Furthermore, they discovered that the performance of Mumbai-based Bait-un-Nasr (BuN) Urban Cooperative Credit Society, an IMFI, lags behind traditional MFIs.

The study by Wasiaturrahma et al. (2020) in East Java, Indonesia, investigated the determinants affecting the coverage of Shariah cooperatives. Findings revealed that the age of cooperatives is influenced significantly by factors like size, non-performing financing (NPF), branch numbers, grants and financial leverage. Notably, the study raises concerns about how the size of a Shariah cooperative negatively affects service coverage, with high NPF substantially reducing coverage but an increase in grants showing positive effects.

Ahmad et al. (2020) compared IMFIs and conventional MFIs worldwide, concluding that IMFIs tend to offer more comprehensive and in-depth coverage. Nonetheless, they noted that traditional MFIs perform better financially. Wasiaturrahma et al. (2020), utilising the DEA technique, found that while BPR (rural banks) and BPRS (Shariah rural banks) are effective producers, they lack efficiency as intermediaries. They also demonstrated that location and capital sufficiency ratio positively impacted their efficiencies.

The sustainability of IMFIs is underscored when Shariah contracts are appropriately implemented (Aliyu et al., 2017) and through robust accountability and collection processes (Bakar et al., 2019). Nevertheless, funding sources significantly impact IMFI sustainability (Said et al., 2019; Sukmana, 2020). The potential of Waqf as an additional revenue source for IMFIs in the future is suggested, prompting the need for strategic planning to secure new funding streams and ensure sustainability.

Based on the research findings, it is evident that IMFIs aim to blend financial and social activities (Widiarto & Emrouznejad, 2015) and serve the underprivileged (Zainal et al., 2020; Wasiaturrahma et al., 2020). Service coverage, however, tends to inversely correlate with size and capital (Wasiaturrahma et al., 2020; Ahmad et al., 2020). The commercialisation of IMFI may pose a challenge in reaching the poor, necessitating shared responsibility amongst stakeholders. Despite this, IMFIs are expected to compete with traditional MFIs in serving the poor while upholding Islamic values (Wasiaturrahma, 2020; Ahmad et al., 2020). Notably, Ben Abdelkader and Mansouri (2019) highlighted the high productivity of IMFIs in achieving both social and financial goals simultaneously, distinguishing them from traditional MFIs. Nevertheless, the tension between these dual objectives remains a challenge for most IMFIs.

Moreover, Ahmed's (2002) study of three IMFIs in Bangladesh highlighted the

economic effects, revealing increases in beneficiaries' and family members' time spent on productive activities, improved output, innovation in products and asset growth. These financial outcomes suggest the potential benefits of Islamic microfinance, although there are still unresolved issues to address.

2.5.3 Empirical Studies on Microfinance and Poverty

According to Armendariz De Aghion and Morduch (2006), the roots of microfinance trace back to the 18th century when it functioned through informal and cooperative lending systems. Conversely, its modern form emerged when economics professor Muhammad Yunus initiated small loans to impoverished villages in Bangladesh, leading to the establishment of Grameen Bank in the 1970s, famously recognised as the 'Poor's Bank' dedicated to combating poverty in rural areas.

Since the inception of Grameen Bank, scholars have increasingly focused on the microfinance sector, particularly evident in numerous conceptual articles during the 2000s (Morduch, 19999). This attention surged notably after 2006 when Muhammad Yunus was awarded the Nobel Peace Prize. The scope of microfinance services expanded to diverse economies, distinct from their initial application (Bhatt & Tang, 2001; Bruhn-leon et al., 2012). While commonly perceived as a specific financial instrument, microfinance is actually an intervention field (Vaessen et al., 2009) aimed at alleviating poverty, promoting employment, fostering economic growth and social inclusion and contributing to the overall economic development (De Koker & Jentzsch, 2013).

Microfinance is increasingly recognised as an effective means to alleviate poverty. Recent studies in various countries demonstrate its potential in significantly reducing poverty by strengthening crisis management strategies, diversifying income sources,

generating financial and various assets and enhancing the socio-economic status of the underprivileged (Swain & Varghese, 2009; Abed & Matin, 2007; Khandker, 1998 Khandker, 2005; Robinson, 2001; Husain, 1998). Morduch and Haley (2002) further emphasised microfinance as an effective tool in eradicating poverty. Simanowitz (2000) highlighted the notable impact microfinance has had on poverty alleviation programme. It is imperative for donors, academics and practitioners to understand the critical importance of MFIs dedicating themselves to achieving self-sufficiency within the poverty alleviation agenda.

Previous literature aligns in emphasising that the primary focus of poverty-focused financial service institutions is their capacity to reach the most impoverished and create a positive impact on their lives. Cuong et al.'s (2007) study in Vietnam verified the positive influence of microfinance programmes on per capita consumption expenditure and the per capita income of participating clients. Chowdhury (2009) and Khandker (2005) corroborated similar outcomes in Bangladesh. Client empowerment through microfinance was affirmed by Javed et al. (2006) and Abbas et al. (2005) in Pakistan. Furthermore, Colombage et al. (2008) concluded from their research in Sri Lanka that microfinance significantly contributes to social and economic advancements at various levels, potentially impacting individuals/families, businesses, and society as a whole.

However, while microfinance serves as a tool in combating poverty and addressing the vulnerability of the poor, it may not completely eradicate poverty. The services offered by Microfinance Institutions (MFIs) to impoverished households can significantly enhance economic welfare, self-reliance, economic and social empowerment. There is no doubt that microfinance has a positive impact on poverty alleviation, as supported by the evidence from a growing number of surveys and case studies. Hulme and Mosley (1996) concluded that well-designed credit schemes have the potential to increase the income of a substantial

number of poor individuals. Often, people remain in poverty due to multiple reasons. According to advocates, the biggest impediment to overcoming poverty and rising above the poverty line is a lack of access to microfinance.

Hulme and Mosley (1996) also highlighted that impoverished individuals have low investments because of their lack of savings and knowledge about investing or due to inertia. MFIs facilitate increased investment by these households in self-improvement, the accumulation of productive assets, or micro-enterprises. Some of the efficient activities provided by MFIs include meeting the working capital needs of the poor, offering relevant investment advice, presenting productive savings options, providing insurance for risk management, and offering advice on flexible money management tailored to the events of poor households. By implementing these practices, MFIs enable low-income families to achieve higher income levels, reduce unemployment and enhance productivity. It also leads to more significant investments in existing or additional productive assets, higher returns on marketed goods and services and reduced livelihoods and production costs due to technology transfer.

However, Morduch and Haley (2002) demonstrated that microfinance has not adequately reached the most impoverished strata of society, similar to many other development tools. The majority of those who lack access to primary healthcare and education are typically the ones without access to microfinance. Moreover, the findings suggesting the positive effects of microfinance on poverty alleviation aligned with achieving the first six of the eight-millennium goals. Therefore, microfinance emerges as a suitable avenue for alleviating poverty and fulfilling millennium goals. Robinson (2001) emphasised the strong demand for micro and small-scale financial services for savings and loans amongst the economically active poor in many developing countries. Access to financial assistance

could enable low-income individuals to meet their financial needs, improve productivity, manage income and expenditures, and expand their micro-scaled businesses. Previous studies have also highlighted the significant economic and social benefits of microfinance, such as generating more revenue, diversifying income, and reducing business risk (Schuler et al., 1998; Rhyne & Otero, 2006).

However, there are dissenting opinions. Some scholars dispute whether extremely impoverished individuals are excluded from microfinance programmes (Hashemi, 2001; Matin et al., 2002; Ahmed et al., 2006; Pronyk et al., 2007; Daley-Harris & Zimmerman, 2009; Banerjee et al., 2013). Other researchers, such as Buckley (1997) and Oommen (2008), found no substantial positive effects of microfinance interventions, but rather harmful ones. Several studies in Bangladesh reveal that although microfinance positively impacts clients' per capita expenditure, the impact is less significant than expected. Rogaly (1996) and Morduch (1999) discovered that microfinance has little effect on poverty alleviation. Moreover, Kabeer (2001) demonstrated the adverse effect of small-scale loans leading to women's debt traps due to ineffective empowerment. Hulme and Mosley (1996) and Fernandez (2007) emphasised that while microfinance effectively benefits poverty and vulnerability reduction, it falls short in fundamentally helping the poor.

Colombage (2004) evidenced the case of Sri Lanka, whereby microfinance has positive effects on the livelihood improvement of the client but faces challenges due to the lack of entrepreneurial skills, small loans, limited product innovation, and inadequate physical infrastructure that negatively impact clients' social and economic development. Conversely, Bello (2006) suggested that microfinance is a good choice for survival but is not the key to business growth. Hulme and Mosley (1996) also highlighted that the vulnerable poor should not be disadvantaged by microfinance access because they have

fewer investment opportunities than wealthier people.

Indeed, microfinance does not cater for everyone. Not all potential customers can handle debt in running a micro-enterprise business. Entrepreneurial and management skills are crucial for success, particularly affecting the very poorest. Additionally, individuals with health issues, mental illness or other significant challenges are generally not suitable candidates for microfinance. Evidence suggests that clients with existing micro-enterprises or employment are the primary beneficiaries of microfinance financial services. Hulme and Mosley (1996), McCulloch and Baulch (2000) and Robinson (2001) suggested that anti-poverty programmes often assume that poverty remains static.

From the reviewed studies, it is evident that many describe microfinance as having a positive impact on poverty alleviation and vulnerability reduction. Conversely, there is ongoing debate about the level of impact on poverty, socio-economic vulnerability and its reach to the most impoverished individuals. Moreover, several internal and external constraints hinder the lending pathway for small-to-small business development in developing countries (Colombage et al., 2008).

Numerous studies have assessed the effectiveness of microfinance in enhancing the welfare of Indonesian microentrepreneurs (Takahashi et al., 2010; Nugroho, 2009; Adam & Lestari, 2017). Takahashi et al.'s (2010) survey combined the Propensity Score Matching (PSM) and Different-in-Different (DID) approaches to assess the prosperity of the emerging microcredit scheme of bank-mixed-NGO (Bank Rakyat Indonesia and Yayasan Bina Swadaya, BRI-YBS) in targeting and promoting the welfare of the poor. They conducted surveys amongst 100 BRI-YBS participants selected by the institution and 100 non-participants chosen by the authors, both as treated groups in the treated villages. Additionally, 250 households were chosen as the control group. The survey was conducted

twice: first in 2007, before loans were disbursed, and then in 2008, after loans had been distributed. They concluded that while the collateral-free scheme might attract debtors, most participants were relatively wealthier families with higher per capita income and more access to microcredit. Consequently, microfinance's impact was not statistically significant on several outcomes, such as household income and self-employed business. Nevertheless, microcredit notably increased the business size of treatment households more than control households, particularly benefitting businesses owned by the poor.

2.5.4 Empirical Studies on Islamic Microfinance and Poverty

Islamic microfinance is gaining prominence in impoverished Muslim nations. According to Ahmed (2002), Islamic microfinance not only addresses the needs of the poor but also resolves issues prevalent in conventional counterparts. Asharaf (2010) also highlighted its potential as an alternative instrument for impoverished Muslims, noting that conventional programmes in Bangladesh fail to alleviate poverty due to religious constraints and interest-based lending.

Shirazi's (2012) findings in Pakistan indicated that impoverished borrowers benefited more than non-poor borrowers, with statistics revealing a 2% to 6% increase in income, specifically observed amongst 3,000 households in 2005, and thus contributing to poverty reduction. Similarly, the research conducted in Thailand by Naipom (2013) showcased the positive contribution of Islamic microfinance to enhancing customer well-being.

Numerous studies have delved into the impact of Islamic microfinance in rural areas. Rahman's (2010) examination of Islamic microfinance programmes in Bangladesh revealed a substantial improvement in the family income of clients by more than 33% upon

participating in the Rural Development Scheme, a Shariah-compliant micro-scale loan programme. Moreover, clients exhibited a rise of approximately 21% in religious activities, a 72% increase in business knowledge and a 79% enhancement in communication skills. These findings suggested that Islamic microfinance significantly influences social and economic aspects, consequently aiding in poverty alleviation within rural regions.

Samer et al. (2015) investigated the influence of the Malaysian microfinance programme, Amanah Ikhtiar Malaysia (AIM), on household income in both urban and rural settings. They discovered a positive impact of AIM's Islamic financial services on household income, particularly benefitting women and older family members. The study highlighted a notably higher impact on poverty alleviation in rural areas amongst 780 surveyed women in Selangor and Melaka.

While many studies have appraised Islamic microfinance programmes by using conventional approaches, these traditional systems often fall short in evaluating Islamic microfinance's holistic performance aligned with Shariah goals. Therefore, this study seeks to explore the role of Islamic microfinance based on the achievement of *Maqasid al-Shariah*. Dar (2004) justified *Maqasid al-Shariah* as a theory to analyse and measure empirical studies. Similarly, Alam et al. (2015) empirically researched AIM's Islamic Microfinance programme, examining its role in impoverished families based on *Maqasid al-Shariah*. Their study focused on KOPMU-DT, an Islamic Microfinance institution in Indonesia, operating in the empowerment of low-income families for nearly a decade.

Alkhan and Hassan (2020) highlighted the pivotal role of Kyrgyzstan's Islamic microfinance (IMF) practice in poverty reduction and economic development. Their findings underscored how these practices contributed to enhancing educational levels within the community. The empirical evidence suggests that IMF practices in Kyrgyzstan align with

critical aspects of *Maqasid al-Shariah*.

ZahidMahmood et al.'s (2017) examination of IMFI's implications on household assets and poverty status focused on three leading IMFIs: Akhuwat Foundation, Farz Foundation and NAYMAT in Lahore, Pakistan. Employing a pre- and post-project approach, the research revealed positive impacts of microfinance on selected respondents. In minimising randomised errors, purposive sampling was utilised, and data were collected using self-administered structured questionnaires. The study utilised three poverty measurements: Foster, Greer and Thorbecke indices, indicating that IMFI financing significantly enhanced the livelihoods of individuals experiencing poverty in Pakistan.

Shaw (2004) and Hasanah and Yusuf (2013) emphasised the effectiveness of microfinance in poverty alleviation by analysing income-related impacts across spatial locations. Shaw's (2004) examination of poverty in Sri Lanka unveiled disparities in poverty impacts based on locations, highlighting more opportunities for indigent clients in semi-urban settings compared to rural areas. This inequality in opportunity necessitates complementary investment in physical and social infrastructure to effectively eradicate rural poverty through micro-enterprise development.

Studies focusing on IMF practices in Indonesia and other countries reveal various positive impacts on poverty reduction and income enhancement (Adnan & Ajija, 2015; Rokhman, 2013; Onakoya & Onakoya, 2013). Adnan and Ajija (2015) emphasised that Islamic microfinance (BMT) significantly uplifted members' income, attributing this success to internalising Islamic values and offering integrated programmes for the impoverished, including spiritual development.

While microfinance primarily targets middle-to-lower-income individuals, Nugroho

(2009) underscored the need for trade-offs to sustain low-income sustainability while maintaining operations like for-profit financial institutions. Hasanah and Yusuf's (2013) investigation of factors influencing the formation of BMT in Indonesia revealed that village location and dominance of Muslims significantly impacted BMT formation. The study noted a higher likelihood of BMT formation in urban areas and Muslim-majority villages but highlighted adverse effects when urban placements were predominant.

Adnan and Ajija's (2015) research on the impact of IMFIs on rural households in Indonesia showed significant income increments and poverty reduction amongst clients of BMT MMU Sidogiri. These findings demonstrated income increases by approximately 50%, reducing respondents below the poverty line by 22.5% and alleviating the severity of poverty.

IMFIs in Indonesia, such as BMT, have significantly contributed to poverty alleviation by offering interest-free microfinance aligned with Shariah principles (Wulandari & Kassim, 2016). Operating on cooperative models, these IMFIs adhere to Shariah principles while fulfilling social obligations in their practices

2.6 A Literature Gap

This chapter extensively covered the foundational literature for this research. It initiates by delving into the comprehension of poverty and microfinance, considering both conventional and Islamic standpoints. By conducting a comprehensive literature review, this study employed the Trade-off Theory to assess the efficacy of aiding impoverished communities while ensuring institutional financial sustainability. Additionally, it discussed the contrasting viewpoints of institutionalists and welfarists concerning the approaches of microfinance institutions towards poverty alleviation.

Microfinance institutions (MFIs) can effectively utilize the concept of the triangle of outreach, financial sustainability, and impact when selecting target clients, designing products, determining loan requirements, and setting application procedures. The more innovative and locally tailored the project design, the better the overall prospects for success. This triangle highlights that, for instance, broader and deeper outreach to the poor may come at the expense of financial sustainability. While the poorest individuals are generally considered less creditworthy, the actual cost for MFIs lies in obtaining information about a person's creditworthiness, regardless of the loan size. Therefore, reaching a larger number of the poorest clients may justify providing subsidies to MFIs that specifically cater to this demographic.

The triangle concept suggests that MFIs must balance the trade-off between financial sustainability and outreach. Expanding access to the poorest segments of the population might involve sacrificing some level of financial self-sufficiency, as these clients often require smaller loans with higher administrative costs. However, addressing this trade-off through subsidies or other support mechanisms can make serving the poorest feasible. Subsidies could help cover the costs associated with gathering information about creditworthiness, thereby enabling MFIs to extend services to clients who otherwise might not have access to credit.

As MFIs strive for sustainability, they can improve their performance by creating better products, adopting demand-driven approaches, and enhancing operational efficiency through cost reduction measures. This balance between outreach, sustainability, and impact

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter outlines the empirical model employed to assess the efficiency and effectiveness of Islamic microfinance in alleviating poverty across various regions in Indonesia. It aims to achieve three primary objectives: firstly, to decompose the technical efficiency (TE), pure technical efficiency (PTE) and scale efficiency (SE) of IMF; secondly, to compare the financial and social efficiency performance of IMF; and thirdly, to explore the effectiveness of IMF in reducing poverty in Indonesia.

Quantitative methods were utilised in this study. The first and second objectives were addressed by gauging efficiency through non-parametric Data Envelopment Analysis (DEA), while the third objective examines effectiveness by using panel data regression analysed with STATA. Data for this research were sourced from the financial statements of Islamic rural banks published by the Indonesia Financial Services Authority, coupled with macroeconomic variables at the provincial level published by the Indonesia Central Bureau of Statistics.

Assessing the performance of Islamic Rural Banks primarily relied on frontier efficiency, comparing their efficiency and identifies best practices based on the DEA efficiency analysis. This approach evaluated two key concepts: effectiveness, which gauges the ability of Islamic microfinance banks to establish and attain goals, and efficiency, representing the ratio of output produced to input utilised. Efficiency serves as a relative performance dimension for Decision-Making Units (DMUs).

3.2 Measurement of Efficiency

Efficiency emerges as a crucial performance measurement standard in this study due to its applicability to both commercial and non-profit MFIs and the comprehensive coverage of various microfinance-related facets (Balkenhol, 2007b). Efficiency in this context involves the utilisation of input to generate output and is often expressed as a ratio, such as production per labour hour or cost per unit (Cooper et al., 2007). Although the characterisation of efficiency in microfinance research has evolved over time, it still presents as a ratio, raising concerns about bias.

The assessment of efficiency in Islamic microfinance can be approached through diverse methods, ranging from straightforward financial metrics to intricate econometric models. Complex efficiency estimation techniques primarily fall into two categories: parametric and non-parametric (Berger & Humphrey, 1997). The superiority between these methods remains debated, given their respective advantages and drawbacks. Parametric approaches necessitate assumptions regarding efficiency distribution and the specific cost or profit function (Iqbal & Molyneux, 2005), whereas non-parametric methods, such as Data Envelopment Analysis (DEA), do not require such functional form specifications.

This study adopted relative efficiency as a pertinent performance criterion to evaluate the holistic social and financial performance of MFIs (Balkenhol, 2007). By using DEA as a non-parametric tool based on linear programming, the study measured the efficiency of MFIs in comparison to benchmark criteria established from the best-performing MFIs. This approach allowed for the evaluation of each MFI's relative efficiency against others with similar attributes, serving as a benchmark. From an efficiency perspective, MFIs are expected to aim for efficiency in achieving both their social and financial objectives.

3.2.1 Data Envelopment Analysis

Efficiency, as delineated in the literature review, denotes a performance level utilising specific inputs to yield particular outputs. The application of a linear programming method known as DEA aids in determining optimal weights for each input and output. DEA serves to assess the effectiveness of comparable decision-making units (DMUs), which encompass various organisations, such as hospitals, schools, factories and banks. This study specifically focused on DMUs constituted by Islamic rural banks as part of IMFIs.

The examination involves calculating the technical efficiency scores for each DMU through mathematical programming. It constructs a frontier of best practices using a linear combination of virtual efficient DMUs for comparison against each actual DMU. This frontier acts as a benchmark of efficiency, highlighting the efficient entities. DEA operates by enveloping observations to establish a frontier that serves as an evaluative tool representing the performances of all evaluated DMUs (Cooper et al., 2007).

DEA was developed by Charnes et al. (1978) as a non-parametric method to evaluate efficiency in the transformation process in decision-making scenarios with multiple inputs and outputs. By employing linear programming, DEA establishes an encompassing linear production boundary over the dataset, serving as a benchmark against which all decision-making entities are assessed, termed an ‘envelope’ (Cook & Zhu, 2015; Emrouznejad & Anouze, 2010; Flückiger & Vassiliev, 2007).

Technical efficiency is computed as the distance from DMUs to the established frontier, measuring relative efficiency across all decision-making entities (Cook & Zhu, 2015; Cooper et al., 2007; Emrouznejad & Anouze, 2010). Since its inception in 1978, DEA has seen significant growth in modelling and application across various sectors

(Emrouznejad et al., 2008). One of DEA's strengths lie in its ability to evaluate efficiency without prior assumptions regarding distribution and production functions (Cook & Zhu, 2015; Cooper et al., 2007), making it particularly effective in situations, whereby indirect input-output relations occur.

3.2.2 CRS, VRS and Scale Efficiency

Two fundamental DEA models were employed in this study: the Charnes-Cooper-Rhodes (CCR) model introduced by Charnes et al. (1978) and the Banker-Charnes-Cooper (BCC) model introduced by Banker et al. (1984). The CCR model assesses technical efficiency under Constant Returns to Scale (CRS) conditions, while the BCC model evaluates efficiency under Variable Returns to Scale (VRS) conditions. In these models, inputs and outputs for specific DMUs are linearly combined in the following manner:

$$\text{Virtual Input} = V_1 X_1 + \dots + V_1 X_1 = i = \sum V_1 X_1 \quad (3.1)$$

$$\text{Virtual Output} = U_1 Y_1 + \dots + U_r Y_r = i = \sum U_r Y_r \quad (3.2)$$

$$\text{Efficiency} = \frac{V_1 X_1 + \dots + V_1 X_1 = i = \sum V_1 X_1}{U_1 Y_1 + \dots + U_r Y_r = i = \sum U_r Y_r} \quad (3.3)$$

The efficiency score for each DMU is determined by maximising the weighted output-to-weighted input ratio, where V_1 represents the weighting for input and U_r signifies the weighting for output measurement.

The second model, the BCC model, introduced by Banker et al. (1984), adapts the CCR model by incorporating the assumption of VRS. This acknowledges that different decision makers may exhibit varying scales of outcomes due to operating in diverse environments. While the CRS model assumes that decision makers function at their most productive scale. Often, this assumption does not hold true. The disparity between the technical efficiency of VRS and the decision maker's specific scale efficiency results in the

technical efficiency of VRS differing from that of CRS, known as technical efficiency (Coelli et al., 1998; Thanassoulis, 2001).

In DEA, two approaches are applied: the input-oriented model, which maximises proportional input reduction while keeping output constant, and the output-oriented model, which maximises proportional output increase while maintaining input constant. While the BCC model assumes an unequal ratio between new input and output (VRS), the CCR model assumes similarity in this ratio (CRS) or the operating of DMUs at their optimal scale (VRS). Additionally, the BCC model considers Technical Efficiency (TE), whereas the CCR model factors in both Scale Efficiency (SE) and Pure Technical Efficiency (PTE).

TE denotes a business unit's ability to either maximise output given a set quantity of inputs or minimise inputs given outputs. As defined by Hassan and Sanchez (2009), PTE indicates a firm's ability to minimise waste by producing as much output as input allows or utilising as little input as output production permits. Scale Efficiency (SE) refers to the firm's ability to operate at its optimal scale, reflecting a proportional reduction if the firm attains a consistent return to scale (CRS).

TE can be dissected into two components: PTE and SE by employing a production technology with VRS. PTE measures a DMU's capability to convert inputs into outputs without the influence of SE. By using the VRS specification, this assessment eradicates the impact of scale efficiency when determining pure technical efficiency (Coelli et al., 1998). The VRS model typically generates technical efficiency scores that are either equal to or higher than those produced by the CRS model as it encompasses data points more closely.

Alternatively, SE denotes the deviation from the long-term competitive equilibrium (Yildirim, 2002). A SE score below one indicates that the DMU is not operating at its most

efficient scale, hindering it from achieving maximum efficiency. Therefore, a DMU demonstrates scale inefficiency if there is a disparity between the production efficiency ratings when employing both CRS and VRS in DEA methodologies.

3.2.3 Input And Output-Oriented

Physical measurements of inputs and outputs are readily available in numerous sectors, but defining and quantifying the inputs and outputs related to financial services pose challenges that have not been adequately addressed in the literature. Financial institutions often lack easily measurable physical attributes (Berger & Humphrey, 1991). Consequently, the selection of appropriate input-output combinations for evaluating financial institution efficiency has become crucial. Incorrect choices in inputs and outputs can skew the assessment outcomes (Ruggiero, 2007). Financial institutions engage in diverse activities, making it complex to encompass them all. Various methods have been identified in the literature for selecting suitable inputs and outputs based on the services provided by financial institutions.

Berger and Humphrey (1997) delved into the issues concerning the selection of inputs and outputs for assessing financial institutions' effectiveness. They proposed two fundamental approaches – the production approach and the intermediation technique – to identify suitable inputs and outputs for efficiency analysis. Additionally, they advocated for the significance of the value-added, asset and user-cost approaches in evaluating efficiency. Favero and Papi (1995) similarly underscored the importance of the intermediation approach, the production approach and the asset approach in efficiency analysis, emphasising their superiority in determining input-output combinations. In the banking literature, the selection of inputs and outputs for efficiency assessments primarily revolves around the intermediation, production and asset approaches (Berger & Humphrey, 1997).

Financial institutions that transform deposits into loans typically employ the intermediation approach, which involves the movement of funds between borrowers and savers (Avkiran, 1999). In this perspective, banks are seen as intermediaries whose core function involves borrowing funds from depositors and then lending these funds for profit, as also emphasised by Yue (1992). Inputs in the intermediation approach include loanable funds, interest costs, labour expenses and deposits, while the outputs consist of loans and deposits. This method is widely adopted in assessing the efficiency of the banking industry (Sathye, 2003; Avkiran, 1999; Drake & Hall, 2003; Kao & Liu, 2004). Employing frontier efficiency analysis, the intermediation approach aims to minimise all costs to maximise profitability. Given that interest expenses typically represent a substantial portion, accounting for around two-thirds of the overall costs for financial organisations, this approach holds paramount importance for banking institutions (Berger & Humphrey, 1997).

The production approach posits that deposit-taking institutions create services for their clientele, employing labour and capital inputs to generate these services (Berger & Humphrey, 1997). This method encompasses transactions on deposit accounts in addition to advances and loans provided by financial institutions. Generally, the quantity and types of transactions across various loan and deposit categories are deemed suitable output measures for this methodology (Drake & Weyman-Jones, 1992). Berger and Humphrey (1997) underscored that transaction volumes and types over a period serve as the best indicators of output. Nevertheless, this approach can be challenging due to data availability issues. The production approach is more apt for evaluating the relative effectiveness of individual branches within an organisation and may diminish the significance of money transfers as a primary function of banks acting as financial intermediaries. Conversely, the intermediation approach evaluates the entire institution's efficiency (Berger & Humphrey, 1997).

Regarding identifying variables, three approaches offer suggestions: the assets method, the value-added approach and the user-cost approach. The assets approach defines organisations' outputs by their assets, particularly focusing on loans as they provide a competitive edge over other industry institutions (Favero & Papi, 1995). This method considers labour, physical capital, deposits and other liabilities as inputs, while loans and other assets serve as outputs (Drake & Weyman-Jones, 1992). In contrast, the value-added approach regards labour and the value of fixed assets as inputs, while assets and liabilities substantially enhancing the firm's value are considered outputs. Tortosa-Ausina (2002) highlighted a significant distinction between the value-added method and the assets approach.

Calculating bank efficiency involves various approaches. The user-cost method, while comprehensive, might pose challenges in application, demanding more extensive data on interest and other income sources. Despite minor inconsistencies, both the value-added and user-cost techniques produce very similar conclusions (Berger & Humphrey, 1997). While most inputs and outputs for financial institutions are generally agreed upon, the suitability of each approach varies, depending on the circumstances. Nonetheless, there is discord concerning the treatment of deposits. Some researchers consider deposits as inputs because financial institutions pay for them, marking them as a primary expense (Brockett et al., 1997; Drake & Hall, 2003; Kao & Liu, 2004). Conversely, other scholars view deposits as outputs due to their link to an institution's liquidity (Bhattacharyya et al., 1997; Saha & Ravisankar, 2000; Sathye, 2001), arguing that using deposits as inputs can artificially inflate efficiency measures.

For this research, the chosen measure is the input-oriented approach. This decision stems from the idea that variables used as inputs can be more readily adjusted by the DMU

managers, giving them greater control over these variables than output variables. In a separate study (Widiarto & Emrouznejad, 2015), both input- and output-oriented CCR and BCC models were utilised in DEA analyses. Microfinance units, facing limited available inputs, naturally seek to maximise outputs, given their dual mission. Consequently, input-oriented models are preferred. However, this study incorporates an input-oriented model to examine scenarios whereby MFIs cannot boost outputs due to geographical, demographic or regulatory constraints and instead need to reduce inputs to enhance efficiencies. Since operational size variations might affect efficiency, the BCC model, considering the VRS assumption, seems more logically suitable for evaluating MFI performance. Nevertheless, the CCR model also estimates SE and compares efficiency against optimal size.

3.2.4 Data Assumptions

For the application of the DEA approach, specific assumptions regarding the data must be met, as outlined by Cooper et al. (2007):

Data across all DMUs) must be positive and numeric for both inputs and outputs. This condition dictates that there should be no negative values or zeros within the dataset.

1. Reflecting managerial objectives, the inputs, outputs and DMUs in the assessment of relative efficiency should align with the desired outcomes. Essentially, the elements of the relative efficiency equation should accurately represent or closely approximate the intended assessment goals.
2. A preference exists for a smaller ratio of inputs to outputs. This preference aligns with the concept that a DMU demonstrates effectiveness by maximising outputs relative to the inputs it utilises (assuming an output-oriented approach). Therefore, the expectation is that the number of inputs

will be fewer than outputs.

3. It is unnecessary for inputs and outputs to use the same measurement units.

For instance, input variables might include the count of employees or working hours, while output variables could encompass profits generated or the quantity of products manufactured.

3.2.5 Variables Selection

The Cobb-Douglas production function serves as the basis for determining input and output variables in the production method. In this context, the output variable pertains to the income generated by MFIs, while all potential labour and capital expenditures constitute the input (Vujic & Jemric, 2001). Nonetheless, crucial differences exist in the conceptualisation of input and output factors between Islamic microfinance and conventional microfinance.

Conventional microfinance derives income from interest on funds lent to clients or held in banks, including penalties for late payments. Conversely, IMF generates income through *ujroh* fees, profit sharing based on *mudarabah* and *musyarakah* contracts, as well as earnings from *murabahah* financing and loan transactions. Notably, penalties resulting from late instalment payments within IMF contribute to social funds instead of adding to its revenue stream. Regarding costs, conventional microfinance incurs expenses in the form of interest paid on customers' funds or to other banks where funds are held in time deposits or savings accounts. In contrast, Islamic microfinance involves fees such as bonuses on *wadiah*, profit-sharing from customers' deposits under *mudarabah* contracts and earnings from *mudarabah*-based investments (Anwar, 2014; Devi & Firmansyah, 2018; Ibrahim, 2019; Rustiarini et al., 2016).

The selection of input and output variables significantly impacts the estimates

derived from DEA. The methodology used to evaluate financial institutions guides the choice of these variables. In this study, the economic and social efficiency of DMUs is examined using a production perspective. The table delineates the input variables, illustrating institutional characteristics, assets and cost structure. Additionally, the output variables depict the social and financial aspects of performance, including financial income and outreach (Gutierrez et al., 2009; Gutierrez & Lezama, 2011).

Based on an extensive review of empirical studies (see Appendix 1), the selection of variables employed as inputs and outputs in DEA was determined. These studies encompass a broad spectrum of objectives, ranging from comparing efficiency across diverse institution types to examining temporal variations in efficiency, and even identifying factors influencing efficiency (Servin et al., 2012; Azad et al., 2016; Van Damme et al., 2016; Kaur, 2016; Gebremichael & Gessesse, 2016; Alinsunurin, 2014; Rahman & Rosman, 2013; Haq et al., 2010; Kumar & Sensarma, 2017).

Table 3.1 derived a thorough summarize variables of efficiency commonly used in this research. Review of literature of the 99 carefully selected research papers, published since 2003 covering data from 1990 to 2016 (see appendix 1), on variables used, results derived, theories, country/region of the study and finally the conclusions drawn.

Table 3.1 presents the most prevalent inputs and outputs utilised in these studies, along with their respective frequencies of use. Frequently employed input variables in DEA literature include total and fixed assets, equity or capital held by the financial institution, the count of employees within the institution, interest expenses associated with borrowing funds and deposits acquired from depositors. Outputs typically involve interest income generated from lending activities, the count of loans or the gross loan portfolio (i.e., disbursed or outstanding loans), and other income sources apart from lending activities. These outputs

collectively represent the most common variables used across these empirical studies.

Table 3.1 Commonly Used Inputs and Outputs in DEA Literature

Input	Frequently used in the literature	Output	Frequently used in the literature
Operating expenses	20	Interest income	13
Employee	16	Number of loans	11
Interest expense	8	Other income	8
Total assets	6	Gross loan portfolio	8
Equity	6	Investment and other earnings assets	7
Fixed assets	6	Number of women borrowers	5
Deposits	6	Net profit /before tax	5
Cost per borrower	3	Return on assets (ROA)	3
Portfolio at risk 30 days	2	Number of borrowers per staff member	3
Number of offices	1	Number of active borrowers	3

This study employed both input- and output-oriented CCR and BCC models in its DEA investigations. Given the inherent objective of Islamic microfinance institutions to maximise outputs within the constraints of limited accessible inputs (dual aims), output-oriented models were utilised. Nonetheless, an input-oriented model was also applied to gauge scenarios where MFIs encounter limitations in enhancing outputs due to regulatory, geographical or demographic constraints, compelling them to curtail inputs to enhance efficiencies. Considering the potential impact of operational size variations on efficiency, the BCC model with the VRS assumption seemed a more rational choice to evaluate MFI

performance. Conversely, the CCR model was also utilised to compute scale efficiency and juxtapose it against the efficiency achieved at an ideal size.

Table 3.2 List of Variables' Efficiency

Variables	Symbol	Definition	Data Sources	References
Input				
Operational Expenses (IDR)	X1	Includes costs like staff, depreciation, amortisation, and administrative costs	Indonesia Financial Authority (www.ojk.go.id)	Sakti and Mohamad (2018), Hafez and Halim (2019),
Total Assets (IDR)	X2	Total amount of assets Islamic Rural Banks	Indonesia Financial Authority (www.ojk.go.id)	Wanke et al. (2019), Samad (2019)
Output				Sakti and Mohamad
Income Financing (IDR)	Y1	Total revenue from finance activities (profit sharing and margin)	Indonesia Financial Authority (www.ojk.go.id)	(2018), Hafez and Halim (2019), Wanke et al. (2019), Samad (2019)
Financing (IDR)	Z1	Total amount of client funds received. Total allocation of funds to borrowers or other entities based on Shariah principles	Indonesia Financial Authority (www.ojk.go.id)	Sakti and Mohamad (2018), Hafez and Halim (2019), Wanke et al. (2019), Samad (2019)

Table 3.2 outlines the input and output variables used in this research. The input variables include operational costs, which encompass all personnel expenses, depreciation, amortization, and administrative costs. These are considered inputs in the production approach because the production process cannot be sustained in the long term if outputs are produced at high costs, underscoring the need for efficient cost management to prevent

waste. Additionally, total assets represent the financial resources available to Islamic microfinance institutions, derived from capital and borrowings, and are used as an input to reflect the capital involved in the production process. (Gutiérrez-Nieto et al., 2009; Widiarto & Emrouznejad, 2015)

The output variables include total financing, which refers to the total outstanding loans at risk of default, with one or more payments overdue by more than 30 days. This variable is treated as an input in the production approach to reflect risk in the transformation process, as lower risk is preferable for the institution. Furthermore, income financing, defined as the revenue generated from the financing portfolio (including the margin rates charged on Islamic microfinance loans), are used as an output to represent sustainability. This variable serves as a proxy for long-term viability, as a microfinance institution that cannot collect sufficient revenue will be unable to operate (Hassan & Sanchez, 2009; Indra Widiarto & Emrouznejad, 2015)

The selected variables for this study are outlined in Table 3.2 and are linked to the primary functions of IMF. Input variables provide insights into the attributes utilised by financial institutions for their operations and service creation. Conversely, output variables are associated with the revenue generation of financial institutions through financing and the range of services offered to customers seeking comprehensive financing. Once again, DEA was employed to conduct a detailed TE analysis, aiming to demonstrate the efficiency of financial institutions in managing their financing portfolios and generating profits.

3.2.6 DEA Model Specifications

Adopted by Gutiérrez-Nieto et al. (2009) and Widiarto and Emrouznejad (2015), the DEA method evaluates overall efficiency, as well as social and financial efficiency separately, by using three distinct parameters, as depicted in Table 3.3.

Table 3.3 DEA Model Specifications

DEA Specification	Efficiency Represented	Input Variables	Output Variables	Data Sources
X1X2-Y1Z1	Overall efficiency	Operational expenses (X1) Total assets (X2)	Income financing (Y1) Financing (Z1)	Indonesia Financial Authority (www.ojk.go.id)
X1X2-Y1	Financial efficiency	Operational expenses (X1) Total assets (X2)	Income financing (Y1)	Indonesia Financial Authority (www.ojk.go.id)
X1X2-Z1	Social efficiency	Operational expenses (X1) Total assets (X2)	Financing (Z1)	Indonesia Financial Authority (www.ojk.go.id)

3.2.7 DMU Selection

The process of selecting financial institutions as DMUs began with assembling a roster of MFI financial statements under the oversight of the Indonesian Financial Services Authority. This step is crucial as one of the principals aims of this study is to scrutinise the performance of MFIs. The initial requirement involved classifying and confirming the accuracy of financial data spanning from 2012 to 2021. Following the collection of financial

information covering the past decade, a total of 144 Islamic rural banks, out of the 165 registered by December 2021 across 24 provinces, were found to have complete data, distributed amongst 21 provinces.

3.2.8 DEA Programme

MaxDEA Ultra 8, developed by Cheng (2014), serves as the software utilised for calculating the efficiency scores of the DMUs. This DEA programme is well-regarded for its user-friendly interface, robust functionality and expert-level capabilities within the current DEA models. It stands out for its comprehensive range of options and ease of use. The software does not require installation and boasts simplicity in dataset preparation. Individual fields or unique data arrangements do not require explicit declaration of input and output names. The dataset, software and DEA model settings are all consolidated into a single access database file (.mdb), ensuring straightforward backup processes. Notably, when restarting MaxDEA Ultra 8 after closure, the database and model settings remain intact. The software imposes no limitations on the number of DMUs or the depth of DEA models, allowing simultaneous execution of multiple models. Users have the freedom to duplicate or rename the MaxDEA Ultra file, and each copy retains a DEA model with saved data and preferences. It optimises the utilisation of multi-core CPUs, enabling concurrent processing of numerous files, which proves beneficial for intricate analyses like bootstrapping. Overall, MaxDEA Ultra 8 provides a comprehensive array of current DEA models, offering versatility and efficiency in DEA analyses.

3.3 Measuring Effectiveness of Islamic Microfinance

3.3.1 Data And Variables

The third objective of this study is to investigate the impact of Islamic rural banking

financing on poverty alleviation. Various literature approaches concerning microfinance and poverty reduction have been employed, drawing from studies by Beck et al. (2007), Clarke et al. (2006) and Abrar et al. (2021). The regression model utilised to assess the effect of microfinance on poverty levels is outlined as follows:

$$Pov_{j,t} = \alpha_0 + \beta_1 TF_{i,t} + B_{i,t} + C_{j,t} + \varepsilon_{j,t} \quad (3.4)$$

Where,

$Pov_{j,t}$ is the poverty headcount (percentage) of region j at time t , in which j denotes the cross-sectional dimension (i.e., region) and t represents the time dimension (i.e., year).

$TF_{i,t}$ is the total financing representing bank i , at time t , whereby i denotes the cross-sectional dimension (i.e., bank) and t refers to the time dimension (i.e., quartile).

$B_{i,t}$ is a vector of bank-specific control variables.

$C_{j,t}$ is a vector of province-specific control variables.

$\varepsilon_{i,t}$ is a residual value.

The primary variables under scrutiny were provincial poverty (Pov) and total financing in Islamic microfinance (TF). Definitions for these variables, along with others used in the study, are provided in 3.3.1. This research employed a model with province-fixed effects, consistent with prior studies by Abedifar et al. (2015) and Abrar et al. (2021), to gauge the efficacy of IMF entities by examining the correlation between overall financing and poverty alleviation.

The regression model incorporated two sets of control variables—bank-specific characteristics to address variance at the bank level and macroeconomic factors to capture provincial-level dynamics. The first set focused on financial and social performance to

capture variances at the bank level. Differences in bank size can lead to variations in performance or efficiency levels, with larger banks potentially benefitting more from economies of scale and diversification (Hughes et al., 2001). Additionally, the management of credit risk is essential as non-performing loans may impede operational efficiency (Berger & DeYoung, 1997), thus, the inclusion of non-performing financing (NPF) as a credit risk indicator.

Macro-level considerations constituted the second set of control variables, including various factors at the provincial level. GDP growth (GrPDB) was included in line with Maudos and Solís (2009). Inflation was another crucial factor. According to Huybens and Smith (1998), inflationary trends can detrimentally affect bank performance by reducing accurate rates of return and exacerbating credit rationing. This study also considered the bank's geographical location, specifically whether it is on Java Island or not, following research by Trinugroho et al. (2017; 2018). Java Island, being the most populated and developed island in Indonesia, serves as the economic hub. Therefore, the empirical investigation will employ the following models to explore the impact of microfinance on poverty:

$$\text{Pov}_{j,t} = \alpha_0 + \beta_1 \text{TF}_{i,t} + \beta_2 \text{FE}_{i,t} + \beta_3 \text{SE}_{i,t} + \beta_4 \text{Risk}_{i,t} + \beta_5 \text{grGDP}_{j,t} + \beta_6 \text{Inf}_{j,t} + \varepsilon_{i,t} \quad (3.5)$$

Where, in the subsequent discussion, “i” refers to the Islamic rural banks (BPRS), “j” denotes the province, and “t” signifies the year. The dependent variable, indicating poverty, is the poverty headcount, representing the proportion of a province's population living below the national poverty threshold.

Table 3.4 List of Variables Effectiveness

Variables	Symbol	Definition	Data Sources	References
Dependent Variables				
Poverty (%)	Pov	Poverty headcount is the percentage of the rural population below the rural poverty line.	Statistics Indonesia (www.bps.go.id)	Abrar (2021), Parewangi and Iskandar (2020)
Independent Variables				
Bank Level Factors				
Total Financing (IDR)	TF	Total financing/loans of Islamic rural banks	Indonesia Financial Authority (www.ojk.go.id)	Abrar et al. (2021)
Non-Performance Financing/Loan (%)	Risk	Non-performing loans of Islamic rural banks	Indonesia Financial Authority (www.ojk.go.id)	Wiwoho et al. (2021), Trinugroho et al. (2018)
Financial Efficiency (%)	FE	Financial efficiency scores	Output MaxDEA	Abrar (2019)
Social Efficiency (%)	SE	Social efficiency score	Output MaxDEA	
Provincial Level Factors				
Growth Domestic Bruto (%)	Gross Regional	gr GDP Regional growth (provincial level)	Statistics Indonesia (www.bps.go.id)	Abrar et al. (2021), Alfian Parewangi and Iskandar (2020), Wiwoho et al. (2021), Trinugroho et al. (2018)
Inflation Rate (%)	Inf	Inflation rate (provincial level)	Statistics Indonesia (www.bps.go.id)	Abrar et al. (2021)

The variable “TF”, denoting Total Financing, encompassed the amalgamation of Islamic rural banks’ financing instruments, including profit-loss sharing (PLS) and non-PLS financing. This variable served as a prospective indicator elucidating the role of intermediaries within Islamic rural banks and their contribution to poverty alleviation in the provinces whereby the BPRS is located.

3.3.2 Panel Data Analysis

This should highlight past studies related to the subject of the thesis. Recent publications (last 5 years) should be discussed in this chapter.

The analysis of the research data in this study employed various statistical tools. Initially, descriptive statistics are utilised to provide a concise overview of the research data without delving into detailed analysis or drawing general conclusions. This method offers a quantitative summary of research objects, simplifying complex datasets into manageable forms for comparison and comprehension (Holcomb, 2016) .

Descriptive statistics involve a univariate analysis, examining individual variables. Three significant characteristics are typically explored:

1. Data distribution depicted through frequency distribution.
2. Central tendency assessed via mean, median and mode.
3. Data dispersion measured by standard deviation.

The final sample comprised 144 IMFIs (DMUs) situated across 21 provinces, with data spanning from 2012 to 2021. Nonetheless, not all DMUs have annual data available, rendering the panel unbalanced. Panel data regression, a statistical tool specifically designed for analysing panel data, was incorporated. Unlike multiple regression analysis, panel data regression necessitates treatments due to the panel data structure, encompassing both cross-

sectional and time-series dimensions. Panel data regression allows the control of variables that may vary over time but remain constant across entities or observations. It encompasses two primary estimator techniques: fixed effects and random effects models, catering to the distinct characteristics of panel data analysis.

3.3.3 Fixed Effect Model (Fem)

The fixed effect model (FEM) in a regression analysis assumes that the intercept in the model differs for each cross-sectional unit due to the unique characteristics of each individual unit (Gujarati & Porter, 2012). In the fixed-effects panel model, these individual specific effects are considered fixed within a cross-sectional unit but are allowed to vary across different units, denoted as:

$$y_{it} = \beta X_{it} + u_1 + u_2 + \dots + u_N + \varepsilon_{it} \quad (3.6)$$

This step involves employing intercept dummies for all cross-sectional units present in the sample. Similarly, for the Pooled Ordinary Least Squares (POLS), Equation (3) can be computed by using the standard OLS estimation approach, provided that ε satisfies all classical assumptions, which is recognised as the least squares dummy variable (LSDV) estimator. Nevertheless, employing this method can be challenging for a large sample size (N), leading to potential issues with degrees of freedom.

It becomes more practical to remove the individual-specific effects initially. This step can be accomplished by applying the within-transformation to Equation (4), like so:

$$(y_{it} - \bar{y}_i) = \beta (x_{it} - \bar{x}_i) + \varepsilon_{it} \quad (3.7)$$

Where $\bar{y}_i$ and $\bar{x}_i$ are the groups means, i.e. $\bar{y}_i = \frac{1}{T} \sum_t y_{it}$ and $\bar{x}_i = \frac{1}{T} \sum_t x_{it}$, and

$$\varepsilon_{it} = (y_{it} - \bar{y}_i) - \beta (x_{it} - \bar{x}_i). \text{ Define } W_{xy} = \sum_{i,t} (x_{it} - \bar{x}_i) (y_{it} - \bar{y}_i) \text{ and } W_{xx} = \sum_{i,t} (x_{it} - \bar{x}_i)^2.$$

The least squares estimation of Equation (5) is known as the fixed-effects estimator or the

within or LSDV estimator. Based on Equation (5), the estimate of the slope coefficient is as follows:

$$\beta_{\text{within}} = \beta_{\text{LSDV}} = W_{xx}^{-1}W_{xy} \quad (3.8)$$

The fixed-effects estimator provides reliable estimates even in cases whereby there is no correlation between the explanatory variable and the error term. Conversely, it may be inefficient in the absence of this correlation as it primarily relies on variations. Another limitation of this estimator is its inability to accommodate time-invariant variables within the model, as they are removed during the within transformation process.

3.3.4 Random Effect Model (REM)

The random effect model assumes that individual units within research samples possess a consistent intercept value derived from the average value. Any disparity in the intercept value for each individual is encompassed within the error term (Gujarati & Porter, 2012). This forms the basis of the random effects panel model.

$$Y_{it} = \beta X_{it} + u_i + \varepsilon_{it}; u_i \sim \text{IID}(0, \sigma u^2) \quad \varepsilon_{it} \sim \text{IID}(0, \sigma \varepsilon^2) \quad (3.9)$$

u_i and ε_{it} are not correlated. Note that, in the random-effects panel model, the error correlation of individual i for different periods is no longer zero. More precisely:

$$E(\varepsilon_{it} \varepsilon_{is}) = \{(\sigma u^2 + \sigma \varepsilon^2 \text{ for } t=s) / (\sigma \varepsilon^2 \text{ for } t \neq s)\} \quad (3.10)$$

Where, $\varepsilon_{it} = u_i + \varepsilon_{it}$. With the variance-covariance matrix whose off-diagonals are not zero, Equation (7) is estimated by using the generalised least squares estimation method:

$$\beta_{\text{GLS}} = (W_{xy} + \phi B_{xy}) / (W_{xx} + \phi B_{xx}) \quad (3.11)$$

Where, $B_{xy} = T_{xy} - W_{xy}$ and $B_{xx} = T_{xx} - W_{xx}$ (They are between variations), ϕ is the ratio of $\sigma \varepsilon^2$ to $T \sigma u^2 + \sigma \varepsilon^2$:

$$\hat{\beta} = \sigma^2 \mathbf{E}_2 / (T \sigma^2 u_2 + \sigma^2 \mathbf{E}_2) \quad (3.12)$$

It is clear that $\hat{\beta}$ GLS will be closer to β POLS if $\sigma^2 u_2$ approaches zero, i.e., there is not much variation in the individual-specific effects. It will be closer to β when it gets larger.

This random-effects panel model is suited when the objective is to draw inferences about the population of the subject under study, whereby the sample is drawn from. In addition, unlike the fixed-effects panel model, it allows the inclusion of time-invariant variables. However, the random-effects panel estimator yields biased estimates if the error term (i.e., $\epsilon_{it} = u_i + \epsilon_{it}$) is correlated with the right-hand-side variables.

3.3.5 Selection Estimation Model

Gujarati and Porter (2012) outlined technical and empirical considerations guiding the choice between FEM and REM selection:

- a. If the number of time-series units (t) is larger and the number of cross-section units (n) is smaller, FEM and REM might not show significant differences. In such cases, the choice may depend on ease of estimation, favouring FEM.
- b. If the number of cross-section units (n) is larger and the number of time-series units (t) is smaller, the estimation results of FEM and REM might significantly differ. The selection depends on whether the cross-section units are randomly chosen REM is appropriate for random selection; otherwise, REM might still be preferable if non-random selection is assumed.
- c. When the cross-section error component correlates with independent variables, the parameter estimated by REM might be biased, while FEM estimations will not show such bias.

d. If the number of cross-section units (n) is larger while the number of time-series units (t) is smaller, and REM assumptions are fulfilled, REM tends to be more efficient than FEM.

The Hausman (1978) test serves as a valuable tool for model selection, favouring the random effects model as its null hypothesis. If the null hypothesis is not rejected, implying the estimates from both models are similar, either model can be used interchangeably. The inclusion of unobserved omitted variables in the error term will not lead to bias or inconsistent parameter estimates if the appropriate model is chosen, thereby avoiding any presumed effects of explanatory variables on the dependent variable (Brooks, 2008).

The selection of the best estimation model in this study is determined through the Hausman test. The hypotheses for the Hausman test are formulated as follows:

H_0 : There is no difference in estimators between FEM and REM.

H_1 : There exists a difference in estimators between FEM and REM.

If the p-value is less than 0.05, H_0 is rejected, indicating that FEM is the preferred estimation model. Conversely, if the p-value exceeds 0.05, H_0 is accepted, suggesting that the REM estimation model is more suitable than FEM.

The coefficient of determination (R^2) measures the proportion of the dependent variable's variability explained by the independent variables. It signifies the fitness level of the regression model in predicting the dependent variable (Gujarati & Porter, 2012). R^2 values range between 0 and 1, whereby values closer to 1 indicate better predictive ability of independent variables for the dependent variable.

The F-statistics test examines if the independent variables collectively impact the dependent variable. The decision-making criteria for this test include:

a. Reject H_0 and accept H_a if the significance value is below the alpha value (α) of

0.05, indicating a well-fitting regression model.

b. Reject H_a and accept H_1 if the significance value exceeds the alpha value (α) of 0.05, suggesting an unfit regression model.

The t-statistics test assesses whether individual independent variables affect the dependent variable. The criteria for decision-making in this test are:

a. Reject H_0 and accept H_a if the significance value is less than the chosen alpha value (α) (e.g., 0.01, 0.05, or 0.09), indicating individual effects of independent variables.

b. Accept H_0 and reject H_a if the significance value is greater than the chosen alpha value (α) (e.g., 0.01, 0.05, or 0.09), indicating the inability of individual independent variables.

In empirical research, ensuring the credibility and robustness of results is paramount. Robustness testing is a vital method employed to validate findings and strengthen research outcomes by subjecting them to diverse analyses and additional variations (Neumayer & Plümper, 2017). This approach serves as a quality assurance tool, enhancing the reliability and validity of the research (Kreinovich et al., 2017).

In this study, a robustness test was conducted by further analysing the independent variables concerning their impact on the dependent variables. Prior quantitative causality studies utilised interaction analysis amongst independent variables, involving the multiplication of variables and subsequent testing of the dependent variable through moderated regression. This additional analysis allows researchers to gain deeper insights into how independent variables interact in predicting the dependent variable. Consequently, it provides a more comprehensive understanding of the research variables, particularly in the context of policymaking.

3.4 Conceptual Framework

The concept of effectiveness used in this study is the term “effectiveness” in this study refers to the way an intervention achieves its desired outcome (Nghiem, 2005). A measure of efficiency was use of production of outputs and the achievement of outcomes in this case poverty alleviation. The logical linkages among elements of Islamic microfinance intervention (see Figure) are as follows: If inputs such as total assets and operational expenses are available then some activities can be organised. If activities such as financing are well organized, then some outputs can be produced. If outputs such as the total income of financing and financing portfolio are realized then the desired outcome, mainly poverty reduction, can be attained.

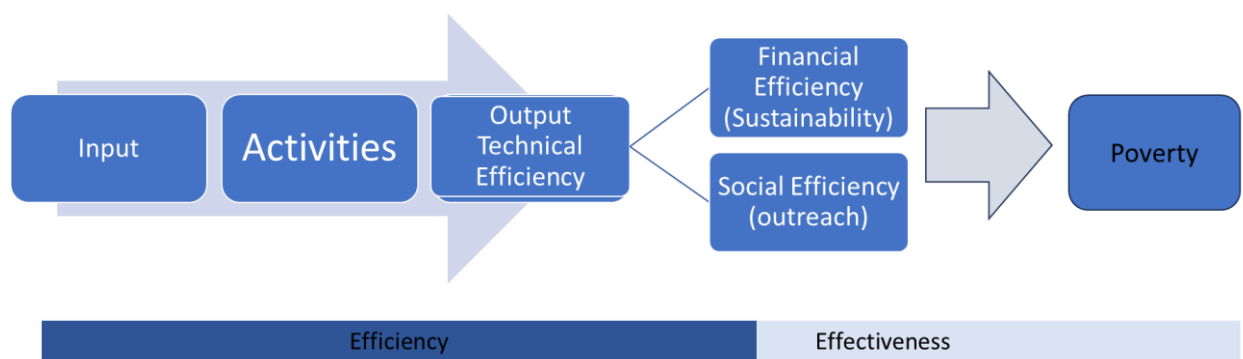


Figure 3.1 Conceptual Framework Efficiency and Effectiveness Islamic Microfinance toward Poverty Alleviation in Indonesia

Based on the conceptual framework that focuses on the general efficiency and effectiveness of Islamic rural banks (IRBs) in Indonesia, here are two formalized hypotheses that align with this broader viewpoint:

H1: Islamic rural banks in Indonesia demonstrate efficiency in their operations.

This hypothesis tests the overall efficiency of IRBs, encompassing technical efficiency (how well inputs are converted into outputs), financial efficiency (sustainability aspects like

profitability and loan repayment rates), and social efficiency (outreach and impact on underserved populations). It posits that IRBs efficiently manage resources and activities to maximize outputs, which is crucial for their long-term operational success and sustainability.

H2: Islamic Rural Banks in Indonesia are effective in alleviating poverty

This hypothesis focuses on the effectiveness of IRBs in achieving their primary social objective—poverty alleviation. It suggests that the activities and efficiencies of IRBs contribute to a measurable decrease in poverty levels among their clients. This hypothesis is critical in validating the social mission of Islamic finance, which is not only to achieve financial sustainability but also to ensure significant social impacts, such as improving the economic well-being of the poor and financially underserved.

3.5 Chapter Summary

This chapter provided an overview of the research data concerning Islamic rural banks in Indonesia and outlined the scope of study. The methodology employed in this research was quantitative and involved explaining the measurement techniques used to achieve three primary research objectives.

The first objective revolved around measuring TE in IMF, which is further dissected into PTE and SE. PTE signifies heightened productivity in banks solely attributable to managerial and organisational capabilities that optimise input utilisation. SE, on the other hand, was the ratio of TE calculated by using VRS assumptions to TE calculated assuming CRS (Farrell, 1985). Berger and Humphrey's (1991) efficiency estimation standards offered the classification of BCC and CCR, where PTE and SE emerge as the two components of TE through these methods.

Utilising two inputs to represent assets and production operational costs, and two

outputs to depict outreach (social goals) and sustainability (financial goals), this study employed DEA. The second goal involved comparing the outcomes of the two efficiency scores generated from this analysis. Additionally, the third objective of this research utilised panel data regression to investigate the effectiveness of IMF performance in reducing poverty, utilising financial and social efficiency scores as specific control variables for IMFs.

CHAPTER 4

RESULT AND DISCUSSION

The general objective of this study is to assess the efficiency and effectiveness of Islamic microfinance in alleviating poverty in Indonesia. Focusing on Islamic rural banks (BPRS) as a pivotal element of Islamic microfinance in the country, this research incorporated extensive data to explore poverty dynamics. The research combined provincial-level data obtained from the Indonesia Statistics Indonesia (BPS) with the dataset concerning Indonesian rural banking provided by the Indonesia Financial Services Authority (OJK).

4.1 Measuring Efficiency of Islamic Microfinance

The primary objectives of this research involved dissecting the technical efficiency, pure technical efficiency and scale efficiency within the realm of Islamic microfinance in Indonesia. Additionally, the study aimed to conduct a comparative analysis of financial and social efficiency performances of Islamic microfinance in Indonesia. The research employed the DEA (Data Envelopment Analysis) tool in conjunction with MaxDEA software to accomplish these goals.

MaxDEA Ultra 8 served as a crucial tool for assessing the efficiency of each IMFIs across different time frames and provinces. This software employed various assumptions, including CRS (Constant Returns to Scale), VRS (Variable Returns to Scale) and both input and output-oriented techniques. The CCR (Charnes-Cooper-Rhodes) model, premised on the assumption of CRS, derives TE outcomes, whereas the BCC (Banker-Charnes-Cooper) model assumed VRS outcomes. SE was derived from TE under PTE, wherein the TE value was divided by CRS under VRS assumptions. Given the dual missions prevalent in IMF, the study compared the performance metrics between financial goals, symbolising sustainability

and social objectives, representing outreach, as indicated in the existing literature.

Table 4.1 Islamic Rural Bank Per Region and Province

Region	Province	Total Per Province	Total Per Region
Sumatera Island	Aceh	9	38
	Sumatera Utara	7	
	Sumatera Barat	7	
	Riau	2	
	Sumatera Selatan	1	
	Bengkulu	1	
	Lampung	9	
	Kep. Bangka Belitung	1	
	Kep. Riau	1	
	Jawa Barat	26	
Java Island	Jawa Tengah	26	92
	Di Yogyakarta	11	
	Jawa Timur	21	
	Banten	8	
	Bali	1	
Bali and Nusa Tenggara	Nusa Tenggara Barat	3	4
	Kalimantan Tengah	1	
Kalimantan Island	Kalimantan Selatan	1	3
	Kalimantan Timur	1	
	Maluku Utara	1	
Sulawesi Island	Sulawesi Selatan	6	7
		144	144

In this study, Islamic rural banks (IRBs) from Indonesia's IMFIs were selected as the DMUs. An initial screening process was conducted within the timeframe of 2012 to 2021 to ensure the utilisation of the most recent data available for analysis. Amongst 144 IRBs located across 21 provinces, only those with complete data encompassing all necessary input

and output variables and excluding any IRBs with missing data or those that have been liquidated, were considered for this study. A comprehensive overview of this selection process is detailed in Table 4.1.

4.1.1 Descriptive Statistics

Table 4.2 presents the descriptive statistics for variables characterising the entire sample, comprising 1,440 observations from 2012 to 2021, although not all data were available for every DMU across all years. The values were denoted in Indonesia Rupiah (IDR). It is worth noting that there were considerable ranges in all variables, indicating substantial differences between the minimum and maximum values. These variations underscored the diverse operating conditions and scales amongst the sampled MFIs. Du et al. (2014) argued that incorporating unit-invariants in efficiency analysis is pertinent given such significant disparities.

Table 4.2 exhibits the variables used for DEA estimation and technical efficiency scores, including descriptive statistics for input and output variables, and technical efficiency scores considering both input and output orientation. The results suggested that IMFIs boasted a relatively high average TE score, nearly reaching 1.00. This finding corresponded with prior research by Wasiaturrahma et al. (2020), highlighting that IRBs have achieved efficient conditions according to the production approach

Table 4.2 Descriptive Statistics of Inputs and Outputs Used in DEA and Efficiency Scores

Variable	Mean	Std. Deviation	Min	Max	Obs
Inputs					
Operating Expenses (X1)	5,230,073.06	9,505,187.55	0	170,389,239.00	1,440
Assets (X2)	64,729,063.67	125,956,179.99	64,834.00	1,402,051,289.00	1,440
Outputs					
Income Financing (Y1)	9,144,977.69	18,318,498.60	0	258,742,103.00	1,440
Financing (Z1)	47,162,523.89	93,190,552.65	35,167.00	1,134,205,380.00	1,440
Technical Efficiency Scores					
Input-Oriented					
CRS (TE)	90.67%	7.88%	65.23%	100%	1,440
VRS (PTE)	95.20%	5.69%	71.82%	100%	1,440
Scale (SE)	95.21%	5.43%	73.75%	100%	1,440
Output-Oriented					
CRS (TE)	90.67%	7.89%	65.23%	100%	1,440
VRS (PTE)	94.82%	5.97%	69.64%	100%	1,440
Scale (SE)	95.60%	4.91%	75.01%	100%	1,440

4.1.2 Decompose Technical Efficiency (TE), Pure Technical Efficiency (PTE) And Scale Efficiency (SE) on Islamic Microfinance Institutions in Indonesia

The first objective of this research is to dissect the efficiency scores of IMFIs by using two orientations: input and output. The measurement outcomes included TE scores assuming CRS, and PTE under VRS. The latter comprised managerial efficiency and SE, which are mutually exclusive and non-additive. SE can manifest in three forms: CRS, Increasing Returns to Scale (IRS) and Decreasing Returns to Scale (DRS). The overall efficiency scores were derived from two input and two output variables (Table 3.3).

Table 4.3 showcases empirical estimates of the overall efficiency, TE, PTE and SE in Indonesian IMFIs. Notably, 12 IRBs, – namely Bahari Berkesan, Bangka Belitung,

Berkah Gemadana, BPRS Gajah Tongga Kota Piliang, BPRS Mitra Amanah, Haji Miskin, Harta Insan Karimah, Hasanah, Untungsyariah, Muamalat Harkat, Syariat Fajar Sejahtera Bali and Vitka Central – maintain efficiency across TE, PTE and SE scores. Employing an input-oriented approach, the average TE, PTE and SE scores were observed at 90.67%, 95.20% and 95.21%, respectively.

In contrast, employing output-oriented measurements yielded efficiency scores of 90.67%, 94.82% and 95.60%, respectively. TE estimates suggested that input-oriented interventions could reduce inputs by 4.79% without affecting output levels. Conversely, with output-oriented policies, IMFIs could enhance their loan portfolio by 5.17% at current input levels. Additionally, IMFIs utilising both approaches had an overall TE of 90.67%, signifying the potential for either a 9.32% output increase or a 9.32% input reduction while maintaining the same input-output ratio.

Technical efficiency reflects a company's ability to maximize output from a given set of inputs. BPR Syariah has a near-100% Technical Efficiency (TE) score due to its status as a formal microfinance institution regulated and supervised by the Indonesian Financial Services Authority (OJK). This regulatory oversight ensures that the institution's operational processes are well-managed, contributing to its high Pure Technical Efficiency (PTE) score, which is also close to 100%.

Table 4.3 Score of Efficiency of Islamic Rural Bank in Indonesia

No.	IMFIs	Input-Oriented			Output-Oriented		
		TE	PTE	SE	TE	PTE	SE
1	Adeco	0.989	0.989	1.000	0.989	0.989	1.000
2	Al Barokah	0.931	0.994	0.937	0.931	0.994	0.937
3	Al Falah	1	1	1	1	1	1
4	Al Hijrah Amanah	0.894	0.987	0.906	0.894	0.986	0.907
5	Al Ihsan	0.840	0.977	0.862	0.840	0.975	0.864

Table 4.3 continued

No.	IMFIs	Input-Oriented			Output-Oriented		
		TE	PTE	SE	TE	PTE	SE
6	Al Mabzur	0.869	0.968	0.899	0.869	0.963	0.903
7	Al Mabzur Babadan	0.931	0.951	0.979	0.931	0.952	0.978
8	Al Madinah Tasikmalaya	0.917	0.948	0.967	0.917	0.943	0.972
9	Al Makmur	0.920	0.938	0.980	0.920	0.947	0.971
10	Al Ma'soem Syariah	0.922	0.950	0.970	0.922	0.951	0.970
11	Al Salaam Aman Salman	0.886	0.940	0.944	0.886	0.944	0.940
12	Al Wadi'ah	0.924	0.950	0.973	0.924	0.951	0.971
13	Al Washliyah	0.714	0.771	0.933	0.714	0.759	0.940
14	Alyaqin	0.966	1.000	0.966	0.966	1.000	0.966
15	Amanah Bangsa	0.993	1.000	0.993	0.993	1.000	0.993
16	Amanah Insan Cita	0.982	0.999	0.983	0.982	0.999	0.983
17	Amanah Insani	0.759	0.801	0.954	0.759	0.800	0.956
18	Amanah Rabbaniyah	0.901	0.912	0.988	0.901	0.911	0.989
19	Amanah Sejahtera	0.834	0.945	0.880	0.834	0.953	0.873
20	Amanah Ummah	0.833	0.866	0.961	0.833	0.872	0.955
21	Ampek Angkek Candung	0.858	0.893	0.963	0.858	0.925	0.927
22	Annisa Mukti	0.948	0.971	0.974	0.948	0.966	0.980
23	Arta Leksana	0.740	0.788	0.939	0.740	0.761	0.973
24	Artha Amanah Ummat	0.901	0.975	0.924	0.901	0.966	0.933
25	Artha Fisabilillah	0.832	0.930	0.893	0.832	0.909	0.915
26	Artha Madani	0.883	0.888	0.994	0.883	0.890	0.992
27	Artha Mas Abadi	0.970	0.988	0.981	0.970	0.987	0.982
28	Artha Pamenang	0.967	0.993	0.974	0.967	0.993	0.974
29	Artha Surya Barokah	0.805	0.823	0.979	0.805	0.830	0.970
30	Asad Alif	0.910	0.949	0.959	0.910	0.942	0.966
31	Asri Madani Nusantara	0.962	0.991	0.971	0.962	0.990	0.972
32	Attaqwa Garuda Utama	0.945	0.969	0.974	0.945	0.963	0.981
33	Bahari Berkesan	1.000	1.000	1.000	1.000	1.000	1.000
32	Attaqwa Garuda Utama	0.945	0.969	0.974	0.945	0.963	0.981
33	Bahari Berkesan	1.000	1.000	1.000	1.000	1.000	1.000
34	Baiturrahman	0.790	0.812	0.975	0.790	0.839	0.938

Table 4.3 Continued

No.	IMFIs	Input-Oriented			Output-Oriented		
		TE	PTE	SE	TE	PTE	SE
35	Baktimakmur Indah	0.955	0.992	0.962	0.955	0.993	0.961
36	Bandar Lampung	0.975	1.000	0.975	0.975	1.000	0.975
37	Bangka Belitung	1.000	1.000	1.000	1.000	1.000	1.000
38	Bangun Drajat Warga	0.878	0.935	0.943	0.878	0.942	0.934
39	Barakah Nawaitul Ikhlas	0.943	1.000	0.943	0.943	1.000	0.943
40	Barkah Gemadana	1.000	1.000	1.000	1.000	1.000	1.000
41	Barokah Dana Sejahtera	0.929	0.982	0.947	0.929	0.984	0.944
42	Baturridha Pusaka	0.975	0.983	0.992	0.975	0.982	0.992
43	Berkah Dana Fadhillah	0.974	1.000	0.974	0.974	1.000	0.974
44	Berkah Ramadhan	0.914	0.937	0.975	0.914	0.935	0.977
45	Bhakti Haji	0.774	0.997	0.776	0.774	0.973	0.794
46	Bhakti Sumekar	0.952	1.000	0.952	0.952	1.000	0.952
47	Bina Amanah Satria	0.845	0.858	0.985	0.845	0.861	0.981
48	Bina Amwalul Hasanah	0.932	0.984	0.946	0.932	0.973	0.957
49	Bina Finansia	0.926	0.953	0.971	0.926	0.946	0.979
50	Bina Rahmah	0.847	0.885	0.947	0.847	0.867	0.973
51	BPR Syariah Magetan	0.800	0.873	0.921	0.800	0.864	0.930
52	BPRS Aman Syariah	0.880	1.000	0.880	0.880	1.000	0.880
53	BPRS Bakti Artha Sejahtera Sampang	0.929	0.941	0.986	0.929	0.943	0.984
54	BPRS Gajah Tongga Kota Piliang	1.000	1.000	1.000	1.000	1.000	1.000
55	BPRS Gotong Royong	0.894	0.936	0.955	0.894	0.931	0.960
56	BPRS Harta Insan Karimah Kota Tegal	0.999	1.000	0.999	0.999	1.000	0.999
57	BPRS Harta Insan Karimah Makassar	0.817	0.942	0.854	0.817	0.882	0.923
58	BPRS Harta Insan Karimah Surakarta	0.970	0.987	0.982	0.970	0.986	0.984
59	BPRS Kota Bekasi	0.748	0.791	0.953	0.748	0.790	0.956
60	BPRS Kota Mojokerto	0.895	0.917	0.975	0.895	0.923	0.968
61	BPRS Lantabur Tebuireng	0.963	0.970	0.993	0.963	0.970	0.993
62	BPRS Mitra Amanah	1.000	1.000	1.000	1.000	1.000	1.000
63	BPRS Mitra Harmoni Kota Bandung	0.821	0.910	0.902	0.821	0.891	0.920
64	BPRS Rahma Syariah	0.713	0.871	0.818	0.713	0.818	0.871
65	BPRS Rahmania Dana Sejahtera	0.980	0.997	0.982	0.980	0.997	0.983

Table 4.3 Continued

No.	IMFIs	Input-Oriented			Output-Oriented		
		TE	PTE	SE	TE	PTE	SE
66	Buana Mitra Perwira	0.852	0.872	0.976	0.852	0.879	0.968
67	Bumi Artha Sampang	0.866	0.886	0.977	0.866	0.882	0.981
68	Cahaya Hidup	0.984	1.000	0.984	0.984	1.000	0.984
69	Carana Kiat Andalas	0.863	0.898	0.962	0.863	0.890	0.971
70	Central Syariah Utama	0.882	0.944	0.932	0.882	0.925	0.952
71	Cilegon Mandiri	0.914	0.920	0.993	0.914	0.920	0.994
72	Daarul Hayat	0.652	0.901	0.738	0.652	0.859	0.779
73	Dana Amanah	0.923	0.988	0.935	0.923	0.983	0.940
74	Dana Hidayatullah	0.945	0.974	0.971	0.945	0.971	0.973
75	Dana Moneter	0.984	1.000	0.984	0.984	1.000	0.984
76	Dana Mulia	0.903	0.923	0.977	0.903	0.919	0.982
77	Danagung Syariah	0.920	0.939	0.978	0.920	0.933	0.986
78	Daya Artha Mentari	0.791	0.824	0.957	0.791	0.816	0.971
79	Dharma Kuwera	0.937	0.962	0.974	0.937	0.960	0.977
80	Dinar Ashri	0.953	1.000	0.953	0.953	1.000	0.953
81	Formes	0.816	0.848	0.962	0.816	0.835	0.977
82	Gala Mitra Abadi	0.922	0.994	0.927	0.922	0.992	0.929
83	Gayo Perseroda	0.971	0.981	0.990	0.971	0.982	0.989
84	Gebu Prima	0.942	0.969	0.971	0.942	0.968	0.971
85	Gowata	0.847	1.000	0.847	0.847	1.000	0.847
86	Gunung Slamet	0.986	0.990	0.996	0.986	0.991	0.995
87	Haji Miskin	1.000	1.000	1.000	1.000	1.000	1.000
88	Harta Insan Karimah	1.000	1.000	1.000	1.000	1.000	1.000
89	Harta Insan Karimah Bekasi	0.953	0.976	0.977	0.953	0.976	0.976
90	Harta Insan Karimah Parahyangan	0.998	1.000	0.998	0.998	1.000	0.998
91	Harum Hikmahnugraha	0.842	0.865	0.973	0.842	0.859	0.980
92	Hasanah	1.000	1.000	1.000	1.000	1.000	1.000
93	Hikmah Wakilah	0.976	0.994	0.981	0.976	0.995	0.981
94	Ikhsanul Amal	0.833	0.935	0.891	0.833	0.912	0.913
95	Insan Cita Jaya Artha	0.855	0.891	0.955	0.855	0.877	0.972
96	Insan Madani	0.960	0.977	0.982	0.960	0.977	0.982

Table 4.3 Continued

No.	IMFIs	Input-Oriented			Output-Oriented		
		TE	PTE	SE	TE	PTE	SE
97	Investama Mega Bakti	0.975	0.979	0.996	0.975	0.981	0.993
98	Karya Mugi Sentosa	0.841	0.904	0.926	0.841	0.909	0.924
99	Khasanah Ummat	0.852	0.970	0.881	0.852	0.966	0.884
100	Kota Juang	0.972	1.000	0.972	0.972	1.000	0.972
101	Kotabumi	0.938	0.980	0.957	0.938	0.981	0.956
102	Lampung Timur	0.958	0.985	0.973	0.958	0.983	0.975
103	Madina Mandiri Sejahtera	0.950	0.950	0.999	0.950	0.961	0.981
104	Mandiri Mitra Sukses	0.896	0.955	0.938	0.896	0.958	0.935
105	Manfaatsyariah	1.000	1.000	1.000	1.000	1.000	1.000
106	Margirizki Bahagia	0.923	0.935	0.988	0.923	0.939	0.983
107	Mentari	0.986	0.990	0.996	0.986	0.990	0.996
108	Mentari Pasaman Saiyo	0.954	0.986	0.967	0.954	0.985	0.968
109	Meru Sankara	0.756	0.969	0.784	0.756	0.964	0.789
110	Metro Madani	0.830	0.880	0.945	0.830	0.897	0.925
111	Mitra Amal Mulia	0.987	0.989	0.998	0.987	0.988	0.998
112	Mitra Cahaya Indonesia	0.918	0.994	0.923	0.918	0.968	0.944
113	Mitra Harmoni Kota Malang	0.877	0.912	0.957	0.877	0.902	0.970
114	Mitra Harmoni Kota Semarang	0.936	0.971	0.964	0.936	0.968	0.967
115	Mitra Harmoni Yogyakarta	0.994	0.996	0.999	0.994	0.995	0.999
116	Muamalah Cilegon	0.838	0.894	0.937	0.838	0.878	0.955
117	Muamalat Harkat	1.000	1.000	1.000	1.000	1.000	1.000
118	Mulia Berkah Abadi	0.945	0.984	0.960	0.945	0.983	0.961
119	Musyarakah Ummat Indonesia	0.963	1.000	0.963	0.963	1.000	0.963
120	Niaga Madani	0.990	1.000	0.990	0.990	1.000	0.990
121	Patuh Beramal	0.973	0.991	0.982	0.973	0.996	0.977
122	PT BPRS Lampung Barat	0.842	0.970	0.868	0.842	0.964	0.875
123	Puduarta Insani	0.999	1.000	0.999	0.999	1.000	0.999
124	Rahman Hijrah Agung	0.926	0.974	0.949	0.926	0.977	0.947
125	Rajasa	0.930	0.956	0.971	0.930	0.951	0.977
126	Rifatul Ummah	0.773	0.970	0.797	0.773	0.948	0.818
127	Riyal Irsyadi	0.829	0.851	0.972	0.829	0.845	0.979

Table 4.3 Continued

No.	IMFIs	Input-Oriented			Output-Oriented		
		TE	PTE	SE	TE	PTE	SE
128	Saka Dana Mulia	0.737	0.966	0.767	0.737	0.939	0.794
129	Sarana Prima Mandiri	0.905	0.913	0.991	0.905	0.915	0.989
130	Sindanglaya Katonapan	0.988	1.000	0.988	0.988	1.000	0.988
131	Sukowati Sragen	0.979	1.000	0.979	0.979	1.000	0.979
132	Suriyah	0.915	0.967	0.947	0.915	0.972	0.941
133	Surya Sejati	0.916	0.992	0.923	0.916	0.957	0.957
134	Syariat Fajar Sejahtera Bali	1.000	1.000	1.000	1.000	1.000	1.000
135	Taman Indah Darussalam	0.779	0.954	0.821	0.779	0.941	0.834
136	Tanggamus	0.871	0.885	0.984	0.871	0.881	0.989
137	Tanmiya Artha	0.902	0.981	0.920	0.902	0.979	0.921
138	Tengku Chiek Dipante	0.870	0.965	0.904	0.870	0.946	0.924
139	Tulen Amanah	0.999	1.000	0.999	0.999	1.000	0.999
140	Ummu	0.680	0.718	0.941	0.680	0.696	0.974
141	Unawi Barokah	0.745	0.996	0.748	0.745	0.993	0.750
142	Vitka Central	1.000	1.000	1.000	1.000	1.000	1.000
143	Wakalumi	0.837	0.970	0.866	0.837	0.938	0.895
144	Way Kanan	0.878	0.903	0.971	0.878	0.903	0.973
	Average	0.907	0.952	0.952	0.907	0.948	0.956

Table 4.3 illustrates that the total TE of IMF was inferior to its PTE. This outcome implied that scale inefficiencies, rather than just technical or managerial inefficiencies, were often the primary cause of technical shortcomings in MFIs. SE ranged between zero and one or from 0% to 100%. An IMFI was deemed scale efficient and operating at its optimal size if its SE ratio was 100%. If the SE fell below 100%, it indicated that the IMFI suffered from a small-scale inadequacy.

Table 4.4 TE, PTE and SE scores for the Period of 2012–2021

Year	Input-Oriented			Output-Oriented		
	TE	PTE	SE	TE	PTE	SE
2012	0.894	0.949	0.942	0.894	0.946	0.946
2013	0.909	0.950	0.957	0.909	0.945	0.961
2014	0.924	0.956	0.967	0.924	0.954	0.969
2015	0.924	0.963	0.959	0.924	0.957	0.965
2016	0.894	0.950	0.941	0.894	0.946	0.945
2017	0.888	0.950	0.933	0.888	0.947	0.937
2018	0.912	0.953	0.956	0.912	0.950	0.959
2019	0.911	0.951	0.959	0.911	0.948	0.962
2020	0.903	0.948	0.952	0.903	0.942	0.958
2021	0.908	0.950	0.956	0.908	0.948	0.958
Average	0.907	0.952	0.952	0.907	0.948	0.956

In Table 4.4, the TE, PTE and SE scores were presented for the research period (2012–2021). The efficiency scores for both input and output orientations exhibited nearly identical values. The average financial efficiency of IMFIs fluctuated over the research period, ranging from 89.40% in 2012 to 90.80% in 2021, while the overall average TE score for IMFI was 90.70%. The trend in scores displayed an uptick from 2012 to 2015, followed by a slight decrease, a subsequent rise and a minor dip during the COVID-19 pandemic. Nonetheless, the research findings indicated that MFIs could curtail their inputs by approximately 9.33% while maintaining the same output level through efficient input utilisation. Furthermore, for the years 2012 through 2021, MFIs could respectively reduce their inputs by 10.59%, 9.14%, 7.55%, 7.63%, 10.61%, 11.17%, 8.80%, 8.89%, 9.69% and 9.22% without squandering any resources.

The subsequent phase involved analysing the efficiency scores across various provinces to evaluate the performance of IMFIs in Indonesia. The outcomes are detailed in

Table 4.5.

Table 4.5 TE, PTE and SE Scores for IMFIIs at Provincial Level

Province	Score Efficiency			Region	Description
	TE	PTE	SE		
Aceh	0.917	0.963	0.953	Non-Java	inefficient
Sumatera Utara	0.940	0.963	0.976	Non-Java	inefficient
Sumatera Barat	0.934	0.959	0.974	Non-Java	inefficient
Riau	0.987	1.000	0.987	Non-Java	inefficient
Sumatera Selatan	1.000	1.000	1.000	Non-Java	efficient
Bengkulu	1.000	1.000	1.000	Non-Java	efficient
Lampung	0.900	0.951	0.947	Non-Java	inefficient
Bangka Belitung	1.000	1.000	1.000	Non-Java	efficient
Kepulauan Riau	1.000	1.000	1.000	Non-Java	efficient
Jawa Barat	0.870	0.926	0.940	Java	inefficient
Jawa Tengah	0.891	0.946	0.943	Java	inefficient
Yogyakarta	0.931	0.958	0.972	Java	inefficient
Jawa Timur	0.869	0.934	0.930	Java	inefficient
Banten	0.920	0.959	0.959	Java	inefficient
Bali	1.000	1.000	1.000	Non-Java	efficient
Nusa Tenggara Barat	0.975	0.997	0.978	Non-Java	inefficient
Kalimantan Tengah	1.000	1.000	1.000	Non-Java	efficient
Kalimantan Selatan	1.000	1.000	1.000	Non-Java	efficient
Kalimantan Timur	1.000	1.000	1.000	Non-Java	efficient
Maluku Utara	1.000	1.000	1.000	Non-Java	efficient
Sulawesi Selatan	0.922	0.985	0.932	Non-Java	inefficient
Average	0.907	0.952	0.952		

Table 4.5 presents the overall TE score under CRS, PTE considering VRS, and SE.

At the provincial level, the scores for input were nearly identical. Specifically, the average minimum efficiency amongst all IMFIIs in the province, namely Jawa Timur, stood at CRS 86.90%, while Jawa Barat exhibited a VRS efficiency of 92.60%. Conversely, the average maximum efficiency scores (100%) for both CRS and VRS were observed in several

provinces, such as Sumatera Selatan, Bengkulu, Bangka Belitung, Kepulauan Riau, Bali, Kalimantan Tengah, Kalimantan Selatan, Kalimantan Timur and Maluku Utara.

The performance of IMFI has notably risen in the past decade, averaging a PTE of 94.42%. Contrasting the average VRS value (PTE) with SE, Table 4.5 highlights the predominant influence of PTE over SE in determining the province's TE. Additionally, various IMFIs at the provincial level in regions outside Java displayed complete efficiency scores compared to those within the Java region.

Table 4.6 TE, PTE and SE Scores for IMFIs at Regional Level

Region	Input-Oriented			Output-Oriented		
	TE	PTE	SE	TE	PTE	SE
Sumatera	0.964	0.982	0.982	0.964	0.982	0.981
Jawa	0.896	0.945	0.949	0.896	0.940	0.954
Bali and Nusa Tenggara	0.988	0.998	0.989	0.988	0.999	0.988
Kalimantan	1.000	1.000	1.000	1.000	1.000	1.000
Sulawesi	0.961	0.993	0.966	0.961	0.985	0.975
Average	0.962	0.984	0.977	0.962	0.981	0.980

Drawing from the initial description of the research object in this chapter, the TE, PTE and SE scores were presented at the regional level. This data aligned with the division of Indonesia's provinces into six regions by the Central Bank of Indonesia in its annual financial report: Sumatra, Java, Kalimantan, Sulawesi, Bali Nusa Tenggara and Papua (Papua was excluded due to the absence of IMFIs). For this study, only five regions were considered.

Table 4.6 showcases the comparison between the average VRS (PTE) and SE values, revealing an evident predominance of PTE over SE in determining technical efficiency at the regional level. Notably, regions outside Java exhibited higher average SE scores, notably Kalimantan (100%), in contrast to the Java region's average score of 89.60%. The average

TE score across all regions, as depicted in Table 4.6 over the entire research period, stood at 96.20%. This finding indicated that IMFIs in the region could generate an output equivalent to 96.20% while experiencing only a 3.8% loss in resources utilised as inputs.

Scale efficiency refers to management's ability to allocate an optimal number of resources relative to the size of the bank (assets) or select a production scale that achieves the desired level of output. The scale efficiency score is higher in Java, as the number of BPRS is relatively small, with a broader scope of reach, which limits competition. This situation enables management to maximize the production scale, leading to higher profits and increased total financing.

4.1.3 Comparing The Financial and Social Efficiencies of Islamic Microfinance Institutions in Indonesia

The second research objective is to compare the Financial Efficiency (FE) and SE performance of IMF in Indonesia. This comparison involved analysing the social and financial efficiencies of IMF by considering CRS (TE), VRS (PTE) and the operational level of IMFI (SE). The study assessed the efficiency of IRBs in both generating financial revenue and reaching out to impoverished clients (social efficiency).

The research utilised an input-oriented approach, aligning with previous studies comparing IMFIs. This approach highlighted the emphasis placed by IMFI management on cost containment, particularly in managing inputs. It also acknowledged that institutions were unable to modify their production methods without potentially impacting other IMFIs. The efficiency score derived from CCR, BCC and SE methods was used to measure the financial and social performance of IMFIs. The efficiency scores for each DMU are displayed in Table 4.7.

Table 4.7 Score of Financial and Social Efficiencies in h Islamic Rural Banks in Indonesia

No.	DMU	CRS		VRS		SE		RTS
		FE	SE	FE	SE	FE	SE	
1	Adeco	0.9189	0.9810	0.9355	0.9880	0.9804	0.9925	CRS
2	Al Barokah	0.5773	0.8400	0.7575	0.9824	0.7756	0.8575	IRS
3	Al Falah	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	CRS
4	Al Hijrah Amanah	0.7661	0.6496	0.9188	0.9097	0.8312	0.7324	IRS
5	Al Ihsan	0.5664	0.6795	0.8541	0.9487	0.6846	0.7254	IRS
6	Al Mabror	0.6758	0.7487	0.8028	0.9116	0.8534	0.8170	IRS
7	Al Mabror Babadan	0.8116	0.7826	0.8580	0.7982	0.9462	0.9789	IRS
8	Al Madinah Tasikmalaya	0.7948	0.7249	0.8562	0.7805	0.9202	0.9272	IRS
9	Al Makmur	0.8996	0.8159	0.9150	0.8863	0.9836	0.9264	IRS
10	Al Ma'soem Syariah	0.7986	0.7453	0.8624	0.7958	0.9302	0.9429	DRS
11	Al Salaam Aman Salman	0.6452	0.7855	0.7106	0.8621	0.9072	0.9141	DRS
12	Al Wadi'ah	0.8069	0.8163	0.8561	0.8577	0.9466	0.9527	IRS
13	Al Washliyah	0.5380	0.6136	0.6758	0.6855	0.8078	0.8967	IRS
14	Alyaqin	0.6982	0.8599	0.9927	1.0000	0.7044	0.8599	IRS
15	Amanah Bangsa	0.9042	0.9431	0.9621	0.9745	0.9415	0.9673	CRS
16	Amanah Insan Cita	0.8784	0.7427	0.9596	0.8301	0.9185	0.9011	CRS
17	Amanah Insani	0.6018	0.5868	0.6935	0.6720	0.8901	0.8980	IRS
18	Amanah Rabbaniah	0.6417	0.8024	0.6692	0.8275	0.9549	0.9692	IRS
19	Amanah Sejahtera	0.6925	0.6345	0.7070	0.7168	0.9777	0.8875	IRS
20	Amanah Ummah	0.7577	0.7096	0.8197	0.7308	0.9242	0.9702	DRS
21	Ampek Angkek Candung	0.7819	0.8032	0.7970	0.8627	0.9808	0.9376	IRS
22	Annisa Mukti	0.5934	0.9402	0.7073	0.9624	0.8441	0.9747	IRS
23	Arta Leksana	0.5731	0.6724	0.6137	0.7555	0.9348	0.8878	IRS
24	Artha Amanah Ummat	0.7988	0.7689	0.9023	0.9535	0.8895	0.8053	IRS
25	Artha Fisabilillah	0.6190	0.6381	0.7633	0.8062	0.8202	0.7735	IRS
26	Artha Madani	0.7291	0.7881	0.7772	0.8052	0.9384	0.9807	DRS
27	Artha Mas Abadi	0.6786	0.8327	0.7279	0.9355	0.9348	0.8865	IRS
28	Artha Pamenang	0.6708	0.9420	0.6935	0.9896	0.9674	0.9518	IRS
29	Artha Surya Barokah	0.7285	0.6342	0.7480	0.6593	0.9742	0.9602	DRS
30	Asad Alif	0.7195	0.6810	0.8404	0.8232	0.8560	0.8249	IRS
31	Asri Madani Nusantara	0.8878	0.6994	0.9542	0.7569	0.9287	0.8955	IRS

Table 4.7 Continued

No.	DMU	CRS		VRS		SE		RTS
		FE	SE	FE	SE	FE	SE	
32	Attaqwa Garuda Utama	0.7174	0.8655	0.8359	0.9454	0.8599	0.9081	IRS
33	Bahari Berkesan	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	CRS
34	Baiturrahman	0.7029	0.6572	0.7144	0.6851	0.9830	0.9554	IRS
35	Baktimakmur Indah	0.9209	0.7511	0.9632	0.8782	0.9576	0.8622	DRS
36	Bandar Lampung	0.6393	0.8846	0.7374	0.9146	0.7083	0.9638	DRS
37	Bangka Belitung	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	CRS
38	Bangun Drajat Warga	0.8332	0.6949	0.9108	0.7245	0.9189	0.9618	DRS
39	Barakah Nawaitul Ikhlas	0.7065	0.8911	1.0000	1.0000	0.7065	0.8911	IRS
40	Barkah Gemadana	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	CRS
41	Barokah Dana Sejahtera	0.8635	0.8480	0.9501	0.9047	0.9085	0.9416	DRS
42	Baturridha Pusaka	0.6639	0.9383	0.6913	0.9669	0.9585	0.9709	DRS
43	Berkah Dana Fadhillah	0.9333	0.9264	1.0000	1.0000	0.9333	0.9264	CRS
44	Berkah Ramadhan	0.7736	0.6461	0.8089	0.6916	0.9515	0.9446	IRS
45	Bhakti Haji	0.6115	0.6164	0.9747	0.9468	0.6255	0.6481	IRS
46	Bhakti Sumekar	0.8963	0.8333	1.0000	1.0000	0.8963	0.8333	DRS
47	Bina Amanah Satria	0.7412	0.6400	0.7522	0.6931	0.9846	0.9242	IRS
48	Bina Amwalul Hasanah	0.8275	0.6479	0.9400	0.7902	0.8771	0.7908	IRS
49	Bina Finansia	0.7940	0.7396	0.8680	0.8651	0.9174	0.8501	IRS
50	Bina Rahmah	0.7364	0.6188	0.8002	0.7138	0.9002	0.8551	IRS
51	BPR Syariah Magetan	0.7291	0.7881	0.7772	0.8052	0.9384	0.9807	IRS
52	BPRS Aman Syariah	0.6786	0.8327	0.7279	0.9355	0.9348	0.8865	IRS
53	BPRS Bakti Artha Sejahtera Sampang	0.6708	0.9420	0.6935	0.9896	0.9674	0.9518	IRS
54	BPRS Gajah Tongga Kota Piliang	0.7285	0.6342	0.7480	0.6593	0.9742	0.9602	CRS
55	BPRS Gotong Royong	0.6980	0.4828	0.7885	0.6534	0.8860	0.7815	IRS
56	BPRS Harta Insan Karimah Kota Tegal	0.8762	0.8460	0.9475	0.9468	0.9253	0.8771	DRS
57	BPRS Harta Insan Karimah Makassar	0.5815	0.6200	0.8543	0.8235	0.6724	0.7085	IRS
58	BPRS Harta Insan Karimah Surakarta	0.8532	0.8303	0.9113	0.8618	0.9394	0.9539	DRS
59	BPRS Kota Bekasi	0.5779	0.5875	0.6717	0.6728	0.8874	0.8981	IRS
60	BPRS Kota Mojokerto	0.8005	0.6863	0.8194	0.7059	0.9750	0.9664	IRS
61	BPRS Lantabur Tebuireng	0.9372	0.9275	0.9591	0.9424	0.9773	0.9834	CRS
62	BPRS Mitra Amanah	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	CRS

Table 4.7 Continued

No.	DMU	CRS		VRS		SE		RTS
		FE	SE	FE	SE	FE	SE	
63	BPRS Mitra Harmoni Kota Bandung	0.5793	0.6043	0.7473	0.7508	0.7834	0.8103	IRS
64	BPRS Rahma Syariah	0.5276	0.5420	0.7533	0.7507	0.6998	0.7230	IRS
65	BPRS Rahmania Dana Sejahtera	0.9011	0.9149	0.9765	0.9866	0.9220	0.9281	IRS
66	Buana Mitra Perwira	0.7637	0.6528	0.8207	0.6772	0.9246	0.9647	DRS
67	Bumi Artha Sampang	0.6696	0.7131	0.6951	0.7894	0.9636	0.9015	IRS
68	Cahaya Hidup	0.9252	0.7732	1.0000	1.0000	0.9252	0.7732	CRS
69	Carana Kiat Andalas	0.7689	0.6599	0.8197	0.7174	0.9376	0.9230	IRS
70	Central Syariah Utama	0.6915	0.5938	0.8467	0.8045	0.8135	0.7217	IRS
71	Cilegon Mandiri	0.8278	0.6462	0.8471	0.6721	0.9741	0.9604	IRS
72	Daarul Hayat	0.4438	0.4419	0.8683	0.8736	0.5436	0.5405	IRS
73	Dana Amanah	0.8110	0.7142	0.9575	0.9068	0.8462	0.7902	IRS
74	Dana Hidayatullah	0.7747	0.8658	0.9073	0.9391	0.8605	0.9230	IRS
75	Dana Moneter	0.9481	0.8380	1.0000	0.9527	0.9481	0.8814	CRS
76	Dana Mulia	0.8306	0.6476	0.8656	0.7520	0.9568	0.8607	IRS
77	Danagung Syariah	0.7404	0.8827	0.7931	0.9136	0.9289	0.9652	IRS
78	Daya Artha Mentari	0.6021	0.5858	0.6717	0.6313	0.8976	0.9265	IRS
79	Dharma Kuwera	0.8010	0.6052	0.8718	0.7358	0.9163	0.8234	IRS
80	Dinar Ashri	0.9157	0.7582	1.0000	1.0000	0.9157	0.7582	CRS
81	Formes	0.7214	0.7108	0.7730	0.7672	0.9329	0.9219	IRS
82	Gala Mitra Abadi	0.7588	0.7812	0.9424	0.9719	0.7976	0.8018	IRS
83	Gayo Perseroda	0.9414	0.7972	0.9545	0.8379	0.9862	0.9516	CRS
84	Gebu Prima	0.8528	0.7157	0.9054	0.7496	0.9398	0.9492	CRS
85	Gowata	0.5020	0.8057	1.0000	1.0000	0.5020	0.8057	IRS
86	Gunung Slamet	0.9535	0.8034	0.9807	0.8404	0.9723	0.9544	DRS
87	Haji Miskin	0.9914	1.0000	0.9950	1.0000	0.9963	1.0000	CRS
88	Harta Insan Karimah	0.9854	0.9771	1.0000	1.0000	0.9854	0.9771	CRS
89	Harta Insan Karimah Bekasi	0.7833	0.8035	0.8913	0.8322	0.8837	0.9696	DRS
90	Harta Insan Karimah Parahyangan	0.8975	0.9732	1.0000	1.0000	0.8975	0.9732	DRS
91	Harum Hikmahnugraha	0.6653	0.7794	0.7002	0.8110	0.9515	0.9607	IRS
92	Hasanah	0.9942	0.9897	1.0000	1.0000	0.9942	0.9897	CRS

Table 4.7 Continued

No.	DMU	CRS		VRS		SE		RTS
		FE	SE	FE	SE	FE	SE	
93	Hikmah Wakilah	0.8766	0.9066	0.9759	0.9842	0.9007	0.9223	DRS
94	Ikhsanul Amal	0.6441	0.6088	0.8541	0.8510	0.7520	0.7148	IRS
95	Insan Cita Jaya Artha	0.7351	0.6977	0.8037	0.7540	0.8999	0.9134	IRS
96	Insan Madani	0.9467	0.7414	0.9598	0.8189	0.9865	0.8928	CRS
97	Investama Mega Bakti	0.9298	0.8769	0.9310	0.9000	0.9987	0.9683	CRS
98	Karya Mugi Sentosa	0.7237	0.6732	0.7426	0.7143	0.9703	0.9414	IRS
99	Khasanah Ummat	0.5952	0.6173	0.8602	0.9011	0.7007	0.6962	99
100	Kota Juang	0.8555	0.8797	0.9953	0.9931	0.8593	0.8857	100
101	Kotabumi	0.5586	0.9199	0.7214	0.9754	0.6882	0.9438	101
102	Lampung Timur	0.6464	0.8949	0.7320	0.9514	0.7181	0.9383	102
103	Madina Mandiri Sejahtera	0.9189	0.8231	0.9190	0.8295	0.9995	0.9906	103
104	Mandiri Mitra Sukses	0.7609	0.6609	0.7815	0.7072	0.9731	0.9398	104
105	Manfaatsyariah	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	105
106	Margirizki Bahagia	0.7854	0.8627	0.8290	0.8958	0.9504	0.9630	106
107	Mentari	0.8511	0.9018	0.8807	0.9336	0.9672	0.9665	107
108	Mentari Pasaman Saiyo	0.8295	0.8463	0.9418	0.9401	0.8789	0.9007	IRS
109	Meru Sankara	0.5792	0.6291	0.9239	0.9577	0.6327	0.6621	IRS
110	Metro Madani	0.4799	0.7464	0.5278	0.7889	0.7924	0.9535	DRS
111	Mitra Amal Mulia	0.8321	0.9559	0.8610	0.9676	0.9662	0.9867	IRS
112	Mitra Cahaya Indonesia	0.6215	0.8590	0.7336	0.9634	0.8522	0.8878	IRS
113	Mitra Harmoni Kota Malang	0.6506	0.7501	0.7331	0.7984	0.8895	0.9316	IRS
114	Mitra Harmoni Kota Semarang	0.7172	0.6643	0.8668	0.7947	0.8402	0.8349	IRS
115	Mitra Harmoni Yogyakarta	0.8662	0.9396	0.8775	0.9467	0.9862	0.9917	IRS
116	Muamalah Cilegon	0.6566	0.7232	0.7874	0.8257	0.8393	0.8749	IRS
117	Muamalat Harkat	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	CRS
118	Mulia Berkah Abadi	0.8456	0.7298	0.9461	0.8163	0.8923	0.9061	IRS
119	Musyarakah Ummat Indonesia	0.7427	0.7972	1.0000	1.0000	0.7427	0.7972	IRS
120	Niaga Madani	0.6730	0.9049	0.7642	1.0000	0.8894	0.9049	IRS
121	Patuh Beramal	0.8369	0.8526	0.9313	0.9897	0.8989	0.8621	IRS
122	PT BPRS Lampung Barat	0.6653	0.6473	0.8446	0.9635	0.6874	0.6777	CRS
123	Puduarta Insani	0.9100	0.9805	0.9325	1.0000	0.9731	0.9805	CRS
124	Rahman Hijrah Agung	0.7968	0.7901	0.8072	0.8636	0.9856	0.9208	IRS

Table 4.7 Continued

No.	DMU	CRS		VRS		SE		RTS
		FE	SE	FE	SE	FE	SE	
125	Rajasa	0.5202	0.8042	0.6240	0.8950	0.6850	0.9012	IRS
126	Rifatul Ummah	0.6116	0.6008	0.8856	0.9198	0.7069	0.6594	IRS
127	Riyal Irsyadi	0.5995	0.7655	0.6362	0.8033	0.9406	0.9504	IRS
128	Saka Dana Mulia	0.5556	0.5323	0.9012	0.8926	0.6351	0.6106	IRS
129	Sarana Prima Mandiri	0.7792	0.7278	0.8019	0.7497	0.9699	0.9655	IRS
130	Sindanglaya Katonapan	0.7848	0.9861	0.9871	1.0000	0.7963	0.9861	IRS
131	Sukowati Sragen	0.8597	0.8372	0.9905	0.9318	0.8678	0.9051	DRS
132	Suriyah	0.8336	0.7093	0.9526	0.7552	0.8765	0.9411	DRS
133	Surya Sejati	0.4988	0.9100	0.9647	0.9881	0.5212	0.9196	IRS
134	Syariat Fajar Sejahtera Bali	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	CRS
135	Taman Indah Darussalam	0.4811	0.6263	0.9312	0.9245	0.5447	0.6895	IRS
136	Tanggamus	0.5686	0.7244	0.6244	0.7777	0.7357	0.9319	IRS
137	Tanmiya Artha	0.7750	0.8169	0.9316	0.9516	0.8267	0.8578	IRS
138	Tengku Chiek Dipante	0.6475	0.6577	0.9283	0.8873	0.7095	0.7600	IRS
139	Tulen Amanah	0.8060	0.9888	1.0000	1.0000	0.8060	0.9888	IRS
140	Ummu	0.4601	0.5437	0.5477	0.5957	0.8343	0.9081	IRS
141	Unawi Barokah	0.3875	0.6818	0.9487	0.9951	0.4225	0.6852	IRS
142	Vitka Central	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	CRS
143	Wakalumi	0.5891	0.6618	0.8412	0.9429	0.7139	0.7071	IRS
144	Way Kanan	0.5822	0.8055	0.6569	0.8402	0.7154	0.9603	DRS
Average		0.7583	0.7762	0.8616	0.8724	0.8748	0.8906	DRS
Average overall efficiency score		0.7673		0.8670		0.8827		

Note: RTS stands for Rate of Returns Scale, IRS stands for Increasing Returns to Scale, CRS stands for Constant Returns to Scale and DRS stands for Decreasing Returns to Scale.

Table 4.7 outlines the average financial, social, and overall efficiency scores of each IRB, evaluated under the assumptions of CRS, VRS and SE. The estimated averages for TE, PTE and SE, following the input-oriented model, stood at 76.73%, 86.70% and 88.27%, respectively. It indicated that collectively, the IMFI sector could reduce their inputs by 12.52% without compromising their current output, encompassing revenue generation and

outreach to impoverished clients. Notably, there was a slightly higher pure technical inefficiency as compared to scale inefficiency, implying that the primary cause of the overall technical inefficiency was more associated with resource utilisation. The outcome signified managerial inefficiency (pure technical inefficiency) rather than improper operational scaling (scale inefficiency). The findings also revealed that 63.88% of IRBs exhibited economies of IRS, while 16.66% operated at the stage of DRS. These results aligned with a previous study by Ali et al. (2023).

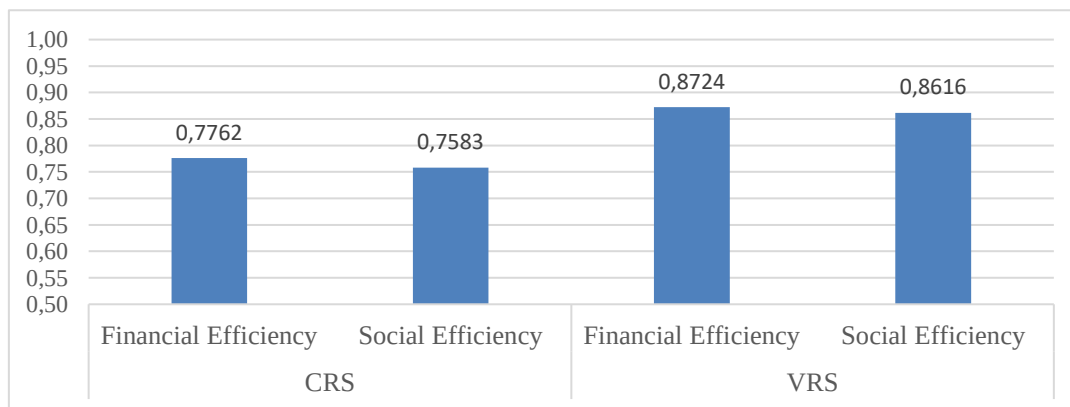


Figure 4.1 Average Scores of Financial and Social Efficiencies

The comparison of scores between financial and social performance is illustrated in Figure 4.1, which displays the average efficiency score for Indonesia's IRB sector from 2012 to 2021, estimated under CRS and VRS assumptions. This comparison summarised and contrasted the mean average financial and social efficiency scores. The average FE, calculated under CRS, reached 86%, whereas it was 92% under VRS. Meanwhile, the average SE, calculated assuming CRS, reached 84%, while it was 90% under VRS. Consequently, the average FE score surpassed the social efficiency score for both CRS and VRS estimates, suggesting that the financial performance of IRBs in Indonesia outweighed their social performance concerning the dual bottom line of IMF. This outcome aligned with research by Abate et al. (2014) and Wasiaturrahma et al. (2020), indicating a trade-off

between outreach to impoverished populations and cost efficiency, leading many MFIs to prioritise FE over social impact.

The subsequent step involved comparing the financial and social efficiency scores throughout the observation period from 2012 to 2021. This process evaluated individual IMFIs in Indonesia against their peers. The findings are presented in Table 4.8, illustrating the FE score alongside TE, represented by CRS and purely considering VRS. Table 4.9 outlines TE, PTE, FE and social efficiency.

Table 4.8 Scores of Financial and Social Efficiencies of Islamic Microfinance Institutions in Indonesia 2012–2021

Period	Financial Efficiency (FE)			Social Efficiency (SE)		
	TE (CRS)	PTE (VRS)	SE	TE (CRS)	PTE (VRS)	SE
2012	0.7729	0.8816	0.8768	0.7209	0.8331	0.8653
2013	0.7973	0.8961	0.8897	0.7296	0.8466	0.8618
2014	0.7818	0.8759	0.8926	0.7388	0.8304	0.8897
2015	0.8210	0.9031	0.9091	0.7667	0.8732	0.8780
2016	0.7702	0.8825	0.8728	0.7260	0.8504	0.8537
2017	0.7538	0.8697	0.8668	0.7663	0.8836	0.8672
2018	0.7681	0.8521	0.9014	0.7791	0.8761	0.8893
2019	0.7873	0.8622	0.9132	0.7868	0.8727	0.9015
2020	0.7427	0.8385	0.8858	0.7918	0.8810	0.8988
2021	0.7666	0.8620	0.8894	0.7772	0.8689	0.8945
Average	0.7762	0.8724	0.8898	0.7583	0.8616	0.8800

Table 4.9 presents empirical results suggesting that, on average, IRBs exhibited relatively lower FE. This finding indicated a need for further effort in optimising the available resources to achieve their objectives effectively. These analyses denoted that the average financial and social efficiency of all IRBs during the study period stood at 0.7762

and 0.7583, respectively, assuming CRS.

Additionally, when considering VRS, the average FE during the same period increased to 0.8724, while social efficiency reached 0.8616. Notably, for IMFIs, the average FE surpassed the average social efficiency, with scores of 0.8898 and 0.8800, respectively, under the variable scale performance metrics.

The divergence between the efficiency scores of CRS and VRS suggested the likelihood of economies of scale in the sector. This study computed the economies of scale ($SE = CRS / VRS$) to identify the specific type of SE prevalent in this data derived from the TE scores (CRS and VRS). Table 4.7 displays the mean VRS scores compared to SE, revealing a clear predominance of pure technical inefficiency over scale inefficiency in determining the technical efficiency for the observed period. There was a notable decline in the average financial and social efficiencies in 2020–2021, potentially attributed to the impact of the COVID-19 pandemic.

The next step was to assess and compare the efficiency scores across different provinces. This process evaluated each IMFI in Indonesia concerning their peers. The results are depicted in Table 4.9. The average TE score for each province in this study highlighted nine IMFI provinces achieving a perfect efficiency score of 1, namely South Sumatra, Bengkulu, Bangka Belitung, Riau Islands, Bali, Central Kalimantan, South Kalimantan, East Kalimantan and North Maluku. Conversely, three provinces registered the lowest TE scores: Central Java (0.702), West Java (0.716) and East Java (0.723).

The average TE to FE ratio for IMFI throughout the study period was 0.8880, indicating that these institutions achieved 88.80% of the output they could have potentially produced with the input utilised, resulting in a loss of 11.20% of resources. Similarly, the

average TE to social efficiency ratio was 0.8704, signifying that IMFI reached 87.04% of potential output, incurring a loss of 12.96% in resources (Table 4.9).

As indicated in Table 4.9, the study observed that the average social and TE score of 87.04% suggested that these IMFIs followed the practice of *qardh hasan*, an Islamic contract whereby no interest or margin is charged to borrowers. Borrowers repay only the borrowed amount, enabling IMFIs to cover their operations solely through voluntary donations. These findings aligned with the direction of the study conducted by Widiarto and Emrouznejad (2015) regarding IMFI practices in Pakistan.

Table 4.9 presents a comparative analysis of financial and social efficiency at the regional level. The comparison revealed that PTE consistently surpassed TE for both financial and social performance. The average TE scores were 91.30% for financial performance and 84.40% for social performance. Meanwhile, the score for PTE indicated 97.20% for financial performance and 96.30% for social performance.

Table 4.9 Financial and Social Efficiency Scores of Islamic Microfinance Institutions of Indonesia at Regional Level

Region	Financial Efficiency			Social Efficiency		
	TE	PTE	SE	TE	PTE	SE
Sumatera	0.913	0.956	0.953	0.890	0.941	0.940
Jawa	0.747	0.847	0.881	0.746	0.847	0.882
Bali and Nusa Tenggara	0.933	0.998	0.935	0.926	0.989	0.936
Kalimantan	1.000	1.000	1.000	1.000	1.000	1.000
Sulawesi	1.000	1.000	1.000	1.000	1.000	1.000
Average	0.913	0.972	0.937	0.844	0.960	0.875

In addition, Table 4.10 highlights that the financial and social performance of IMFIs in regions outside Java achieved a perfect score of 100%, specifically in Kalimantan and

Sulawesi. Conversely, the lowest scores were observed for IMFIs in the Java region, indicating a financial performance at 74.70% and social performance at 74.60%. Moreover, an evident trend apparent from the table is that, except for Kalimantan and Sulawesi, all financial performance scores surpassed social performance scores, although the disparity in scores was notably insignificant.

4.1.4 Discussion of the Results

The research findings indicated that the average TE observed in IMFIs primarily stemmed from technical inefficiencies alone. This outcome pointed to suboptimal output production, including a deficit in fundraising efforts. Amongst the 144 IMFIs scrutinised in this study, only 12 exhibited notably high efficiency levels. Those with lower efficiency levels demonstrated reduced TE and PTE, often attributed to deficient management, inadequate human resource quality and insufficient funding. As a recommendation, optimising inputs and increasing outputs in IMFIs with lower efficiency levels is advised. This effort could involve acquiring additional capital from external sources to enhance profitability. The study also holds significance by offering insights into how IMFIs can strive for financial independence and sustainability, particularly by optimising efficiency levels.

Most research emphasised that IMFIs operate on a framework that provides interest-free loans to their target audience, with repayments made within stipulated periods without interest charges. Sharpe (1995) underscored the primary objectives of IMFIs, focusing on poverty alleviation and the enhancement of social well-being amongst underprivileged communities. These institutions play a pivotal role in fostering job creation and supporting project development. Additionally, Obaidullah (2008) highlighted the importance of incorporating *zakat* and *sadaqah* contributions to bolster funding sources and amplify social impact on impoverished communities.

Research findings indicate that inefficiencies in Islamic Rural Banks (IRBs), largely arise from deficiencies in variables of inputs such as the number of assets and operational costs. Inefficiency in IRBs can be attributed to the inability to fully utilize available resources to generate optimal outputs. For instance, an inadequate asset base limits the institution's ability to scale its financing activities, thereby hindering its capacity to reach a larger number of clients and deliver sustainable financial services (Hermes & Lensink, 2011). Without sufficient assets, MFIs struggle to meet the demand for loans, particularly in underserved regions, further exacerbating financial exclusion and reducing the potential impact on poverty alleviation.

Operational costs play a significant role in determining the efficiency of an MFI. High operational costs, such as those related to personnel, administrative expenses, and infrastructure, reduce profitability and sustainability (Cull, Demirgüç-Kunt, & Morduch, 2007). In the Indonesian context, operational inefficiencies have been found to stem from the relatively high costs of running microfinance programs, particularly in remote areas where infrastructure is limited. As a result, these higher costs hinder the ability of MFIs to offer competitive pricing and reach a broader market.

In Indonesia, IRBs must strike a balance between minimizing operational costs and ensuring adequate resource allocation for growth. The deficiencies in assets and operational inefficiencies lead to higher costs per borrower, which can impact the overall financial sustainability of the institution. Research by Hassan and Sanchez (2009) highlights that MFIs with better resource allocation and cost management practices tend to perform better in terms of both financial and social outcomes.

Multiple studies conducted by Wasiaturrahma (2020) and Risfandy and Pratiwi (2022) suggested that MFIs still exhibit some degree of inefficiency when assuming CRS.

Furthermore, certain effective MFIs do not operate with constant technology returns, expecting variable returns instead. This finding indicated inefficiencies at the scale and posed a significant issue of size for certain organisations, negatively impacting their effectiveness and subsequently impeding their capacity to alleviate poverty. The research findings implied that MFIs in Indonesia prioritise their financial goals over social goals. This study endeavoured to answer the fundamental question of what drives the objectives—social or financial—of Indonesian MFIs. In fact, considering varying returns to scale, the average difference between the social and financial performance of IRBs was 0.0108 (0.8724 - 0.8616). These conclusions were consistent when assuming CRS, with the average difference for IRBs expanding to 0.0179 (0.7762 - 0.7583).

Although variations between the two hypotheses may be due to diverse reasons, such as external environmental factors or internal MFI characteristics, this study highlighted that investors who lack social responsibility mainly utilise private funding sources. Consequently, microfinance has undergone substantial transformations in Indonesia and globally in recent years, shaped by numerous crises that have posed challenges to sustainability. These IRBs have dedicated considerable efforts to adopt a set of “good practices” to boost their efficiency and attract private investors, driven by a profitability rationale, considering financial independence as the primary criterion aligning with social goals. Nevertheless, it is crucial to interpret the findings of this investigation carefully. Due to data limitations, a proxy measure (total financing) was used to assess social performance, which inadequately captured the multidimensional nature of this concept. Therefore, this measurement failed to accurately portray the role of MFIs in poverty alleviation, warranting further studies with richer, more comprehensive data.

In conclusion, the calculation of TE by using the DEA approach in MFIs revealed

their ongoing inefficient performance in the production approach, as identified by Widiarto and Emrouznejad (2015) and Risfandy et al. (2016). Institutions need to secure funding to enhance production efficiency. Across all provinces in this study, varying efficiency scores were observed, notwithstanding their geographical locations, as it has been demonstrated that a higher concentration of IMFIs in a city corresponded to greater potential utilisation. Enhanced city infrastructure contributed to improved institutional performance. Moreover, variations in efficiency scores were linked to the number of IMFIs in a province. In comparison to Java, IMFI showed greater effectiveness in provinces outside Java, which was associated with concentration and competition from similar institutions (Trinugroho et al., 2018).

Furthermore, the efficiency performance of IMF in Indonesia, assessed using the non-parametric DEA technique, depicted IMFI efficiency levels. The empirical analysis of 144 IRBs' data collected from 21 provinces between 2012 and 2021 underscored that financial performance held more prominence than social performance. Moreover, the efficiency score signified that IMFI earnestly considered sustainability and social objectives. This slight disparity between financial and social performance based on various scale assumptions emphasised the prominence of the "institutionalist" school of thought governing industrial activity in Indonesia and beyond. Meanwhile, religious aspects explained IMFIs' societal influence.

4.2 Measuring the Effectiveness of Islamic Microfinance towards Poverty Alleviation

The third objective of this study is to assess the effectiveness of IMF in alleviating poverty in Indonesia. As a fundamental component of this evaluation, the research relied on extensive data pertaining to IRBs (BPRS) within the Indonesian context. The dataset

comprised information gathered from 144 Islamic rural banks situated across 21 provinces in Indonesia. This comprehensive dataset spanned from 2012 to 2021 and encompassed data at both the bank and provincial levels. The study integrated information from various sources, including provincial-level data sourced from the Indonesia Statistics Bureau (BPS), the dataset on Indonesian rural banking provided by the Indonesia Financial Services Authority (OJK) and specific data obtained from IRBs. For detailed information regarding the definition of each variable utilised in this study, please refer to Table 3.5.

4.2.1 Descriptive Statistics

Sekaran and Bougie (2016) suggested for utilising descriptive statistics as a means to succinctly summarise extensive datasets. These statistics offer a powerful way to comprehend and compare data by presenting essential information, including data distribution, central tendency and data dispersion. In the context of this study, various research variables were considered, such as poverty headcount (depicted as “Pov”), total financing, risk financing, financial efficiency score, social efficiency score, GDP growth and inflation rate at the provincial level.

Referring to Table 4.10, the Pov variable signified the poverty headcount, reflecting the percentage of rural population living below the national poverty line. The dataset comprised 1,441 observations. The average poverty headcount was recorded at 10.81%, with a standard deviation of 3.19. The lowest recorded poverty headcount stood at 3.61%, while the highest was at 18.58%. Regarding the TF of IRBs, the dataset contained 1,436 observations. On average, the total loans amounted to IDR 46,600,000, with a standard deviation of 93,400,000. The minimum total loan value was recorded at 0, while the maximum reached 1,130,000,00.

Table 4.10 Descriptive Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
Pov	1,441	10.81476	3.197163	3.61	18.58
TF	1,436	46,600,000	93,400,000	0	1,130,000,000
Risk	1,388	9.457695	10.76305	0	96.81
FE	1,441	.7761717	.1477053	.0729997	1
SE	1,441	.7584257	.1395464	.1027319	1
grGDP	1,440	4.452958	2.701171	-9.34	21.76
Inf	1,439	3.228659	2.505078	.05	11.58

The variable “Risk” signified the non-performing financing (NPF) of IRBs, with 1,388 observations available. On average, non-performing loans amounted to 9.457%, exhibiting a standard deviation of 1.076. The lowest recorded non-performing loan value stood at 0, while the highest reached 96.81.

Moving to the variable FE score and comprising 1,441 observations, the average score hovered around 0.77, showing a standard deviation of 0.14. The minimum score observed was 0.07, while the maximum was 1. The variable social efficiency score also consisted of 1,441 observations. The average social efficiency score was approximately 0.75, with a standard deviation of 0.13. The lowest score recorded was 0.10, while the highest was 1.

The regional grGDP at the provincial level encompassed 1,440 observations. On average, the GDP growth rate was around 3.22%, with a standard deviation of 2,701,171. The lowest growth rate stood at -9.34, indicating a decline in GDP, while the highest recorded growth rate was 21.76. Finally, the inflation rate (inf) at the provincial level

incorporated 1,439 observations. The average inflation rate was approximately 3.22%, showing a standard deviation of 2.50. The minimum inflation rate observed was 0.05, while the maximum reached 11.58. These descriptive statistics offered a comprehensive view of the variables' distribution and variability within the dataset, laying the groundwork for comprehending their characteristics and evaluating potential relations for subsequent analyses.

4.2.2 Result of Data Panel Regression

The regression model integrated two sets of control variables: one encompassing IRB-specific elements at the bank level and another comprising macroeconomic factors to address provincial-level variations. The bank-level factors consisted of FE and social efficiency SE scores, elucidating differences in efficiency levels, while NPL disclosed financing risks.

The second set involved provincial macroeconomic parameters, including inf and grGDP. Additionally, the factor in the bank's geographical location distinguished whether it operated in Java or elsewhere. Java, being Indonesia's most populous island and a significant economic centre, hosts a higher concentration of BPRS than any other region across the nation, evident in Table 4.11. This study stratified the sample into Java and non-Java segments (utilising the dummy variable "Reg") and number of Muslim population (utilising the dummy variable "MPOP") to scrutinise regional disparities, employing equations that parallel one another in their structure and analysis.

Table 4.11 Number of IRB by Provinces, Regions and Percentage of Muslims

Province	Total Per Province	Percentage	Regions (Java or non-Java)	Percentage of Muslims
Aceh	9	6.25	Non-Java	0.99
Sumatera Utara	7	4.86	Non-Java	0.68
Sumatera Barat	7	4.86	Non-Java	0.98
Riau	2	1.39	Non-Java	0.87
Sumatera Selatan	1	0.69	Non-Java	0.97
Bengkulu	1	0.69	Non-Java	0.98
Lampung	9	6.25	Non-Java	0.97
Kep. Bangka Belitung	1	0.69	Non-Java	0.89
Kep. Riau	1	0.69	Non-Java	0.77
Jawa Barat	26	18.06	Java	0.95
Jawa Tengah	26	18.06	Java	0.99
DI Yogyakarta	11	7.64	Java	0.93
Jawa Timur	21	14.58	Java	0.98
Banten	8	5.56	Java	0.93
Bali	1	0.69	Non-Java	0.10
Nusa Tenggara Barat	3	2.08	Non-Java	0.98
Kalimantan Tengah	1	0.69	Non-Java	0.73
Kalimantan Selatan	1	0.69	Non-Java	0.97
Kalimantan Timur	1	0.69	Non-Java	0.87
Maluku Utara	1	0.69	Non-Java	0.76
Sulawesi Selatan	6	4.17	Non-Java	0.91
Average				0.87

Table 4.11 presents data on the distribution of Islamic Rural Banks (IRBs) across various provinces in Indonesia, categorized by regions (Java or non-Java) and the percentage of Muslims in each province. The table shows that IRBs are more concentrated in Java, with provinces like West Java and Central Java having the highest number of IRBs (26 each, 18.06%). These regions also exhibit high percentages of Muslim populations, with West

Java at 95% and Central Java at 99%, which aligns with the religious nature of Islamic banking.

In non-Java regions, the distribution of IRBs is more dispersed, with smaller numbers spread across provinces. For example, provinces like Aceh, Lampung, and North Sumatra have relatively higher numbers of IRBs (ranging from 6.25% to 4.86%), and their Muslim populations are also predominantly high, with Aceh reporting 99%. However, there are provinces such as Bali, with a very low percentage of Muslims (10%) and only one IRB (0.69%), reflecting a limited presence of Islamic banking in areas with smaller Muslim populations.

The mean percentage of Muslims across all provinces in the table is 87%, indicating that the presence of IRBs is strongly correlated with the size of the Muslim population in each region. Regions with higher percentages of Muslims tend to have more IRBs, especially in Java, where most provinces show both a high concentration of IRBs and a large Muslim population. This suggests that Islamic banking services are more prevalent in areas where there is a higher demand for Sharia-compliant financial products.

Table 4.12 deliniates the baseline regression results examine the relationship between total financing (TF), bank-specific variables, and poverty (pov) in the context of both OLS, Fixed Effects (FE), and Random Effects (RE) models. These models provide insights into how financial factors and macroeconomic conditions (grGDP and inf) influence poverty levels, with notable differences across models.

Table 4.12 Baseline Regression

	OLS (1) Pov	FE (2) Pov	RE (3) Pov
Total Financing	-0.0000000397*** (-4.65)	-0.00000000654* (-2.58)	-0.00000000642** (-2.65)
Risk	0.0313*** (4.25)	0.00833* (2.04)	0.00866* (2.13)
Financial Efficiency	-0.454 (-0.95)	0.745* (2.20)	0.719* (2.15)
Social Efficiency	-1.279** (-2.88)	-0.716** (-3.08)	-0.728** (-3.14)
Growth GDP	-0.110** (-2.76)	-0.00248 (-0.27)	-0.00354 (-0.39)
Inflation	0.195*** (5.25)	0.186*** (14.60)	0.186*** (14.36)
Constant	11.95*** (27.07)	10.47*** (40.93)	10.50*** (30.81)
Observation	1336	1336	1336
No of IRBs	144	144	144
R ²	0.0676		
R2 within		0.3035	
R2 overall			0.0463
Haussman Test FE vs. RE			
Chi ²			322.34
p-value			0.000

Notes: ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

The first phase involved model selection between fixed and random effects utilising the Hausman test. This test evaluated and determined the preferable model for panel data regression between fixed effects and random effects. After estimating the panel data regression models using both fixed and random effects, the subsequent step included conducting the Hausman test to ascertain the superior model (Gujarati & Porter, 2012). The ensuing outcomes are presented below:

Table 4.13 Hausman Test Result

Models		Chi Sq. Statistics	Prob	Sig.
Linear	Regression	342.23	0.000	***
(OLS)				
Fixed Effect (FE)		54.88	0.000	***
Random Effect (RE)		322.34	0.000	***

Notes: *** significant at 0.01

The outcomes of the Hausman Test in Table 4.13, displaying a probability value of 0.000 across all models, indicated a significant distinction. This outcome inferred that fixed effects should be considered over random effects in the baseline regressions, as detailed in Table 4.13. A substantial chi-square value denoted the inconsistency of random effects.

Aligning with this expected outcome from the baseline regression, the subsequent results from Table 4.13 are as follows:

a. Total Financing (TF):

In all models (OLS, FE, and RE), total financing (TF) has a negative and significant impact on poverty. Specifically, the OLS model shows a highly significant negative coefficient (-0.0000000397, $t = -4.65$, ***), indicating that an increase in total financing correlates with a reduction in poverty. The FE model also demonstrates a significant but smaller negative coefficient (-0.00000000654, $t = -2.58$, *), and the RE model similarly shows a significant negative effect (-0.00000000642, $t = -2.65$, **). These results support the hypothesis that total financing (TF) can alleviate poverty, aligning with prior research that emphasizes the role of financial resources in improving living standards and reducing economic hardships.

b. Non-Performing Financing (risk):

The risk variable is positively and significantly associated with poverty across all models, with the OLS model showing the highest significance (coefficient = 0.0313, $t = 4.25$, ***). This indicates that higher levels of non-performing loans increase poverty, likely due to the financial instability that such loans introduce to the banking sector. Both the FE and RE models also report positive and significant coefficients, though at lower magnitudes (FE: coefficient = 0.00833, $t = 2.04$, *; RE: coefficient = 0.00866, $t = 2.13$, *), highlighting the need for effective risk management to mitigate the adverse effects of financial distress on poverty levels.

c. Financial Efficiency (FE):

Financial efficiency has mixed results across the models. In the OLS model, the coefficient is negative but not significant (-0.454, $t = -0.95$), suggesting no strong evidence that financial efficiency directly reduces poverty. However, in the FE and RE models, financial efficiency shows a significant positive relationship with poverty (FE: coefficient = 0.745, $t = 2.20$, *; RE: coefficient = 0.719, $t = 2.15$, *), implying that in certain contexts, increased financial efficiency may not necessarily contribute to poverty reduction, potentially due to efficiency gains being retained within the financial sector rather than distributed to broader economic actors.

d. Social Efficiency:

Social efficiency consistently shows a negative and significant impact on poverty across all models, suggesting that banks with higher social efficiency—those that prioritize social objectives alongside financial goals—help reduce poverty. The OLS model reports a coefficient of -1.279 ($t = -2.88$, **), while the FE and RE models report coefficients of -0.716 ($t = -3.08$, **) and -0.728 ($t = -3.14$, **), respectively. These results underscore the

importance of socially responsible banking practices in addressing poverty.

e. Macroeconomic Variables (GDP growth and inflation rate):

The impact of GDP growth on poverty is negative and significant in the OLS model (coefficient = -0.110, $t = -2.76$, **), indicating that higher economic growth is associated with lower poverty levels. However, the effect becomes insignificant in both the FE and RE models, suggesting that the relationship between growth and poverty may be more complex and influenced by regional or institutional factors.

Inflation consistently shows a positive and significant impact on poverty across all models, with the OLS model showing a coefficient of 0.195 ($t = 5.25$, ***), and similar results in the FE and RE models (FE: coefficient = 0.186, $t = 14.60$, ***; RE: coefficient = 0.186, $t = 14.36$, ***). This result is consistent with economic theory, as inflation erodes purchasing power, disproportionately affecting low-income households and increasing poverty.

In the baseline regression, all provincial-level variables have a significant impact on poverty, suggesting that regional differences matter for Islamic rural bank financing. We then investigate the effect of other provincial characteristics: the percentage of the Muslim population (PMPOP) and bank location (Java and non-Java).

Table 4.14 The Impact of Location (Java and Non-Java) and Muslim Populotion on Poverty

	Location		MPOP	
	Java	Non-Java	High	Low
Total Financing	-0.00000000616*	-0.00000000698*	-0.00000000645*	-0.0000000163*
	(-2.01)	(-2.48)	(-2.55)	(-3.02)
Risk	0.00942	0.00759	0.00852	0.0108
	(1.64)	(1.42)	(1.90)	(1.75)
Financial Efficiency	1.120*	0.0485	0.766*	0.0530
	(2.35)	(0.13)	(2.15)	(0.07)
Social Efficiency	-0.990*	-0.570	-0.719**	-0.308
	(-2.39)	(-1.92)	(-2.98)	(-0.51)
Growth GDP	-0.0300*	0.0268**	-0.00371	0.0116
	(-2.44)	(2.89)	(-0.37)	(0.49)
Inflation	0.225***	0.135***	0.191***	0.115***
	(12.55)	(8.31)	(13.69)	(5.52)
Constant	10.45***	10.90***	10.68***	8.228***
	(31.36)	(26.99)	(40.54)	(11.01)
Observation	842	494	1231	105
No of IRBs	89	52	129	11
R2 within	0.3126	0.3318	0.304	0.329

Notes: ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

The regression results explore the impact of location (Java versus Non-Java) and the percentage of the Muslim population on total financing, bank-specific variables, and macroeconomic factors. This analysis helps understand the regional disparities in financing and how the Muslim population affects the operations of Islamic Rural Banks (IRBs) in Indonesia.

a. Total Financing and Location

In both Java and Non-Java regions, total financing shows a significant negative impact on poverty, with stronger effects in non-Java regions. In Java, the coefficient is -0.00000000616 ($t = -2.01$, *), while in non-Java, it is -0.00000000698 ($t = -2.48$, *),

indicating that increased financing reduces poverty in both areas, but the effect is more pronounced in non-Java. This could be due to the relative scarcity of financial resources in non-Java regions, making additional financing more impactful for poverty alleviation. Similarly, when analysing the effect by Muslim population size, both high and low Muslim population regions demonstrate significant negative impacts of financing on poverty, with the largest effect in low Muslim population areas (-0.0000000163 , $t = -3.02$, *). This suggests that Islamic financial services are effective in reducing poverty across different demographic contexts, although their impact is stronger where financial access is more limited.

b. Bank-Specific Variables

For bank-specific variables, the results vary between Java and Non-Java regions. The Non-Performing Finance (Risk) variable shows a positive association with poverty in both regions, though it is not statistically significant in either case (Java: coefficient = 0.00942 , $t = 1.64$; non-Java: coefficient = 0.00759 , $t = 1.42$). This indicates that higher levels of non-performing loans in Islamic Rural Banks slightly increase poverty, though the effect is modest.

c. Financial and Social efficiency

There is a significant positive impact on poverty in Java (coefficient = 1.120 , $t = 2.35$, *), suggesting that increased financial efficiency does not necessarily translate into poverty reduction. In non-Java, the relationship is insignificant, indicating that efficiency gains may not be as relevant for poverty outcomes in less financially developed regions.

Social efficiency shows a consistent negative impact on poverty, though the effect is more significant in Java. In Java, the coefficient is -0.990 ($t = -2.39$, *), while in non-Java, the coefficient is -0.570 ($t = -1.92$), and not statistically significant. This suggests that Islamic

banks with higher social efficiency—those that prioritize social objectives—are more effective at reducing poverty, particularly in more developed regions like Java. In regions with a higher percentage of Muslims, social efficiency also plays a critical role, with a significant negative impact in areas with a high Muslim population (-0.719 , $t = -2.98$, **). These results reinforce the idea that socially responsible banking can contribute meaningfully to poverty alleviation, especially in regions where there is greater alignment with Islamic principles.

d. Macroeconomic Variables and Inflation

The effect of regional economic growth on poverty varies between Java and Non-Java. In Java, economic growth has a small but significant negative effect on poverty (coefficient = -0.0300 , $t = -2.44$, *), while in non-Java, the relationship is positive but not significant (coefficient = 0.0268 , $t = 2.89$, **). This indicates that growth-driven poverty reduction is more prominent in Java, possibly due to stronger institutional frameworks and economic opportunities. Inflation shows a significant positive effect on poverty across all regions (Java: coefficient = 0.225 , $t = 12.55$, ***; non-Java: coefficient = 0.135 , $t = 8.31$, ***), reinforcing the notion that inflation disproportionately affects the poor by eroding purchasing power.

The regression analysis highlights that location (Java vs. Non-Java) and the percentage of the Muslim population play critical roles in the effectiveness of Islamic financial services in reducing poverty. Total financing has a stronger impact in non-Java regions and areas with a lower Muslim population, suggesting that financial interventions are particularly crucial in regions with limited access to financial resources. Bank-specific factors, such as financial efficiency and social efficiency, show varied impacts, with social efficiency emerging as a key factor in poverty reduction, particularly in regions with a higher

Muslim population.

4.2.3 Discussion of The Results

The outcomes derived from this regression analysis offered profound insights into the intricate relation between poverty and several independent variables, such as Total Financing (TF) sourced from IRBs, Risk, FE indicative of sustainability, Social Efficiency representing outreach, and macroeconomic controls, grGDP and inflation rate (Inf). This discussion contextualised these findings within the existing realm of research and acknowledged the nuances unique to this study.

a. Total Financing and Poverty Alleviation

The discoveries aligned with prior research that underscored the fundamental role of credit access in alleviating poverty (Morduch, 1999; Karlan & Morduch, 2010). The inverse correlation between TF and poverty levels emphasised the significance of improving financial inclusivity and broadening credit accessibility, especially through IRBs. This resonance echoed the broader objectives of microfinance programmes and initiatives aimed at empowering marginalised communities (Banerjee et al., 2013). The negative effect of Total Financing (TF) on poverty can be explained by several key factors. First, even though increased access to financing generally helps reduce poverty, the way these loans are utilized plays a crucial role. In many cases, borrowers may use loans for survival needs (e.g., food, healthcare, necessities) rather than investing in productive ventures. As a result, the loans do not generate sufficient returns to support repayment, leading to higher default rates and a worsening financial situation for the borrower. This misallocation of loan funds is a common issue in microfinance, especially among poorer borrowers, who may lack the financial literacy to invest wisely or may be in such a dire

economic situation that survival takes precedence over business development (Khandker, 2005).

Another contributing factor is the inefficiency within MFIs themselves. Poor management practices, inadequate oversight, and inefficient allocation of resources can lead to suboptimal loan disbursement practices, further compounding the issue. If MFIs are inefficient in selecting, monitoring, and supporting their borrowers, the likelihood of loan misuse and default increases. Therefore, despite increasing the total volume of financing, these inefficiencies reduce the overall impact on poverty reduction. As Karim, Tarazi, and Reille (2010) point out, inefficiencies in microfinance operations often result in limited outreach and suboptimal performance, which could explain the observed negative effects of Total Financing on poverty.

b. Risk Financing and Poverty Alleviation

The positive link between non-performing loans (risk) and poverty levels reaffirmed concerns raised in earlier studies (Beck et al., 2004; Clarke et al., 2006). It underscored the pivotal role of effective risk management within IRBs to mitigate the adverse impact of non-performing loans on both financial stability and poverty levels. This outcome pointed out the significance of prudent lending practices and strategies for loan recovery, as emphasised by regulatory bodies like the Basel Committee on Banking Supervision (2006).

According to descriptive statistic average of non-performing financing as a proxy of risk Islamic Rural Bank 9.45. it is high and can implies possible that non-performing loans (NPLs) affect poverty positively because individuals living in poverty may use loans primarily for survival needs rather than business development. Studies have shown that when loans are used to cover necessities such as food, healthcare, or housing, rather than being

invested in income-generating activities, the borrower's ability to repay the loan is compromised. As a result, the risk of default increases, contributing to higher NPLs, which in turn perpetuates the cycle of poverty (Khandker, 2005). This misallocation of loan funds for non-productive purposes is a common issue in microfinance, especially in contexts of extreme poverty where short-term survival takes precedence over long-term investments.

In the context of Islamic microfinance, the intent is to promote both economic development and social welfare by offering financial services to underserved populations. However, if borrowers are unable to invest in productive assets and instead use loans to address immediate needs, the intended outcomes—such as poverty alleviation and business growth—are not realized. This creates a situation where NPLs rise, as borrowers struggle to generate sufficient returns to repay the loan. Research by *Karim, Tarazi, and Reille (2010)* highlights that this pattern is especially prevalent in microfinance programs targeting poor communities, where loans are more often diverted to non-business-related expenditures.

For microfinance, including Islamic finance, to effectively reduce poverty, it is critical that loans be used for productive purposes. According to *Hermes and Lensink (2011)*, microfinance programs that lack proper oversight or support often see higher default rates when loans are used for consumption rather than income-generating activities. This results in a positive relationship between NPLs and poverty, as seen in the regression results. Borrowers who are unable to invest their loans productively are more likely to default, further entrenching them in poverty.

To address this issue, Islamic financial institutions can implement more targeted interventions such as financial education, flexible repayment schemes, and enhanced monitoring to ensure that loans are used for productive ventures. *Obaidullah and Khan (2008)* argue that financial literacy programs and proper loan structuring, particularly in

Islamic microfinance, can significantly reduce default rates and help ensure that loans contribute to sustainable economic development rather than being used for short-term survival.

c. Financial and Social Efficiencies

The divergent outcomes regarding FE and social efficiency SE in this study resonated with existing literature recognising the context-driven nature of these variables (Demirgüç-Kunt & Klapper, 2013; Fisman & Love, 2007). The inverse correlation between FE and poverty in non-Java regions implied the potential for optimising resource allocation within IRBs to alleviate poverty in these specific areas. The varying effects observed across different models and regions underscored the necessity for further exploration into the precise mechanisms through which FE and social efficiency influenced poverty outcomes.

The findings derived from this regression analysis offered insights into the nuanced roles played by financial performance (FE) and social performance (social efficiency) within IRBs, impacting poverty reduction in Indonesia. These results provided context and complement previous studies exploring the correlation between financial institutions, social outreach and poverty alleviation in the Indonesian landscape.

This investigation presented mixed outcomes concerning the influence of financial performance (FE) on poverty levels. Particularly, the enhancement of FE correlated with reduced poverty rates in non-Java regions. This result suggested that optimising resource allocation and achieving enhanced financial sustainability within Islamic Rural Banks could potentially enhance poverty reduction outcomes in these specific regions. This finding aligned with prior research emphasising the potential role of well-managed financial institutions in contributing to poverty alleviation (Erlando et al., 2020).

It is crucial to recognise the context-specific nature of the relation between FE and poverty. Instead of pursuing FE in isolation, it should be part of a comprehensive strategy that considers the distinct requirements and circumstances of the communities served by IRBs. Previous research highlighted that the impact of FE on poverty alleviation varied based on factors like the bank's scale, economic milieu and the targeted clientele (Wasiaturrahma et al., 2020).

Similarly, this study presented diverse findings concerning the link between social performance (social efficiency) and poverty. While the outcomes were not uniform across models and regions, they underscored social efficiency's significance in the poverty reduction equation. In specific cases, bolstering social efficiency within IRBs was associated with decreased poverty rates. Social efficiency embodied the bank's outreach to underserved segments and its dedication to social responsibility.

Previous studies underlined the critical role of social efficiency in aligning financial institutions' objectives with broader poverty reduction and social inclusion goals (Akbar & Nabiha, 2019). Social efficiency encompasses endeavours to reach marginalised communities, offer financial literacy and facilitate access to essential services. It provides a pathway for IRBs to contribute to enhancing the welfare of vulnerable populations.

These findings emphasised the importance of adopting a balanced approach that considers both financial performance (FE) and social performance (social efficiency) within IRBs. Policymakers and bank administrators need to realise that FE and social efficiency are not mutually exclusive but rather complementary facets of bank operations. Efforts to enhance financial sustainability should be coupled with strategies promoting inclusive financial services and social responsibility.

d. Macroeconomic Controls

The examination of the relation between regional growth of grGDP and inflation rate (inf) concurred with established economic tenets. The inverse correlation between grGDP and poverty aligned with prior research highlighting economic growth's role in poverty reduction (Ravallion & Chen, 2007). Conversely, the positive link between inf and poverty emphasised the significance of adept monetary policy to mitigate inflation's adverse effects on impoverished individuals (Khan & Senhadji, 2001).

e. Location (java and non-Java) and Muslims Population

The regression results reveal significant regional differences between Java and Non-Java in the impact of total financing on poverty reduction. In both regions, total financing has a negative and significant effect on poverty, though the effect is slightly stronger in non-Java, indicating that additional financing may have a more pronounced impact in areas with less access to financial services. This suggests that regions with lower financial infrastructure, like non-Java, benefit more from increased financing. Additionally, areas with a lower percentage of Muslims also show a stronger impact of total financing on poverty, possibly due to the relatively lower availability of Islamic financial services in these regions. These findings imply that expanding financial access in underserved areas can have a greater impact on poverty reduction, regardless of the religious demographic. (Trinugroho et al., 2017, 2018; Wasiaturrahma et al., 2020)

In terms of bank-specific factors, the results show a mixed impact on poverty. Non-performing loans (Risk) positively affect poverty in both Java and Non-Java, though the effect is modest. Financial efficiency has a significant positive effect on poverty in Java but is not significant in non-Java, suggesting that financial efficiency does not always translate

to poverty alleviation. However, social efficiency, which reflects socially responsible banking practices, has a significant negative impact on poverty, especially in Java and regions with a higher percentage of Muslims. This indicates that Islamic banks with a focus on social goals are more effective in reducing poverty in regions aligned with Islamic principles. These results underscore the importance of socially responsible banking and targeted financial interventions in improving poverty outcomes across different regions in Indonesia.(Akbar & Siti-Nabiha, 2022; Harahap et al., 2023).

Islamic microfinance has the potential to alleviate poverty in Indonesia by providing financial access to underserved populations, particularly in regions where conventional financial institutions are less active. From the regression results, we observe that total financing has a significant negative impact on poverty, indicating that increasing financial resources, such as through microfinance, can reduce poverty levels, especially in non-Java regions. This effect is particularly pronounced in areas with lower financial infrastructure, where access to Islamic microfinance can provide much-needed capital for small-scale enterprises and low-income households. Previous studies, such as those by Obaidullah and Khan (2008), have highlighted that Islamic microfinance not only provides financial inclusion but also does so in a manner that aligns with the ethical and social principles of Islam, making it an attractive option for many in Muslim-majority regions.

Islamic microfinance operates through mechanisms such as profit-sharing (*Mudarabah*), asset-based financing (*Murabaha*), and partnership contracts (*Musharakah*), which emphasize risk-sharing and ethical lending. These mechanisms encourage entrepreneurship and self-sufficiency, which are critical for sustainable poverty reduction. The regression results on social efficiency demonstrate that Islamic rural banks with strong social missions are more effective in reducing poverty, especially in regions with higher

Muslim populations. This aligns with the findings of Dusuki (2008), who argues that Islamic microfinance institutions (IMFIs) contribute to poverty alleviation by combining financial services with social welfare programs, such as zakat (charitable giving) and qard al-hasan (benevolent loans), which directly target the poorest segments of society. By focusing on both financial and social outcomes, IMFIs can help individuals not only meet their immediate financial needs but also build long-term economic resilience.

Additionally, the non-performing loan (risk) variable suggests that proper risk management is necessary to prevent defaults, which can undermine the sustainability of microfinance programs. Islamic microfinance, by adhering to Shariah principles, encourages responsible borrowing and lending, reducing the likelihood of over-indebtedness—a common issue in conventional microfinance. In conclusion, the combination of financial inclusion, ethical financing principles, and a strong social mission positions Islamic microfinance as a powerful tool for poverty alleviation in Indonesia, particularly in regions where conventional financial systems have failed to reach the most vulnerable populations. These findings are supported by studies such as Ahmed (2002) and Choudhury (2013), which further emphasize the role of Islamic microfinance in empowering the poor through socially responsible financing models.

The results from the baseline and regression analyses on Java, Non-Java, and Muslim population variables reveal significant insights into the financial and social performance of Islamic Rural Banks (IRBs) in Indonesia. One of the key findings is the disparity in technical efficiency between Java and Non-Java regions. While Islamic finance is growing across the country, the IRBs in Java face intense competition and concentration, which has led to lower efficiency scores compared to those in non-Java regions. This could be attributed to market saturation and inefficiencies in resource allocation within the more competitive Islamic

banking environment on Java. In contrast, non-Java regions, with less competition and possibly more targeted financial access, seem to benefit from better financial performance.

The relationship between financial performance and social performance is crucial to understanding the challenges faced by IRBs in Indonesia. Social efficiency scores, which measure how well banks meet their social objectives, are lower in areas with higher competition. This indicates that while IRBs in Java are competing to maximize their financial performance, they may be underperforming in meeting their social mandates, such as providing financial services to underserved populations and contributing to poverty alleviation. This suggests a broader issue where the commercial pressures of the financial system may be detracting from the social objectives that are central to the Islamic finance model, particularly the goals of equity, social justice, and poverty reduction.

In terms of policy, the Financial Services Authority of Indonesia (OJK) has laid down a regulatory framework for IRBs, but the focus seems to be more on financial performance than on social impact. Given that the efficiency of IRBs in meeting their social objectives is suboptimal, particularly in Java, there is a need to revise regulatory policies to encourage a stronger balance between financial and social performance. For instance, more targeted incentives could be introduced for IRBs that successfully demonstrate social impact in addition to financial sustainability. These incentives could be in the form of tax relief or preferential treatment for participating in national financial inclusion programs.

Additionally, the policy could focus on addressing the lack of financial access in non-Java regions by promoting innovative Islamic financial products tailored to local contexts. This could include partnerships with microfinance institutions, enhanced digital banking services to reach remote areas, and more support for social financing mechanisms such as zakat, waqf, and qard al-hasan. Policies that promote a social mission in finance would not

only help improve the efficiency of IRBs but also strengthen their role in achieving broader economic development goals, such as poverty reduction and equitable growth, especially in less developed regions.

In conclusion, the results from this study highlight a critical need for rebalancing the financial and social objectives of Islamic Rural Banks in Indonesia. By refining regulatory policies and placing a stronger emphasis on social performance, the Indonesian government can enhance the role of IRBs in fostering inclusive and sustainable economic development. This would help address the growing disparity between Java and Non-Java regions, while ensuring that Islamic finance remains aligned with its core values of promoting social justice and economic equity.

4.3 Chapter Summary

This chapter provided an in-depth exploration of the efficiency and effectiveness of IMF in addressing poverty in Indonesia. It delineated three core research objectives centred on analysing data through DEA to gauge efficiency and effectiveness. Additionally, Panel Data Regression using Stata was employed for data analysis, followed by a comprehensive interpretation and discussion of the results.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The primary aim of this study is to examine the efficiency and effectiveness of Islamic microfinance in alleviating poverty in Indonesia. This overarching goal is underpinned by several specific objectives. First, it involved dissecting TE, PTE and SE of IMFIs in Indonesia. The study, utilising the DEA approach to calculate technical efficiency, discovered that out of the 144 IMFIs evaluated, only 12 demonstrated full efficiency. Notably, the efficiency scores varied across provinces, with urban areas displaying higher utilisation potential due to improved infrastructure. Additionally, provinces with differing numbers of IMFIs also exhibited varied efficiency levels, with non-Java provinces showcasing better effectiveness compared to Java Island.

Secondly, a comparison of the financial efficiency and social efficiency performance of IMF in Indonesia revealed that financial performance takes precedence over social performance. Despite this, the study highlighted the commitment of institutions to both sustainability and social objectives. The minimal disparity between financial and social performance scores, especially under differing scale assumptions, aligned with the “Institutionalist” school of thought prevalent in Indonesia and other regions. The social impact and dominance of IMF were further elucidated by its religious and ethical aspects, contributing significantly to societal influence.

Lastly, the study evaluated the effectiveness of IMF in alleviating poverty in Indonesia. It identified a direct association between increased TF in Islamic rural banks and reduced poverty levels, emphasising the critical role of expanding credit access in

underserved communities. Nonetheless, managing non-performing loan (risk) levels was equally crucial, as higher non-performing loans corresponded to elevated poverty rates. This outcome emphasised the need for robust risk management practices within these financial institutions. Furthermore, the study discovered nuanced relationships between FE and poverty across different regions, signalling the necessity for deeper exploration of regional dynamics, the impact of FE on poverty and management strategies for regional economic growth and inflation.

5.2 Recommendations

The empirical findings yield several recommendations for IMFIs, particularly Islamic rural banks, to prioritise the enrichment of their human capital. This outcome entailed investing in extensive training and developmental programmes aimed at equipping staff with a profound comprehension of Islamic principles and financial methodologies. Moreover, fostering an ethical culture within the institution is imperative. Encouraging employees to align their conduct with the institution's objectives in social impact and financial sustainability is essential. By nurturing knowledgeable and ethically principled human resources, IMFIs can more effectively navigate the complexities associated with poverty alleviation.

Strategic decision-making plays a crucial role in determining the impact of IMF on poverty reduction. Institutions must carefully deliberate on their mission and objectives, selecting between profit maximisation and aligning with social missions. Achieving a balance that encompasses both financial sustainability and social outreach is a commendable pursuit. This approach ensures that financial success does not compromise the fundamental social mission of the institution, thus fostering a more comprehensive impact on poverty alleviation.

Continuous efforts to enhance financial performance are paramount. IMFIs should concentrate on optimising their management of financing portfolios, efficient resource allocation and exploring innovative avenues for revenue generation. A robust financial foundation empowers these institutions to broaden their outreach and tailor financial products that cater specifically to the distinct requirements of underserved communities. Strengthening financial performance is not only a strategic imperative but also a significant means to drive poverty reduction substantially.

Acknowledging the societal significance of IMF, institutions should actively engage with local communities across provinces. Establishing robust connections with these communities facilitates a deeper understanding of their specific needs and contexts. Customising financial products to suit these unique requirements, alongside comprehensive financial education initiatives, empowers individuals and businesses to enhance their financial well-being. Collaborating with local community leaders and organisations serves to seamlessly integrate microfinance into more extensive strategies aimed at alleviating poverty.

Given the nuanced regional disparities observed in the influence of FE on poverty, conducting comprehensive regional analyses becomes imperative. Understanding the underlying factors driving these variations is crucial for tailoring poverty reduction strategies to fit the specific needs of each region. Collaboration amongst policymakers, financial institutions and development organisations is essential to devise area-specific initiatives that address the unique challenges and opportunities present in each locality. An approach tailored to the local context ensures that poverty alleviation efforts resonate more effectively with the diverse dynamics of individual regions.

To complement the efforts of IMFIs, policymakers should prioritise initiatives aimed

at fostering regional economic growth. These initiatives should focus on creating job opportunities, nurturing entrepreneurial ventures and enhancing overall living standards within these areas.

Furthermore, effective management of inflation rates, especially in regions experiencing high poverty rates, holds significant importance. Policymakers should implement robust monetary policies and establish social safety nets to mitigate the adverse impact of inflationary pressures on vulnerable populations. A coordinated approach to manage inflation can safeguard the purchasing power of individuals with lower incomes, thereby facilitating more impactful poverty alleviation strategies.

Balancing profit maximisation with a social mission presents a complex challenge. IMFIIs might encounter difficulties in defining their mission while ensuring that financial sustainability does not compromise their commitment to social impact. Maintaining this equilibrium, especially during economic downturns, can be particularly challenging. While achieving performance is desirable, it may necessitate considerable time and effort. Optimising various operational aspects poses challenges, and not all Islamic rural banks may possess the capacity or expertise to effectively implement these improvements.

Adapting financial products and educational programmes to suit diverse community needs demands a profound comprehension of these varied requirements. Challenges such as language barriers, cultural disparities and varying levels of financial literacy can hinder effective community engagement. While tailoring poverty reduction strategies to regional dynamics is crucial, it also introduces complexities. Implementing initiatives tailored to specific regions necessitates a deep understanding of local contexts and may demand additional administrative and logistical resources. Broadening outreach, particularly in non-Java areas, remains essential.

External factors like shifts in government policies or economic shocks can significantly impact poverty alleviation endeavours. These elements often lie beyond the control of IMFIs and may necessitate adaptive strategies, such as those encountered during the COVID-19 pandemic. Managing inflation rates also poses challenges, especially for policymakers. Inflation is influenced by various factors, including global economic conditions, which might surpass the direct control of local or national authorities. Effectively managing inflation requires a multifaceted approach that goes beyond the scope of Islamic rural banks.

Incomplete data becomes a limitation as measuring efficiency and assessing the effectiveness of poverty reduction strategies relies on accurate data and comprehensive analysis. Limitations in data collection and quality may be evident, particularly in regions lacking adequate infrastructure for data gathering and analysis. Amongst the 167 BPRs, only 144 had complete data available, which could impact the overall assessment.

5.3 Policy Implications

First, strengthen social performance through strategic financing initiatives. Islamic Rural Banks (BPRS) should actively participate in OJK (Financial Services Authority) programs and collaborate with the Regional Financial Access Acceleration Team to improve social performance and expand the reach of Sharia microfinance. This can be achieved by channelling financing to combat predatory lending and increasing investments in sectors such as agriculture. Additionally, BPRS can enhance their role in financing Micro, Small, and Medium Enterprises (MSMEs) by participating in government credit programs, such as KUR or Regional KUR, which are designed to support local economic growth.

Second, leverage information technology for operational efficiency and customer engagement. To expand market access and increase financing portfolios, BPRS should focus

on strengthening financial literacy and inclusion among consumers and the broader community. This is in line with the P2SK Law and OJK regulations, such as POJK Number 22 of 2023, which emphasize consumer and community protection. BPRS should collaborate with up to three other financial institutions to enhance their outreach efforts. By improving financial literacy, BPRS customers and surrounding communities will gain a better understanding of the benefits, risks, costs, rights, and obligations associated with Sharia microfinance products and services.

Finally, leverage information technology for operational efficiency and customer engagement. BPRS should continue to adopt and expand the use of information technology (IT) to improve internal operations and enhance customer services. From an operational perspective, process automation can increase business efficiency, reduce operational costs, and minimize fraud risks. For customers, BPRS can offer flexible electronic services that are accessible anytime and anywhere. By developing IT-based services with various innovative features, BPRS can improve competitiveness and better meet the needs of their customers, contributing to the overall growth and sustainability of Islamic microfinance institutions.

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APPENDICES

1. The Previous Study in efficiency

<i>No</i>	<i>Authors</i>	<i>Efficiency variables</i>	<i>Country(ies)</i>	<i>Method</i>	<i>Conclusion</i>
1	Hussein (2003)	SFA: Input prices cost of capital, cost of funds, cost of labour, investment in murabaha, investment in other modes of finance, off balance sheet transactions. TOBIT regression: Total assets, total deposits, government banks, private banks, Islamic finance/total assets, musharika/total assets, bank finance through other modes of finance, tradeoff between musharika and murabaha finance, non-financial activities, musharika/off balance sheet items, murabaha/off balance sheet, deposit mix.	Sudan	Stochastic Frontier analysis, TOBIT regression	Joint ownership banks operate more efficiently than government owned banks. Bank size and equity size, capital adequacy ratio negatively affect cost efficiency. Shariah compliant products and personnel expenses have positive impact on cost efficiency of Islamic banks.
2	Hassan (2003)	DEA: Inputs labour, fixed capital, customer and short-term funds, Input prices: staff expenses/customer and short-term funding, total expenditure on fixed assets/customer and short-term funds, total interest expenses/customer and short-term funds, Output: total loans, other earning assets, off balance sheet items Regression: Efficiencies, size of the bank, market power, profitability.	Pakistan, Iran, Sudan	Data envelopment analysis, Malmquist productivity index, correlation analysis, regression analysis	Islamic banks are less efficient than their conventional counterparts. Efficiency scores are highly correlated with profitability measures showing effect of efficiency on profitability. Islamic banks have better allocative efficiency than technical efficiency due to highly supportive regulatory environment. Scale inefficiency is higher than pure technical efficiency which shows that Islamic banks are suffering more from product diversification and market penetration rather than staff abilities. Productivity variation in Islamic banks is due to technological variations and not due to staff abilities.

<i>No</i>	<i>Authors</i>	<i>Efficiency variables</i>	<i>Country(ies)</i>	<i>Method</i>	<i>Conclusion</i>
3	Yudistira (2004)	DEA: Inputs: staff costs, fixed assets, total deposits Outputs: Total loans, other income, liquid assets Regression: Capital to total assets, net income to total assets, log of assets, market share, geographical location, listed and no listed banks	Bahrain, Kuwait, Qatar, United Arab Emirates, Indonesia Malaysia, Algeria, Gambia, Sudan, Egypt, Jordan, Yemen	Data envelopment analysis, OLS	Conventional banks have better efficiencies than Islamic banks. Islamic banks have performed better during crisis than their conventional counterparts. Islamic banks have fewer economies to scale than conventional banks. Islamic banks in middle east are less efficient than banks in any part of the world. Support from the regulator has better influence than market share on efficiencies of the banks.
4	Shams and Molyneux (2004)	SFA: Price of inputs: Price of deposit, price of labour Outputs: total loans, other income Price of outputs: price of loans, price of other income Logit regression: Total cost, profits, price of deposit, price of labour, total loans, other income, price of loans, price of other income, total equity, total provisions. equity, return on assets, provision, foreign bank dummy, loan/assets, fixed assets, total assets, total assets/GDP	Qatar, UAE, Saudi Arabia, Kuwait, Bahrain, Oman	Stochastic Frontier analysis, logit regression	Cost inefficiency between the region is between 8% to 10% and profit inefficiency is between 30% to 32%. The risk and quality have negative impact on efficiency levels of banks.
5	Hassan (2005)	DEA: Inputs: Labour, fixed capital, customer and short-term funds Input prices: Price of labour, price of capital, price of funds Outputs: Total loans, other earning assets, off balance sheet items Regression: Efficiencies, bank size, profitability, loan ratio	Algeria, Bahamas, Bahrain, Bangladesh, Brunei, Egypt, Gambia, Indonesia, Iran, Jordan, Kuwait, Lebanon, Malaysia, Mauritania, Qatar, Saudi Arabia, Sudan, Tunisia, United Arab	Data envelopment analysis, regression analysis, correlation	Islamic banking industry is less efficient than conventional banking. All efficiency scores are highly related with ROA and ROE which means profitability can be increased with efficiency scores. Cost efficiency in Islamic banks is lower than profit and revenue efficiency which means Islamic banks mostly focus on revenues at whatever costs. The allocative efficiency is also higher than technical efficiency which means Islamic banks have to look for new avenues to generate revenues and control costs. Scale efficiency is also higher than pure technical efficiency which means that Islamic banks need to focus output related activities as well. Larger bank size and

<i>No</i>	<i>Authors</i>	<i>Efficiency variables</i>	<i>Country(ies)</i>	<i>Method</i>	<i>Conclusion</i>
			Emirates, UK, Yemen		profitability are positively related with efficiency which shows banks need to increase their scale through diversification. Also major source of efficiency in Islamic banks is adoption of new technologies rather than improving managerial qualities.
6	Hassan (2006)	DEA: Inputs: Labour, fixed capital, customers and short-term funding funds Price of inputs: Total expenditure on employees/customer and short-term funding, total expenditure on premises and fixed assets/customer and short-term funds, total non-interest expenses on deposits and non-deposit funds/customer and short-term funding Outputs: Total loans, other earning assets and off balance sheet items.	Global	Data envelopment analysis	Islamic banks were less efficient than their conventional counterparts. The efficiency of Islamic banks is related to return on assets and return on equity. The main cause of inefficiency of Islamic banks was allocative inefficiency. Islamic banks are more efficient in countries where the whole banking system is Islamic. Technological advancement increases productivity of Islamic Banks. Islamic banks need to introduce more products to survive in competition with Islamic banks.
7	Mokhtar et al. (2006)	DEA: Inputs: Total deposits, personnel expenses, other operating or overhead expenses Outputs: Total earning assets Input prices: Return paid to depositors/total deposits, personnel expenses/total assets, other overhead expenses/total assets	Malaysia	Data envelopment analysis, regression analysis	Average efficiency of Islamic banks is increasing but is still less than efficiency of conventional banks. Efficiency increases with the increase in size and age of the bank.
8	Omar et al. (2006)	DEA: Inputs: Total deposits, personnel expenses, capital expenditure, input prices, price of deposits, price of labour, price of capital expenditure	Malaysia	Malmquist productivity index, data envelopment analysis	Total factor productivity increases with technical efficiency. Islamic banks are less efficient than conventional banks. Islamic bank efficiency increases are solely coming from increases in scale efficiency.

<i>No</i>	<i>Authors</i>	<i>Efficiency variables</i>	<i>Country(ies)</i>	<i>Method</i>	<i>Conclusion</i>
		Output: loans and advances, capital market investments, and money market investments			
9	Brown and Skully (2006)	DEA: Inputs: Personnel expenses, non-interest expenses Outputs: Loan deposits, other earning assets Ratio analysis; assets, ROA, ROE, cost to income ratio, Islamic operations/total assets, equity investments/total assets, income from Islamic transactions/total assets, deposit and short-term funding/total assets, other non-interest bearing assets/total assets, equity/total assets, total funding, customer loans, total deposits, other earning assets, personnel expenses, non-interest expenses	Bahrain, Egypt, Iran, Jordan, Malaysia, Kuwait, Pakistan, Qatar, Russia, Sudan and United Arab Emirates	Data Envelopment Analysis, Financial Ratio Analysis	There exists no obvious relationship between, profitability, Islamic financing and efficiency. Islamic bank investments are short-term in nature but are more or ethical importance than financial investments. Islamic banks efficiency should be examined taking in view their social efficiency as well. As ethical performance takes time to grow therefore short-term poor results of Islamic banks should not be of concern.
10	Bader et al. (2007)	DEA: Inputs: Labour, fixed assets, total funds Outputs: total loans, other earning assets, off balance-sheet items, price of inputs and outputs: price of labour, price of fixed assets, price of funds, price of loans, price of other earning assets, price of off balance sheet items	Algeria, Egypt, Gambia, Senegal, Sudan, and Tunisia, Bangladesh, Brunei, Indonesia, Malaysia, and Pakistan, Bahrain, Iran, Jordan, Kuwait, Lebanon, Qatar, Saudi Arabia, Turkey, UAE, Yemen	Data Envelopment Analysis, Mann-Whitney test, Kruskal-Wallis test	Revenue efficiency is higher in all banks than their cost efficiency. New Islamic banks are more efficient than old Islamic banks.
11	Mokhtar et al. (2007)	DEA: Inputs: Total deposits, total overhead expenses Outputs: total earning assets, personnel and other expenses/total assets, return paid to depositors/total deposits	Malaysia	Data envelopment analysis	Efficiency of Islamic banks is increasing while efficiency of conventional banks is stable. Full-fledged Islamic banks are more efficient than window Islamic banks.

<i>No</i>	<i>Authors</i>	<i>Efficiency variables</i>	<i>Country(ies)</i>	<i>Method</i>	<i>Conclusion</i>
12	Sufian (2007)	DEA: Inputs: Total loans, total deposits Outputs: Investments, investments, loan loss provisions	Malaysia	Two model data envelopment analysis to account for sensitivity of efficiency scores, spearman and Pearson correlation	Foreign banks have higher efficiency than local banks, scale inefficiency is higher than technical efficiency. Technical efficiency is more effected by taking excessive risks. Scale efficiency has more effects on technical efficiency than pure technical efficiency. Islamic banks need to optimise their size because they are operating at decreasing returns to scale.
13	Sufian and Abdul Majid (2007)	DEA: Inputs: Total deposits, total assets, labour Outputs: Total loans, investments GMM: Natural log of deposits, loan/total assets, natural log of total assets, loan loss provision/total loans, net return income/total assets, equity/total assets, return on assets, natural log of gross domestic product, dummy of foreign banks. Dummy of Islamic banks.	Malaysia	Two stage: Data envelopment analysis, multivariate TOBIT regression analysis	Scale inefficiency in Islamic banks is higher than technical inefficiency. Banks are realising economies of scale. Foreign banks are more technical efficiency and consequently are more cost efficient.
14	Hassan et al. (2009)	DEA: Inputs, Labour , fixed assets, total funds, price of inputs: price of labour, price of fixed assets, price of funds Outputs: Total loans, other earning assets, off balance sheet items	Africa, Asia, Middle East	Data envelopment analysis, t-test, stochastic Frontier analysis	Profit efficiency is higher and stable than cost efficiency over the years, but the difference between Islamic banks and conventional banks is not significant. Islamic banks in middle east have higher cost efficiency than banks in other parts. Large size conventional banks have higher efficiencies than small banks
15	Mokhtar et al. (2008)	DEA: Inputs: Total deposits, total overhead expenses Outputs: Total earning assets Input prices: personnel and other expenses/total assets, return paid to depositors/total deposits	Malaysia	Data envelopment analysis	Efficiency of Islamic banks is increasing while efficiency of conventional banks is stable. Full-fledged Islamic banks are more efficient than window Islamic banks. Efficiency of Islamic banks was lower than conventional banks.
16	Kamaruddin et al. (2008)	DEA: Inputs: Personnel expenses, total deposits, fixed assets, input prices price of labour, price of deposit, price of capital	Malaysia	Data envelopment analysis	Efficiency of Islamic banks remains almost stagnant during the period. Cost efficiency of domestic banks was higher than foreign banks.

<i>No</i>	<i>Authors</i>	<i>Efficiency variables</i>	<i>Country(ies)</i>	<i>Method</i>	<i>Conclusion</i>
		Outputs: earning assets, other assets, other income			Though domestic banks have better efficiencies but foreign banks are catching them up.
17	Sufian and Haron (2008)	DEA: Inputs: Total deposits, labour, total loans Outputs: Investments	Malaysia	Malmquist productivity index, multivariate regression analysis	The productivity increase in Islamic banks is due to increase in technical efficiency but mainly from scale efficiency, without any support from technological advancement. Foreign Islamic banks are suffering from productivity regress due to technological and technical efficiency as well. Zakat paying Islamic banks are more efficient than non-zakat paying banks. Profitability and bank size has positive impact on bank productivity.
18	Sufian et al. (2008)	DEA: Inputs: Total loans, income, investments Outputs: Deposits, assets	Bahrain Bangladesh Egypt, Gambia Indonesia Iran, Kuwait Malaysia Pakistan Saudi Arabia Turkey United Arab Emirates, Qatar South Africa Sudan Yemen	Data envelopment analysis	Banks in MENA region have better technical efficiency than Islamic banks in Asia. Also Islamic banks in countries with both Islamic and conventional banking systems display better efficiencies than countries solely with Islamic banking systems.
19	Bader et al (2008)	DEA: Inputs: Total costs, revenues, profits Outputs: labour, fixed capital, total funds, total loans, other earning assets, off balance sheet assets, total personal expenses/by the total funds, depreciation expenses/the fixed assets, interest expenses on deposits and non-deposits funds plus other operating expenses/by the total Funds, Interest income/ total loans, other operating income/other earning assets, net commission revenue plus net earning income	Egypt, Bahrain, Tunisia, Jordan, Kuwait, Lebanon, Qatar, Saudi Arabia, Turkey, UAE, and Yemen.	Data envelopment analysis	Cost and technical efficiency of all banks is better than revenue efficiency. No significant difference between efficiencies of Islamic and conventional banks. The behavior of Islamic and conventional banks is similar towards efficiency.

<i>No</i>	<i>Authors</i>	<i>Efficiency variables</i>	<i>Country(ies)</i>	<i>Method</i>	<i>Conclusion</i>
		divided by off-balance sheet items			
20	Sufian and Noor (2009)	DEA: Inputs: Deposits, capital, financing Outputs: Investments, income.	Asian countries and MENA region	Data envelopment analysis, correlation analysis, TOBIT regression analysis	Technical inefficiency in Islamic banks is higher than the scale inefficiency. Islamic banks in MENA region are more technically efficient than banks in Asia. Banks with low market share and low Non-performing loans have more technically efficiency. Banks with more technical efficiency have more profitability. Favourable economic conditions contribute to efficiency of the banks.
21	Johnes et al. (2009)	DEA: Inputs: Deposits and short-term funding, fixed assets Outputs: General and administration expenses, equity Ratios: Cost to income ratio, non-interest expense to average assets, net interest margin, other operating income to average assets, return on average assets, return on average assets.	GCC countries	Data envelopment analysis, financial ratio analysis, Malmquist productivity index, correlation analysis	Islamic banks have less cost efficiency but more revenue efficiency. The results of Islamic and conventional banks are significantly different. Technical efficiency of conventional banks is higher than Islamic banks. In order to be more technically efficiency Islamic banks need to be more shariah compliant. Difference between shariah rules also leads to difference between efficiencies of Islamic banks in different regions. Banks which are cost efficient tend to have better financial performance ratios. Although banks have improved on technical efficiency but their overall efficiency has decreased.
22	Hamilton et al. (2010)	DEA: Inputs: Total cost, net profit Input prices: Price of funds, price of labour, price of physical capital Outputs: Loans, investments, other earning assets, price of	Jordan	Stochastic Frontier analysis, data envelopment analysis	Profit and cost efficiency of Islamic banks is lower than the similar efficiencies of their conventional counterparts. Alternate profit efficiency which includes market power is higher in Islamic banks.

<i>No</i>	<i>Authors</i>	<i>Efficiency variables</i>	<i>Country(ies)</i>	<i>Method</i>	<i>Conclusion</i>
		loans, price of investments, price of other earning assets.			
23	Srairi (2010)	DEA: Inputs: Labour cost, fixed capital, total cost Outputs: Total profit, Input and output prices: personnel expenses/total assets, interest expenses/total deposits, other administration and operating expenses/fixed assets, net total loans, other earning assets, per capital GDP, M2 money supply/GDP, total deposit of banking sector, average annual rate of inflation, density of population, assets of three largest banks/total assets of the country, total loans of banking sector/total deposits, total equity of banking sector/total assets, natural log of total assets, equity/total assets, net profits/average total assets, loans/total assets, cost/income	Bahrain, Kuwait, Oman, Qatar, Saudi Arab, UAE	Stochastic Frontier analysis, data envelopment analysis, maximum likelihood model	Banks need to put more control on personnel cost than on financial cost for improving technical efficiency. Countries with higher per capital income have lower cost efficiency. Countries with higher capital to asset, loan to deposit and population density have higher cost efficiency. Banks have significantly higher profit efficiency than cost efficiency. Higher demand of Islamic banking is leading to creation of monopoly of Islamic banks. The rise in bank efficiency is not systematic. conventional banks have better cost and profit efficiency than Islamic banks. Highly capitalised and profitable banks are less efficient.
24	Jreisat and Paul (2010)	DEA: Inputs: Labour, deposits, loans Outputs: Other investment	Jordan	Data envelopment analysis	Small size banks are more efficient than medium and large banks, domestic banks have better technical efficiency than foreign banks. The efficiency of Islamic banking sector is increasing overall.
25	Akhtar (2010)	DEA: Input: Interest expense, non-interest expense Output: Interest income, non-interest income.	Saudi Arabia	Data envelopment analysis, Malmquist productivity index	The productivity of Islamic banks is increasing due to adoption of new technology and not due to efficiency. Technical and pure technical efficiencies are decreasing.
26	Noor et al. (2010)	DEA: Inputs: Total deposits, assets Output: Total loans, income, investments	Bangladesh, Indonesia, Malaysia, Pakistan	Data envelopment analysis	Pure technical inefficiency in Islamic banks is higher than scale inefficiency. Banks in Indonesia are more efficient.

<i>No</i>	<i>Authors</i>	<i>Efficiency variables</i>	<i>Country(ies)</i>	<i>Method</i>	<i>Conclusion</i>
27	Ahmad et al. (2010)	DEA: Inputs: Total deposits, labour costs, Output: total assets, total loans, income, other earning assets	Bahrain, Bangladesh, Brunei, Egypt, Gambia, Indonesia, Iran, Iraq, Jordan, Kuwait, Malaysia, Mauritania, Pakistan, Palestine, Saudi Arabia, Singapore, Syria, Thailand, Turkey, UAE, UK, Qatar, Yemen, South Africa, Sudan	Data envelopment analysis	Islamic banks have higher pure technical efficiency than scale efficiency. In low income countries Islamic banks operate under increasing returns to scale. Banks that operate under increasing return to scale should endeavour to reduce their scale inefficiency.
28	Shahid et al. (2010)	DEA: Inputs: Deposit, Capital, Outputs: Investments, loans and advances, price of capital, price of deposits	Pakistan	Data envelopment analysis, t-test	Technical efficiencies of conventional banks are higher than Islamic banks while cost and scale efficiencies are lower.
29	Onour and Abdalla (2010)	DEA: Inputs: Salaries and wages, deposits Outputs: Loans, net income	Sudan	Data envelopment analysis, Malmquist index	Bank ownership, and size have no relationship with efficiency of Islamic banks. Banks with improved technical efficiency also exhibit also depict productivity improvement.
30	Ahmad and Noor (2011)	DEA: Inputs: Total loans, total deposits, labour cost Output: Income, other earning asset, total assets. For Tobit multivariate analysis and fixed effect model: Operating expenses/total assets, equity/total assets, total loans and assets, loans/total assets, loans/deposit, and non-performing loans/total loans, while the loans/GDP, inflation, market capitalisation, and seven dummy to test various event (Asian financial	25-Islamic countries	Data envelopment analysis, TOBIT model, fixed effects model, ordinary least square method	Islamic banks have greater technical efficiency. Banks in Asia with greater technical efficiency derive more profitable results.

<i>No</i>	<i>Authors</i>	<i>Efficiency variables</i>	<i>Country(ies)</i>	<i>Method</i>	<i>Conclusion</i>
		crisis, global financial crisis ,Middle east and North Africa, Asia, low medium and high income countries) fall under economic condition.			
31	Noor and Ahmad (2011)	DEA: Inputs: Total deposits, labour cost ,total assets Outputs: Total loans, income, other earning assets TOBIT and fixed effect model: total loans divided by total assets (LOANS/TA), log of total assets (LNTA), non-performing loans divided by total loans (NPL/TL), log of total deposits (LNDEPO), operating expenses divided by total assets (OE/TA) and book value of stockholders' equity as a fraction of total assets (EQUITY/ TOTAL ASSET). Logarithm of GDP, inflation, market capitalisation (MARKET), AFC, GFC, MENA, Asian countries, and country income level (LOW, MEDIUM and HIGH).	Global analysis	Data envelopment analysis, fixed effect model, TOBIT regression model	Islamic banks have better pure technical efficiency than scale efficiency. Pure technical inefficiency have lead to technical inefficiency. Technical efficiency is related with operating expenses, asset size, equity, non-performing loans, average fixed costs and GDP.
32	Mariani et al. (2011)	Labour expenses plus physical capital expenses and financial expenses, loan, other earning assets, price of labour, price of financial capital, price of physical capital, loan quality, equity/assets, Islamic bank dummy, merged bank dummy, financial crisis, Foreign bank with IB dummy, foreign bank without IB dummy, Domestic bank with IB dummy, publicly owned bank dummy.	Malaysia	Stochastic Frontier analysis, generalised Malamquist index	Islamic banks have lower cost efficiency than conventional banks. Asian crisis 1998 had negative affects on Malaysia banking industry. Banks with higher technical efficiency have higher productivity change as well. Technological advancement brings initial cost efficiency which then grows to cost efficiency with increase in productivity and technical efficiency. Merged banks did not have did not have any impact on their productivity. After mergers banks need to relaunch their products to reap benefits of mergers.

<i>No</i>	<i>Authors</i>	<i>Efficiency variables</i>	<i>Country(ies)</i>	<i>Method</i>	<i>Conclusion</i>
33	Kablan and Yousfi (2011a)	DEA: Inputs: Labour, physical capital, deposits Outputs: Net loans, net liquid assets, total earning assets Price of inputs: Personnel expenses/total assets, other expenses/total assets, income	Algeria, Lebanon, Tunisia, Malaysia, Turkey, Yemen, Bahrain, Egypt, Jordan, Saudi Arab, UAE, Kuwait, Qatar, Iran, Pakistan, Sudan	Data efficiency analysis, stochastic frontier analysis, Hausmann test, correlation analysis	Size of the bank has negative impact on efficiency of the bank because of operating at wrong scale. Banks in Asia are the most efficient. Profitability and market power have positive impact on efficiency. It is more costly for Islamic banks to operate in country with Islamic government and Islamic systems.
34	Kablan and Yousfi (2011b)	DEA: Inputs: Labour, physical capital, deposits Input prices: Personnel expenses/total assets, other expenses/total assets Outputs: Income, net loans, net liquid assets, total earning assets. TOBIT regression: log of total assets, return on assets, bank deposit/total assets, deposits, urban population, GDP per capita, risk taking, dummy of Middle East bank, dummy of UK banks, dummy of Islamic banking system, dummy of subprime crisis.	Iran, Jordan, Kuwait, United Arab Emirates, Qatar, Bahrain, Lebanon, Saudi Arabia, Yemen, Pakistan, Malaysia, Turkey, Brunei, Sudan, Egypt, Tunisia, UK	Data efficiency analysis, stochastic frontier analysis, TOBIT regression model	Profitability and market power have negative impact on efficiency of Islamic banks. GDP has positive impact on efficiency while urban population has negative impact on efficiency of Islamic banks. Efficiency of Islamic banks in countries where solely Islamic banks exist is below average. Islamic banks depict higher efficiency in competitive systems. Islamic banks in countries which have better Islamic regulatory frameworks show better efficiency.
35	Hadad et al. (2011)	DEA: Inputs: Total consumer deposits and commercial borrowing, total employee expenses, total non-employee expenses Outputs: Total provisions, total commercial loans, other earning assets, net total off balance sheet income	Indonesia	Malmquist Index, semi-oriented radial measure-data envelopment analysis, truncated regression analysis	Major cause of productivity improvement is technological advancement. Risk Management efficiency also effects technical efficiency of financial institutions. Banks efficiency is highly related with stock market efficiency and log of total assets. The productivity of Indonesian banking sector is highly dispersed and volatile.

<i>No</i>	<i>Authors</i>	<i>Efficiency variables</i>	<i>Country(ies)</i>	<i>Method</i>	<i>Conclusion</i>
36	Tahir et al. (2011)	DEA: Inputs: Total deposits, overhead expenses Output: Total loans, other earning assets	Africa, Far East and Central Asia, Europe, Middle East	Data envelopment analysis	Islamic banks suffer higher from pure technical efficiency than scale efficiency. Banks in middle east are more efficient than banks in any other part of the world. Larger banks exhibit better results are constant returns to scale. But most of the Islamic banks are operating at diminishing returns to scale. Size of the Islamic banks is mostly big in middle east. The number of Islamic banks over increasing returns to scale has declined, which shows the efficiency of Islamic banks decreases with increase in size.
37	Moussawi and Obeid (2011)	DEA: Input: Total fixed assets, interest expense, personnel expenses, other operating expenses Outputs: Total earning assets, net commission revenue, total deposits Regression: Growth rate, inflation rate, equity to asset ratio, size of the bank, doubtful loans to asset ratio, return on assets.	GCC region	Data envelopment analysis, regression analysis	Productive efficiency of Islamic banks has increased but the results are dispersed. Inflation is the major factor in determining efficiency of Islamic banks. The relationship between economic growth and efficiency appears negative.
38	Mostafa (2011)	DEA: Inputs: Assets, equity, net income Outputs: Return on assets, return on equity	Saudi Arab, Iran, Kuwait, Malaysia, Bahrain, Qatar, Turkey, Egypt, Bangladesh, Syria, Sudan, Brunei, Jordan, Pakistan, Indonesia, UK, Yemen, Singapore, Palestine,	Data envelopment analysis, sensitivity analysis	Efficiency does not have any significant relationship with profitability in Islamic banks, however, efficiency does contribute to long term performance. Changing the variables in the model changes the efficiency between 0.8 to 1.

<i>No</i>	<i>Authors</i>	<i>Efficiency variables</i>	<i>Country(ies)</i>	<i>Method</i>	<i>Conclusion</i>
39	Noor and Ahmad (2012a)	DEA: Inputs: Total deposits, labour cost, total assets Output: Total loans, income, other earning assets TOBIT and fixed effect model: Total loans divided by total assets (LOANS/TA), log of total assets (LNTA), non-performing loans divided by total loans (NPL/TL), log of total deposits (LNDEPO), operating expenses divided by total assets (OE/TA) and book value of stockholders' equity as a fraction of total assets (EQUITY/ TOTAL ASSET). Logarithm of GDP, inflation, market capitalisation (MARKET), AFC, GFC, MENA, Asian countries, and country income level (LOW, MEDIUM and HIGH)			
40	Noor and Ahmad (2012b)	DEA: Inputs: Deposit, labour, fixed capital Outputs: Loan and advances, income, other earning assets TOBIT: Return on equity, operating expenses/total assets, equity/total assets, natural log of total assets, loans/total assets, natural log of total deposits, natural log of GDP, inflation, market capitalisation, dummy for crisis, dummy for region.			
41	Al-Khasawneh et al. (2012)	DEA: Inputs: Personnel expenses, fixed assets, loanable funds net loans Outputs: Other earning assets (loans to special sectors, inter-bank loans and investment securities, total interest income/net loans, other operating income/other earning assets, as personnel expenses/total assets, non- interest expenses/ total assets, total interest expense/loanable funds.	Tunisia, Algeria, Egypt, Sudan	Data envelopment analysis	Conventional banks have increasing cost efficiencies while Islamic banks have decreasing. Revenue efficiency in Islamic banks is higher than conventional banks. Islamic banks are more successful in countries with competitive conventional systems than solely with Islamic systems.

<i>No</i>	<i>Authors</i>	<i>Efficiency variables</i>	<i>Country(ies)</i>	<i>Method</i>	<i>Conclusion</i>
42	Ahmad and Rahim Abdul Rahman (2012)	DEA: Inputs: Total personnel expenses, net book value of property plant and equipment Outputs: Total deposits, loans and advances, total income	Malaysia	Data envelopment analysis, t-test and Mann-Whitney U-test	Most of the Islamic banks have scale inefficiency. There are two factors to pure technical efficiency managerial efficiency and technological advancement but Islamic banks suffering primarily from managerial inefficiency.
43	Abu-Alkheil et al. (2012)	DEA: Inputs: Deposits and short-term funding, total expenses, total staff cost Outputs: Total loans, total revenues	GCC, Turkey, Malaysia and UK	Data envelopment analysis, financial ration analysis, correlation analysis, regression analysis	Islamic banks are technically inefficient. Islamic banks in Muslim countries are more efficient than Islamic banks in non-Muslim countries. An Islamic bank should be a medium sized bank because it helps to achieve efficiencies.
44	Yahya et al. (2012)	DEA: Inputs: Deposits (this includes, current, savings and term deposits plus short-term borrowings), fixed assets Output: other earning assets among these assets are loans and advances to banks, securities, derivatives, investment in property, and insurance assets), and overheads, loan amount (this is inclusive of residential mortgage loans, consumer or retail loans, commercial loans less non-performing loans), interest revenue, and net income.	Malaysia	Data envelopment analysis, t-test	The efficiency of Islamic banks was below conventional banks earlier but became at par lately.
45	Said (2012)	DEA: Inputs: Labour cost, fixed assets, total deposits Output: Total loans, liquid assets, and other income	USA	Data envelopment analysis	There are significant changes in the efficiency of Islamic banks during and after the crisis.

<i>No</i>	<i>Authors</i>	<i>Efficiency variables</i>	<i>Country(ies)</i>	<i>Method</i>	<i>Conclusion</i>
46	Sufian et al. (2012)	DEA: Inputs: Deposits, labour, input prices: interest expenses/deposits, personnel expenses/total assets Output: Loans, income, output prices income on loans and other loans/loans, other operating income/income Generalised regression: revenue efficiency, log of total assets, loan loss reserve/gross loans, equity/total assets, bank deposit/total deposit, total loans/total asset, on-interest income/total asset, log of GDP, inflation, dummy of domestic Islamic banks, observation for banks, observation for year	Malaysia	Data envelopment method, multivariate regression analysis using generalised least square comprising fixed effect and random effect model, Mann Whitney (Wilcoxon) test, t-test	Revenue efficiency of domestic Islamic banks remains lower than foreign Islamic banks. Capitalisation has positive effects on revenue efficiency, whereas market share, inflation and liquidity have negative effects.
47	Akhtar (2013)	DEA: Inputs: Deposit, labour, capital Output: Interest income, loan and advances, capital TOBIT: Efficiencies, real GDP from oil sector, oil prices, market capitalisation of banking industry, return on equity.	Saudi Arabia	Data envelopment analysis and TOBIT regression analysis	Banks in Saudi Arab remained least effected by Financial crisis but remained inefficient. Banks are mostly effected allocative inefficiency which means they are unable to find optimum mix of their inputs and outputs. Banks with large market share are better able to achieve efficiency. There is significant relationship with profitability with efficiency means banks can have profitable operations despite inefficiencies.
48	Kablan and Yousfi (2013)	SFA,DEA: Inputs: Labour, physical capital, deposits Input prices: Personnel expenses/total expenses, total expenses/total assets, income for deposits/total assets, output: net loans, net liquid assets, total earning assets Regression and correlation: Cost efficiency, natural log of total cost, natural log of loans, natural log of securities, natural log of loans, natural log of personnel expenses, size, return on assets, return on equity, risk taking market power, per capital GDP, population density, risk taking, dummy middle east,	Iran, Jordan, Kuwait, United Arab Emirates, Qatar, Bahrain, Lebanon, Saudi Arabia, Yemen, Pakistan, Malaysia, Brunei, Sudan, Egypt, Tunisia, UK	Stochastic Frontier analysis, data envelopment analysis, regression analysis	Islamic banks in Asia are more efficient than all other regions. It is less costly for Islamic banks to operate in countries with Islamic government legislation. However, this does not guarantee cost efficiency. Profitability and market power have positive impact on efficiency of Islamic banks.

<i>No</i>	<i>Authors</i>	<i>Efficiency variables</i>	<i>Country(ies)</i>	<i>Method</i>	<i>Conclusion</i>
		dummy UK, dummy of Islamic banking system, dummy of subprime crisis.			
49	Ftiti et al. (2013)	DEA: Inputs: Staff expenses, fixed assets, total deposits Outputs: Total loans, other revenues, liquid assets Regression: Asset quality, management quality, liquidity, return on assets, return on equity, bank size, market share, gross domestic product, population density, Herfindahl-Hirschmann index, equity ratio.	GCC Countries	Data envelopment analysis, regression analysis	GDP, population density and experienced management positively effects efficiency of Islamic banks.
50	Said (2013)	DEA; Inputs: Labour cost, fixed capital, total deposits Outputs: Total loans, liquid assets, other income Financial ratios: Credit risk (ratio of total debt to total asset), liquidity risk (equity/total asset), operational risk (EBIT/net total assets) Correlation analysis: The correlation between financial ratio analysis and efficiency analysis	MENA region	Three stage analysis: data envelopment analysis, correlation analysis, financial ratio analysis	Credit and operational risks are negatively related with efficiency while relationship of liquidity risk with efficiency is not significant in Islamic banks.
51	Sufian et al. (2013)	DEA: Inputs: Deposits, number of employees, physical capital, input prices: price of deposit, price of labour Outputs: Loans, investment Price of output: Price of loans, price of investment	Malaysia	Data envelopment analysis, Mann-Whitney and Wilcoxon test, Kruskall-Wallis tests	Domestic Islamic banks have lower revenue efficiency but better cost and profit efficiency than multinational Islamic and other banks. Foreign banks in Malaysia benefit from their global advantage.

<i>No</i>	<i>Authors</i>	<i>Efficiency variables</i>	<i>Country(ies)</i>	<i>Method</i>	<i>Conclusion</i>
52	Shahwan and Hassan (2013)	Profitability efficiency: Inputs: Total deposits, total expenses, leverage Outputs: Return on assets, return on equity. Marketability efficiency: Inputs: ROA, ROE Outputs: EPS, P/E ratio Social efficiency: Inputs: Audit Committee, proportion of local executives, institutional ownership, government ownership Outputs: EPS, P/E ratio, the voluntary social disclosure score.	UAE	Data envelopment analysis	The banks have high profitability and social efficiency but are far below in marketability efficiency. Banks with high profit efficiency have high social efficiency and vice versa.
53	Firdaus and Hosen (2013)	DEA: Inputs: Total deposits, total assets, labour cost Outputs: Financing, operational Income TOBIT : Efficiencies, assets , the number of the branch of the banks, ROA, ROE,CAR, NPF	Indonesia	Data envelopment analysis, TOBIT regression model	There is a huge dispersion in the efficiency score of Islamic banks, which means that Islamic banking in Indonesia is not competent enough. Non-performing loans and capital adequacy ratios have negative impacts on the efficiency of the banks.
54	Johnes et al. (2014)	DEA: 1st stage variables: Inputs: Deposits and short-term funding, fixed assets, general and administrative expenses, equity Outputs: Total loans, other earning assets 2nd stage variables: inputs: assets, loan loss/loans, loan loss/assets, net loans/assets, normalised Herfindahl index, market capitalisation, growth in real GDP, inflation, GDP per capita Islamic banks need to improve on their portfolio and product management, whereas conventional banks need to improve on their performance management.	18-Countries with 60% or more Muslim Population	2-stage data envelopment analysis (DEA) and meta- frontier analysis (MFA).	Results suggest that managers of Islamic banks are efficient but Islamic banks are inefficient.
55	Sufian and Kamarudin (2014)	DEA: Inputs: Deposit, labour, capital Outputs: Loan, investment	Bangladesh	Slack-based data envelopment analysis	Islamic banks are not operating according to their scale of investment which is causing scale inefficiency.

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56	Sufian et al. (2014)	DEA: Inputs: Deposits, labour, Input prices: price of deposits, price of labour Output: Loan, income Output prices: price of loan, price of investment	Malaysia	Data envelopment analysis and Mann-Whitney (Wilcoxon test), T-test	The revenue of domestic Islamic banks is lower than foreign Islamic banks. Large Islamic banks are operating at decreasing or constant returns to scale while small Islamic banks are operating at Increasing or constant returns to scale. Banks on increasing returns to scale are always target of being taken over.
57	Rosman et al. (2014)	DEA: Inputs: loans, other earning assets, deposits and short-term funding Outputs: fixed assets, personnel expenses. TOBIT model: Return on assets, total assets, equity/total assets, loan loss provisions/net interest expenses	Middle Eastern and Asian countries	Data envelopment analysis, TOBIT model	Islamic Banks are more technically efficient whereas Islamic Banks in Asia are even more technically efficient. Also Islamic banks have grown beyond productive scale therefore need to adjust their scale to improve their efficiency.
58	Kamarudin et al. (2014)	DEA: Inputs: Deposits, labour cost, loans Output: Income, price of deposits, price of labour, price of loans, price of income	GCC countries	Data envelopment analysis, Mann-Whitney and Wilcoxon test, Kruskal-Wallis tests	Conventional banks have significantly higher efficiencies than Islamic banks. Revenue efficiencies effects profit efficiencies in Islamic banks but not in conventional banks.
59	Shawtari et al. (2015)	DEA: Discretionary accrual proxy for earning quality, Overall Efficiency using DEA, Capital ratio, Size of the bank, Loan to Deposits, GDP, Auditor, Islamic or Non-Islamic Banks (Panel Data)	Yemen	Two stage approach using Breusch-Pagan Lagranges multiplier (LM) pooled OLS and random effects.	Islamic like conventional banks use and manipulate loan loss provisions to smooth their profitability which is a non-shariah compliant practice.
60	Shawtari et al. (2015)	DEWA: Deposits, capital, labour, interest income, non-interest income, total loans, financing income, non-interest income, total financing, total loans to borrowers, total financing in case of Islamic banks. Panel regression: Dummy Islamic, natural log of GDP, natural log of inflation index, natural log of market concentration, natural log of total assets, natural log of capital structure, natural log of return on assets,	Yemen	Three stage data envelopment window analysis (modified DEA analysis), panel data technique with unbalanced data for regression.	Islamic banks are better than conventional banks in terms of efficiency. The profitability of Islamic banks is negatively related to their efficiency. The size of bank only matters in case of Islamic banks for enhancement of efficiencies.

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		natural log of loan loss provisions/total loans, natural log of non-interest income/non finance income, natural log of total loans or finances.			
61	Gheeraert and Weill (2015)	DEA: Inputs: Total credit to GDP, Islamic credit to GDP, conventional credit to GDP, total deposits to GDP, Islamic deposits to GDP, conventional deposits to GDP inflation, latitude, log (Y/L), log (K/L)	Algeria, Argentina, Bahrain, Bangladesh, Belize, Benin, Bolivia, Botswana, Brazil, Burkina Faso, Cameroon, Chad, Chile, Colombia, Congo, Dem. Rep., Costa Rica, Cote d'Ivoire, Cyprus, Dominican Republic, Ecuador, Egypt, El Salvador, Ethiopia, Gabon, Ghana, Guatemala, Guyana, Honduras,	Stochastic Frontier analysis, data envelopment analysis	Development of Islamic banks favors overall efficiency of the economy, however the relationship is nonlinear. Development of Islamic banking favors overall economic efficiency unless it remains under controlled parameters. Excessive growth in Islamic banking has negative effects on overall economic efficiency of the economy. The relationship of conventional banking development with economic efficiency only starts after some certain level of development is reached with conventional banking.

<i>No</i>	<i>Authors</i>	<i>Efficiency variables</i>	<i>Country(ies)</i>	<i>Method</i>	<i>Conclusion</i>
			India, Indonesia, Iran, Israel, Jordan, Kenya, Kuwait, Madagascar, Malawi, Malaysia, Mali, Mauritania, Mauritius, Mexico, Mongolia, Morocco, Mozambique, Nepal, Niger, Pakistan, Papua New Guinea, Paraguay, Peru, Philippines, Rwanda, Saudi Arabia, Senegal, Singapore, South Africa, South Korea, Sri Lanka, Sudan, Swaziland, Syria, Thailand, Togo, Trinidad and Tobago, Tunisia, Uganda, Uruguay,		

<i>No</i>	<i>Authors</i>	<i>Efficiency variables</i>	<i>Country(ies)</i>	<i>Method</i>	<i>Conclusion</i>
			Venezuela, and Zambia.		
62	Salami and Adewale (2015)	Inputs: Total deposits, capital, total loans Outputs: Income, investments,	Malaysia	Data envelopment analysis, Malmquist productivity index	The efficiency of window Islamic banks is better than the efficiency of full-fledged Islamic banks. Banks with longer years of operations are more efficient than other banks. The productivity improvement in Islamic banks is mainly due to technical efficiency improvement.
63	Zuhroh et al. (2015)	Inputs: Third party funds, labour, assets Input prices: Price of funds, price of labour, price of assets, loans (credit) Bifilar: Cost efficiency, assets, equity/assets, asset quality, liquidity, non-performing loans, competition.	Indonesia	Stochastic Frontier analysis, ordinary least square with maximum likelihood method, bifilar regression	Islamic banks have lower cost efficiency than conventional banks which is because of allocative efficiency. Technical efficiency of Islamic banks is higher than conventional banks. Islamic banking suffers from lack of supervision and regulations.
64	Abbas et al. (2015)	Inputs: Employees, fixed assets, deposits, equity Outputs: Loans and advances, investments, markup (interest) income, other income	Pakistan	Data envelopment analysis, Malmquist productivity index	The productivity of Islamic banks is higher than conventional banks. The major source of productivity decline is technological change index. Which means that Islamic banks should focus on adopting new technologies.
65	Belanès et al. (2015)	Inputs: Total salary expenses, fixed assets and total deposits Outputs: Total loans, other revenues and liquid assets	Saudi Arabia, UAE, Qatar, Qatar, Bahrain, Kuwait	Data envelopment analysis	Results indicate negative impact of global crisis on Islamic banks. Efficiency of Islamic banks significantly decreased after the crisis. With the decrease in efficiency many conventional banks lost their business but Islamic banks gained but to Sharia factor.
66	Bahrini (2015)	DEA, MMI: Inputs: Labour cost, fixed assets, total deposits Outputs: Total loans, investment portfolio, no operating income Regression: Capital adequacy, bank size, management quality, business diversification, credit risk, return on equity, loan to deposit ratio, cash to total asset ratio.	MENA Region	Data envelopment analysis, bootstrap Malmquist index, second stage regression analysis	Efficiency of Islamic banks have grown during the period. Technological progress is positively related to efficiency. Sluggish adoption to new technology also slows down productivity improvement. The growth of bank efficiency is mainly due to bank specific variables although economic factors also leave their impact. Banks in MENA region have put their focus more on

No	Authors	Efficiency variables	Country(ies)	Method	Conclusion
					scale efficiency than technical efficiency. Global financial crisis also impacted efficiency of GCC Islamic banks.
67	Sufian and Kamarudin (2015)	DEA: Inputs: Deposit, labour, physical capital, input prices: price of deposit, price of labour, price of physical capital Output: Loans, investments. Regression: namely, size, asset quality, capitalisation, market share, liquidity and management quality.	Indonesia, Malaysia and Brunei	Data envelopment analysis-test, Mann-Whitney [Wilcoxon], Kruskal-Wallis tests, OLS regression, generalised least square	There exists significant difference between local and foreign Islamic banks. Domestic banks have better revenue efficiency and foreign banks have better cost efficiency. Bank size, asset quality, capitalisation, liquidity, management quality, gross domestic product and inflation.
68	Ab-Rahim and Chiang (2016)	DEA: Inputs: Personnel expenses, book value of premises and fixed assets, deposits and short-term funding Outputs: Total loans and other earning assets Regression: ROA, ROE, net income margin, marketshare, market concentration, technical efficiency, scale efficiency, expenses, loan, size, HHI, size	Malaysia	Data envelopment analysis, concentration ratios, Herfindahl-Hirschman index (HHI), regression	Inefficiencies in Islamic banks are higher but these should not be dealt with mergers and acquisitions like in the case of conventional banks.
69	Abbas et al. (2016)	DEA efficiency model: Inputs: Employees, fixed assets, deposits Outputs: Loans and advances, investments DEA effectiveness model: Inputs: Loans and advances, investments Outputs: Mark-up interest income, other income TOBIT: Efficiency, effectiveness, performance, years of operation, owner's equity/assets, loans and advances/assets, non-performing loans/assets, log (deposits), profit (before tax)/assets, non-markup income/assets, other operating expenses/assets, square of the sum of the	Pakistan	Data envelopment analysis, TOBIT regression analysis	Reason for inefficiency of Islamic banks is their early age and small size. Islamic banks have increased their competitiveness with the increase in experience and size. Islamic banks are suffering from loan loss provisions. GDP growth rate and minimum capital requirements have positive effect on efficiency of Islamic banks whereas market concentration and inflation have negative effects.

<i>No</i>	<i>Authors</i>	<i>Efficiency variables</i>	<i>Country(ies)</i>	<i>Method</i>	<i>Conclusion</i>
		market shares of each bank in national market, dummy of minimum capital requirements by regulatory authority			
70	Wanke et al. (2016)	DEA: Inputs: Assets, deposits, equity, outputs: provisions ,operational results, personal expenses, banking products, number of employees	Middle East Including Iran; South and South East Asia; Africa and Europe	Two stage and technique for order preference by similarity to the ideal solution (TOPSIS) method with neural network analysis	The efficiency of Islamic banks recently subjected to War remains low. Major factors of Inefficiency in Islamic banks relate to cost structure and country of origin of the bank. Cultural traditions also leave positive impact on efficiency of Islamic banks. Islamic banks do not learn from their experiences due to low competition. European and Gulf-based Islamic banks are required to focus on their learning curves.
71	Aghimien et al. (2016)	DEA Inputs: Total assets, deposit Outputs: Total loans, income	Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, UAE	Data envelopment analysis	Technical inefficiency in Islamic banks is mainly due to pure technical inefficiency. Scale inefficiency is quite low in Islamic banks. Large Islamic banks are operating at decreasing or constant returns to scale while small Islamic banks are operating at increasing or constant returns to scale.
72	Majeed and Zanib (2016)	DEA: Inputs: Deposits, fixed assets, capital, Outputs: investments,advances,assets	Pakistan	Data envelopment analysis	Conventional banks have higher technical efficiency than Islamic banks. Islamic branches of conventional banks are less efficient than Islamic banks and also enjoy better scale efficiency.
73	Mirdamadian et al. (2016)	DEA: Inputs: total assets, systematic risk, non-systematic risk, return on equity, Outputs: yearly efficiency, sales growth, current ratio and earning per share	Iran	Data envelopment analysis	EPS and ROE have the most influence on efficiency of DMU's

<i>No</i>	<i>Authors</i>	<i>Efficiency variables</i>	<i>Country(ies)</i>	<i>Method</i>	<i>Conclusion</i>
74	Tan et al. (2016)		Malaysia	Extended DEA gaps model	Service quality of an organisation is very much based internal strengths and is also effected from internal weaknesses.
75	Alqahtani et al. (2017)	DEA: Inputs: Islam Year, Islamic or conventional bank, state foreign or listed bank Outputs: Capital adequacy ratio, non-performing-loans, cost to income ratio, return on assets, other earning assets/total assets, natural log of fixed capital/labour expenses, natural log of total assets, inflation, GDP, Natural log of annual oil prices	GCC countries	Non-parametric data envelopment method, parametric stochastic frontier analysis with regression analysis	In the long run there is no significant difference between the cost efficiencies of Islamic and conventional banks. Conventional banks have better profit efficiency. Only Islamic banks in Bahrain have better cost and profit efficiency due to better management. During global financial crisis Islamic banks remained more cost efficient. Profit efficiency gap of Islamic and conventional banks eroded down during financial crisis period. When financial crisis remained within financial sector Islamic banks remained less effected however, when crisis spread into economy Islamic banks started to receive effects. This shows Islamic banks are more related to real sector of the economy. Domestic banks were more efficient than Islamic banks.
76	Doumpos et al. (2017)	BOFSI: Equity/total assets, loan loss provision/gross loans ratio, cost/income, profits/total assets, liquid assets/deposits and short-term funding ratio. DEA: Inputs deposit, equity overhead Output: Other assets, loans other earning assets. SFA: Interest expenses/deposits, overheads/total assets, loans other earning assets	Algeria, Bahrain, Bangladesh, Brunei, Egypt, Indonesia, Iraq, Jordan, Kuwait, Lebanon Malaysia, Mauritania Pakistan, Qatar, Saudi Arabia, Senegal, Syria, Tunisia, Turkey, UAE, Yemen	BOFSI, data envelopment analysis, stochastic Frontier analysis	Islamic banks have performed better in MENA region, however, conventional banks have performed better in Asia and Gulf region. Overall performance and efficiencies of Islamic banks are very similar to those of conventional banks.

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77	Daly and Frikha (2017)	DEA: Inputs: Market share, income diversity, total assets Outputs: Equity/total assets, net loans/total assets, govt. variables, efficiency	Bahrain	Data envelopment analysis, multiple regression, DWH test, Fisher-test, financial ratios	Income diversity, bank size, solvability indicators, and loans to assets ratio has positive impact on the performance of Islamic banks' (ROE). Whereas market share, solvability indicators and net loans to total assets (NL/TA) have significant effects on the ROE for conventional banks.
78	Miah and Uddin (2017)	DEA: Inputs: Operating costs, cost of deposits Outputs: loan Output. Regression: Efficiencies, bank's size, earning assets, and equity buffer, Islamic bank dummy	Saudi Arab, UAE, Kuwait, Qatar, Bahrain, Oman	Data envelopment analysis, stochastic Frontier analysis, ordinary least square analysis	Conventional banks are more cost efficient than Islamic banks. Islamic banks in Qatar and Saudi Arabia Banks are developing but banks in Bahrain and Kuwait have matured up and thus have cut throat competition with their competitors however, their size is smaller. Conventional banks are oversized whereas Islamic banks undersized which is leading to diseconomies of scale. Capital adequacy ratio in the GCC region is double the Basel requirement which is also a cause of inefficiency. Islamic banks are diverse in terms of cost efficiency whereas conventional banks are homogenous. short-term efficiency of Islamic banks is higher than conventional banks.
79	Batir et al. (2017)	DEA: Inputs: labour, capital, funds Outputs: Total loans, off balance sheet items, price of labour, price of physical capital, price of funds TOBIT: Technical efficiency, cost efficiency, allocative efficiency, profitability, capital adequacy, expense, deposit, loans, loan quality (NPL), size, GDP growth, inflation.	Turkey	Date envelopment analysis and TOBIT method	Technical Efficiency is higher than Allocative efficiency for all banks. Efficiencies of Islamic banks are higher than efficiencies of conventional banks in all respects. External variables such as GDP and inflation effect both types of banks negatively.
80	Bahrini (2017)	DEA: Inputs: Labour, fixed assets, deposits Outputs: Total loans, other earning assets	MENA region and GCC region	Boot strap data envelopment analysis	Pure technical inefficiency causes technical inefficiency. It has no concern with scale efficiency. Efficiency of GCC region Islamic banks remained better than the efficiency of

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					Non-GCC region Islamic banks during the period of crisis.
81	Ali Shah and Masood (2017)	Admin cost, deposit account, capital employed, commission on premium, net return margin, total loans and advances, net spread earned, total financing, gross premium, net investment income	Pakistan	Data envelopment analysis	The technical efficiency of Insurance sector is better than banking sector. Scale efficiency of conventional financial institutions is better than Islamic.
82	Azad et al. (2017b)	Production approach: Inputs: Interest expense, salary expenses, operating expenses Outputs: Interest income, net income Profitability approach: Inputs: Total capital, salary expense, interest expense Outputs: Total deposits, total loans Intermediation approach: Inputs: Total capital, total deposit, salary expense Outputs: Total loans	Malaysia	Two stage data envelopment analysis	Foreign banks have higher efficiencies than domestic banks. However, domestic Islamic banks are more efficient than domestic conventional banks. Islamic bank nature, foreign ownership and GDP are major determinants of bank efficiency. Efficiency scores vary according to approach and variables selection. To estimate efficiency during business cycles profitability approach should be used. Intermediation approach should be applied on long term data as it is more closer to going concern concept. Production approach gives holistic idea of bank efficiency, hence it should be applied to gauge the efficiency of the bank to serve the economy. The improvement in bank efficiency is not the phenomenon of technology and training alone, rather it also depends upon business strategy, bank's operational approach, and time of existence as well.
83	Azad et al. (2017a)	DEA Input: Deposit, equity, interest expense, non-interest expense. Undesirable carry over output: Non-earning assets Desired output: Liquid assets, net income Undesirable outcome: Loan loss provision Intermediary: Earning assets, loans	Malaysia	Three step NDEA model, robust regression, CAMEL	Local conventional and Islamic Banks are performing better than their foreign counterparts in terms of efficiency. Separate efficiency for each stage of operation of the bank i.e., production, intermediation and profitability should be computed. Banks inputs and outputs are related to each other i.e., by

<i>No</i>	<i>Authors</i>	<i>Efficiency variables</i>	<i>Country(ies)</i>	<i>Method</i>	<i>Conclusion</i>
					increasing inputs a proportionate output cannot be expected. Banks have different efficiencies in different stages of operation.
84	Shawtari et al. (2018)	DEWA: Inputs: Deposits, capital, labour Input prices: loan/finance, interest/finance income, non-interest/finance income Pooled OLS: Natural log of pure technical efficiency, natural log of scale efficiency, dummy of Islamic banks, natural log of GDP, natural log of inflation index, natural log of market concentration, natural log of total assets of the bank, natural log of capital/total assets, natural log of return on assets, natural log of finance provision/total finance, natural log of total non-interest income, natural log of total loans and finances for conventional and Islamic banks, natural log of liquid assets/liabilities.	Yemen	Three stage data envelopment window analysis (modified DEA analysis), pooled ordinary least square.	Islamic banks are far better than their conventional counterparts on the basis of technical and scale efficiencies. However, pure technical efficiency of conventional banks remain higher which implied Islamic banks need to invest more on human resource training.
85	Mezzi (2018)	DEA: Inputs: Staff cost, physical capital, total deposits Outputs: Income paid to depositors, administrative expenditure, total debt assets, total assets of participation, debt and participation returns, other income Regression: Size of the board of directors, number of independent directors, concentration of capital, size of shariah board, existence of a central shariah board, size of the bank, debt financing intensity, return on assets, quality management, risk of failure, financial crisis, economic growth.	Saudi Arabia, Bahrain. Bangladesh, Indonesia, Jordan, Kuwait, Malaysia, Palestine, Qatar, Sudan, Syria, Tunisia, UAE, Yemen	Data envelopment analysis, regression analysis	Islamic banks are showing improvement in cost efficiency. Malaysian and GCC Banks are realising scale efficiencies. MENA and South East Asian Banks have almost similar scale efficiencies. Board of directors and Shariah Board have significant roles in improving efficiencies. Size, financial stability, debt financing and cost control contribute significantly towards efficiency improvement.

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86	Zeineb and Mensi (2018)	DEA: Inputs: IZ-score, CEO duality, board size, structure Outputs: Total assets, deposit, debt ratio, credit growth, GDP.	GCC region	Data envelopment analysis, stochastic Frontier analysis, Z-score, sensitivity analysis	Banks with higher risk appear more efficient due to their governance structure. Economic conditions of a country play important role between efficiency and risk relationship.
87	Hadhek et al. (2018)	DEA: Inputs: Profit, number of employees, funds, net fixed assets, prices of inputs: personnel expenses/total assets, profit expenses/total deposits, operating expenses/fixed assets Outputs: Net loans, investment bond, bond, certificate of deposit. TOBIT: GDP/total population, average rate of inflation, population density, log of total assets, equity/total assets, net profit/average total assets, total loans/total assets, costs/income	Saudi Arab, Iran, Malaysia, Pakistan, Thailand, Egypt, Qatar, Jordan, Dubai, Tunisia, Kuwait, Sharjah, Dubai, Oman, Abu Dhabi	Two stage stochastic Frontier analysis, data envelopment analysis, TOBIT regression	There exists negative relationship between bank size and profit efficiency. Inflation and demand density negatively effects profit efficiency whereas GDP effects positively. Equity ratio and operating costs negatively affect profit efficiency whereas Credit risk does not have any significant relationship.
88	Mahdi and Abbes (2018)	DEA analysis: Inputs: Labour cost, fixed capital for production, financial capital Outputs: Total loans, other earning assets, personal expenses, fixed assets, total deposits. GMM: Loan loss provisions, bank cost efficiency, loan growth rate, net interest/return margin, preprovision income, capital, loan to asset ratio, inflation, GDP	Bahrain, Iraq, Algeria, Egypt, Jordan, Kuwait, Qatar, Saudi Arabia, Palestine, Tunisia, Turkey, UAE, Yemen, Pakistan	Data envelopment analysis, stochastic Frontier analysis, generalised method of movements	Risk taking in Islamicbank is the cause of risk underestimation, over estimation of technical efficiency and future profits.
89	Bahrini and Qaffas (2018)	Inputs: Staff costs, fixed assets, total deposits Outputs: Total loans, investment portfolio	Bahrain, UAE, Kuwait, Qatar, Saudi Arabia	Boot strap data envelopment analysis	Islamic banks have better technical efficiency than scale efficiency. Pure Technical inefficiency causes scale inefficiency. The efficiency scores of banks were not affected by financial crisis, be it during or after. Efficiency of Islamic banks was effected by financial crisis when it spread from financial to real sector.

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90	Sakti and Mohamad (2018)	DEA: Total deposit, personnel expenses, fixed assets, loans, non-interest income Regression: Size of the bank, fee income, non-deposit funding, loan deposit ratio, loss reserve, loan loss provision, non-performing loans, Z- score, return on assets, equity to asset ratio.	Indonesia	Data envelopment analysis, t-score, Z-score,	Islamic banks in Indonesia rely on non-deposit funding. Islamic banks have better assets quality. Islamic banks have better stability, overall efficiency, technical efficiency and scale efficiency.
91	Hassana et al. (2018)	DEA: Inputs deposits Outputs: Assets, capital, investments, advances, income	Saudi Arabia	Data Envelopment Analysis	With the increase in scale of business the efficiency of Saudi Islamic banks have started to decline.
92	Mohtashami et al. (2018)	DEA: Inputs physical assets, number of employees, deposit values, operational costs Outputs: Received commission, loan payments, investment amount, net revenue.	Iran	Two stage double frontier data envelopment analysis, Malmquist productivity index.	None of the bank has shown improvement in efficiency or productivity.
93	Nejad et al. (2018)	DEA: Input: Salaries, employee benefits Outputs: Branch profitability	Iran	DEA	Employee benefits lead to improved productivity of the bank branches.
94	Chaffai and Hassan (2019)	DEA: Inputs: Personnel expenses, book value of fixed assets, interest expenses, Outputs: total loans, other earning assets, and deposits.	Algeria, Bahrain, Egypt, Iran, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates, and Yemen	Stochastic Frontier analysis	Conventional banks are more efficient than Islamic banks in terms of technological, managerial and allocative efficiency. Banks in MENA region need to introduce more products and introduce more technology to improve their efficiency. The technological efficiency is higher in larger banks. Foreign bank status has no impact on efficiency. Online banking is important driver of cost efficiency.
95	Hafez and Halim (2019)	DEA: Inputs: Total deposits, assets Outputs: Total loans income	Egypt	DEA	Before financial crisis conventional banks outperformed Islamic window banks and Islamic banks. After financial crisis Islamic banks have better.

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96	Johnes et al. (2019)	For financial ratio analysis: cost to income ratio, non-interest expense to average assets ratio, net interest margin, other operating income to average assets, return on average assets, return on average equity.	GCC Countries	Financial ratio analysis and extended data envelopment analysis, i.e., Malmquist productivity index with standard two component composition	Cost efficiency of Islamic banks is lower than conventional banks; revenue efficiency is similar; Variations in technical efficiency and technology are more pronounced in Islamic banks. The blend of Islamic and conventional banks improves the ability of banking system to absorb external shocks; besides the distinction of Islamic and conventional, the distinction within Islamic banks in terms of product lines and specialisation. Islamic banks can improve their cost efficiency by adopting latest information technology speculations.
97	Wanke et al. (2019)	Inputs: Loans Outputs: Total assets and equity Contextual variables: bank ownership, type, and origin are assessed as exogenous factors. Country of origin represents the endogenous factor.	MENA	Dynamic DEA	The results reveal that bank type, origin, and ownership impact efficiency levels differently in terms of profit sheet, balance sheet, and financial health indicators, although the impact of culture and regulatory barriers seem to prevail at the country level.
98	Samad (2019)	DEA: Inputs: Labour, capital, deposits, and expenses; Outputs: Loans, investments in securities, and advances TOBIT: Capital adequacy, asset quality, management quality, cost efficiency, liquidity index, bank size.	Bangladesh	DEA with TOBIT Analysis, SFA, CAMEL and CAMEL plus Model	Efficiency of Islamic banks is positively related to capital adequacy ratio and number of branches and negatively related to poor loan quality, higher liquidity claim and bank size.
99	Saljoughia et al. (2019)	Choice of input out variables depends upon various factors. No single input out combination is applicable on all banks in operation	Fortune 500 List	DEA	DEA is a useful technique to identify inefficient units. Each inefficient bank can set its own bench marks input output variables and can accordingly improve their performance.

