An-Najah National University
Faculty of Graduate Studies

EVALUATING EFFICIENCY OF BANKS OPERATING IN SOME MIDDLE EAST COUNTRIES: ISLAMIC VERSUS CONVENTIONAL BANKS

By
Muna Ghaleb Mahmoud Nairat

Supervisor
Dr. Islam Abdeljawad

This Thesis is Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Finance, in the Faculty of Graduate Studies, An-Najah National University, Nablus, Palestine

2024

EVALUATING EFFICIENCY OF BANKS OPERATING IN SOME MIDDLE EAST COUNTRIES: ISLAMIC VERSUS CONVENTIONAL BANKS

By
Muna Ghaleb Mahmoud Nairat

This Thesis was defended successfully on 11/02/2024 and approved by:

Dr. Islam Abdeljawad **Supervisor**	**Signature**
Dr. Mohammad Sharba **External Examiner**	**Signature**
Dr. Shatha Qamhieh **Internal Examiner**	**Signature**

Acknowledgement

First, I would like to thank my supervisor, Dr. Islam Abdeljawad, for his constant support of my graduate studies and associated research and his patience, inspiration, and vast knowledge. His guidance was invaluable throughout the entire process of conducting research and writing this thesis.

Declaration

I, the undersigned, declare that I submitted the thesis entitled:

EVALUATING EFFICIENCY OF BANKS OPERATING IN SOME MIDDLE EAST COUNTRIES: ISLAMIC VERSUS CONVENTIONAL BANKS

I declare that the work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degree or qualification.

Student's Name	**Muna Ghaleb Mahmoud Naitat**
Signature:	منى غالب محمود نعيمات
Date:	**11/02/2024**

Table of Contents

List of Tables

List of Figures

List of Appendices

EVALUATING EFFICIENCY OF BANKS OPERATING IN SOME MIDDLE EAST COUNTRIES: ISLAMIC VERSUS CONVENTIONAL BANKS

By
Muna Ghaleb Mahmoud Nairat
Supervisor
Dr. Islam Abdeljawad

Abstract

Background: Improving efficiency is central to the success of any financial institution, especially in today's competitive market environment. Focusing on improving efficiency helps banks reduce costs, increase profits, enhance customer satisfaction, improve competitiveness, and enhance financial stability.

Objectives: This study aims to evaluate the technical efficiency and identify the main factors contributing to the efficiency of Islamic and conventional banks in Iran, Jordan, Palestine, Lebanon, and Syria.

Methodology: (83) banks participated in this study during the period 2013–2017, where secondary data was obtained from the annual financial reports of banks operating in the selected regions. and then analysed using data envelopment analysis (DEA) to evaluate the degree of technical efficiency and Regression analysis was also used to determine the main factors affecting the technical efficiency.

Results: The results of the DEA showed that Islamic banks are more efficient in using inputs (assets, capital, and deposits) to produce outputs (income, investment, and advances) from conventional banks in these countries, as well as their role in confronting the political and economic conditions that these countries suffer from, and that conventional banks in Syria and Lebanon are more efficient than Islamic banks because of government restrictions on Islamic banks, while Islamic banks in Iran, Jordan, and Palestine are more efficient because governments do not impose restrictions on their work.

The results of the regression analysis showed that bank size, capital adequacy, liquidity, profitability, GDP, poor asset quality and non-performing loans positively affect the technical efficiency of these countries' banking sector. The rule of law adversely affects this technical efficiency due to increased administrative costs. The study also revealed that Islamic banks are more efficient than conventional banks, and this is due to the

business strategy of Islamic banks, which focuses on reducing costs, which leads to increasing their technical efficiency.

Recommendations: Based on the results, the researcher suggests that regulatory authorities pass laws focusing on efficiency, determine the level of efficiency banks must achieve, and expand the geographical and temporal scope of the study to obtain more reliable results and proposals to improve the efficiency of the banking industry.

Keywords: data envelopment analysis; technical efficiency; Islamic banks; conventional banks.

Chapter One

Introduction

1.1 Preface

Research on the economy has a long tradition. Economic growth is considered one of the fundamental pillars of any country. All nations strive to develop their economies to have political strength and an ideal standard of living that enables them to meet their human needs for advancement among the world's economies by stimulating the economic and investment sectors. The importance of this role emerges, especially in developing countries that suffer from several economic issues, such as unemployment, a low standard of living, inflation problems resulting from financial dependence, and floating currency values in a crumbling economy (Zidan, 2019).

The banking sector contributes significantly to the economic development of the country. It is considered a financial intermediation unit between the units of the overflow (who owns the money) and the units of the deficit (who needs the money). The transfer of funds between these units contributes to financing investments in the basic form, thus advancing economic growth in the country (Almaqtari, Al-Homaidi, Tabash & Farhan, 2019).

The global economy has been exposed to financial crises in recent years, especially the mortgage crisis, which has led to the collapse of many of the great conventional banks worldwide. It contributed greatly to the emergence and popularity of the Islamic banking sector, which prohibits the use of interest from the principle of prohibiting usury. It also contributed significantly to its lack of exposure to risks associated with interest rates and usurious loans, which were the main factors in the mortgage crisis. Therefore, Islamic banks became our safe room for depositors and investors in light of the conditions of financial crises. They have also emerged as one of the most important competitors in the conventional banking sector (Miah, Suzuki & Uddin, 2021; Siraj & Pillai, 2012).

The Middle East region is a rich field for researchers because it serves as a bridge between Europe and Asia. The MENA area is also one of the oil-rich regions. It significantly contributed to the growth of those countries' banking systems but was limited by weak institutional foundations. As a result, the region's banking systems are growing swiftly. Governments should consider implementing proactive and advantageous economic and

institutional policies centred on Islamic finance because massive oil-fueled deposits anticipated to raise lending volumes do not seem to benefit net oil-exporting Middle Eastern countries (Boukhatem & Moussa, 2018).

Given the majority Muslim population in the Middle East and their ability to adapt to changing conditions and meet the financial requirements of the region, Islamic banks have expanded rapidly throughout the region. Moreover, Islamic banks are distinguished from conventional banks by refraining from using interest, which puts them in fierce competition with conventional banks. This led to new products and services from both types of banks. This also led to improved banking services in the region. The Islamic banking industry contributes significantly to the growth of the country's economy. Given its enormous potential, the industry needs to be able to maintain this upward pace to grow its market share in the Islamic banking sector. As a result, the Bank's effectiveness deserves greater attention. To determine the resistance of the Islamic banking sector to market fluctuations, it is also necessary to measure its financial health as well as efficiency (Raditya & Wibowo, 2022).

The Middle East's banking industry faces several political and economic challenges. However, the most recent global financial crisis brought on by the Corona virus and the crisis to which oil was exposed during this time had a detrimental impact on the industry and reduced bank efficiency (El-Chaarani, Abraham & Skaf, 2022).

The Middle East region is considered home to a variety of conventional and Islamic banks, mainly because of the similarity of the cultural level and the adoption of the Islamic religion by a large segment of the population of this region. The convergence of the economic levels of these countries makes it possible to compare their effectiveness to determine the most influential banks. They contribute to presenting a clear idea to the relevant parties (regulatory authorities, investors, and influential people in management) to make appropriate decisions regarding the relationship between each party.

Despite this, there is not much literature on assets and liabilities that examines Islamic banks in the region and across several countries systematically and consistently. The information on what drives the growth of Islamic finance is even more limited. There hasn't been a thorough investigation of the factors impacting our knowledge, except for a few broad generalizations that emerge in print media (Syed Ali, 2015).

To evaluate the efficiency of Islamic banks versus conventional banks, the data envelopment analysis (DEA) method, which is widely used in operations research and economics, is used to evaluate the performance of decision-making units (DMUs) such as companies or organizations. In addition to DEA analysis, regression analysis can be used, which helps identify the factors that affect efficiency. This helps improve the efficiency of the banking sector and enhance financial stability.

Although many studies have evaluated the efficiency of Islamic and conventional banks using data envelope analysis (DEA) and regression analysis, most of these studies appeared in different countries in the Middle East region. Hence, these studies are the first to bring together Iran, Jordan, Palestine, Lebanon, and Syria. This research seeks to determine how to evaluate the efficiency of banks operating in these regions and the main factors that contribute to the efficiency of banks in this region by comparing Islamic banks and conventional banks in light of these countries' political and economic conditions.

1.2 Research Problem

The banking sector operates in challenging conditions and are nevertheless subject to the political and economic climate of the Middle Eastern nations. As a result, it appears vulnerable to systemic risks like price shocks and inflation, which must be considered by the banking sector operates credit management (Abusharbeh, 2020).

The presence of domestic and international commercial banks made it more difficult for Islamic banks in the selected Middle East countries to compete in any way. These banks employed several internal strategies to generate revenues and ensure their viability, which heightened the level of competition (Awwad, 2022).

Islamic banking is subject to several restrictions and limitations, including the absence of pertinent national banking legislation, a lack of the necessary financial infrastructure, a low level of financial literacy among individuals and corporations, and a lack of knowledge about Islamic financial products (Jusupova, Kokh & Nikonova, 2018).

Accordingly, studying the efficiency of Islamic banks operating in the selected Middle Eastern countries is considered It is extremely important because of its ability to direct these banks towards correcting deviations in the path something its work and directing it to give sufficient attention to the issue of banking efficiency.

1.3 Research questions

In this study, we attempt to provide answers to the following questions:

1. What is the technical efficiency level of banks operating in the selected Middle Eastern countries?
2. What are the main factors that affect the efficiency of banks in the selected Middle Eastern countries?

1.4 Objective of the Study

This study generally aims to study the technical efficiency of Islamic banks and conventional banks in Iran, Jordan, Palestine, Lebanon, and Syria, all of which are developing countries, in order to improve the efficiency of the banking sector, which in turn will benefit the economies of these countries. Further, the study will shed light on the factors determining such efficiency.

The main goal is divided into different sub-goals, including:

1. Evaluating the efficiency of banks operating in the selected Middle Eastern countries.
2. Determining the main factors that contribute to the efficiency of banks in the selected Middle Eastern countries.

1.5 Research Importance

This study is important because it focuses on measuring efficiency aimed at reducing costs for banks and achieving higher profits. It also provides new data on the technical efficiency of conventional and Islamic banks in Iran, Jordan, Palestine, Lebanon, and Syria. In addition, it contributes to a better understanding of the nature of banking, which helps in making investment and financing decisions.

This study is very important because it provides valuable information to regulators, administrators, and sector watchdogs. It also provides information for decision-makers to make policies that support the growth of the banking sector and help customers and investors identify the most efficient banks they can rely on for their investments and financial operations.

Chapter Two
Theoretical Background

2.1 Definitions of Concepts

2.1.1 Islamic bank

Islamic banks flourished after the global financial crisis in 2008, the mortgage crisis, and European countries' desire to diversify funding sources. Islamic banks began to expand rapidly and showed a better risk tolerance than conventional banking organizations. The standard idea known as "Islamic banking" is simply banking that conforms to the Islamic belief system. There are already more than (300) Islamic banks operating around the world. The assets of Islamic banks have grown significantly, but they still constitute a small part of the global financial system (Jusupova et al., 2018; Mokhtar, AlHabshi & Abdullah, 2006).

This bank aims to support financial services and economic growth without engaging in transactions prohibited by Islamic law. Customers can obtain financial services consistent with their religious beliefs using Murabaha, Mudaraba, and Musharaka. The operational framework of Islamic banks facilitates their ability to maintain a strong infrastructure and prudent supervision. Thus, they equip them to effectively face the political and economic challenges affecting the banking sector (Gait & Worthington, 2007; Islahi, 2018; Hussain, Shahmoradi & Turk, 2015).

Islamic banks adopt a unique approach to managing political and economic risks based on Islamic values and principles. This approach allows them to manage investments more cautiously and avoid risky practices. The Islamic financial system is less vulnerable to risks due to its mechanisms. This allows Islamic banks to avoid exploitation and forbidden speculation. This increases confidence in the banking system during crises. Additionally, Islamic banks focus on long-term investments, making them less harmful in the face of sudden economic risks (Parveen, Langari Zadeh, & Muzakkir Syed, 2015; Abdul-Majid, Saal & Battisti, 2010 (Mirzaei, Saad, & Emrouznejad, 2022)) .

2.1.2 Conventional bank

conventional banks evolved over time, from traders lending money interest and advancing to the modern banking system. Their main objective was to provide financial services to individuals and companies, including accepting deposits, granting loans, facilitating payments, and providing investment and insurance services. conventional banks operate through a partial reserve system, holding a percentage of deposits as reserves and lending the rest to customers with interest. They use various financing tools, including loans, deposits, investments, and other services such as bank charges (Shafique, Faheem & Abdullah, 2012).

This bank aims to make a profit from the interest payments it charges on loans, enjoying more freedom to devise new financial instruments that return profits to the bank and can invest in projects and give loans without restrictions (Bader, Mohamad, Ariff & Shah, 2008).

Conventional banks face political and economic risks, such as political instability, economic volatility, credit risks, and market risks. To manage these risks, conventional banks use diversification, hedging, insurance, and reserve creation. Diversification involves investing funds in different risk reduction sectors, while hedging involves using financial instruments to hedge certain risks. Insurance provides insurance against various risks, reserves are configured to meet unexpected risks (Hassan, Mohamad & Khaled, Bader, 2009; HASSAN, Khan, AMIN & Khokhar, 2018; El-Chaarani et al., 2022).

2.1.3 Bank's efficiency

While assessing the bank's performance level, efficiency is closely linked to productivity, with these two describing the comparison of inputs and outputs. Efficiency is used to measure the bank's effectiveness in using its resources, while productivity is used to measure the bank's ability to achieve its objectives. A bank with high efficiency and productivity is one that can achieve its goals at the lowest possible cost (Izadikhah, 2018).

The efficiency of banks is crucial because it allows them to achieve profits and build a strong capital base that enables them to bear market risks and fluctuations and reduce the risks of financial deficits and political and economic risks that affect the banking industry (Alber, Elmofty, Kishk, & Sami, 2019).

The goal is to achieve maximum production (output) versus the inputs used. Because the most efficient banks have higher productivity, this leads to improving the bank's financial performance and increasing its competitiveness. However, banks with less efficiency may need greater improvements (Mokhtar et al., 2006; Sharma, Sharma, & Barua, 2013; Mandl, Dierx & Ilzkovitz, 2008).

2.1.4 Types of Efficiency

Determining the efficiency of banks is an important tool for evaluating their performance and making them able to compete in the markets. There are different types of efficiency, such as technical efficiency, allocation efficiency, and productivity efficiency.

1. Technical Efficiency: Technical efficiency indicates the extent of productive capacity that the bank can achieve by using the lowest possible amount of resources or essential inputs to perform its functions. Inputs (capital, deposits, and assets) and outputs(advances, investments, and income). The bank is described as "technically efficient" when it seeks productivity using the lowest possible amount of such inputs. This means that the bank is trying to maximize efficiency with the least possible input (Hassan & Aliyu, 2018; Qureshi & Shaikh, 2012; Sillah & Khan, 2014).

2. Allocative efficiency: Allocation efficiency is a key feature of effective banking systems and is the Bank's ability to allocate its resources in a more useful way to achieve efficiency. This efficiency refers to the optimal distribution of deposits, loans, and banking services, reflected in the ability of banks to channel resources to more profitable projects, which benefit banks, thereby contributing to the bank's increased efficiency.

   The primary objective of allocation efficiency is to achieve profit and reduce risk, leading to the delivery of the best services to customers through the effective allocation of resources (Othman, Mohd-Zamil, Rasid, Vakilbashi & Mokhber, 2016).

3. Productive efficiency: In the banking field, it is the ability of banks to produce a given quantity of output using a given set of inputs. It is crucial for banks and the economy as a whole, as efficient banks provide better products and services at lower costs, benefiting customers and investors. Measuring productive efficiency helps banks identify areas for improvement and achieve their goals (Sillah & Khan, 2014).

Various production efficiency methods include process improvement, resource management, and quality focus. Process improvement can involve redesigning processes, using new technologies, or training workers. Resource management can involve better inventory management. Quality focus can involve reducing defects and improving (Hassan & Aliyu, 2018; Qureshi & Shaikh, 2012).

Technology can be used to improve production efficiency, such as electronic banking systems. Risk management can reduce losses and save money. Innovation can lead to the development of new, more efficient products and services. It can be understood that improving production efficiency in banks is essential for achieving their goals and enhancing their performance (Fecher, Kessler, Perelman, & Pestieau, 1993).

2.1.5 Overview of Data Envelopment Analysis (DEA)

Data envelopment analysis is a non-parametric method based on linear programming theory in operations research. It is used to evaluate the relative efficiency of decision-making units (DMUs) that use a certain number of inputs to produce outputs. Relative efficiency is defined as comparing the efficiency of each decision-making unit or each economic unit. Compared to other economic units in the sample that use the same inputs to produce the same outputs (Hassan & Aliyu, 2018). It helps to determine best practices or standards by comparing the performance of Different units (Talluri, 2000).

Data envelope analysis (DEA) is a way to compare the effectiveness of Islamic and conventional banks in order to enhance profitability and competitiveness. It finds the areas where banks may grow successfully and helps them manage risk, both of which are necessary to meet the organizational goals

It aims to distinguish between effective and ineffective units by assessing the bank's ability to use input efficiently to produce optimal outputs. The efficiency scale ranges from (0) to (1), as 1 indicates optimal efficiency and the value (0) indicates an ineffective use. The analysis of the data envelope determines effective banks and uses it as a reference standard to compare them with ineffective banks, which helps in the ineffective banks to improve their efficiency (Hatami-Marbini & Toloo, 2019; Mirzaiyan, Sanei, Lotfi & Mozaffari, 2019).

2.1.6 Different types of DEA models (CRS, VRS)

Returns to scale: It is a measure that reflects the relative increase in outputs relative to the relative increase in inputs. Therefore, it is an economic measure that measures the efficiency level of the economic unit under evaluation by inputs and outputs.

The constant return to scale model (CRS) by (Charnes, Cooper & Rhodes, 1978) assumes that the economic unit, such as the bank, has constant returns and that the volume of production changes in the same proportion as the volume of inputs. The model also assumes that all banks in the market follow the same technology and methods, allowing the assessment of banks' efficiency by comparing inputs and outputs. However, this model faces challenges because it assumes constant returns to scale and does not consider irregular changes in inputs and outputs in different proportions. This is due to the fact that banks may differ in size, type of activity, and geographical location.

For this reason, BCC Banker, Cooper, Seiford & Zhu (2011) developed the variable return to scale model (VRS), which assumes that all banks use different technology, allowing them to receive different returns on their inputs. This means that banks can produce the same outputs using a variety of inputs.

Since the VRS model considers different changes in input and output ratios between several banks, it is more realistic than the CRS model. Furthermore, the model facilitates more efficient change steering. However, compared to the CRS model, the analysis of the VRS model can be more difficult. The model could need more thorough data processing (Hassan & Aliyu, 2018; Debasish, 2006; Johnes, Izzeldin, Pappas, & Tsionas, 2014).

2.1.7 Types of Efficiency Measurements in DEA

1. Input-oriented model: It is concerned only with inputs and seeks to reduce the inputs. This model assumes that the most efficient bank is the bank that uses the least amount of resources to produce the same amount of outputs (Al Shaher, Kasawneh & Salem, 2011).
2. Output-oriented model: It is concerned only with outputs and seeks to maximize output. This model assumes that the most efficient bank is the one that produces the most output using the same amount of resources (Al Shaher et al., 2011).

Theory

These theories are closely related to this study, as the impact of the bank's ability to use its resources to achieve the bank's banking services will be observed on the efficiency of the banking sector in Iran, Jordan, Palestine, Lebanon, and Syria. Furthermore, this theory discusses bank size, liquidity, profitability, capital adequacy, GDP, poor asset quality, non-performing loans, and the rule of law, which are relevant to this study, as evidenced by the impact of these factors on the technical efficiency of the banking sector operating in selected countries.

2.1.8 Efficiency Theory

Bank efficiency theory measures the efficiency of banks in using resources to maximize production or profit. It evaluates the bank's ability to maximize profit by efficiently using input and outputs and managing risk effectively. Efficient banks can identify areas for improvement, increase profitability by increasing revenue or reducing costs, and make decisions that increase profitability and reduce administrative costs.The theory of efficiency in Islamic banks may differ from conventional banks due to differences in financing structures and operations (Mensi & Zouari, 2010).

2.1.9 Theory of Production

The theory of production in economics explains how banks decide the proportion of each product or service they provide, such as advances, investments, income, and the use of resources such as assets, deposits, and capital. It is based on basic economic principles, such as the relationship between bank prices and factor prices and the relationship between bank prices, factors of production, and quantities. Banks make decisions about their production activities in three layers: short-term decisions, which involve cost reduction and profit maximization, medium-term decisions, which involve branch sizing, technology identification; and long-term decisions, which involve limiting the number of branches and determining the types of banking services they will provide. These decisions are based on basic economic principles and are influenced by factors such as interest rates and technology costs. Production theory in Islamic banks may differ from production theory in conventional banks due to differences in their financial structure and operations (Ferreira, 2019).

2.2 Literature review

The majority of countries around the world are working to strengthen their banking systems, as this is extremely important for economic progress. This applies to the Middle East region. The Middle East is viewed as a region with shared economies, cultures, and religions, but it faces many difficulties that limit its ability to thrive economically. With the emergence of oil and its high prices, the economies of these regions grew thanks to the investments of oil-exporting countries. This positively impacted other countries in the region (Iran, Jordan, Palestine, Lebanon, and Syria) through increased trade, capital flows, and worker remittances, leading to increased banking system penetration (Khasawneh, Al Shaher, Kasawneh & Salem, 2011).

These developments created an environment of intense competition between different banking sectors, the most prominent of which was the competition between Islamic and conventional banks due to the significant influence of Islamic culture on Islamic banks.

Because of the competition between types of banks, interest in knowing which bank is better in terms of efficiency has increased (Fecher et al., 1993). Many types of analytical methods have been used to evaluate efficiency. Until data encapsulation analysis developed over time to measure financial performance and predict future trends in the financial and economic sectors, major advances in data processing and storage technology during the 1990s paved the way for using database management systems and sophisticated data analysis tools. Data envelopment analysis now relies on the latest technologies, such as extensive data, to improve understanding and decision-making.

This section deals with many studies that compare the performance of Islamic and conventional banks. Many studies have indicated the importance of the data envelope model in comparing similar economic units. So, since its first application in the economy and because of its demonstrated worth in the analysis to know the efficiency of the Islamic and conventional banking sectors and to compare them in the Middle East, the data envelope model will be used to assess the effectiveness of banks. (Ahmad, Noor & Sufian, 2010) investigated the effectiveness of Islamic banks in (16) countries in the Middle East and Africa between 2001 and 2006 to determine the efficiency of banks using the data envelope model. The study results showed that Islamic banks in these regions are more effective than those in other Asian regions.

According to Khartabiel, Ahmad and Bakar (2018) studied the comparative performance analysis of Islamic and conventional banks in various countries of the Middle East. The study sample included (44) Islamic and (44) conventional banks from Asia, Africa, the Middle East, the Gulf region, and Europe for (12) years from 2005 to 2016, compared for their financial performance. This study adopted data envelope analysis and regression analysis to measure the degree of efficiency of banks to represent their financial performance. The results of this study indicated that although Islamic and conventional banks are relatively ineffective from a technical point of view, Islamic banks were less volatile than conventional banks during the period before and after the global financial crisis. The study recommended a new international banking system business model based on Shari'ah law transactions. In order to stimulate the economy and establish a link between financial expansion and economic growth, nations and financial institutions should both support Islamic business activity.

The Muslim majority in all Middle Eastern countries has greatly aided the spread of Islamic banks. Raditya and Wibowo (2022) studied the efficiency and stability of the Islamic banking industry in Indonesia, Malaysia, and the Middle East region. The study aimed to measure the efficiency of these banks and their ability to adapt to fluctuations in the market and measure the differences between the Islamic banking industry between these countries, as the study sample included 110 banks from 2016 to 2020. The majority of these banks were from Middle Eastern countries, and this data was processed.

Using random frontier analysis (SFA) and Z-score technology, the study used total funding as an output variable (output) and also used total fixed assets, total external funding, and total staff costs as input variables. The study found that total Indonesian Islamic banks are less efficient than Malaysian Islamic banks and banks operating in the Middle East region, but they are more stable in the face of market fluctuations. In addition, the study found, using the regression model of ordinary least squares (OLS), that all these variables (inputs) positively impact the efficiency of Islamic banks and that the financing of third parties is the most important. The study indicated that the Islamic banking industry contributes significantly to the growth of the country's economy.

Given its immense potential, an industry needs to maintain this upward pace to grow the market share of the Islamic banking sector. As a result, a bank's effectiveness warrants

greater consideration. To assess the Islamic banking sector's resistance to market volatility, efficiency, and financial health (Raditya & Wibowo, 2022), the competition between them and commercial banks was intense because Islamic law forbids usury. Even though there is a Muslim majority in these countries, we cannot say that Islamic banks are more efficient than conventional banks.

Johnes, Izzeldin, Pappas, and Tsionas (2014) conducted a study comparing the financial performance of Islamic and conventional banks before and after the global financial crisis from 2004 to 2009. The study included countries with a Muslim population of (60%) and both Islamic and conventional banking systems. Data envelopment analysis was used to compare efficiency levels using deposits, short-term financing, fixed assets, general and administrative expenses, and property rights. Regression analysis was also used to determine the factors affecting efficiency (bank size and gross domestic product). The study reveals that bank size negatively affects the efficiency of Islamic banks. While GDP positively affects the efficiency of the banking sector, given the constraints imposed on them, managers of Islamic banks are likely to be more productive than conventional banks. The results indicate that Islamic banks can manage resources effectively and maintain profitability.

Moualhi (2015) evaluated the efficiency of (33) Islamic banks using data envelopment analysis for the Middle East and North Africa (MENA) region between 2006 and 2012. The results showed the inefficiency of Islamic banks due to the management's inability to monitor costs and use resources. In a similar study published by (Noor, Bakri,Wan Yusof, Noor & Zainal, 2020) experimental results showed the inefficiency of Islamic banking sectors in the Middle East, North Africa, Asia, and other regions during the study period. The reason is that during the recent global financial crisis and the Asian financial crisis, moral hazard was the reason for the insufficient private sector oversight of financial markets by rating agencies and private investors, which reduced the efficiency levels of banks.

Many researchers Zidan (2019) have been interested in studying the relationship between the banking sector and economic growth. Generally speaking, banks are considered the most important financial intermediaries within the economy as they link surplus and deficit economic units together, resulting in a positive relationship between banking

credits and economic expansion. This shows that, in the case of supply-led growth, the growth of the banking sector tends to increase the productive potential of the Palestinian economy. However, the interest rate, customer deposits, and the number of branches have little bearing on economic expansion. The banking credit policy substantially impacts the economy; hence, clear advantages exist. Understanding which conventional and Islamic banks are the most effective due to their intense competition is essential. Due to the fact that a healthy banking system is reflected in the banks' efficiency, which also helps in economic growth, banks' monetary policy is sound (Milenković, Radovanov, Kalaš & Horvat, 2022).

Previous research Altun Ada & Dalkiliç (2014) studied the performance comparison of Malaysian and Turkish Islamic banks and used a data envelope model to measure the efficiency of Islamic banks in Turkey and Malaysia from 2009 to 2010. It was found that the efficiency of Malaysia's banking sector is better than that of Turkey's banking sector. The researchers (Ayaz, Qahar & Ullah, 2021) conducted another study to determine the efficiency of Islamic banks in Pakistan and Malaysia regarding governance, risk, and bank efficiency. In both countries, that risk negatively affects the efficiency of banks.

Other researchers Mustafa & Zahoor (2022) conducted a study for the same purpose in Pakistan from 2008 to 2018. He used the same metrics that the researcher used to determine the efficiency of the banking sector. However Ayaz, Qahar and Ullah (2021), found that Islamic banks are characterized by efficiency in Pakistan. According to Aikael (2008), who utilized a data envelopment model to examine the efficacy of the banking industry from 1998 to 2004, commercial banks in Nitsaya were the most effective. Tanzanian banks' performance was good, but they still required development. Similarly, the researchers Sari, Ajija, Wasiaturrahma, & Ahmad (2022) showed that conventional banks were highly efficient in Indonesia from 2006 to 2019.

Many studies have indicated the importance of comparing the conventional and Islamic banking sectors, the most important of which was the study by (Mirzaei et al., 2022). Mirzaei studied the performance of bank stocks during the Corona pandemic. The study sample included (426) banks distributed in (48) countries around the world. The study adopted the data envelope analysis model and found that the financial performance of the shares of Islamic banks was superior to their conventional counterparts in light of the

conditions of the Corona pandemic, which is consistent with the study by (Miah et al., 2021), which indicates that conventional banks are more vulnerable to collapse in the crises that the world is facing. In contrast, Islamic banks are unique in that they can draw large numbers of customers during crises even though their profits may be modest.

An early work completed by Bade, Mohamad, Ariff, and Shah (2008) evaluated (43) Islamic and (37) conventional banks to determine their efficiency using the data envelope model. The inputs were the sum of employee costs and fixed assets, and the outputs were the sum of loans and other income-generating assets. The researcher explained in his study that there is no clear difference when comparing the efficiency of Islamic and conventional banks. Another study (Hassan et al., 2009) included (22) Islamic banks and (18) conventional banks from Organization of the Islamic Conference (OIC) countries during the period 1990–2005. The results of the study showed that there is no clear difference between the efficiency of Islamic banks and the efficiency of conventional banks.

According to Qureshi and Shaikh (2012), the effectiveness of Islamic and conventional banks in Pakistan from 2003 to 2008 was compared using data envelope analysis and financial ratios. Financial ratio research shows that Islamic banks are more effective at generating income and less efficient at generating costs. They employed technical, pure technical, and scale efficiencies to examine the data envelope analysis to compare efficiency. The study's findings demonstrated that conventional banks in Pakistan were more effective than Islamic banks during the study period.

According to Shahid, Rehman, Niazi, and Raoof (2010) in their study on the Pakistani banking system, showed agreement with Qureshi and Shaikh (2012). The study results showed that conventional banks are more efficient than Islamic banks by using the data envelope model, which uses inputs from deposits, capital, and outputs portfolio investment, loans, and advances to ascertain whether bank efficiency negatively impacts the Egyptian economy.

Recent research Kerimov, Babayev, Dudchenko, Samusevych & Tumpach (2023) examined the effectiveness of (21) conventional banks, four conventional banks with Islamic windows, and 5 Islamic banks between 2005 and 2020 using the data envelope model and financial ratios monetary system. According to the study, conventional banks

are less capable of supporting the Egyptian economy than the Islamic banking system. By measuring the constant and variable technical efficiency, the researchers (Loghod, 2010) clarified the effectiveness of Islamic banks comparedto conventional banks. Given that the volume yield in the Emirates is constant, he employed two inputs—fixed assets and deposits—and just one output return on assets. According to the findings, Islamic banks are more effective than conventional banks.

Recently published work by Hadzi and others (2022) used a data envelope model with CRS and VRS for the study. It focused on comparing conventional banks with Islamic banks operating in Indonesia between 2011 and 2019 to determine their efficiency. The researcher used several variables as input and output, including liquid assets, total financing, profit-sharing income, operating costs, personnel costs, and fixed assets. The results showed that conventional banks are more effective than Islamic banks.

According to Haque, Tausif, and Anis (2020) conducted another study that included the same purpose: a comparison between Islami and conventional banks in the Kingdom of Saudi Arabia during 2014–2018 using conventional financial ratios and the data envelope model. The results show that conventional banks are more efficient than Islamic banks. In terms of return on assets and return on equity.

According to Srairi (2010) in the Gulf Cooperation Council countries from 1999 to 2007, the researchers examined the effectiveness of (48) Islamic and (23) conventional banks. The total of paid interest expenses, additional operational and administrative costs, and expenditures for personnel made up the inputs. The output was the net amount of client loans and other assets with an income-producing potential. Conventional banks are more effective than Islamic banks.

According to Sawafta (2021) suggests that financial institutions in Palestine develop their operational and management processes in order to deal with the financial climate. They must expand their risk management research and training initiatives. In addition, it is necessary to cut back on loans to the public sector (government). Additionally, there is a need to concentrate on mergers, particularly for smaller banks, to boost their capital and create banking units that can compete to deliver superior customer service and promote the banking industry's stability. The study produced several findings, the most significant of which is the presence of high-level strategic innovation characteristics in Islamic banks

in Palestine (82.22% relative weight). Additionally, there are no variations in the average estimates of the study variables' reality in Islamic banks due to gender, age group, educational qualification, number of years of service, or job title. The study also offered several recommendations, such as that the bank should create a setting and climate where staff may devote their intellectual energy, encourage them to use strategic creativity, and treat all creative ideas fairly regardless of who came up with them (Mohamed, Suliman, Mazen & Abu-Naser, 2020).

According to study of Shawtari, Ariff, and Abdul Razak (2015) compared the efficiency of Islamic and conventional banks in Yemen from 1996 to 2011. They used data envelopment analysis and regression analysis. The results showed that the banking sector in Yemen was low in efficiency, as Islamic banks showed higher efficiency than conventional banks. The regression test also showed that Islamic banks were more efficient than conventional banks using the variables bank size, profitability, capital, and total loans. The study highlights the need to improve efficiency in the banking sector.

According to study of Sufian and Habibullah (2009) evaluated the effectiveness of Islamic banks in (16) countries in the El-Mina region. The researcher used data envelopment analysis for inputs (deposits and capital) and outputs (financing, investment, and income). Using regression analysis, the study identified variables affecting efficiency, including bank size, non-performing loans, and GDP. The results showed that non-performing loans negatively impacted efficiency, while bank size and GDP positively impacted efficiency. Larger banks result in more savings. The study results showed that Islamic banks in the El-Mina region enjoy technical efficiency. Siraj, Naz, Sheikh & Farooqi (2022) used the same analysis methods in Pakistan to measure the efficiency of the banking sector from 2005 to 2018. The results of this study indicate that conventional banks have higher efficiency levels than Islamic banks.

Anwar (2014) studied the determinants of the efficiency of Malaysian banks from 2002 to 2010 using regression analysis (size, liquidity, profitability, GDP, non-performing loans, and capital). The results showed that all factors positively affected efficiency and that non-performing loans affected Positively due to their low ratio of less than (0.05), meaning that non-performing loans did not significantly affect the bank’s efficiency.

A study in Jordan analyzed the profitability of (24) banks from 2008 to 2018. The study revealed that the capital adequacy ratio, cost-to-income ratios, and non-performing loans positively influence the profitability of banks in emerging markets (Al-Sharkas & Al-Sharkas, 2022).

The calibre of the assets held by financial institutions significantly impacts their effectiveness and success in the banking and financial services industries. Poor asset quality can have a big impact on banks' efficiency. Wahid (2016) comparing the efficiency of banks in Malaysia from 2004 to 2013, examined the impact of efficiency determinants on Islamic banks and conventional banks using data envelopment analysis and regression analysis. The study concluded that Islamic banks have better efficiency than conventional banks, as Islamic banks witnessed significantly higher levels of efficiency. In comparison with small banks, the study found that banks with weak asset quality experienced lower efficiency and productivity levels than banks with higher asset quality. Also, there is a positive relationship between GDP and the efficiency of Islamic banks as the demand for financial services increases with economic growth.

According study by Shaikh, Sharif, and Arif (2016) analyzed the efficiency of (5) Islamic banks and (25) conventional banks in Pakistan from 2008 to 2013 using asset quality, and the results showed that Islamic banks are better than their counterparts. The reason is that the higher the quality of the assets, the smaller the allowances for loan losses, and this makes them more efficient due to avoiding investment that conflicts with Islamic principles.

According of Bushara, Aziz and Hussain (2018) to studied the efficiency of Islamic and conventional banks using factors that affect efficiency (size and profitability) during the financial crisis. The researcher found that conventional banks faced more difficulties than Islamic banks in maintaining profitability during the 2008 financial crisis. The researcher agreed with the results of (Jusupova et al., 2018) that Islamic banks are better than conventional banks in facing crises, while Islamic banks, in general, showed higher capital adequacy and implemented strategies to reduce costs during the financial crisis, which led to an increase in efficiency.

Studies conducted by Basu, Prasad & Rodriguez (2015); El-Chaarani et al. (2022) examined the impact of the COVID-19 epidemic on the indicators of Islamic banks and

conventional banks. They found that while Islamic banks could maintain their efficiency, most commercial banks suffered due to the strategy in which they operate, which led to inefficiency. The reason is that the volatile economic growth causes banks to suffer from a decrease in demand for their financial services, an increase in default on loans, and thus a decrease in production.

These results are in line with Sufian and Habibullah (2009), who evaluated the efficiency of Islamic banks and conventional banks in East Asian countries using variables (liquidity, size, profitability, and gross domestic product) to determine the extent of the impact of these factors on the efficiency of banks using regression analysis. The results showed that, due to the financial crisis that led to an economic recession, there was a negative correlation between gross domestic product and the efficiency of banks during the country's crisis.

The rule of law greatly influences the effectiveness of the banking industry (Moualhi, 2015). Because Islamic banks operate according to Shari'a principles, they are believed to be more efficient than conventional banks, especially in areas exposed to political and economic factors that lead to a weak rule of law. This is due to the nature of its work, which relies on the principles of Islamic Shari'a, which distinguish it by being free of benefits and having the ability to absorb risks. Conventional banks are ineffective in countries with weak legal systems since they rely primarily on usurious loans for their financing, which exposes them to the risk of loan default and non-payment by customers and companies (Sbeiti & Alqatan, 2021). In countries with strong legal systems, the rule of law benefits Islamic and conventional banks by improving operational efficiency and promoting fair competition. The rule of law enhances investor confidence in Islamic and conventional banks by providing a stable and predictable legal environment.

2.3 The gap

Most previous studies have focused on measuring conventional banks' efficiency as a key element of the local economy. This study highlights both conventional banks and Islamic banks and assesses and compares the technical efficiency of these banks. The study will also highlight the factors affecting the technical efficiency of the banking sector.

This is the first study to evaluate the technical efficiency of banks in Iran, Jordan, Palestine, Lebanon, and Syria using a data anvelopment analysis model and regression analysis. Albaity, Mallek & Noman (2019) found that in the Middle East, Islamic banks are more susceptible to the competition-fragility impact than conventional ones. This study has potentially substantial policy ramifications for regulators aiming to increase bank stability. Therefore, this study provides a comprehensive picture of the bank's efficiency and a comparison between conventional and Islamic banks.

2.4 Conceptual Design

Technical efficiency is a crucial topic for improving the productivity of Islamic and conventional banks. However, previous literature and online studies show that results vary due to factors like methodology, sample size, competence type, and the economic environment of each country, especially in the tested sample.

1. Data envelopment analysis

Data envelopment analysis is the most effective way to calculate the efficiency of banks. The study of Hatami-Marbini & Toloo (2019) indicates how a particular bank operates technically on a relative basis compared to other banks that operate in the same conditions within the sample, and since the most efficient bank is the one that was able to create the largest number of outputs with the same level of inputs.

Inputs and outputs are essential tools for evaluating the efficiency of banks in various aspects. Inputs and outputs are intimately related. A bank can improve its efficiency by better managing assets, capital, and deposits. This improved management leads to achieving profits and reducing costs, which in turn contributes to increasing the volume of investments, advances, and income. This efficiency enhances the bank's ability to withstand losses, improves competitiveness, and boosts customer confidence, thus enhancing its overall performance (Hassan & Aliyu, 2018).

Input

1. Assets: Reflect the bank's size and financial capabilities, which are all assets owned by the bank and used in the operation of the bank and include funds, investments, loans, real estate, and other assets belonging to the bank. Large assets indicate that

the bank has sufficient resources to invest and finance loan (Johnes et al., 2014; Moualhi, 2015).

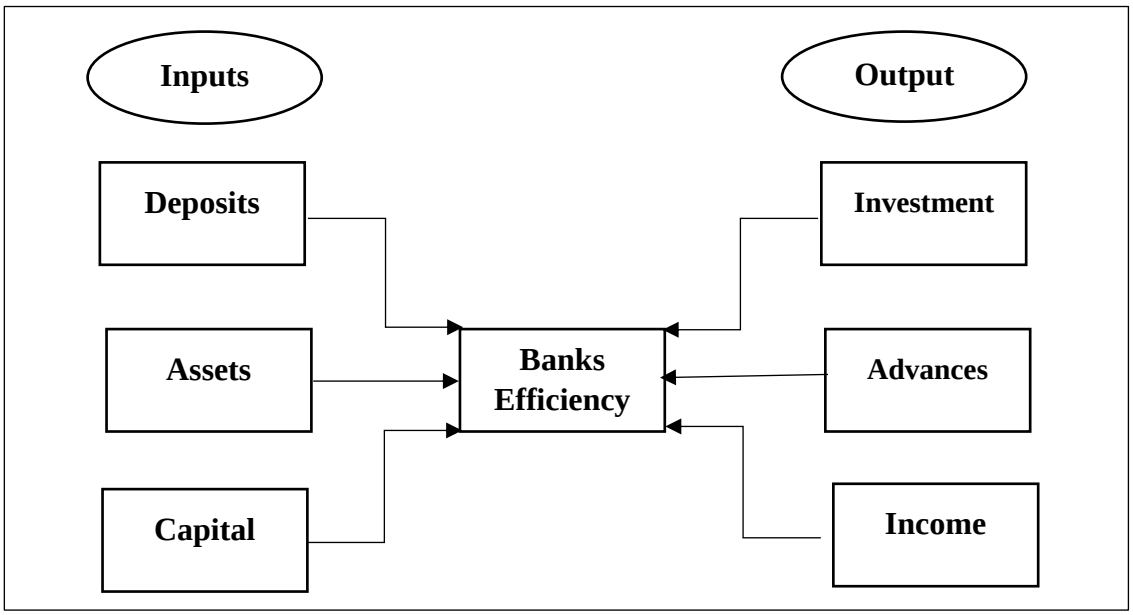
2. Deposits: Reflect on the bank's available resources as the main sources of funding for banks. Large deposits indicate that the bank has a strong customer base (Johnes et al., 2014; Khartabiel et al., 2018; Moualhi, 2015).
3. Capital: Reflects the bank's ability to withstand losses. This is the total amount of money used by the bank to issue shares and retain profits and is used to finance the bank's activities. The big capital indicates that the bank has a strong financial base that enables it to withstand losses without the bank going bankrupt (Johnes et al., 2014; Qureshi & Shaikh, 2012).

Output

1. Advances: Reflect the bank's ability to provide banking services to customers, such as loans and investments against collateral. Large advances indicate that the bank plays an important role in the economy (Hassan & Aliyu, 2018).
2. Investment: Reflects the bank's ability to grow and expand, banking services that the bank provides to customers or participates in, such as investments and loans that generate high returns and help achieve the bank's financial objectives (Hassan & Aliyu, 2018; Khartabiel et al., 2018; Moualhi, 2015; Sillah & Harrathi, 2015).
3. Income: Reflects the bank's financial performance, which is the total revenue it earns from its banking services. A large income indicates that the bank is performing well (Khartabiel et al., 2018; Moualhi, 2015; Qureshi & Shaikh, 2012).

Figure (1)

Conceptual framework of the data envelopment analysis model



2. Determinants of bank efficiency

Banks differ in the characteristics that constitute their internal environment and distinguish them in their performance from other banks. Capital adequacy , bank size, liquidity, GDP, profitability, non-performing loans, poor asset quality, and the rule of law are the most important characteristics of banks that distinguish them from others.

1. Bank type: The type of business offered by the banking sector can have an impact on its efficiency. For example,(Jusupova et al., 2018) found that bank type is a key factor in determining cost efficiency. El-Chaarani et al., (2022); Ahmad, Noor & Sufyan (2010) found that Islamic banks have higher cost efficiency than conventional banks, giving them a competitive advantage in the market. The reason for this is that Islamic banks can reduce costs by relying on Islamic Sharia principles that impose restrictions on their banking services, such as avoiding usury that protects them from sudden political and economic volatility in crises, giving them a competitive advantage in the market, as well as the use of modern techniques and automation of operations, which can help improve efficiency and reduce costs.

   H1: There is a positive relationship between the type of bank and the technical efficiency of the banking sector in the selected countries.

2. Bank Size: The size of the bank reflects the tendency of large banks to be more efficient than small banks because they have a high ability to take advantage of the abundance of size, enabling them to reduce costs, achieve profits, and improve competitiveness (Shawtari et al., 2015; Sufian & Habibullah, 2009; Antunes, Hadi-Vencheh, Jamshidi, Tan & Wanke, 2022; Anwar, 2014; Khartabiel et al., 2018). Small banks are sometimes perceived as more flexible in adapting their services because they can meet customers' needs more flexibly in the face of economic downturns (Johnes et al., 2014; Shawtari et al ., 2015; Siraj et al., 2022; Wahid, 2016).

   H2: There is a positive relationship between bank size and the technical efficiency of Islamic banks and conventional banks in the selected Middle Eastern countries.

3. Profitability (ROA): Reflects the Bank's financial performance, which is the ability of the Bank to use its assets for profit. The most profitable banks have higher efficiency than the least profitable banks because they have more resources to invest. High-profit banks have the potential to maintain profit margins and manage administrative costs more efficiently, allowing them to allocate more capital and reduce the risk of economic recession and political instability (Antunes et al., 2022; Anwar, 2014; Fernandes, Stasinakis, & Bardarova, 2018; Khartabiel et al., 2018).

   H3: There is a positive relationship between the profitability (ROA) and technical efficiency of Islamic banks and conventional banks in the selected countries.

4. Liquidity: Reflects the bank's ability to meet its financial obligations. The most liquid banks tend to be more efficient than the least liquid banks because they have sufficient funds to cover their obligations. The most liquid banks also enable the bank to manage risks more effectively, improve the bank's ability to finance activity, invest in assets, and increase its ability to attract deposits (Anwar, 2014; Kamarudin, Sufian, Nassir, Anwar & Hussain, 2019). On the other hand, low liquidity causes banks to manage their operations less effectively, which increases their exposure to risk because it raises administrative expenses, which reduces the bank's efficiency (Fernandes et al., 2018).

H4: There is a positive relationship between liquidity and technical efficiency of Islamic banks and conventional banks in the selected countries.

5. Capital adequacy: Reflects the bank's ability to cover losses, Banks with strong capital tend to be more efficient than banks with weak capital because they have more ability to cover losses without the bank going bankrupt. Banks are also more able to attract customers because they are safer and enable banks to expand their business and manage their risks more efficiently (Anwar, 2014; Fernandes et al., 2018; Kamarudin et al., 2019; Shawtari et al., 2015).

   H5: There is a positive relationship between bank capital adequacy and the technical efficiency of Islamic banks and conventional banks in the selected countries.

6. Poor Asset Quality: Measures the risks associated with the Bank's financial assets, loans, and investments that the Bank does not expect to recover in full, putting banks at risk of bankruptcy and losses if they are unable to repay debts as their poor assets quality grow. Lower quality increases the allocation of loan losses, raising credit costs, raising risk, and decreasing customer confidence. Banks can improve poor asset quality vulnerability management by taking effective steps to improve risk assessment, diversify the asset portfolio, and create adequate allocations to meet credit risks. It can also restructure and schedule poor assets, which positively reflects the bank's efficiency (Kamarudin et al., 2019; Wahid, 2016; Sukmana & Setianto, 2018).

   H6: There is a positive relationship between Poor asset quality and technical efficiency of Islamic banks and conventional banks in the selected countries.

7. GDP Growth: Reflects the size of the overall economy. A developing economy tends to be more efficient than a declining economy because banks have more opportunities. Growth and expansion lead to increased demand from customers and investors for banking services, which reflects positively on the efficiency of banks (Anwar, 2014; Johnes et al., 2014; Kamarudin et al., 2019; Khartabiel et al., 2018; Wahid, 2016). Conversely, economic expansion leads to inflation and financial instability, thus increasing risks to banks and may lead to decreased efficiency due to instability. As a result, banks may find it more difficult to obtain the funds needed

for their operations, leading to increased risks facing banks and potentially reduced efficiency due to financial instability (Sufian & Habibullah, 2009).

H7: There is a positive relationship between the GDP and the technical efficiency of Islamic banks and conventional banks in the selected countries.

8. Rule of Law: The rule of law is a fundamental pillar of banks' efficiency, providing a stable legal environment that reduces risks and enhances the confidence of the financial system. The rule of law forces banks to follow disclosure, auditing, and compliance guidelines with anti-corruption laws and regulations such as money laundering, supporting terrorism, and protecting customers' rights. Banks perform better in countries with strong legal regimes because they are protected from potential losses by protecting property rights. It enhances banks' financial stability and increases their ability to make investments and projects Making profits This has a positive impact on banks' efficiency (Sufian et al., 2009; Moualhi, 2015; Sbeiti & Alqatan, 2021). However, strong legal systems may hinder banks' ability to operate efficiently because they raise the administrative expenses of doing business by requiring banks to comply with imposed rules, which reduces their profits.

   A strong rule of law increases government oversight to ensure that banks follow the law and avoid engaging in illegal activity, such as money laundering. This raises banks' administrative expenses to set up the system and hire new employees to ensure no criminal activities.

   H8: There is a positive relationship between the Rule of Law and the technical efficiency of Islamic banks and conventional banks in the selected countries.

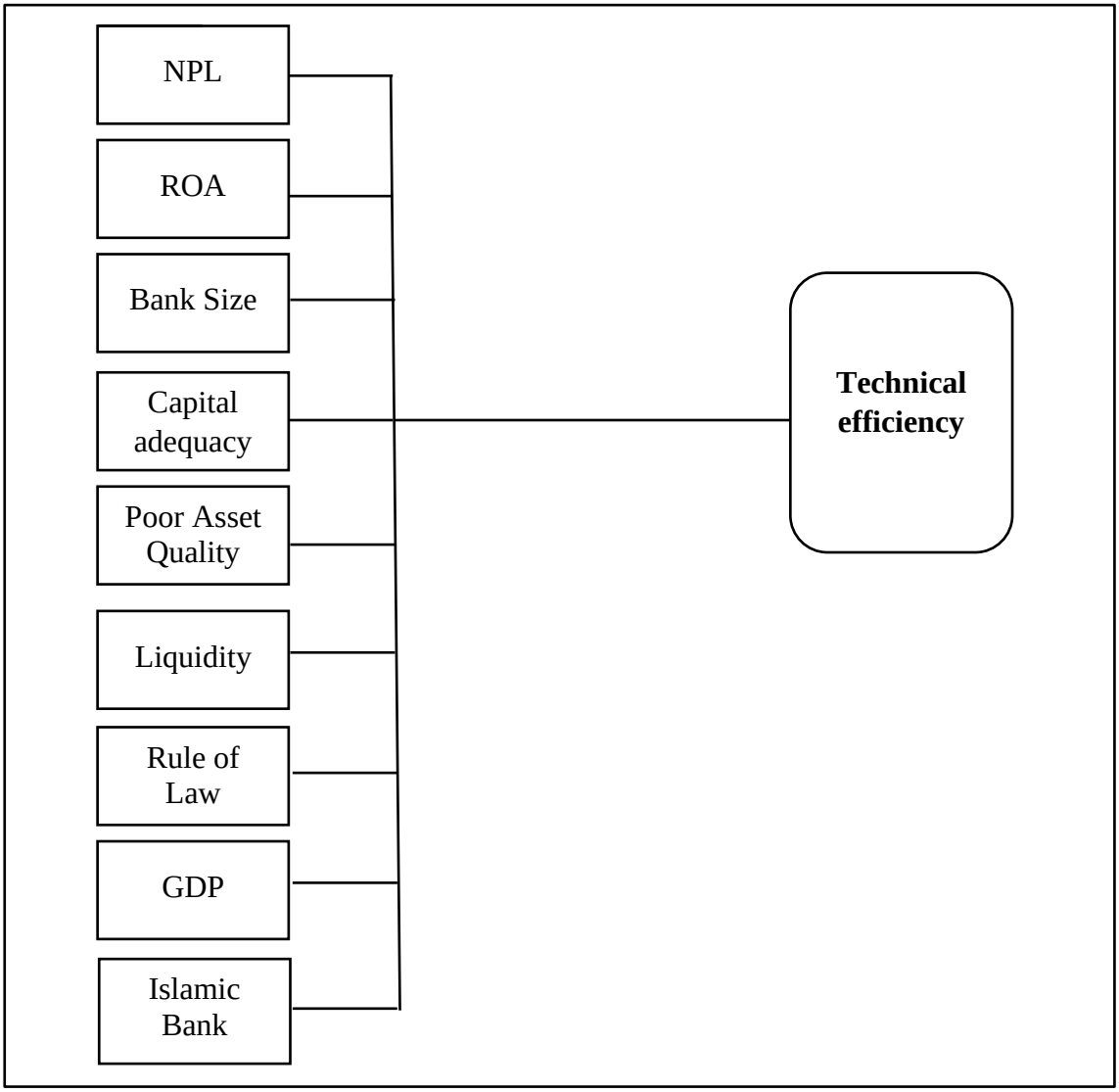
9. Non-Performing Loans (NPL): Reflect the level of risk in the banking system. Banks with a lower percentage of non-performing loans tend to be more efficient than banks with a higher percentage of non-performing loans because they have lower risks, which is a key requirement for capital allocation to take on risk. Higher levels of non-performing loans result in lower bank efficiency due to higher credit risk. This exposes the bank to losses and also leads to higher administrative costs. Banks can manage or reduce the risk associated with non-performing loans by restructuring,

scheduling, or selling them at a higher profit rate, which positively affects their efficiency (Anwar, 2014; Shawtari et al ., 2015).

H9: There is a negative relationship between non-performing loans and the technical efficiency of Islamic banks and conventional banks in the selected countries.

Figure (2)

Conceptual research model



Chapter Three
Research Methodology

3.1 Introduction

The main objective of this study is to estimate the technical efficiency of Islamic banks compared to conventional banks operating in Iran, Jordan, Palestine, Lebanon, and Syria and determine the factors affecting it. This chapter contains the study sample, research techniques, research model, and variable measurements.

3.2 Sample of Study

Since this study compares the effectiveness of Islamic banks with conventional banks, the sample of the study included (83) banks in Iran, Jordan, Palestine, Lebanon, and Syria. The reason for these countries' choice is that they share the same political and economic conditions.

There are (27) Islamic banks and (56) conventional banks for all countries. This is consistent with the DEA convention, which requires the minimum number of DMUs to be three times greater than the number of inputs plus outputs (Hassan & Aliyu, 2018). This study uses a quantitative study design, using secondary data obtained from annual financial reports from 2013 to 2017.

3.3 Research Techniques

3.3.1 Data Analysis and Mathematical Models

Data envelopment analysis focuses on analyzing a set of indicators and criteria to evaluate how well banks are performing financially and economically (Hibatullah & Nurcahyani, 2022). DEA is used To achieve the main goal of the study and answer its questions: What is the level of efficiency of banks operating in selected countries, namely Iran, Jordan, Palestine, Lebanon, and Syria? Does the efficiency of Islamic banking differ from the efficiency of conventional banks? This study applies two basic data envelopment analysis (DEA) models. Input-oriented and output-oriented models with both constant return to scale CRS and variable return to scale VRS. Input-oriented models require results to be greater than or equal to (1), indicating efficiency. In output-oriented models, results should be lower and closer to (1), indicating efficiency. A bank with a score closer to (1) is considered more efficient (Karimzadeh, 2012).

The variables used in this method are derived from bank inputs and outputs. The most prosperous bank can take advantage of the inputs and outputs very well, which enhances its processes and enhances productivity. Consequently, a bank that is more efficient can achieve higher profits and provide high quality services to customers, making it the best choice for investors and customers. This study uses input and output variables to convert inputs like deposits, assets, and capital into outputs like investments, advances, and income (Hassan & Aliyu, 2018).

Table (1)

Measurements of inputs and outputs for dependent variables

Variables	Description	Reference
Inputs		
Deposits	Total Deposits of customers	(Qureshi & Shaikh, 2012) (Kerimov et al., 2023) (Hassan & Aliyu, 2018) (Sillah & Harrathi, 2015) (Johnes et al.,2014)
Assets	Total assets include cash and balance with treasury and other banks, due from financial institutions, investment, financing, and other related assets, operating fixed assets, deferred taxed	(Kerimov et al., 2023) (Sillah & Harrathi, 2015) (Johnes et al.,2014) (Hassan & Aliyu, 2018)
Capital	Equity capital is the summation of all funds that banks use by issuing shares or retaining profits.	(Hassan & Aliyu, 2018) (Qureshi & Shaikh, 2012) (Johnes et al., 2014)
Output		
Investment	Total investments granted	(Khartabiel et al., 2018) (Sillah & Harrathi, 2015) (Hassan & Aliyu, 2018)
Advances	Financing and other related assets	(Hassan et al., 2018)
Income	Total bank revenues after subtracting the costs of doing business such as depreciation, interest, taxes, and other expenses.	(Hassan & Aliyu, 2018) (Qureshi & Shaikh, 2012)

To measure inputs and outputs, input-oriented models and output-oriented models using crs and vrs returns to scale:

1. Input-oriented constant return to scale

The model reduces the inputs without any change in the output. Effective banks can produce the same outputs (investment, advances, and income) using fewer inputs (deposits, assets, and capital) when evaluating the efficiency of banks.

Mathematical explanation:

The CRS model assumes that bank efficiency remains constant regardless of the volume of production and can be represented mathematically using an efficiency estimation equation using data envelopment analysis. the model can be represented as follows (Kamarudin et al., 2019).$Minimize\ \emptyset_k$

to$y_{rk} - \sum_{j=1}^{n}\ \lambda_j y_{rj}\ \leq 0 \qquad r = 1, \ldots, s$

$$\emptyset_k\ x_{ik} - \sum_{j=1}^{n}\ \lambda_j x_{ij}\ \geq 0 \qquad i = 1, \ldots, m$$

$$\lambda_j \geq 0\ \forall j\ = 1, \ldots., n\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(1)$$

$Minimize\ \emptyset_k$: The minimum degree of efficiency of the administrative unit is: The total number of units to be measured.

x_{ik}: The number of inputs to the decision-making unit to be measured.

y_{rk}: The number of outputs of the decision-making unit to be measured.

M: is the total number of input variables (in this study, 3 inputs).

S: is the total number of output variables (in this study, 3 outputs).

N:-The number of units to be measured (in this study, 83 banks).

λ_j: The inputs and outputs to be measured must be positive.

2. Input-oriented variable return to scale

The model reduces the inputs without any change in the output. In evaluating banks, efficient banks can produce the required outputs (advances, investment, and income) using the least possible inputs (assets, capital, and deposits).

Mathematical explanation:

The VRS model assumes that the bank's efficiency changes as the volume of production changes, which can be represented mathematically using an efficiency estimation equation using envelope analysis. The model can be represented as follows:(Kamarudin et al., 2019)

$$Minimize\ \emptyset_k$$

Subject to

$$y_{rk} - \sum_{j=1}^{n} \lambda_j y_{rj} \leq 0 \qquad r = 1, \dots, s$$

$$\emptyset_k\ x_{ik} - \sum_{j=1}^{n} \lambda_j x_{ij} \geq 0 \qquad i = 1, \dots, m$$

$$\sum_{j=1}^{n} \lambda_j = 1$$

$$\lambda j \geq 0\ \forall j = 1, \dots, n \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2)$$

Minimize ∅_k: The minimum degree of efficiency of the administrative unit is: The total number of units to be measured.

x_{ik}: The number of inputs to the decision-making unit to be measured.

y_{rk}: The number of outputs of the decision-making unit to be measured.

M: is the total number of input variables (in this study, 3 inputs).

S: is the total number of output variables (in this study, 3 outputs).

N:-The number of units to be measured (in this study, 83 banks).

λ_j: The inputs and outputs to be measured must be positive.

3. Output-oriented constant return to scale

The model Maximizes the outputs produced using the available inputs. In evaluating banks, effective banks can Maximize outputs (advances, investment, and income) using the same inputs (assets, capital, and deposits).

Mathematical explanation:

The CRS model assumes that bank efficiency remains constant regardless of the volume of production and can be represented mathematically using an efficiency estimation equation using data envelopment analysis.the model can be represented as follows: (Kamarudin et al., 2019)

$$Maximize\ \emptyset_k$$

Subject to

$$\emptyset_k\ y_{rk} - \sum_{j=1}^{n} \lambda_j y_{rj} \leq 0 \qquad r = 1, \dots, s$$

$$x_{ik} - \sum_{j=1}^{n} \lambda_j x_{ij} \geq 0 \qquad i = 1, \dots, m$$

$$\lambda_j \geq 0\ \forall j\ = 1, \dots, n \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

$Maximize\ \emptyset_k$: The maximum degree of efficiency of the administrative unit is: The total number of units to be measured.

X_{jk}: The number of inputs to the decision-making unit to be measured.

y_{rk}: The number of outputs of the decision-making unit to be measured.

M: is the total number of input variables (in this study, 3 inputs).

S: is the total number of output variables (in this study, 3 outputs).

N:-The number of units to be measured (in this study, 83 banks).

λ_j: The inputs and outputs to be measured must be positive.

4. Output-oriented variable return to scale

The model Maximizes the outputs produced using the available inputs. In evaluating banks, effective banks can Maximize outputs (advances, investment, and income) using the same inputs (assets, capital, and deposits).

Mathematical explanation:

The VRS model assumes that the bank's efficiency changes as the volume of production changes, which can be represented mathematically using an efficiency estimation equation using envelope analysis. The model can be represented as follows:(Kamarudin et al., 2019)

$$Maximize\ \emptyset_k$$

Subject to

$$\emptyset_k\ y_{rk} - \sum_{j=1}^{n} \lambda_j y_{rj} \leq 0 \qquad r = 1, \dots, s$$

$$x_{ik} - \sum_{j=1}^{n} \lambda_j x_{ij} \geq 0 \qquad i = 1, \dots, m$$

$$\sum_{j=1}^{n} \lambda_j = 1$$

$$\lambda_j \geq 0\ \forall j = 1, \dots, n \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

Maximize $\emptyset_k$: The maximum degree of efficiency of the administrative unit is: The total number of units to be measured.

X_{jk}: The number of inputs to the decision-making unit to be measured.

y_{rk}: The number of outputs of the decision-making unit to be measured.

M: is the total number of input variables (in this study, 3 inputs).

S: is the total number of output variables (in this study, 3 outputs).

N:-The number of units to be measured (in this study, 83 banks).

λ_j: The inputs and outputs to be measured must be positive.

3.3.2 Regression analysis

Model specifications and estimation

The second goal of the study is to use regression analysis In order to achieve the main goal of the study and answer the question: What are the main factors that affect the efficiency of banks and the role played by the bank size, liquidity, non-performing loans, GDP, rule of law, capital adequacy, profitability (ROA) and poor asset quality, and the Islamic bank as a dummy variable.

The dependent variable here reflects the efficiency of banks, as several measures were used: (ioTECRS) input-oriented technical efficiency with a constant return to scale; (ioTEVRS) input-oriented technical efficiency with a variable return to scale; (ooTECRS) output-oriented technical efficiency with a constant return to scale; (ooTEVRS) output-oriented technical efficiency with a variable return to scale, see table (2) in appendix (C).

3. Model Estimation

$y = \beta_0 + \beta_1 * SIZE + \beta_2 * PROF + \beta_3 * LIQ + \beta_4 * CAR + \beta_5 * ASQ + \beta_6 * GDP + \beta_7 * Rule\ of\ Law + \beta_8 * NPL + \beta 9 * Islamic + e$

Y: Technical efficiency.

B0: Constant.

SIZE: Bank Size.

PROF: Profitability.

LIQ: Liquidity.

CAR: Capital adequacy.

ASQ: Poor Asset Quality.

GDP: Country GDP.

Rule of Law: Rule of Law.

NPL: Non-Performing Loans (NPL).

Islamic: Islamic bank Dummy variable.

e: Error term.

Chapter Four

Results and Discussions

4.1 Introduction

This section discusses the results of the first phase: efficiency estimation using data envelopment analysis. This stage begins with testing the technical efficiency of conventional banks and Islamic banks through detailed tables of the models that were used: the input-oriented model (CRS), the input-oriented model (VRS), the output-oriented model (CRS), and the output-oriented model (VRS).

The results of the second stage: Determinants of efficiency using regression analysis This stage begins with a descriptive data analysis. Then, the correlation analysis is presented, and the Pooled results with robust standard errors are tested to estimate the factors (size, profitability, liquidity, poor asset quality,GDP, rule of law, and capital adequacy) that affect the efficiency of Islamic banks and conventional banks in Iran, Jordan, Palestine, Lebanon, and Syria.

4.2 Results for the first stage: Efficiency estimation using data envelopment analysis (DEA)

DEA Results

According to the four techniques, the average annual technical efficiency of conventional and Islamic banks is displayed separately and jointly in the tables for each country.

Table (3)

Average technical efficiency for the entire sample by year

Year	Input-CRS	Input-VRS	Output-CRS	Output-VRS
2013	0.57	0.65	5.28	4.38
2014	0.56	0.64	5.28	4.37
2015	0.61	0.69	8.14	6.60
2016	0.64	0.72	1.77	1.55
2017	0.57	0.68	2.10	1.77
Average TE	**0.59**	**0.67**	**4.51**	**3.73**

Table (3) shows this in general over the five years using the four methods. Using the input-oriented method (CRS), the average technical efficiency scores for all countries during these years range between (56%) and (64%), with 2016 obtaining the highest score at (64%) and 2014 obtaining the lowest score at (56%).

Using the input-oriented method (VRS), the average technical efficiency scores range between (64%) and (72%). The best year for proficiency scores was 2016, with an average technical proficiency score of (72%). Meanwhile, in 2014, it achieved the lowest average for technical efficiency, which was (64%). Using the output-oriented method (CRS), the average technical efficiency ranges from (1.77%) to (8.14%). The year 2016 recorded the best average technical efficiency at (1.77%), and 2015 recorded the lowest average technical efficiency at (8.14%). Using the output-oriented method (VRS), the average technical efficiency ranges from (1.55%) to (6.60%), and the best year for efficiency is 2016. It recorded the highest average technical efficiency at (1.55%), and 2015 had the lowest average technical efficiency, recording (6.60%).

In conclusion, the table showed that using all the different methods from 2013 to 2017, all methods showed that 2016 was the best year for technical efficiency in banks. In 2014, input-crs and input-vrs had the lowest average technical efficiency, (0.56%) and (0.64%), respectively. The year 2015 recorded the lowest average technical efficiency in the CRS output method and the VRS output method, at (8.14%) and (6.60%), respectively. As mentioned previously, the DMU (Decision Making Unit) is effective when its value reaches (1) or (100%). This indicates that a DMU is considered increasingly inefficient if the efficiency number is less than or closer to (0). Accordingly, technical inefficiency in banks is due to managerial inefficiency in managing costs and resources, including insufficient fixed capital, low employee wages, insufficient managerial capacity, and excess liquid assets (Aikaeli, 2006; Moualhi, 2015).

Input-oriented CRS:

Tables (4)

DEA average technical efficiency score of the selected bank on an input-oriented constant return scale by country, year, and bank type

Average io_TE_CRS						
	Iran	**Jordan**	**Lebanon**	**Palestine**	**Syria**	**Average TE**
Conventional	**0.430**	**0.597**	**0.466**	**0.593**	**0.602**	**0.537**
2013	0.432	0.582	0.457	0.550	0.527	0.510
2014	0.450	0.578	0.467	0.521	0.535	0.514
2015	0.489	0.577	0.464	0.571	0.799	0.568
2016	0.385	0.621	0.470	0.671	0.772	0.583
2017	0.391	0.629	0.474	0.652	0.378	0.508
Islamic	**0.740**	**0.874**	**0.256**	**0.612**	**0.577**	**0.703**
2013	0.727	0.890	0.182	0.544	0.539	0.683
2014	0.716	0.819	0.314	0.576	0.458	0.664
2015	0.695	0.836	0.309	0.631	0.781	0.704
2016	0.772	0.897	0.275	0.674	0.774	0.760
2017	0.790	0.930	0.200	0.637	0.334	0.704
Average TE	**0.723**	**0.644**	**0.458**	**0.599**	**0.595**	**0.591**

Table (4) shows the average technical efficiency measures between Islamic banks and conventional banks by year from 2013 to 2017 for the five countries: Iran, Jordan, Palestine, Lebanon, and Syria. It shows that none of the Islamic banks or conventional banks had a technical efficiency rate of (100%).

Technical efficiency measures for conventional banks range from (0.508) to (0.583) with an average of (0.537), while Islamic banks range between (0.664) and (0.760) with an average of (0.703). This is evidence that conventional banks in these countries in the period from 2013 to 2017 suffered from lower efficiency compared to Islamic banks. Conventional bank management generally did not use the optimal mix of inputs to achieve the best outputs in these countries within these years.

Country-wise, the best year for average technical efficiency scores for Islamic banks operating in Iran was 2017, with an average of (79%), while the lowest average year for these banks was 2015, with an average of (69.5%). The lowest year in which conventional banks operated in Iran was 2016, with an average of (38.5%), and the best year for these banks was 2015, with an average of (48.9%). The results for conventional banks were lower than those for Islamic banks during all years. The average efficiency of Islamic banks is (74%), which is higher than the average technical efficiency of conventional banks, which reached (43%).

For banks operating in Jordan, the table showed that the average technical efficiency score for the years 2013 to 2017 was higher for Islamic banks (87.4%) than conventional banks (59.7%). The year 2017 was the highest year for the average technical efficiency of Islamic banks operating in Jordan, with an average of (93%). It is also the same year as the best for conventional banks, with an average of (62.9%).

For banks operating in Lebanon, the table showed that the average degree of technical efficiency for the years 2013 to 2017 was higher for conventional banks (46.6%) compared to Islamic banks (25.6%). The year 2017 was the highest year for the average technical efficiency of conventional banks operating in Lebanon, with an average of (47.4%). The year 2014 was the highest year for the average technical efficiency of Islamic banks operating in Lebanon, at a rate of (31.4%).

For banks operating in Palestine, the table showed that the average technical efficiency score from 2013 to 2017 was higher for Islamic banks (61.2%) than conventional banks (59.3%). The year 2017 was the highest year for the average technical efficiency of conventional banks operating in Palestine, with an average of (65.2%). The year 2016 was the highest year for the average technical efficiency of Islamic banks operating in Palestine, at a rate of (67.4%).

For banks operating in Syria, the table showed that the average degree of technical efficiency for the years 2013 to 2017 was higher for conventional banks (60.2%) compared to Islamic banks (57.7%). The year 2015 was the highest year for the average technical efficiency of conventional banks operating in Syria, with an average of (79.9%). It is also the same year that is considered the best for Islamic banks, with an average of (78.1%).

The table also shows that Iranian banks have the highest average technical efficiency among the five countries, with an average of (72.3%) for both types of banks. However, Lebanon recorded the lowest rate of technical efficiency among these five countries, with an average of (45.8%).

Table (5)

DEA Maximum technical efficiency score of the selected bank on an input-oriented constant return scale by country, year, and bank type

Max io_TE_CRS						
	Iran	**Jordan**	**Lebanon**	**Palestine**	**Syria**	**Max TE**
Conventional	**0.489**	**1.000**	**1.000**	**0.737**	**1.000**	**1.000**
2013	0.432	0.963	0.860	0.624	0.934	0.963
2014	0.450	0.996	1.000	0.598	0.667	1.000
2015	0.489	1.000	0.968	0.613	1.000	1.000
2016	0.385	1.000	0.855	0.737	1.000	1.000
2017	0.391	1.000	0.891	0.722	0.746	1.000
Islamic	**1.000**	**1.000**	**0.314**	**0.756**	**0.848**	**1.000**
2013	1.000	1.000	0.182	0.626	0.670	1.000
2014	0.904	0.821	0.314	0.667	0.528	0.904
2015	0.838	0.878	0.309	0.740	0.848	0.878
2016	1.000	0.949	0.275	0.756	0.844	1.000
2017	1.000	1.000	0.200	0.689	0.455	1.000
Max TE	**1.000**	**1.000**	**1.000**	**0.756**	**1.000**	**1.000**

Table (5) shows the maximum technical efficiency score of the selected bank on an input-oriented constant return scale by country, year, and bank type.

The banks' technical efficiency measures reached a maximum of (100%) in both banks. This is evidence that the conventional and Islamic banks in these countries in the period from 2013 to 2017 were efficient, meaning that the conventional and Islamic banks generally used the optimal mix of inputs to achieve the best outputs in these countries during these years.

At the country level, the best year for the maximum technical efficiency scores for Islamic banks operating in Iran was 2013, 2016 and 2017 reached a maximum of (100%), while the lowest maximum for these banks was in 2015, at (83.8%). The lowest year in which conventional banks operated in Iran was 2016, with a rate of (38.5%), and the best year for these banks was 2015, with a rate of (48.9%). The results for conventional banks were lower than those for Islamic banks during all years. The maximum technical efficiency of Islamic banks is (100%), which is higher than the maximum technical efficiency of conventional banks, which reaches (48.9%).

For banks operating in Jordan, the best year for Islamic banks was 2013-2017, with the maximum reaching (100%), while the lowest average for these banks was in 2014 at (82.1%). The lowest year in which conventional banks operated in Jordan was 2013, with a rate of (96.3%), and the best year for these banks was 2015, 2016, and 2017, with a maximum rate of 100%. The results for conventional and Islamic banks during all years were similar, as the maximum efficiency for Islamic banks reached (100%), similar to the technical efficiency of conventional banks, which reached (100%).

For banks operating in Lebanon, the best year for Islamic banks was 2014, with a rate of (31.4%), while the lowest average for these banks was in 2017, with a rate of (20%). The lowest year in which conventional banks operated in Lebanon was 2016, with an average of (85.5%), and the best year for these banks was 2014, with an average of (100%). The results for conventional banks were better than those for Islamic banks during all years. The maximum efficiency limit for conventional banks is (100%), which is higher than the maximum technical efficiency limit for Islamic banks, which reaches (31.4%).

For banks operating in Palestine, the best year for Islamic banks was 2016, with a rate of (75.6%), while the lowest rate for these banks was in 2013, with a rate of (62.6%). The lowest year in which conventional banks operated in Palestine was 2014, with a rate of (59.8%), and the best year for these banks was 2016, with a rate of (73.7%). The results for conventional banks were lower than those for Islamic banks during all years. The maximum technical efficiency of Islamic banks is (75.6%), which is higher than the maximum technical efficiency of conventional banks, which reaches (73.7%).

For banks operating in Syria, the best year for Islamic banks was 2015, with a rate of (84.8%), while the lowest maximum for these banks was in 2017, with a rate of (45.5%).

The lowest year in which conventional banks operated in Syria was 2014, at a rate of (66.7%), and the best year for these banks was 2015, and in 2016, the maximum rate was (100%). The results for Islamic banks were lower than those for conventional banks during all years. The maximum efficiency limit for conventional banks is (100%), which is higher than the maximum technical efficiency limit for Islamic banks, which reaches (84.8%).

The table also shows that banks in Iran, Jordan, Lebanon, and Syria enjoy the highest maximum technical efficiency of (100%) for both types of banks. However, Palestine recorded the lowest percentage of technical efficiency among these five countries, at (75.6%).

Input oriented VRS:

Table (6)

DEA average technical efficiency score of the selected bank on an input-oriented variable return scale by country, year, and bank type

Average io_TE_VRS						
	Iran	**Jordan**	**Lebanon**	**Palestine**	**Syria**	**Average TE**
Conventional	**0.477**	**0.663**	**0.534**	**0.631**	**0.732**	**0.613**
2013	0.552	0.643	0.523	0.619	0.635	0.584
2014	0.482	0.642	0.524	0.573	0.656	0.584
2015	0.491	0.635	0.524	0.605	0.879	0.629
2016	0.436	0.690	0.544	0.688	0.843	0.650
2017	0.423	0.707	0.555	0.670	0.648	0.620
Islamic	**0.832**	**0.926**	**0.761**	**0.655**	**0.666**	**0.802**
2013	0.828	0.946	0.665	0.619	0.568	0.781
2014	0.810	0.875	0.810	0.636	0.496	0.758
2015	0.786	0.891	0.802	0.680	0.877	0.804
2016	0.851	0.942	0.790	0.695	0.901	0.855
2017	0.884	0.975	0.737	0.645	0.486	0.812
Average TE	**0.812**	**0.707**	**0.542**	**0.639**	**0.714**	**0.675**

Table (6) shows the average technical efficiency measures between Islamic banks and conventional banks by year from 2013 to 2017 for the five countries: Iran, Jordan, Lebanon, Palestine, and Syria. Using the input-oriented method (vrs).

Technical efficiency measures for conventional banks range from (58.4%) to (65%), with an average of (61.3%), while Islamic banks range from (75.8%) to (85.5%), with an average of (80.2%). This is evidence that conventional banks in these countries in the period from 2013 to 2017 suffered from low efficiency compared to Islamic banks. Conventional bank management generally did not use the optimal mix of inputs to achieve the best outputs in these countries during these years.

At the country level, the best year for the average technical efficiency scores for Islamic banks operating in Iran was 2017, with an average of (88.4%), while the lowest average for these banks was 2015, with an average of (78.6%). The lowest year in which conventional banks operated in Iran was 2017, with an average of (42.3%), and the best year for these banks was 2013, with an average of (55.2%). The results for conventional banks were lower than those for Islamic banks during all years. The average efficiency of Islamic banks is (83.2%), which is higher than the average technical efficiency of conventional banks, which reaches (47.7%).

For banks operating in Jordan, the best year for Islamic banks was 2017, with an average of (97.5%), while the lowest average for these banks was in 2014, with an average of (87.5%). The lowest year conventional banks operated in Jordan was 2015, with an average of (63.5%). The best year for these banks was 2017, with an average of (70.7%). The results for conventional banks were lower than those for Islamic banks during all years. The average efficiency of Islamic banks is (92.6%), which is higher than the average technical efficiency of conventional banks, which reaches (66.3%).

For banks operating in Lebanon, the best year for Islamic banks was 2014, with an average of (81%), while the lowest average for these banks was in 2013, with an average of (66.5%). The lowest year in which conventional banks operated in Lebanon was 2013, with an average of (52.3%), and the best year for these banks was 2017, with an average of (55.5%). The results for conventional banks were lower than those for Islamic banks during all years. The average efficiency of Islamic banks is (76.1%), which is higher than the average technical efficiency of conventional banks, which reaches (53.4%).

For banks operating in Palestine, the best year for Islamic banks was 2016, with an average of (69.5%), while the lowest average for these banks was in 2013, with an average of (61.9%). The lowest year in which conventional banks operated in Palestine was 2014, with an average of (57.3%), and the best year for these banks was 2016, with an average of (68.8%). The results for conventional banks were lower than those for Islamic banks during all years. The average efficiency of Islamic banks is (65.5%), which is higher than the average technical efficiency of conventional banks, which reaches (63.1%).

For banks operating in Syria, the best year for Islamic banks was 2016, with an average of (90.1%), while the lowest average for these banks was in 2017, with an average of (48.6%). The lowest year in which conventional banks operated in Syria was 2013, with an average of (63.5%), and the best year for these banks was 2015, with an average of (87.9%). The results for Islamic banks were lower than those for conventional banks during all years. The average efficiency of conventional banks is (73.2%), which is higher than the average technical efficiency of Islamic banks, which reaches (66.6%).

The table also shows that Iranian banks have the highest average technical efficiency among the five countries, with an average of (81.2%) for both types of banks. However, Lebanon recorded the lowest rate of technical efficiency among these five countries, with an average of (54.2%).

Table (7)

DEA Maximum technical efficiency score of the selected bank on an input-oriented variable return scale by country, year, and bank type

Max of io_TE_VRS						
	Iran	**Jordan**	**Lebanon**	**Palestine**	**Syria**	**Max TE**
Conventional	**0.552**	**1.000**	**1.000**	**0.749**	**1.000**	**1.000**
2013	0.552	1.000	0.927	0.689	1.000	1.000
2014	0.482	1.000	1.000	0.650	0.970	1.000
2015	0.491	1.000	0.969	0.667	1.000	1.000
2016	0.436	1.000	0.920	0.749	1.000	1.000
2017	0.423	1.000	1.000	0.731	1.000	1.000
Islamic	**1.000**	**1.000**	**0.810**	**0.782**	**1.000**	**1.000**
2013	1.000	1.000	0.665	0.697	0.708	1.000
2014	1.000	0.910	0.810	0.721	0.616	1.000
2015	0.922	1.000	0.802	0.782	0.940	1.000
2016	1.000	0.954	0.790	0.766	1.000	1.000
2017	1.000	1.000	0.737	0.700	0.604	1.000
Max TE	**1.000**	**1.000**	**1.000**	**0.782**	**1.000**	**1.000**

Table (7) shows the maximum technical efficiency in Iran, Jordan, Lebanon, Palestine, and Syria in the input orientation method (VRS).

The banks' technical efficiency measures reached a maximum of (100%) in both banks. This is evidence that the conventional and Islamic banks in these countries in the period from 2013 to 2017 were efficient, meaning that the conventional and Islamic banks generally used the optimal mix of inputs to achieve the best outputs in these countries during these years.

At the country level, the best year for the maximum technical efficiency scores for Islamic banks operating in Iran was 2013, 2014, 2016, and 2017 reached a maximum of (100%), while the lowest maximum for these banks was in 2015, at (92.2%). The lowest year in which conventional banks operated in Iran was 2017, with a rate of (42.3%), and the best year for these banks was 2013, with a rate of (55.2%). The results for conventional banks

were lower than those for Islamic banks during all years. The maximum technical efficiency of Islamic banks is (100%), which is higher than the maximum technical efficiency of conventional banks, which reaches (55.2%).

For banks operating in Jordan, the best year for Islamic banks was 2013, 2015 and 2017. The maximum reached (100%), while the lowest average for these banks was in 2014 at (91%). In contrast, all conventional banks showed (100%) technical efficiency in the five years. The results for conventional banks and Islamic banks during all years were similar, as the maximum efficiency for Islamic banks reached (100%), which is similar to the technical efficiency of conventional banks, which reaches (100%).

For banks operating in Lebanon, the best year for Islamic banks was 2014, with a rate of (81%), while the lowest average for these banks was in 2013, with a rate of (66.5%). The lowest year in which conventional banks operated in Lebanon was 2016, with an average of (92%), and the best years for these banks were 2014 and 2017, with an average of (100%). The results for conventional banks were better than those for Islamic banks during all years. The maximum technical efficiency of conventional banks is (100%), which is higher than the maximum technical efficiency of Islamic banks, which reaches (81%).

For banks operating in Palestine, the best year for Islamic banks was 2015, with a rate of (78.2%), while the lowest rate for these banks was in 2013, with a rate of (69.7%). The lowest year in which conventional banks operated in Palestine was 2014, at a rate of (65%), and the best year for these banks was 2016, at a rate of (74.9%). The results for conventional banks were lower than those for Islamic banks during all years. The maximum technical efficiency of Islamic banks is (78.2%), which is higher than the maximum technical efficiency of conventional banks, which reaches (74.9%).

For banks operating in Syria, the best year for Islamic banks was 2016, with a rate of (100%), while the lowest rate for these banks was in 2017, with a rate of (60.4%). The lowest year in which conventional banks operated in Syria was 2014, at a rate of (97%), and the best years for these banks were 2013, 2015, 2016, and 2017, with a maximum rate of (100%). The results for Islamic banks were lower than for conventional banks during all years. The maximum efficiency limit for conventional and Islamic banks is (100%).

The table also shows that banks in Iran, Jordan, Lebanon and Syria enjoy the highest maximum technical efficiency of (100%) for both types of banks. However, Palestine recorded the lowest percentage of technical efficiency among these five countries, at (78.2%).

Output oriented CRS

Table (8)

DEA average technical efficiency score of the selected bank on an Output-oriented constant return scale by country, year, and bank type

Average of oo_TE_CRS						
	Iran	**Jordan**	**Lebanon**	**Palestine**	**Syria**	**Average TE**
Conventional	**2.346**	**16.076**	**2.334**	**1.723**	**2.003**	**5.906**
2013	2.312	19.962	2.387	1.846	2.193	7.017
2014	2.222	20.225	2.365	1.962	1.918	7.030
2015	2.043	36.800	2.382	1.758	1.329	11.344
2016	2.595	1.694	2.265	1.498	1.399	1.893
2017	2.555	1.699	2.270	1.552	3.177	2.249
Islamic	**1.468**	**1.152**	**4.110**	**1.677**	**1.999**	**1.625**
2013	1.433	1.133	5.488	1.880	2.011	1.669
2014	1.474	1.221	3.182	1.782	2.207	1.640
2015	1.477	1.201	3.232	1.632	1.288	1.495
2016	1.517	1.118	3.642	1.507	1.297	1.518
2017	1.441	1.089	5.006	1.581	3.194	1.804
Average TE	**1.517**	**13.589**	**2.402**	**1.708**	**2.002**	**4.514**

Table (8) shows the average technical efficiency of the five countries during the period 2013–2017.

Technical efficiency measures for conventional banks range from (1.89%) to (11.34%), with an average of (5.90%), while Islamic banks range from (1.49%) to (1.804%), with an average of (1.62%). This is evidence that conventional banks in these countries in the period from 2013 to 2017 suffered from low efficiency compared to Islamic banks.

Conventional bank management generally did not use the optimal mix of inputs to achieve the best outputs in these countries during these years.

At the country level, the best year for the average technical efficiency score for Islamic banks operating in Iran was 2013, with an average of (1.43%), while the lowest average for these banks was 2016, with an average of (1.51%). The lowest year in which conventional banks operated in Iran was 2016, with an average of (2.59%), and the best year for these banks was 2015, with an average of (2.04%). The results for conventional banks were lower than those for Islamic banks during all years. The average efficiency of Islamic banks is (1.46%), which is higher than the average technical efficiency of conventional banks, which reaches (2.34%).

As for banks operating in Jordan, the best year for Islamic banks was 2017, with an average of (1.08%), while the lowest average for these banks was 2014, with an average of (1.22%). The lowest year in which conventional banks operated in Jordan was 2015, with an average of (36.8%), and the best year for these banks was 2016, with an average of (1.69%). The results for conventional banks were lower than those for Islamic banks during all years. The average efficiency of Islamic banks is (1.15%), which is higher than the average technical efficiency of conventional banks, which reaches (16.07%).

As for banks operating in Lebanon, the best year for Islamic banks was 2014, with an average of (3.18%), while the lowest rate for these banks was in 2013, with an average of (5.48%). The lowest year in which conventional banks operated in Lebanon was 2013, with a rate of (2.38%), and the best year for these banks was 2016, with a rate of (2.26%). The results for conventional banks were better than those for Islamic banks during all years. The average efficiency of conventional banks is (2.334%), which is higher than the average technical efficiency of Islamic banks, which reaches (4.11%).

As for banks operating in Palestine, the best year for Islamic banks was 2016, with an average of (1.50%), while the lowest rate for these banks was in 2013, with an average of (1.88%). The lowest year in which conventional banks operated in Palestine was 2014, with a rate of (1.96%), and the best year for these banks was 2016, with a rate of (1.49%). The results for conventional banks were lower than those for Islamic banks during all years. The average efficiency of Islamic banks is (1.67%), which is higher than the average technical efficiency of conventional banks, which reaches (1.72%).

As for banks operating in Syria, the best year for Islamic banks was 2015, with an average of (1.28%), while the lowest average for these banks was 2017, with an average of (3.19%). The lowest year in which conventional banks operated in Syria was 2017, with an average of (3.17%), and the best year for these banks was 2015, with an average of (1.32%). The results for Islamic banks were better than those for conventional banks during all years. The average efficiency of conventional banks is (2.00%), which is lower than the average technical efficiency of Islamic banks, which reaches (1.99%).

The table also shows that Iranian banks have the highest average technical efficiency among the five countries, with an average of (1.51%) for both types of banks. However, Jordan recorded the lowest rate of technical efficiency among these five countries, with an average of (13.58%).

Table (9)

DEA Maximum technical efficiency score of the selected bank on an output-oriented constant return scale by country, year, and bank type

Max oo_TE_CRS						
	Iran	**Jordan**	**Lebanon**	**Palestine**	**Syria**	**Max TE**
Conventional	**2.04**	**1.00**	**1.00**	**1.36**	**1.00**	**1.00**
2013	2.31	1.04	1.16	1.60	1.07	1.04
2014	2.22	1.00	1.00	1.67	1.50	1.00
2015	2.04	1.00	1.03	1.63	1.00	1.00
2016	2.60	1.00	1.17	1.36	1.00	1.00
2017	2.56	1.00	1.12	1.39	1.34	1.00
Islamic	**1.00**	**1.00**	**3.18**	**1.32**	**1.18**	**1.00**
2013	1.00	1.00	5.49	1.60	1.49	1.00
2014	1.11	1.22	3.18	1.50	1.89	1.11
2015	1.19	1.14	3.23	1.35	1.18	1.14
2016	1.00	1.05	3.64	1.32	1.19	1.00
2017	1.00	1.00	5.01	1.45	2.20	1.00
Max TE	**1.00**	**1.00**	**1.00**	**1.32**	**1.00**	**1.00**

Table (9) shows the best degree of technical efficiency for the five countries from 2013–2017.

Bank technical efficiency measures reached (100%) in both banks. This is evidence that the conventional and Islamic banks in these countries in the period from 2013 to 2017 were efficient, meaning that the conventional and Islamic banks generally used the optimal mix of inputs to achieve the best outputs in these countries during these years.

At the country level, the best year for the technical efficiency scores of Islamic banks operating in Iran was 2013, 2016 and 2017 being the best values at (100%), while the lowest value recorded for these banks was in 2015, at (1.19%). The lowest year in which conventional banks operated in Iran was 2016, with a rate of (2.60%), and the best year for these banks was 2015, with a rate of (2.04%). The results for conventional banks were lower than those for Islamic banks during all years. The best value for the technical efficiency of Islamic banks is (100%), which is higher than the technical efficiency of conventional banks, which reaches (2.04%).

For banks operating in Jordan, the best years for Islamic banks were 2013 and 2017, recording the best percentage of (100%), while the lowest value for these banks was in 2014 at (1.22%). On the other hand, the best years for efficiency in conventional banks were 2014, 2015, 2016, and 2017, recording a value of (100%), and the lowest value for conventional banks was in 2013, with a rate of (1.04%). The results for conventional banks were better than Islamic banks during all years. The best efficiency value for Islamic banks reached (100%), similar to conventional banks' technical efficiency, which reached (100%).

As for banks operating in Lebanon, the best year for Islamic banks was 2014, with a rate of (3.18%), while the lowest value for these banks was in 2013, with a rate of (5.49%). The lowest year in which conventional banks operated in Lebanon was 2016, recording a value of (1.17%), and the best year for these banks was 2014, recording a value of 100%. The results for conventional banks were better than those for Islamic banks during all years. The best value for the technical efficiency of conventional banks is (100%), which is higher than the technical efficiency of Islamic banks, which reaches (3.18%).

For banks operating in Palestine, the best year for Islamic banks was 2016, with a rate of (1.32%), while the lowest rate for these banks was in 2013, with a rate of (1.60%). The lowest year in which conventional banks operated in Palestine was 2014, at a rate of (1.67%), and the best year for these banks was 2016, at a rate of (1.36%). The results for

conventional banks were lower than those for Islamic banks during all years. The best efficiency value for Islamic banks is (1.32%), which is higher than the technical efficiency of conventional banks, which reaches (1.36%).

For banks operating in Syria, the best year for Islamic banks was 2015, with a rate of (1.18%), while the lowest rate for these banks was in 2017, with a rate of (2.20%). The lowest year in which conventional banks operated in Syria was 2014, with a rate of (1.50%), and the best years for these banks were 2015 and 2016. The best value was recorded at (100%). The results for Islamic banks were lower than for conventional banks during all years. The best efficiency value for conventional banks is (100%), better than Islamic banks, which reaches (1.18%).

The table also shows that banks in Iran, Jordan, Lebanon and Syria have the best technical efficiency of (100%) for both types of banks. However, Palestine recorded the lowest percentage of technical efficiency among these five countries at (1.32%).

Output-oriented VRS.

Table (10)

DEA average technical efficiency score of the selected bank on an Output-oriented variable return scale by country, year, and bank type

	Average of oo_TE_VRS					
	Iran	**Jordan**	**Lebanon**	**Palestine**	**Syria**	**Average TE**
Conventional	**1.995**	**12.831**	**2.057**	**1.660**	**1.752**	**4.854**
2013	1.758	15.900	2.144	1.760	2.058	5.777
2014	1.885	16.120	2.109	1.889	1.748	5.771
2015	2.014	29.213	2.111	1.704	1.199	9.161
2016	2.141	1.466	1.958	1.450	1.257	1.656
2017	2.175	1.457	1.964	1.496	2.497	1.903
Islamic	**1.282**	**1.082**	**2.518**	**1.646**	**1.832**	**1.414**
2013	1.267	1.055	3.835	1.812	1.935	1.478
2014	1.298	1.141	1.891	1.742	2.128	1.459
2015	1.292	1.130	1.839	1.608	1.123	1.292
2016	1.393	1.061	1.925	1.494	1.099	1.340
2017	1.158	1.023	3.101	1.577	2.873	1.500
Average TE	**1.321**	**10.873**	**2.075**	**1.655**	**1.773**	**3.735**

Table (10) shows the average technical efficiency in Iran, Jordan, Lebanon, Palestine, and Syria during the period 2013–2017.

Technical efficiency measures for conventional banks range from (1.65%) to (9.16%), with an average of (4.85%), while Islamic banks range from (1.29%) to (1.50%), with an average of (1.41%). This is evidence that conventional banks in these countries in the period from 2013 to 2017 suffered from low efficiency compared to Islamic banks. Conventional bank management generally did not use the optimal mix of inputs to achieve the best outputs in these countries during these years.

At the country level, the best year for the average technical efficiency score for Islamic banks operating in Iran was 2017, with an average of (1.15%), while the lowest average for these banks was 2016, with an average of (1.39%). The lowest year in which conventional banks operated in Iran was 2017, with an average of (2.17%), and the best year for these banks was 2013, with an average of (1.75%). The results for conventional banks were lower than those for Islamic banks during all years. The average efficiency of Islamic banks is (1.28%), which is higher than the average technical efficiency of conventional banks, which reaches (1.99%).

For banks operating in Jordan, the best year for Islamic banks was 2017, with an average of (1.02%), while the lowest average for these banks was 2014, with an average of (1.14%). The lowest year in which conventional banks operated in Jordan was 2015, with an average of (29.21%), and the best year for these banks was 2017, with an average of (1.45%). The results for conventional banks were lower than those for Islamic banks during all years. The average efficiency of Islamic banks is (1.08%), which is higher than the average technical efficiency of conventional banks, which reaches (12.83%).

For banks operating in Lebanon, the best year for Islamic banks was 2015, with an average of (1.83%), while the lowest rate for these banks was in 2013, with an average of (3.83%). The lowest year in which conventional banks operated in Lebanon was 2013, with a rate of (2.14%), and the best year for these banks was 2016, with a rate of (1.95%). The results for conventional banks were better than those for Islamic banks during all years. The average efficiency of conventional banks is (2.05%), which is higher than the average technical efficiency of Islamic banks, which reaches (2.51%).

For banks operating in Palestine, the best year for Islamic banks was 2016, with an average of (1.49%), while the lowest rate for these banks was in 2013, with an average of (1.81%). The lowest year in which conventional banks operated in Palestine was 2014, with a rate of (1.88%), and the best year for these banks was 2016, with a rate of (1.45%). The results for conventional banks were lower than those for Islamic banks during all years. The average efficiency of Islamic banks is (1.64%), which is higher than the average technical efficiency of conventional banks, which reaches (1.66%).

For banks operating in Syria, the best year for Islamic banks was 2016, with an average of (1.09%), while the lowest average for these banks was 2017, with an average of (2.87%). The lowest year in which conventional banks operated in Syria was 2017, with an average of (2.49%), and the best year for these banks was 2015, with an average of (1.19%). The results for Islamic banks were lower than those for conventional banks during all years. The average efficiency of conventional banks is (1.75%), which is better than the average technical efficiency of Islamic banks, which reaches (1.83%).

The table also shows that Iranian banks have the highest average technical efficiency among the five countries, with an average of (1.32%) for both types of banks. However, Jordan recorded the lowest rate of technical efficiency among these five countries, with an average of (10.87%).

Table (11)

DEA Maximum technical efficiency score of the selected bank on an output-oriented variable return scale by country, year, and bank type

Max OO_TE_VRS						
	Iran	**Jordan**	**Lebanon**	**Palestine**	**Syria**	**Max TE**
Conventional	**1.76**	**1.00**	**1.00**	**1.35**	**1.00**	**1.00**
2013	1.76	1.00	1.07	1.54	1.00	1.00
2014	1.89	1.00	1.00	1.58	1.15	1.00
2015	2.01	1.00	1.03	1.51	1.00	1.00
2016	2.14	1.00	1.08	1.35	1.00	1.00
2017	2.18	1.00	1.00	1.38	1.00	1.00
Islamic	**1.00**	**1.00**	**1.84**	**1.32**	**1.00**	**1.00**
2013	1.00	1.00	3.83	1.53	1.37	1.00
2014	1.00	1.09	1.89	1.46	1.89	1.00
2015	1.08	1.00	1.84	1.32	1.05	1.00
2016	1.00	1.04	1.93	1.32	1.00	1.00
2017	1.00	1.00	3.10	1.45	1.93	1.00
Max TE	**1.00**	**1.00**	**1.00**	**1.32**	**1.00**	**1.00**

Table (11) shows the best results for technical competence in Iran, Jordan, Lebanon, Palestine, and Syria during the period 2013–2017.

Bank technical efficiency measures reached (100%) in both banks. This is evidence that the conventional and Islamic banks in these countries in the period from 2013 to 2017 were efficient, meaning that the conventional and Islamic banks generally used the optimal mix of inputs to achieve the best outputs in these countries during these years.

At the country level, the best year for the technical efficiency scores of Islamic banks operating in Iran were 2013, 2014, 2016, and 2017, with the best value at (100%), while the lowest value recorded for these banks was in 2015, at (1.08%). The lowest year in which conventional banks operated in Iran was 2017, with a rate of (2.18%), and the best year for these banks was 2013, with a rate of (1.76%). The results for conventional banks were lower than those for Islamic banks during all years. The best value for the technical

efficiency of Islamic banks is (100%), which is higher than the technical efficiency of conventional banks, which reaches (1.76%).

For banks operating in Jordan, the best year for Islamic banks were 2013, 2015, and 2017, recording the best rate of (100%), while the lowest value for these banks was in 2014, at (1.09%). On the other hand, the five years were the best years for efficiency in conventional banks, recording a value of (100%). The results for conventional banks were better than Islamic banks during all years. The best efficiency value for Islamic banks reached (100%), similar to conventional banks' technical efficiency, which reached (100%).

As for banks operating in Lebanon, the best year for Islamic banks was 2015, with a rate of (1.84%), while the lowest value for these banks was in 2013, with a rate of (3.83%). The lowest year in which conventional banks operated in Lebanon was 2016, recording a value of (1.08%), and the best year for these banks was 2014 and 2017, recording a value of (100%). The results for conventional banks were better than those for Islamic banks during all years. The best value for the technical efficiency of conventional banks is (100%), which is higher than the technical efficiency of Islamic banks, which reaches (1.84%).

For banks operating in Palestine, the best year for Islamic banks was 2015 and 2016, at a rate of (1.32%), while the lowest rate for these banks was in 2013, at a rate of (1.53%). The lowest year in which conventional banks operated in Palestine was 2014, at a rate of (1.58%), and the best year for these banks was 2016, at a rate of (1.35%). The results for conventional banks were lower than those for Islamic banks during all years. The best efficiency value for Islamic banks is (1.32%), which is higher than the technical efficiency of conventional banks, which reaches (1.35%).

For banks operating in Syria, the best year for Islamic banks was 2016, with a rate of (100%), while the lowest percentage for these banks was in 2017, with a rate of (1.93%). The lowest year in which conventional banks operated in Syria was 2014, at a rate of (1.15%), and the best years for these banks were 2013, 2015, 2016, and 2017. The best value was recorded at (100%). The results for Islamic banks were lower than for conventional banks during all years. The best efficiency value for conventional banks is (100%), similar to Islamic banks, which reach (100%).

The table also shows that banks in Iran, Jordan, Lebanon and Syria have the best technical efficiency of (100%) for both types of banks. However, Palestine recorded the lowest percentage of technical efficiency among these five countries at (1.32%).

Table (12) in appendix (C) shows Islamic and conventional banks' average technical efficiency in all estimation methods for the selected countries.

Iranian Islamic banks recorded average efficiency in all methods. Estimating the efficiency of (0.740, 0.832, 1.468 & 1.282) is better than conventional banks. The results were recorded in Jordan when different methods were used to estimate technical efficiency. The average technical efficiency of Islamic banks was (0.874, 0.926, 1.152, & 1.082), respectively, better than that of conventional banks. In Lebanon, the result was that conventional banks recorded an average technical efficiency of (0.466, 2.334 & 2.057), respectively, which was better than Islamic banks, with the exception of the input-oriented VRS method. Different results showed that Islamic banks recorded an average technical efficiency of (0.761), which is better than conventional banks.

In Palestine, all methods show the same results. The average technical efficiency in Islamic banks was (0.612, 0.655, 1.677 & 1.646), respectively, as they are more efficient than conventional banks. In Syria, there was a difference in the result only in one method, the output-oriented CRS method, where an average technical efficiency was recorded at (1.999), which shows that Islamic banks are more efficient than conventional banks. In contrast, the other three methods show that conventional banks are more efficient, with an average efficiency of (0.602, 0.732 & 1.752).

Table (13) in appendix (C) shows the best results for Islamic and conventional banks using all efficiency estimation methods.

In Iran, the maximum score for Islamic banks was (1.00) in all estimation methods, which is better than conventional banks. In Jordan, all evaluation methods showed no difference between the types of banks, as the technical efficiency was recorded at (1.00). In Lebanon, the maximum value in all estimation methods was for conventional banks, which recorded a technical efficiency (1.00), which is better than Islamic banks.

In Palestine, all methods show that the maximum value of the technical efficiency of Islamic banks was recorded as (0.756, 0.782, 1.320 & 1.320), which is better than conventional banks. In Syria, the CRS input-output system shows that conventional banks recorded the best technical efficiency score of (1.00) over the years, while VRS methods show that both Islamic and conventional banks recorded the same value of (1.00).

4.1.1 Discussion the result

Efficient banks reduce costs and increase profits by effectively managing capital, deposits, and assets to generate advances, investments, and income. This leads to increased profits, improved competitiveness, and improved customer confidence. Effective resource management ensures the bank achieves its goals with minimal resources, resulting in increased profits and improved customer satisfaction.

The five countries (Iran, Jordan, Palestine, Lebanon, and Syria) share the same political and economic conditions that significantly affect the banking sector, such as regional conditions, inflation, exchange rate fluctuations, government political forces, the national banking sector, economic challenges, and security risks (Abdul-Majid et al., 2010; El-Chaarani et al., 2022).

The results showed that Islamic banks are more efficient than conventional banks. The reason is that Islamic banks adhere to the Sharia provisions that supervise and monitor the bank's work and prohibit usury and the sharing of profits and losses. It is keen to diversify investment and provide specialized financing services to meet customer needs and achieve profit without violating the principles of Islamic Sharia, which makes it more efficient at bearing risks. Islamic banks have proven their ability to manage inputs and outputs efficiently. The result agreed with studies Abdul-Majid et al., 2010; Parveen et al. (2015), which indicated that it operates at the optimal size of operations and is administratively effective in controlling costs and making the most of its resources.

Conventional banks mainly seek to maximize profits, which leads them to focus on providing savings and investment services with high returns to their customers. This focus on profit forces them to invest in high-risk projects and provide high-interest loans, making them vulnerable to the risk of default during political and economic crises. When

loans default, banks are forced to take steps to increase their ability to cope with these crises, which leads to higher administrative costs and lower efficiency.

The study's findings demonstrated that Islamic banks in Iran, Palestine, and Jordan are more efficient than conventional banks. This is because Islamic banks are better able to adjust to challenging political and economic environments. It is more resilient to risk and can withstand the financial ups and downs that these countries' markets experience. Furthermore, the success of Islamic banks in Iran can be attributed to a law that was implemented in 1983 and mandates that all banks operating within the nation must adhere to Islamic law (Mirzaei et al., 2022).

conventional banks are more efficient than Islamic banks in Lebanon and Syria due to government restrictions on Islamic banks, the study found. These restrictions limit the use of Islamic finance contracts and face political pressure due to fears of the spread of Islamic ideas and the financing of extremist activities. As a result, conventional banks have emerged and their technical efficiency has increased. These restrictions are not imposed in Iran, Jordan, and Palestine (El-Chaarani et al., 2022; Hassan & Aliyu, 2018; Hassan et al., 2009).

4.3 Results for the Second stage: Determinants of efficiency using regression analysis

Tests for regression analysis are shown first. The study used descriptive statistics to provide an initial understanding of the nature of the data. Second, create a correlation matrix to evaluate the relationship between variables based on their strength and direction of association. Third, pooled regression analysis to determine the effect of independent variables on technical efficiency.

Descriptive statistics

Descriptive statistics provide a rough picture of the data to be analyzed, such as its average, how volatile this data is, and whether or not it contains outliers. These descriptive specialists include a sample containing (415) observations during the period 2013-2017 for 83 banks, but the number of observations may decrease in some models due to missing data for some variables in certain years.

After collecting financial data from the annual financial reports of Islamic and conventional banks, descriptive statistics were prepared for the study variables, consisting of the arithmetic mean, standard deviation, maximum value, and minimum value.

Table (14) in appendix (C) shows descriptive statistics for the dependent variables representing the efficiency of Islamic and conventional banks in the selected regions.

(ioTECRS) as the input-oriented technical efficiency model Constant Return Scale, (ioTEVRS) the input-oriented technical efficiency model variable Return Scale, ooTECRS the Output-oriented technical efficiency model Constant Return Scale, and the (ooTECRS) output-oriented technical efficiency model variable Return Scale, where the average of these ratios are (0.591 0.675, 4.514 & 3.735), respectively, as these ratios represent the technical efficiency of the banks within the sample. Both the (ioTECRS) and (ioTEVRS) are (0.591 & 0.675). The banks are able to optimally use inputs to produce outputs, as the (ioTEVRS) is better than the (ioTECRS). This means that banks have more flexibility in using inputs to produce outputs, and both the(ooTECRS) and the (ioTEVRS) represent 4.514 and 3.735 in the ability of the banks in the sample to use their resources relatively effectively. This means that the banks in the sample can generate more output per unit of input. Since the (ioTEVRS) it is considered better than the (ioTECRS). The table shows the standard deviation of (0.203, 0.212, 32.123 & 25.367), indicating that there is a discrepancy in the sample and the reason is the outliers, as there are banks in the sample with low technical efficiency and banks in the sample with high technical efficiency.

The factors that affect the efficiency of banks are the size of the bank, return on assets, Capital adequacy, liquidity, GDP growth, rule of law, and non-performing loans.

The average of these ratios reached (21.581, 0.013, 0.127, 0.235, 0.106, -0.004, -0.676 & 0.151), respectively. Values for GDP growth -0.004 and rule of law (-0.676) indicate that the technical efficiency of the banks in the sample is affected in economic recession and in countries that suffer from a weak rule of law.

The minimums reached (17.672, -0.325, -0.633, 0.011, 0.001, -0.263, -2.096 & 0), respectively. Negative values for each of the return on assets (-0.325) indicate that there are banks in the sample that bear losses, and the Capital adequacy ratio (-0.633) indicates

that There are banks in the sample that have more debt than equity, and this indicates that there are more accumulated losses than Capital adequacy, and GDP growth (-0.263) indicates the presence of an economic recession that affects the efficiency of banks and the rule of law (-2.096) indicates that the countries in the sample are weak In the rule of law due to the political conditions that countries suffer from

The maximum levels reached (24.804, 0.287, 0.792, 0.499, 0.636, 0.089, 0.467 & 1.296) indicating that the banks in the sample have technical efficiency.

Regarding the dummy variable Islamic Bank, the table indicates that the average technical efficiency of the Islamic banks in the sample is (0.3250, and the standard deviation indicates that there is a large discrepancy between the banks in the sample, as there are banks that are not Islamic banks and banks that are Islamic banks.

The standard deviation indicates the extent to which the values fluctuate from their arithmetic mean. It also indicates the risks if they are related to the ratios that represent returns on banks. The fluctuation in the standard deviation indicates that extreme values led to a large difference in the variance of (1.656, 0.041, 0.118, 0.106 & 0). (142, 0.069, 0.722, 0.199 & 0.469), respectively.

Pairwise correlations

The table (15) in appendix (C) displays the correlation between independent variables to determine if there is a high correlation between them.

ince the multicollinearity problem means that there are at least two independent variables that have a strong relationship with each other, Explain the results of the correlation matrix that there is a correlation between (ioTEVRS) and (ioTECRS) at a rate of (0.881) and that there is a correlation between (ooTEVRS) and (ooTECRS) at a rate of (1.000. The results of the above correlation matrix also show that the correlation between the independent variables (size, profitability, Capital adequacy, liquidity, asset quality, GDP, rule of law, and non-performing loans) The results showed that there is a high correlation between asset poor quality and non-performing loans at a rate of (0.908), Which means that there is a correlation problem and it is solved using multiple regression models to avoid including two variables in one model that contain a multicollinearity problem.

Panel data analysis

In order to study the extent of the impact of the independent variables on the level of technical efficiency of the banking sector in Iran, Jordan, Palestine, Lebanon, and Syria, a regression analysis was used to analyze the size and direction of the impact of the independent variables and their impact on technical efficiency.

Regression model:

y = b0 + b1*log (SIZE)+ b2* PROF + b3* LIQ + b4* CAR + b5* ASQ + b6* GDP + b7*Rule of Law+b8*NPL + b9* Islamic + e

Pooled results with robust standard errors were applied. The table (16) in appendix (C) represents the results of the pooled regression analysis to determine the effect of each independent variable on the technical efficiency (dependent variables) of the banking sector in Iran, Jordan, Palestine, Lebanon, and Syria.

R-squared values of (0.671, 0.509, 0.547 & 0.446), respectively, indicate the ability of the independent variables to explain the dependent variable.

The results showed a positive,statistically significant relationship between the size of the bank and the input-oriented model (VRS) and the output-oriented model (VRS) at statistically significant levels of (0.05) and (0.01), respectively, with rates of (0.0166 & -0.129), respectively. This means that larger banks are more efficient in using inputs to produce outputs. The larger the bank size, the greater its efficiency. The more efficient the bank is, the higher the profits and the lower the costs, unlike small banks that need high costs to compensate by providing high-quality services to obtain high revenues. This result is consistent with (Antunes et al., 2022; Anwar, 2014; Kamarudin et al., 2019; Sufian et al., 2009). The positive relationship between size and the output-oriented and input-oriented models is due to the fact that the negative sign for the output-oriented models is due to the fact that the lower the scores and the closer they are to (1) indicate efficiency, while the relationship between size and the input-oriented model indicates that more scores were greater than or equal to (1) for proficiency.

For the ROA variable, ROA represents the bank's profitability. There is a positive, statistically significant relationship between the return on assets and the input-oriented

model crs and the input-oriented model vrs and the output-oriented model crs and the output-oriented model vrs at statistically significant levels of (0.01, 0.05, 0.01 & 0.01), respectively, with rates of (2.295, 0.991, -7.445 & -4.533), respectively. banks with higher profitability are more efficient in using inputs to produce outputs. This indicates that profitability enables banks to invest in many resources that bring profit to the bank, and profitability also enables the bank to manage risks more efficiently. The results were consistent with Shawtari et al. (2015) finding a positive relationship at the levels of (0.05) and (0.01), indicating that in inefficient banks, customers are more attracted to banks characterized by high profitability. The positive relationship between the return on assets and the output-oriented and input-oriented models is due to the negative sign of the output-oriented models. The reason is that the lower the scores and the closer they are to (1) indicate efficiency, while the relationship between the return on assets and the input-oriented model indicates that whenever scores are greater than or equal to 1, they indicate proficiency.

For Capital adequacy variables, There is a positive, statistically significant relationship between capital and the input-oriented model vrs at statistically significant levels of (0.05) at a rate of (0.405).This means that increasing capital leads to increasing the technical efficiency of the bank, which means that the bank is more efficient in using inputs to produce outputs. This indicates that capital enables banks. When banks suffer losses, they can use the capital available to them to compensate for those losses and enable them to expand their business and attract deposits. This is consistent with (Anwar, 2014; Fernandes et al., 2018; Kamarudin et al., 2019).

For the liquidity variable, the results indicate a positive, statistically significant relationship between liquidity and the input-oriented model crs and the input-oriented model vrs and outputs-oriented model crs and the output-oriented model vrs at statistically significant levels of (0.01, 0.01, 0.01 & 0.01), respectively, with rates of (1.232, 0.975, -5.629 & -3.939), respectively. This means that high-liquidity banks increase the Bank's technical efficiency, which means that the Bank is more efficient in using inputs to produce outputs. This indicates that the more liquidity this increases, the more efficient banks will lead to the Bank's ability to meet their financial obligations and improve the Bank's ability to finance activities, invest in assets, and attract deposits, thereby reducing administrative costs and increasing the Bank's ability to manage and

risks. This is consistent with (Anwar, 2014; Kamarudin et al., 2019). The positive relationship between the Liquidity and the output-oriented and input-oriented models is due to the negative sign of the output-oriented models. The reason is that the lower the scores and the closer they are to (1) indicate efficiency, while the relationship between the Liquidity and the input-oriented model indicates that whenever scores are greater than or equal to (1), they indicate proficiency.

For the Poor asset quality variable, there is a positive, statistically significant relationship between poor asset quality and the input-oriented model crs and using the input-oriented model vrs and using output-oriented model crs and using output-oriented model vrs at statistically significant levels of (0.01, 0.01, 0.05 & 0.01), respectively, with rates of (0.417,0.566,-1.378 & -1.425), respectively. This means that banks with higher levels of Poor asset quality tend to be more efficient in using inputs to produce outputs. Poor asset quality forces banks to improve their business practice by scheduling and restructuring bad assets in order to benefit from them, which reflects positively on the efficiency of banks and makes them more capable of managing their risks. It was agreed Sukmana & Setianto (2018) that Islamic banks are better than conventional banks. Its poor asset management is that financing its business and its work in sharing profits and losses makes it less risky than conventional banks.

For the GDP variable, the table results indicate a positive relationship with statistical significance at the level of (0.05) between the GDP and the input-oriented model vrs, meaning that the greater the GDP, the more efficient the banks are. This means that growth in GDP leads to increased efficiency of banks in using inputs to produce outputs. The greater the demand for financial services provided by banks, which positively affects the profitability and efficiency of banks, the results were consistent with Shawtari et al. (2015) found a positive relationship at the levels of (0.01) and the result consistent with (Anwar, 2014; Johnes et al., 2014; Kamarudin et al., 2019; Khartabiel et al., 2018; Wahid, 2016).

For the rule of law variable, the results showed a negative, statistically significant relationship between the rule of law and the input-oriented model crs and using input-oriented model vrs at a statistically significant level of (0.1 & 0.1), respectively, with rates of (-0.0208 & -0.0228) respectively. This indicates that the rule of law represents a burden

on the efficiency of banks, as their administrative costs increase in order to comply with the requirements imposed by the law, such as disclosure and transparency requirements and increased government oversight of banks, which leads to This leads to an increase in administrative costs and a decrease in profits, which leads to banks' inefficiency. The result is consistent with (Hassan & Aliyu, 2018).

The results showed a positive, statistically significant relationship between the Islamic Bank and the input-oriented model crs and the input-oriented model vrs and the output-oriented model vrs at statistically significant levels of (0.01, 0.01 & 0.05), respectively, with rates of (0.0934, 0.137 & -0.198) . This means that Islamic banks are more efficient than conventional banks in using inputs to produce outputs. This means that Islamic banks in Iran, Jordan, Lebanon, Palestine and Syria are relatively more efficient compared to their conventional banks. This result is consistent with our previous findings (Ahmad, Noor& Sufian, 2010; Jusupova et al., 2018), which indicate that Islamic banks in the selected countries are more efficient than conventional banks.

The results showed a positive,statistically significant relationship between the size of the bank and the output-oriented model (VRS) at statistically significant levels of 0.05 , with rates of (-0.123). This means that Larger banks tend to be more efficient than smaller banks because they have the ability to achieve economies of scale. This result is consistent with (Antunes et al., 2022; Anwar, 2014; Kamarudin et al., 2019; Sufian et al., 2009). The positive relationship between size and the output-oriented and input-oriented models is due to the fact that the negative sign for the output-oriented models is due to the fact that the lower the scores and the closer they are to (1) indicate efficiency.

For the ROA variable, ROA represents the bank's profitability. There is a positive, statistically significant relationship between the return on assets and the input-oriented model crs and the input-oriented model vrs and the output-oriented model crs and the output-oriented model vrs at statistically significant levels of (0.05, 0.1, 0.05 & 0.05), respectively, with rates of (2.464, 1.210, -7.981 & -5.050), respectively. banks with higher profitability are more efficient in using inputs to produce outputs.This indicates More profitable banks tend to be more efficient than less profitable banks because they have more resources to invest and grow, improving their ability to manage risks by maintaining profit margins.The results were consistent with (Shawtari et al., 2015). The

positive relationship between the return on assets and the output-oriented and input-oriented models is due to the negative sign of the output-oriented models. The reason is that the lower the scores and the closer they are to (1) indicate efficiency, while the relationship between the return on assets and the input-oriented model indicates that whenever scores are greater than or equal to (1), they indicate proficiency.

For Capital adequacy variables, There is a positive, statistically significant relationship between capital and the input-oriented model vrs at statistically significant levels of (0.1) at a rate of (0.427). Banks with strong capital tend to be more efficient than banks with weak capital because they have more ability to withstand losses without the bank going bankrupt. This is consistent with (Anwar, 2014; Fernandes et al., 2018; Kamarudin et al., 2019).

For the liquidity variable, the results indicate a positive, statistically significant relationship between liquidity and the input-oriented model crs and the input-oriented model vrs and outputs-oriented model crs and the output-oriented model vrs at statistically significant levels of (0.01, 0.01, 0.01 & 0.01), respectively, with rates of (1.193, 0.944, -5.505 & -3.860), respectively. This means that high-liquidity banks increase the Bank's technical efficiency, which means that the Bank is more efficient in using inputs to produce outputs. This indicates that More liquid banks tend to be more efficient than less liquid banks because they have efficient Sufficient funds to cover its obligations.This is consistent with (Anwar, 2014; Kamarudin et al., 2019).

For the GDP variable, the table results indicate a positive relationship with statistical significance at the level of (0.05) between the GDP and the input-oriented model vrs, meaning that the greater the GDP, the more efficient the banks are. This means that growth in GDP leads to increased efficiency of banks in using inputs to produce outputs. This suggests that banks are more efficient in a growing and stable economy than in a deteriorating economy because banks have more growth and expansion, the result consistent with (Anwar, 2014; Johnes et al., 2014; Kamarudin et al., 2019; Khartabiel et al., 2018; Wahid, 2016).

For the rule of law variable, the results showed a negative, statistically significant relationship between the rule of law and the input-oriented model crs and using input-oriented model vrs at a statistically significant level of (0.05 & 0.05), respectively, with

rates of (-0.0277 & -0.321) respectively. This indicates that the rule of law adversely affects banks because of their increased administrative costs in order to abide by the laws imposed by the rule of law, resulting in a decline in banks' efficiency. The result is consistent with (Hassan & Aliyu, 2018).

For the non-performing loans variable, the results indicated a positive and statistically significant relationship between non-performing loans, the input-oriented model, the input-oriented model, the input-oriented model, the output-oriented model, and the output-oriented model vrs at statistical significance. (0.05. 0.01. 0.01 & 0.05) respectively at (0.174, 0.268, -0.679 & -0.829) respectively. This indicates that the bank with non-performing loans is more efficient than the bank with fewer non-performing loans. The bank with non-performing loans works to improve doing business by allowing restructuring, rescheduling, or selling at higher prices, which enables the bank to recover a large portion of these loans thus enhancing its efficiency, This result is consistent with (Anwar, 2014; Shawtari et al ., 2015).

The results showed a positive, statistically significant relationship between the Islamic Bank and the input-oriented model crs and the input-oriented model vrs and the output-oriented model vrs at statistically significant levels of (0.01, 0.01 & 0.05), respectively, with rates of (0.988, 0.140 & -0.211). This indicates that Islamic banks are more efficient than conventional banks because they have advantages such as Islamic Sharia provisions that increase the efficiency of banks because of their business strategy that protects them from sudden political and economic volatility experienced by these countries in Iran, Jordan, Lebanon, Palestine, and Syria. This result is consistent with our previous findings (Ahmad, Noor & Sufian, 2010; Jusupova et al., 2018), which indicate that Islamic banks in the selected countries are more efficient than conventional banks.

Hypothesis Testing

H1: There is a positive relationship between the type of bank and the technical efficiency of the banking sector in selected countries.

Tables (16 & 17) in appendix (C) show that there is a positive impact of bank type on the technical efficiency of the banking sector in selected countries, and therefore the H1

hypothesis has been accepted. This result is consistent with (Ahmad, Noor& Sufian, 2010; Jusupova et al., 2018).

H2: There is a positive relationship between bank size and technical efficiency of Islamic banks and conventional banks in the selected countries.

Tables (16 & 17) in appendix (C) show that there is a positive effect of bank size on the technical efficiency of Islamic and conventional banks, so the hypothesis is accepted H2. This result is consistent with (Anwar, 2014; Kamarudin et al., 2019; Sufian et al., 2009).

H3: There is a positive relationship between the profitability (ROA) and technical efficiency of Islamic banks and conventional banks in the selected countries.

Tables (16 & 17) in appendix (C) show that there is a positive effect of the profitability (ROA) on the technical efficiency of Islamic banks and conventional banks, so the hypothesis is accepted H3. This result is consistent with (Shawtari et al., 2015).

H4: There is a positive relationship between liquidity and technical efficiency of Islamic banks and conventional banks in the selected countries.

Tables (16 & 17) in appendix (C) show that there is a positive effect of liquidity on the technical efficiency of Islamic and conventional banks. Therefore, the hypothesis is accepted H4. This result is consistent with (Anwar, 2014; Kamarudin et al., 2019).

H5: There is a positive relationship between capital adequacy and the technical efficiency of Islamic banks and conventional banks in the selected countries.

Tables (16 & 17) in appendix (C) show that there is a positive effect of capital adequacy on the technical efficiency of Islamic banks and conventional banks, so the hypothesis is accepted H5. This result is consistent with (Anwar, 2014; Fernandes et al., 2018; Kamarudin et al., 2019).

H6: There is a positive relationship between Poor asset quality and technical efficiency of Islamic banks and conventional banks in the selected countries.

Table (16) in appendix (C) shows that there is a positive effect of poor asset quality on the technical efficiency of Islamic banks and conventional banks, so the hypothesis is accepted H6. This result is consistent with (Sukmana & Setianto, 2018).

H7: There is a positive relationship between the GDP and the technical efficiency of Islamic banks and conventional banks in the selected countries.

Tables (16 & 17) in appendix (C) show that there is a positive effect of the GDP on the technical efficiency of Islamic banks and conventional banks, so the hypothesis is accepted H7. This result is consistent with (Johnes et al., 2014; Kamarudin et al., 2019; Khartabiel et al., 2018; Shawtari et al., 2015; Wahid, 2016).

H8: There is a positive relationship between the Rule of Law and the technical efficiency of Islamic banks and conventional banks in the selected countries.

Tables (16 & 17) in appendix (C) show that there is a negative impact of the rule of law on the technical efficiency of Islamic banks and conventional banks, so the hypothesis is rejected H8. This result is consistent with (Hassan et al., 2009).

H9: There is a negative relationship between non-performing loans and the technical efficiency of Islamic banks and conventional banks in the selected countries.

Table (17) in appendix (C) shows that there is a positive effect of non-performing loans on the technical efficiency of Islamic and conventional banks, and therefore the hypothesis is rejected H9. This result is consistent with (Anwar, 2014; Shawtari et al., 2015).

Chapter Five

Conclusion and Recommendations

5.1 Introduction

This study aims to evaluate technical efficiency and its determinants in Islamic and conventional banks for (83) banks in Iran, Jordan, Palestine, Lebanon, and Syria between 2013 and 2017. DEA was used to estimate the technical efficiency scores, and regression analysis was used to examine the effect of the factors determining technical efficiency.In this section, the conclusion, recommendations, and limitations of the study will be presented.

5.2 Conclusion

The results of the data envelopment analysis are shown, which uses the inputs of assets, capital, and deposits and outputs of advances, income, and investment. using estimation methods: input-oriented CRS, input-oriented VRS, output-oriented CRS, and output-oriented VRS. The results of the four estimation methods show that the Islamic banking sector is more efficient in using inputs to produce outputs than conventional banks. During the period covered by the study from 2013 to 2017. This is because they enjoy advantages such as Islamic Sharia provisions that impose restrictions on their work and protect them from sudden political and economic volatility affecting them (Abdul-Majid et al., 2010; Parveen et al., 2015).

The results of the data envelope analysis also showed that conventional banks are more efficient than Islamic banks in Lebanon and Syria. due to government restrictions and political pressure on the activities of Islamic banks, hindering their ability to grow and expand due to their fear of spreading Islamic ideas and financing terrorism. These factors led to the prosperity of conventional banks, while Islamic banks faced significant difficulties in operating and developing. This result is consistent with the results of (Johnes et al., 2014; Hassan & Aliyu, 2018).

The results of the data envelope analysis also showed that Islamic banks are more efficient than conventional banks in Iran, Jordan, and Palestine. This can be attributed to several reasons. Firstly, the law that was imposed in Iran in 1983 stipulates that all banks in Iran must be Islamic banks that adhere to the principles of Islamic Sharia. Secondly,

governments in these countries do not impose restrictions on Islamic banks that restrict their operation, resulting in the prosperity and expansion of Islamic banks. This result is consistent with the results of (Khartabiel et al., 2018; Miah et al., 2021; Mirzaei et al., 2022).

The regression results showed that the size of the bank has a positive impact on the technical efficiency of Islamic banks and conventional banks. The large size of the bank allowed it to provide a wide range of services and products to customers, thereby increasing the efficiency of the use of its resources and reducing risk. This result is consistent with (Antunes et al., 2022; Kamarudin et al., 2019; Sufian et al., 2009). It was also found that Profitability enables the Bank to generate returns on its investments, contributing to increased capital and efficiency of operations, attracting investments, and improving the Bank's ability to expand, thus increasing the technical efficiency of banks Shawtari et al., (2015). Capital adequacy was also found to ensure the Bank's ability to withstand unforeseen losses, thereby enhancing its stability and efficiency. Increasing capital adequacy increases customer confidence and improves access to finance, increasing banks' technical efficiency. (Anwar, 2014; Fernandes et al., 2018; Kamarudin et al., 2019). Liquidity was also found to show the bank's ability to meet its obligations, increasing customer confidence and attracting more deposits. This has a positive impact on the technical efficiency of banks, aligning with (Kamarudin et al., 2019) findings. Poor asset quality is also found to improve business practices and improve risk management in banks through restructuring. This is reflected positively in banks' technical efficiency, as per (Sukmana & Setianto, 2018). GDP was also found to increase banks' business opportunities, increase the demand for financial services and improve the business environment, thereby enhancing the technical efficiency of banks, (Johnes et al., 2014; Kamarudin et al., 2019; Khartabiel et al., 2018; Shawtari et al., 2015; Wahid, 2016) findings. The rule of law was also found to be a burden for banks because of their compulsory adherence to laws and regulations, which would increase their administrative costs and adversely affect banks' technical efficiency., as per Hasan et al., (2022) findings. Non-performing loans were also found to increase operating costs, lower profitability, and increase credit risk, reducing banks' technical efficiency, He also found that Islamic banks are better than conventional banks and that the efficiency of Islamic banks is due to their experience in the field of Islamic financial services, and focus on financing that

conforms to the principles of Islamic sharia, thereby enhancing efficiency through their ability to confront the political and economic risks suffered by these countries.

5.3 Recommendation

1. The results also showed that the technical efficiency of the banking industry is positively affected by volume, liquidity, profitability, adequacy of capital, distressed loans and poor asset quality. Banks must therefore seek to increase the number of their customers, expand their markets, and introduce new goods and services. It should also aim to reduce the ratio of non-performing loans, improve asset quality, and enhance liquidity, profitability and capital adequacy. Decision makers must strengthen the independence of the judiciary, combat corruption and promote fair laws. In addition, it should invest in information technology, improve payment systems and promote financial inclusion.

2. The results also showed that the rule of law has a negative impact on technical efficiency. The study recommends enhancing awareness and legal culture by improving the business environment and financial laws and developing infrastructure. This includes organizing workshops, publishing information materials, providing specialized legal training, reviewing financial laws and Simplifying legal procedures, enhancing transparency, and ensuring the independence and integrity of the judiciary. In addition, strengthening partnerships between banks and government agencies and supporting their infrastructure can further enhance efficiency.

3. Since the results showed that Islamic banks are more efficient than conventional banks, the regulatory authority must issue a system that supports the work of the banking sector. While considering the requirements and needs of each type of bank in order to interact with changes in the market to ensure profitability and meet customer expectations. These steps should be taken after a thorough examination of internal and external requirements, with an emphasis on improving the efficiency of operations and meeting customer expectations.

4. The necessity of continuing research in the field of evaluating the efficiency of Islamic and conventional banks in Iran, Jordan, Palestine, Lebanon, and Syria and to

develop stimulus policies to enhance their efficiency. Furthermore, the regulatory body must prioritize efficiency in its regulations and procedures and establish specific efficiency standards that banks must meet.

5. Since the technical efficiency of Islamic and conventional banks was measured in Iran, Jordan, Palestine, Lebanon, and Syria, researchers can expand the geographical and temporal scope of the study using data envelopment analysis and regression analysis in order to compare their results with our findings and come up with more recommendations that would enhance the efficiency of the banking sector.

6. Since the technical efficiency of Islamic banks and conventional banks in Iran, Jordan, Palestine, Lebanon, and Syria has been examined by data envelopment analysis, future research can be conducted through other analysis techniques or by examining another type of efficiency. Therefore, researchers must conduct more research on the efficiency of the banking sector in the selected countries and compare their results with our findings to come up with more recommendations that can improve the efficiency of the banking sector.

5.4 Originality/Implications

The study differs from previous research because it studies technical efficiency in countries suffering from political and economic conditions that affect the efficiency of banks. There is no similar previous research that addressed the efficiency of the banking sector in Iran, Jordan, Palestine, Lebanon, and Syria using multiple inputs and outputs in data envelopment analysis (DEA) to estimate degrees of technical efficiency. We conducted a comparison between the technical efficiency levels of Islamic banks and conventional banks operating in these nations. The efficiency-affecting factors and their effects on decision-making processes—which may be used to assess banks' performance—were also studied in this study. The management of these banks can also use these results to improve the process of providing banking services, reduce costs, and increase profits. The research can also be useful to the banking regulatory body in developing new policies and procedures to enhance bank efficiency, monitor the performance of banks in the region, and take appropriate measures in case of risks.

5.5 Limitations and Suggestions

Like all studies, the current study has a number of drawbacks that make additional research necessary. Due to the difference in sample size in Iran, Jordan, Palestine, Lebanon, and Syria, knowing the technical efficiency between these banks is difficult, which makes comparisons between the efficiency of the types of banks inaccurate. Another obstacle is the lack of prior research on the effectiveness and comparison of conventional banks and Islamic banks in the selected countries. Consequently, it is not possible to compare the findings of this study with those of other studies conducted in the same environment.

In addition, we know that the DEA technique evaluates efficiency by creating a benchmark based on available information, but it is not always possible for a bank to achieve full efficiency over time due to the use of many input and output variables that are difficult to manage. Second, the data set is small, and the identified input and output factors may not be comprehensive. Future studies could expand their research by including other variables. Third, because there haven't been many prior studies conducted in these countries, it's challenging to compare the findings of the DEA technique, which is used in Iran, Jordan, Palestine, Lebanon, and Syria, to assess the efficacy of Islamic and conventional banks. Therefore, future research may broaden its reach by comparing the level of efficiency with other countries and making a cross-country comparison.

List of Abbreviations

Abbreviations	Definition
DEA	Data Envelopment Analysis
DMU	Decisions Making Units
CRS	Constant Returns to Scale
VRS	Variable Returns to Scale
TE	Technical Efficiency
Io-TE-CRS	input-oriented technical efficiency Constant Return Scale
Io-TE-VRS	input-oriented technical efficiency variable Return Scale
oo-TE-CRS	Output-oriented technical efficiency Constant Return Scale
oo-TE-VRS	output-oriented technical efficiency variable Return Scale

References

Abdul-Majid, M., Saal, D. S., & Battisti, G. (2010). Efficiency in Islamic and conventional banking: an international comparison. *Journal of Productivity Analysis, 34*, 25–43.

Abusharbeh, M. (2020). *Determinants of Islamic bank financing in the Middle East: Vector Error Correction Model (VECM)*.

Ahmad, N. H. bt, Noor, M. A. N. M., & Sufian, F. (2010). The efficiency of Islamic banks: empirical evidence from the Asian countries' Islamic banking sectors. *Journal for International Business and Entrepreneurship Development*, *5*(2), 154–166.

Aikaeli, J. (2006). Commercial banks efficiency in Tanzania. *Available at SSRN 980933*.

Aikaeli, J. (2008). *Commercial Banks Efficiency in Tanzania*.

Albaity, M., Mallek, R. S., & Noman, A. H. M. (2019). Competition and bank stability in the MENA region: The moderating effect of Islamic versus conventional banks. *Emerging Markets Review, 38*, 310–325.

Alber, N., Elmofty, M., Kishk, I., & Sami, R. (2019). Banking efficiency: concepts, drivers, measures, literature and conceptual model. *Drivers, Measures, Literature and Conceptual Model (January 5, 2019)*.

Almaqtari, F. A., Al-Homaidi, E. A., Tabash, M. I., & Farhan, N. H. (2019). The determinants of profitability of Indian commercial banks: A panel data approach. *International Journal of Finance & Economics*, *24*(1), 168–185.

Al Shaher, T., Kasawneh, O., & Salem, R. (2011). The major factors that affect banks' performance in Middle Eastern countries. *Journal of Money, Investment and Banking*, *20*, 101–109.

Al-Sharkas, A. A., & Al-Sharkas, T. A. (2022a). The impact on bank profitability: Testing for capital adequacy ratio, cost-income ratio and non-performing loans in emerging markets. *Journal of Governance and Regulation/Volume*, *11*(1).

Al-Sharkas, A. A., & Al-Sharkas, T. A. (2022b). THE IMPACT ON BANK PROFITABILITY: TESTING FOR CAPITAL ADEQUACY RATIO, COST-INCOME RATIO AND NON-PERFORMING LOANS IN EMERGING MARKETS. *Journal of Governance and Regulation*, *11*(1 special issue), 231–243. https://doi.org/10.22495/jgrv11i1siart4.

Altun Ada, A., & Dalkiliç, N. (2014). *Efficiency Analysis in Islamic Banks: A Study for Malaysia and Turkey*. http://www.tkbb.org.tr.

Antunes, J., Hadi-Vencheh, A., Jamshidi, A., Tan, Y., & Wanke, P. (2022a). Bank efficiency estimation in China: DEA-RENNA approach. *Annals of Operations Research*, *315*(2), 1373–1398.

Antunes, J., Hadi-Vencheh, A., Jamshidi, A., Tan, Y., & Wanke, P. (2022b). Bank efficiency estimation in China: DEA-RENNA approach. *Annals of Operations Research*, *315*(2), 1373–1398. https://doi.org/10.1007/s10479-021-04111-2.

Anwar, M. (2014a). *I BANK EFFICIENCY AND LENDING PROPENSITY: EVIDENCE FROM COMMERCIAL BANKS IN INDONESIA*.

Anwar, M. (2014b). *I BANK EFFICIENCY AND LENDING PROPENSITY: EVIDENCE FROM COMMERCIAL BANKS IN INDONESIA*.

Awwad, B. (2022). *The role of environmental disclosure in enhancing the market value of industrial and service companies listed on the Palestine stock exchange*.

Ayaz, M. Q., Qahar, A., & Ullah, R. (2021a). Organizational and Demographic Level Diversity Practices and Employees Performance. *SEISENSE Business Review*, *1*(1), 1–9.

Ayaz, M. Q., Qahar, A., & Ullah, R. (2021b). Organizational and Demographic Level Diversity Practices and Employees Performance. *SEISENSE Business Review*, *1*(1), 1–9. https://doi.org/10.33215/sbr.v1i1.536.

Bader, M. K. I., Mohamad, S., Ariff, M., & Shah, T. H. (2008). Cost, revenue, and profit efficiency of Islamic versus conventional banks: international evidence using data envelopment analysis. *Islamic Economic Studies*, *15*(2).

Banker, R. D., Cooper, W. W., Seiford, L. M., & Zhu, J. (2011). Returns to scale in DEA. *Handbook on Data Envelopment Analysis*, 41–70.

Basu, M. R., Prasad, A., & Rodriguez, M. S. L. (2015). *Monetary operations and Islamic banking in the GCC: challenges and options*. International Monetary Fund.

Boukhatem, J., & Moussa, F. Ben. (2018). The effect of Islamic banks on GDP growth: Some evidence from selected MENA countries. *Borsa Istanbul Review*, *18*(3), 231–247.

Bushara, M. O. A., Aziz, Y. A. M., & Hussain, A. I. M. (2018). The sources of productivity change in Yemen Islamic banks: An application of Malmquist productivity index. *International Journal of Financial Management and Economics*, *1*(1), 39–45.

Charnes, A., Cooper, W. W., & Rhodes, E. (1978). Measuring the efficiency of decision making units. *European Journal of Operational Research*, *2*(6), 429–444.

Debasish, S. S. (2006). Efficiency performance in Indian banking—Use of data envelopment analysis. *Global Business Review*, *7*(2), 325–333.

El-Chaarani, H., Abraham, R., & Skaf, Y. (2022a). The impact of corporate governance on the financial performance of the banking sector in the MENA (Middle Eastern and North African) region: An immunity test of banks for COVID-19. *Journal of Risk and Financial Management*, *15*(2), 82.

El-Chaarani, H., Abraham, R., & Skaf, Y. (2022b). The Impact of Corporate Governance on the Financial Performance of the Banking Sector in the MENA (Middle Eastern and North African) Region: An Immunity Test of Banks for COVID-19. *Journal of Risk and Financial Management*, *15*(2). https://doi.org/10.3390/jrfm15020082.

Fecher, E., Kessler, D., Perelman, S., & Pestieau, P. (1993). Productive Performance of the French Insurance Industry*. In *The Journal of Productivity Analysis* (Vol. 4). Kluwer Academic Publishers.

Fecher, F., Kessler, D., Perelman, S., & Pestieau, P. (1993). Productive performance of the French insurance industry. *Journal of Productivity Analysis*, *4*, 77–93.

Fernandes, F. D. S., Stasinakis, C., & Bardarova, V. (2018a). Two-stage DEA-Truncated Regression: Application in banking efficiency and financial development. *Expert Systems with Applications*, *96*, 284–301.

Fernandes, F. D. S., Stasinakis, C., & Bardarova, V. (2018b). Two-stage DEA-Truncated Regression: Application in banking efficiency and financial development. *Expert Systems with Applications*, *96*, 284–301. https://doi.org/10.1016/j.eswa.2017.12.010

Ferreira, C. (2019). *Evaluating the European bank efficiency using Data Envelopment Analysis: evidence in the aftermath of the recent financial crisis Cândida Ferreira Evaluating the European bank efficiency using Data Envelopment Analysis: evidence in the aftermath of the recent financial crisis*.

Fuad Hadziq, M., Mardoni, Y., & Syafril, S. (2022). REANALYSIS OF SPIN-OFF ISLAMIC BANKS IN INDONESIA: EFFICIENT OR NOT? *Jurnal Ekonomi Dan Keuangan Syariah*, *6*(2), 214–228. https://doi.org/10.29313/amwaluna.v6i1.8599.

Gait, A. H., & Worthington, A. C. (2007). *A primer on Islamic finance: Definitions, sources, principles and methods*.

Haque, M. I., Tausif, M. R., & Anis, A. (2020). Continued discussion on conventional versus Islamic banks: combining financial ratios and efficiency. *Banks and Bank Systems*, *15*(1), 132.

Hasan, D., Ul Mustafa, A., & Zahoor, Z. (2022). A publication of Title: Modelling Islamic Banking Efficiency by Decomposing using DEA Bootstrapping Analysis History. *Islamic Banking & Finance Review (IBFR*, *9*(1). https://doi.org/10.32350/ibfr.91.04.

Hassan, M. K., & Aliyu, S. (2018a). A contemporary survey of islamic banking literature. *Journal of Financial Stability*, *34*, 12–43. https://doi.org/10.1016/j.jfs.2017.11.006.

Hassan, M. K., & Aliyu, S. (2018b). A contemporary survey of Islamic banking literature. *Journal of Financial Stability*, *34*, 12–43.

HASSAN, M.-U., Khan, M. N., AMIN, M. D. F. B. I. N., & Khokhar, I. (2018). Measuring the Performance of Islamic Banks in Saudi Arabia. *International Journal of Economics & Management*, *12*(1).

Hassan, M. U., Khan, M. N., Amin, M. F., & Khokhar, I. (2018). Measuring the performance of islamic banks in Saudi Arabia. *International Journal of Economics and Management*, *12*(1), 99–115.

Hassan, T., Mohamad, S., & Khaled I. Bader, M. (2009a). Efficiency of conventional versus Islamic banks: evidence from the Middle East. *International Journal of Islamic and Middle Eastern Finance and Management*, *2*(1), 46–65.

Hassan, T., Mohamad, S., & Khaled I. Bader, M. (2009b). Efficiency of conventional versus Islamic banks: evidence from the Middle East. *International Journal of Islamic and Middle Eastern Finance and Management*, *2*(1), 46–65. https://doi.org/10.1108/175383909109 46267.

Hatami-Marbini, A., & Toloo, M. (2019a). Data envelopment analysis models with ratio data: A revisit. *Computers and Industrial Engineering*, *133*, 331–338. https://doi.org/10.1016/j.cie. 2019.04.041.

Hatami-Marbini, A., & Toloo, M. (2019b). Data envelopment analysis models with ratio data: A revisit. *Computers & Industrial Engineering*, *133*, 331–338.

Hibatullah, I., & Nurcahyani, A. (2022). Analysis Efficiency of Islamic Bank in Indonesia and Saudi Arabia With Data Envelopment Analysis Approach. *ISLAMICONOMIC: Jurnal Ekonomi Islam*, *12*(2).

Hussain, M., Shahmoradi, A., & Turk, R. (2015). *WP/15/120 An Overview of Islamic Finance An Overview of Islamic Finance 1*.

Islahi, A. A. (2018). History of Islamic Banking and Finance. *Intellectual Discourse*, *26*.

Izadikhah, M. (2018). Improving the Banks Shareholder Long Term Values by Using Data Envelopment Analysis Model. *Advances in Mathematical Finance and Applications*, *3*(2), 27–41.

Johnes, J., Izzeldin, M., & Pappas, V. (2014). A comparison of performance of Islamic and conventional banks 2004-2009. *Journal of Economic Behavior and Organization*, *103*. https://doi.org/10.1016/j.jebo.2013.07.016.

Johnes, J., Izzeldin, M., Pappas, V., & Tsionas, M. (2014). *Measuring Convergence in Islamic and Conventional Banks: Evidence from Global Data*.

Jusupova, L. M., Kokh, I. A., & Nikonova, T. V. (2018). Islamic Banking: Modern Trends and Problems. *International Conference" Economy in the Modern World"(ICEMW 2018)*, 318–322.

Kamarudin, F., Sufian, F., Nassir, A. M., Anwar, N. A. M., & Hussain, H. I. (2019a). Bank efficiency in Malaysia a DEA approach. *Journal of Central Banking Theory and Practice*.

Kamarudin, F., Sufian, F., Nassir, A. M., Anwar, N. A. M., & Hussain, H. I. (2019b). Bank Efficiency in Malaysia a DEA Approach. *Journal of Central Banking Theory and Practice*, *8*(1), 133–162. https://doi.org/10.2478/jcbtp-2019-0007.

Karimzadeh, M. (2012). *Efficiency analysis by using data envelop analysis model: Evidence from Indian banks*.

Kerimov, A., Babayev, A., Dudchenko, V., Samusevych, Y., & Tumpach, M. (2023). *BANKING SYSTEM STABILITY IN CRISIS PERIODS: THE IMPACT OF THE BANKING REGuLATOR INDEPENDENCE*.

Khartabiel, G. M., Salha Tunku Ahmad, T., & Bakar, R. (2018). *International Journal of Social Science and Economic Research ANALYSIS OF THE COMPARATIVE PERFORMANCE OF ISLAMIC AND CONVENTIONAL BANKS: DOES GDP MATTER? 1**. www.ijsser. orgwww.ijsser.org

Khasawneh, O., Al Shaher, T., Kasawneh, O., & Salem, R. (2011). The Major Factors that Affect Banks' Performance in Middle Eastern Countries. In *Journal of Money, Investment and Banking*. http://www.eurojournals.com/JMIB.htm.

Loghod, H. A. (2010). Do Islamic banks perform better than conventional banks? Evidence from Gulf cooperation council countries. *Journal of Management*, *7*(3), 56–72.

Mandl, U., Dierx, A., & Ilzkovitz, F. (2008). *The effectiveness and efficiency of public spending*. Directorate General Economic and Financial Affairs (DG ECFIN), European.

Mensi, S. (2010). Efficient Structure versus Market Power: Theories and Empirical Evidence. In *International Journal of Economics and Finance* (Vol. 2, Issue 4). www.ccsenet.org/ijef.

Miah, M. D., Suzuki, Y., & Uddin, S. M. S. (2021). The impact of COVID-19 on Islamic banks in Bangladesh: a perspective of Marxian "circuit of merchant's capital." *Journal of Islamic Accounting and Business Research*, *12*(7), 1036–1054.

Milenković, N., Radovanov, B., Kalaš, B., & Horvat, A. M. (2022). External two stage DEA analysis of bank efficiency in West Balkan countries. *Sustainability*, *14*(2), 978.

Mirzaei, A., Saad, M., & Emrouznejad, A. (2022a). Bank stock performance during the COVID-19 crisis: does efficiency explain why Islamic banks fared relatively better? *Annals of Operations Research*, 1–39.

Mirzaei, A., Saad, M., & Emrouznejad, A. (2022b). Bank stock performance during the COVID-19 crisis: does efficiency explain why Islamic banks fared relatively better? *Annals of Operations Research*. https://doi.org/10.1007/s10479-022-04600-y.

Mirzaiyan, M., Sanei, M., Lotfi, F. H., & Mozaffari, M. R. (2019). Evaluation of Financial Ratios in DEA-R Model with Production Trade-Offs and Weight Restrictions. *Journal of Mathematical Extension*, *13*(2), 69–91.

Mohamed, S. K., Suliman, A. E. T., Mazen, J. A. S., & Abu-Naser, S. S. (2020). *Strategic Creativity in Islamic Banks in Palestine between Reality and Implementation*.

MOHD NOOR, N. H. H., BAKRI, M. H., WAN YUSOF, W. Y. R., MOHD NOOR, N. R. A., & Zainal, N. (2020). The impact of the bank regulation and supervision on the efficiency of Islamic Banks. *The Journal of Asian Finance, Economics and Business*, *7*(11), 747–757.

Mokhtar, H. S. A., AlHabshi, S. M., & Abdullah, N. (2006). A conceptual framework for and survey of banking efficiency study. *UNITAR E-Journal*, *2*(2), 1–19.

Moualhi, M. (2015). Efficiency in Islamic banking: Evidence from MENA region. *International Journal of Islamic Economics and Finance Studies*, *1*(2), 5–21.

Othman, F. M., Mohd-Zamil, A., Zaleha, S., Rasid, A., Vakilbashi, A., & Mokhber, M. (2016). International Journal of Economics and Financial Issues Data Envelopment Analysis: A Tool of Measuring Efficiency in Banking Sector. *International Journal of Economics and Financial Issues*, *6*(3), 911–916. http:www.econjournals.com.

Othman, F. M., Mohd-Zamil, N. A., Rasid, S. Z. A., Vakilbashi, A., & Mokhber, M. (2016). Data envelopment analysis: A tool of measuring efficiency in banking sector. *International Journal of Economics and Financial Issues*, *6*(3), 911–916.

Parveen, T., Langari Zadeh, E., & MuzakkirSyed, A. (2015). Evolution of Islamic banking in Iran: prospects and problems. *IOSR Journal of Business and Management*, *17*(1), 23–37.

Qureshi, M. A., & Shaikh, M. (2012a). Efficiency of Islamic and conventional banks in Pakistan: a non-parametric approach. *International Journal of Business and Management*, *7*(7), 40.

Qureshi, M. A., & Shaikh, M. (2012b). Efficiency of Islamic and Conventional Banks in Pakistan: A Non-parametric Approach. *International Journal of Business and Management*, *7*(7). https://doi.org/10.5539/ijbm.v7n7p40.

Raditya, Y. A., & Wibowo, B. (2022a). The Efficiency and Stability of the Islamic-Banking Industry in Indonesia, Malaysia, and the Middle-East. *Tenth International Conference on Entrepreneurship and Business Management 2021 (ICEBM 2021)*, 240–248.

Raditya, Y. A., & Wibowo, B. (2022b). *The Efficiency and Stability of the Islamic-Banking Industry in Indonesia, Malaysia, and the Middle-East*.

Sari, S., Ajija, S. R., Wasiaturrahma, W., & Ahmad, R. A. R. (2022). The efficiency of Indonesian commercial banks: does the banking industry competition matter? *Sustainability*, *14*(17), 10995.

Sawafta, O. (2021). Risk management in conventional and Islamic banks in Palestine: A comparative analysis. *Banks and Bank Systems*, *16*(2), 182–189.

Sbeiti, W., & Alqatan, A. (2021). Islamic Banking Performance Versus Conventional Banking. *Review of Economics and Finance*, *19*, 312–325. https://doi.org/10.55365/1923.X2021. 19.32.

Shafique, A., Faheem, M. A., & Abdullah, I. (2012). Impact of global financial crises on the Islamic banking system: Analysis of Islamic financial system during financial crunch 2008. *Arabian Journal of Business and Management Review (OMAN Chapter)*, *1*(9), 124.

Shahid, H., Rehman, R., Niazi, G. S. K., & Raoof, A. (2010). Efficiencies comparison of Islamic and conventional banks of Pakistan. *International Research Journal of Finance and Economics*, *49*(9), 24–42.

Shaikh, A., Sharif, S., & Arif, I. (2016). Comparison of Islamic banks with conventional banks: Evidence from an emerging market. *Journal of Management Sciences*, *3*(1), 22–38.

Sharma, D., Sharma, A. K., & Barua, M. K. (2013). Efficiency and productivity of banking sector: A critical analysis of literature and design of conceptual model. *Qualitative Research in Financial Markets*, *5*(2), 195–224.

Shawtari, F. A., Ariff, M., & Abdul Razak, S. H. (2015). Efficiency assessment of banking sector in Yemen using data envelopment window analysis: A comparative analysis of Islamic and conventional banks. *Benchmarking: An International Journal*, *22*(6), 1115–1140.

Shawtari, F. A., Ariff, M., & Razak, S. H. A. (2015). Efficiency assessment of banking sector in Yemen using data envelopment window analysis: A comparative analysis of Islamic and conventional banks. *Benchmarking*, *22*(6), 1115–1140. https://doi.org/10.1108/BIJ-10-2014-0097.

Sillah, B. M. S., & Harrathi, N. (2015a). Bank efficiency analysis: Islamic banks versus conventional banks in the Gulf Cooperation Council Countries 2006-2012. *International Journal of Financial Research*, *6*(4), 143–150.

Sillah, B. M. S., & Harrathi, N. (2015b). Bank Efficiency Analysis: Islamic Banks versus Conventional Banks in the Gulf Cooperation Council Countries 2006 - 2012.

International Journal of Financial Research, *6*(4). https://doi.org/10.5430/ijfr.v6n4p143.

Sillah, B. M. S., & Khan, M. N. (2014). The performance of Saudi Banking industry 2000-2011: have the banks distinguished themselves from one another? *International Journal of Financial Research*, *5*(2), 121–132.

Siraj, K. K., & Pillai, P. S. (2012). Comparative study on performance of Islamic banks and conventional banks in GCC region. *Journal of Applied Finance and Banking*, *2*(3), 123.

Siraj, S., Naz, I., Sheikh, R. U., & Farooqi, M. (2022). The Cost Effectiveness, Performance & Shar¯ ı ‘ah Supervisory Board Attributes in Islamic Banks. *Journal of Islamic Business and Management*, *12*(1).

Srairi, S. A. (2010). Cost and profit efficiency of conventional and Islamic banks in GCC countries. *Journal of Productivity Analysis*, *34*(1), 45–62.

Sufian, F., & Akbar Noor Mohamad Noor, M. (2009a). The determinants of Islamic banks’ efficiency changes: Empirical evidence from the MENA and Asian banking sectors. *International Journal of Islamic and Middle Eastern Finance and Management*, *2*(2), 120–138.

Sufian, F., & Akbar Noor Mohamad Noor, M. (2009b). The determinants of Islamic banks’ efficiency changes: Empirical evidence from the MENA and Asian banking sectors. *International Journal of Islamic and Middle Eastern Finance and Management*, *2*(2), 120–138. https://doi.org/10.1108/17538390910965149.

Sufian, F., & Habibullah, M. S. (2009a). Asian financial crisis and the evolution of Korean banks efficiency: A DEA approach. *Global Economic Review*, *38*(4), 335–369.

Sufian, F., & Habibullah, M. S. (2009b). Asian financial crisis and the evolution of Korean banks efficiency: A DEA approach. *Global Economic Review*, *38*(4), 335–369. https://doi.org/10.1080/12265080903391735.

Sukmana, R., & Setianto, R. H. (2018a). House Prices and Islamic Bank Stability in Indonesia: Evidence from Autoregressive Distributed Lag (ARDL) Model. *Jurnal Pengurusan*, *52*.

Sukmana, R., & Setianto, R. H. (2018b). House prices and islamic bank stability in Indonesia: Evidence from autoregressive distributed lag (ARDL) model. *Jurnal Pengurusan*, *52*, 73–84. https://doi.org/10.17576/pengurusan-2018-52-06.

Syed Ali, S. (2015). *Islamic banking in the MENA region*.

Talluri, S. (2000). Data envelopment analysis: models and extensions. *Decision Line*, *31*(3), 8–11.

ul Mustafa, A., & Zahoor, Z. (2022). Modelling Islamic Banking Efficiency by Decomposing using DEA Bootstrapping Analysis. *Islamic Banking and Finance Review*, *9*(1), 65–82.

Wahid, M. A. (2016). Comparing the efficiency of Islamic and conventional banks based on the evidence from Malaysia. *The Journal of Muamalat and Islamic Finance Research*, 35–66.

Zidan, K. (2019a). THE IMPACT OF BANKING SECTOR ON ECONOMIC GROWTH: EMPIRICAL ANALYSIS FROM PALESTINIAN ECONOMY. In *International Journal of Economics and Financial Issues*. EconJournals. https://doi.org/10.32479/ijefi.7369.

Zidan, K. (2019b). THE IMPACT OF BANKING SECTOR ON ECONOMIC GROWTH: EMPIRICAL ANALYSIS FROM PALESTINIAN ECONOMY. *International Journal of Economics and Financial Issues*, *9*(1), 253–258. https://doi.org/10.32479/ijefi.7369.

Appendices

Appendix (A)

Sample of the study

No	Bank Name	Bank type	Country
1	Jordan Trade Facilities Company Plc	Conventional	Jordan
2	Islamic International Arab Bank	Islamic	Jordan
3	Safwa Islamic Bank	Islamic	Jordan
4	Jordan Islamic Bank	Islamic	Jordan
5	Invest Bank	Conventional	Jordan
6	Bank Of Jordan Plc	Conventional	Jordan
7	Jordan Ahli Bank Plc	Conventional	Jordan
8	Cairo Amman Bank	Conventional	Jordan
9	Bank Al Etihad	Conventional	Jordan
10	Jordan Kuwait Bank	Conventional	Jordan
11	Arab Banking Corporation (Jordan)	Conventional	Jordan
12	Housing Bank For Trade & Finance (The)	Conventional	Jordan
13	Jordan Commercial Bank	Conventional	Jordan
14	Capital Bank Of Jordan	Conventional	Jordan
15	Arab Bank Plc	Conventional	Jordan
16	Arab Jordan Investment Bank	Conventional	Jordan
17	Societe Generale De Banque-Jordanie	Conventional	Jordan
18	Central Bank Of Jordan	Conventional	Jordan
19	Ansar Bank	Islamic	Iran
20	Ayandeh Bank Public Share Holding Company	Islamic	Iran
21	Bank Hekmat Iranian	Islamic	Iran
22	Bank Mellat	Islamic	Iran
23	Bank Pasargad	Islamic	Iran
24	Bank Saderat Iran	Islamic	Iran
25	Bank Sarmayeh	Islamic	Iran
26	Bank Sepah	Islamic	Iran
27	Bank Tejarat	Islamic	Iran
28	Day Bank	Conventional	Iran
29	Eghtesad Novin Bank Pjsc	Islamic	Iran
30	Iran Zamin Bank	Islamic	Iran
31	Karafarin Bank	Islamic	Iran
32	Middle East Bank	Islamic	Iran
33	Parsian Bank	Islamic	Iran
34	Post Bank Of Iran	Islamic	Iran
35	Saman Bank	Islamic	Iran
36	Sina Bank	Islamic	Iran
37	Al Baraka Bank Sal	Islamic	Lebanon
38	Bank Audi Private Bank	Conventional	Lebanon
39	Bank Audi Sal	Conventional	Lebanon
40	Bank Of Beirut S.A.L.	Conventional	Lebanon
41	Bankmed, Sal	Conventional	Lebanon
42	Banque Bemo Sal	Conventional	Lebanon

43	Banque De L'habitat Sal	Conventional	Lebanon
44	Banque Libano-Francaise	Conventional	Lebanon
45	Banque Misr Liban	Conventional	Lebanon
46	Bbac Sal	Conventional	Lebanon
47	Blom Bank S.A.L.	Conventional	Lebanon
48	Bsl Bank Sal	Conventional	Lebanon
49	Byblos Bank S.A.L.	Conventional	Lebanon
50	Credit Libanais S.A.L.	Conventional	Lebanon
51	Creditbank Sal	Conventional	Lebanon
52	Cscbank Sal	Conventional	Lebanon
53	Emirates Lebanon Bank Sal	Conventional	Lebanon
54	Fenicia Bank Sal	Conventional	Lebanon
55	Ffa Private Bank Sal	Conventional	Lebanon
56	Fransabank Sal	Conventional	Lebanon
57	Ibl Bank Sal	Conventional	Lebanon
58	Jammal Trust Bank Sal	Conventional	Lebanon
59	Lebanese Swiss Bank Sal (The)	Conventional	Lebanon
60	National Bank Of Kuwait (Lebanon) Sal	Conventional	Lebanon
61	Saradar Bank Sal	Conventional	Lebanon
62	Societe Generale De Banque Au Liban – Sgbl	Conventional	Lebanon
63	Arab Islamic Bank	Islamic	Palestine
64	Bank Of Palestine Plc	Conventional	Palestine
65	Palestine Investment Bank	Conventional	Palestine
66	Palestine Islamic Bank	Islamic	Palestine
67	Quds Bank Public Shareholding Company Ltd	Conventional	Palestine
68	The National Bank Tnb	Conventional	Palestine
69	Al Baraka Bank Syria Sa	Islamic	Syria
70	Arab Bank Syria Sa	Islamic	Syria
71	Bank Al-Sharq	Conventional	Syria
72	Bank Of Jordan-Syria	Conventional	Syria
73	Bank Of Syria And Overseas Sa	Conventional	Syria
74	Banque Bemo Saudi Fransi Sa	Conventional	Syria
75	Byblos Bank Syria S.A.	Conventional	Syria
76	Cham Islamic Bank Sa	Islamic	Syria
77	Commercial Bank Of Syria	Conventional	Syria
78	Fransabank-Syria S.A.	Conventional	Syria
79	International Bank For Trade And Finance Sa	Conventional	Syria
80	National Credit Bank (Closed Shareholding Company)	Conventional	Syria
81	Qatar National Bank - Syria Sa	Conventional	Syria
82	Syria Gulf Bank Sa	Conventional	Syria
83	Syria International Islamic Bank	Islamic	Syria

Appendix (B)

Presents the sample of this thesis

Country	Banks	Conventional Banks	Islamic banks	Year
Syria	15	11	4	2013-2017
Palestine	6	4	2	2013-2017
Lebanon	26	25	1	2013-2017
Iran	18	1	17	2013-2017
Jordan	18	15	3	2013-2017
Total	83	56	27	2013-2017

Appendix (C)

Tables

Table (2)

Description of the study variables

Variable	Definition	Equation	References
ioTECRS	Input Oriented Technical Efficiency with constant return to scale	Calculated from the first stage	(Kamarudin et al., 2019)
ioTEVRS	Input Oriented Technical Efficiency with variable return to scale	Calculated from the first stage	(Kamarudin et al., 2019)
ooTECRS	Output Oriented Technical Efficiency with constant return to scale	Calculated from the first stage	(Kamarudin et al., 2019)
ooTEVRS	Output Oriented Technical Efficiency with variable return to scale	Calculated from the first stage	(Kamarudin et al., 2019)
NPL	Non-performing loans to gross loans and advances granted to customers	$= \frac{\text{Non} - \text{performing loans}}{\text{total asset}}$	(Anwar, 2014)(Al-Sharkas & Al-Sharkas, 2022)(Al-Sharkas & Al-Sharkas, 2022)
SIZE	Natural logarithm of total asset	=log asset	(Al-Sharkas & Al-Sharkas, 2022) (Shawtari et al., 2015) (Johnes et al., 2014) (Sufian et al.,2009) (Antunes et al., 2022) (Kamarudin et al., 2019)
PROF	Return on assets by taking the percentage of net profit after tax to total assets	$\frac{\text{Net profit after tax}}{\text{total asset}}$	(Shawtari et al.,2015) (Antunes et al., 2022) (Fernandes et al., 2018) (Al-Sharkas & Al-Sharkas, 2022)
LIQ	Total loans divided by total deposits.	$\frac{\text{total loans}}{\text{total deposits}}$	(Fernandes et al., 2018) (Kamarudin et al., 2019)
CAR	A ratio of the total equity to total asset.	$\frac{\text{total equity}}{\text{total asset}}$	(Shawtari et al.,2015) (Fernandes et al., 2018) (Kamarudin et al., 2019) (Al-Sharkas & Al-Sharkas, 2022)
ASQ	Ratio of loan loss provisions to total loans. Note: this variable increases with the poor quality of assets and should be interpreted accordingly.	$\frac{\text{loans loss provision}}{\text{total loans}}$	(Sukmana & Setianto, 2018) (Kamarudin et al., 2019) (Al-Sharkas & Al-Sharkas, 2022)
GDP growth	Measured as the percentage change in real gross domestic products	Obtained from World Bank national accounts data.	World Bank national accounts data, (Shawtari et al.,2015) (Johnes et al., 2014) (Sufian et al., 2009) (Kamarudin et al., 2019)
Rule of Law	Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and	Obtained from Worldwide Governance Indicator of World Bank	Worldwide Governance Indicator,(Sufian et al.,2009)

	violence. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.		
Islamic	Measured as Dummy variable, where '1' is used for Islamic, while '0' is used for conventional.	1=Islamic bank 0=conventional bank	(Kamarudin et al., 2019) (Shawtari et al.,2015) (Johnes et al.,2014)

Table (12)

Summary for results of average technical efficiency score

Type	Country	Input-CRS	Input-VRS	Output-CRS	Output-VRS
	Iran	0.430	0.477	2.346	1.995
	Jordan	0.597	0.663	16.076	12.831
Conventional	**Lebanon**	0.466	0.534	2.334	2.057
	Palestine	0.593	0.631	1.723	1.660
	Syria	0.602	0.732	2.003	1.752
Average		**0.537**	**0.613**	**5.906**	**4.854**
	Iran	0.740	0.832	1.468	1.282
	Jordan	0.874	0.926	1.152	1.082
Islamic	**Lebanon**	0.256	0.761	4.110	2.518
	Palestine	0.612	0.655	1.677	1.646
	Syria	0.577	0.666	1.999	1.832
Average		**0.591**	**0.802**	**1.625**	**1.414**

Table (13)

Summary of max value recorded technical efficiency score

Type	Country	Input-CRS	Input-VRS	Output-CRS	Output-VRS
	Iran	0.48	0.55	2.04	1.76
	Jordan	1.00	1.00	1.00	1.00
Conventional	**Lebanon**	1.00	1.00	1.00	1.00
	Palestine	073	0.74	1.36	1.35
	Syria	1.00	1.00	1.00	1.00
Maximum		**1.00**	**1.00**	**1.00**	**1.00**
	Iran	1.00	1.00	1.00	1.00
	Jordan	1.00	1.00	1.00	1.00
Islamic	**Lebanon**	0.31	0.81	3.18	1.84
	Palestine	0.75	0.78	1.32	1.32
	Syria	0.84	1.00	1.18	1.00
Maximum		**1.00**	**1.00**	**1.00**	**1.00**

Table (14)

Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
IoTECRS	415	0.591	0.203	0.002	1
IoTEVRS	415	0.675	0.212	0.005	1
OoTECRS	415	4.514	32.123	1	528.501
OoTEVRS	415	3.735	25.367	1	417.53
Bank size	415	21.581	1.656	17.672	24.804
ROA	415	0.013	0.041	-0.325	0.287
Capital adequacy	415	0.127	0.118	-0.633	0.792
Liquidity	323	0.235	0.106	0.011	0.499
PoorAsset quality	319	0.106	0.142	0.001	0.636
GDP growth	323	-0.004	0.069	-0.263	0.089
Rule of low	323	-0.676	0.722	-2.096	0.467
NPL	323	0.151	0.199	0	1.296
Islamic	415	0.325	0.469	0	1

Table (15)

Correlation coefficient matrix

Variables	(ioTECRS)	(ioTEVRS)	(ooTECRS)	(ooTEVRS)	Bank size	ROA	capital adequacy	Liquidity	Asset poor quality	GDP	Rule of low	NPL
(1) ioTECRS	1.000											
(2) ioTEVRS	0.881	1.000										
(3) ooTECRS	-0.256	-0.274	1.000									
(4) ooTEVRS	-0.256	-0.278	1.000	1.000								
(5) Bank size	0.000	-0.012	0.101	0.099	1.000							
(6) ROA	0.260	0.195	-0.034	-0.034	-0.198	1.000						
(7) capital adequacy	0.210	0.232	-0.080	-0.080	-0.524	0.655	1.000					
(8) Liquidity	0.512	0.356	-0.562	-0.475	0.222	-0.149	-0.124	1.000				
(9)poor Asset quality	0.134	0.238	-0.014	-0.014	-0.472	0.356	0.364	-0.476	1.000			
(10) GDP growth	0.007	-0.020	-0.019	-0.064	0.346	-0.278	-0.199	0.375	-0.586	1.000		
(11) Rule of low	0.155	0.036	-0.244	-0.225	0.375	-0.192	-0.184	0.660	-0.612	0.506	1.000	
(12) NPL	0.046	0.162	0.038	0.016	-0.439	0.275	0.307	-0.475	0.908	-0.560	-0.590	1.000

Table (16)

Pooled results with robust standard errors

	(1)	(2)	(3)	(4)
VARIABLES	**ioTECRS**	**ioTEVRS**	**OoTECRS**	**ooTEVRS**
Bank size	0.00644	0.0166**	-0.0599	-0.129***
	(0.00937)	(0.00526)	(0.0384)	(0.0228)
ROA	2.295***	0.991**	-7.445***	-4.533***
	(0.504)	(0.350)	(1.372)	(1.015)
Capital adequacy	0.0533	0.405**	-0.221	-0.986
	(0.279)	(0.134)	(1.191)	(0.691)
Liquidity	1.232***	0.975***	-5.629***	-3.939***
	(0.0740)	(0.0925)	(0.607)	(0.492)
Asset Poor quality	0.417***	0.566***	-1.378**	-1.425***
	(0.0407)	(0.0393)	(0.395)	(0.234)
GDP growth	0.271	0.360**	0.0820	-0.447
	(0.149)	(0.0836)	(1.132)	(0.763)
Rule of low	-0.0208*	-0.0228*	0.0734	0.0410
	(0.00942)	(0.00924)	(0.0506)	(0.0538)
Islamic	0.0934***	0.137***	-0.0749	-0.198**
	(0.0142)	(0.0210)	(0.0818)	(0.0658)
Constant	0.0167	-0.106	4.961**	5.852***
	(0.245)	(0.142)	(1.085)	(0.671)
Observations	319	319	319	319
R-squared	0.671	0.509	0.547	0.446

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table (17)

Pooled results with robust standard errors

	(1)	(2)	(3)	(4)
VARIABLES	**ioTECRS**	**ioTEVRS**	**OoTECRS**	**ooTEVRS**
Bank size	0.00320	0.0129	-0.0519	-0.123**
	(0.0105)	(0.00614)	(0.0458)	(0.0307)
ROA	2.464**	1.210*	-7.981**	-5.050**
	(0.657)	(0.501)	(1.975)	(1.485)
Capital adequacy	0.0721	0.427*	-0.264	-1.013
	(0.314)	(0.181)	(1.268)	(0.765)
Liquidity	1.193***	0.944***	-5.505***	-3.860***
	(0.0740)	(0.0925)	(0.607)	(0.492)
GDPgrowth	0.130	0.225**	0.555	-0.0964
	(0.122)	(0.0740)	(0.936)	(0.598)
Rule of low	-0.0277**	-0.321**	0.0845	0.0445
	(0.00757)	(0.00710)	(0.0441)	(0.0486)
NPL	0.174**	0.268***	-0.679***	-0.829**
	(0.0403)	(0.0533)	(0.145)	(0.196)
Islamic	0.0988***	0.140***	-0.0981	-0.211**
	(0.0143)	(0.0222)	(0.0739)	(0.0598)
Constant	0.0167	-0.106	4.961**	5.852***
	(0.245)	(0.142)	(1.085)	(0.671)
Observations	323	323	323	323
R-squared	0.644	0.474	0.534	0.438

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

R-squared values of 0.644, 0.474, 0.534, and 0.438, respectively, indicate the ability of the independent variables to explain the dependent variable.

Table (18)

Testing hypothesis results

#	Hypothesis	Accepted/ rejected
1	There is a positive relationship between the type of bank and the technical efficiency of the banking sector in selected countries.	Accepted
2	There is a positive relationship between bank size and technical efficiency of Islamic banks and conventional banks in the selected countries.	Accepted.
3	There is a positive relationship between the profitability (ROA) and technical efficiency of Islamic banks and conventional banks in the selected countries.	Accepted.
4	There is a positive relationship between liquidity and technical efficiency of Islamic banks and conventional banks in the selected countries.	Accepted.
5	There is a positive relationship between capital adequacy and the technical efficiency of Islamic banks and conventional banks in the selected countries.	Accepted.
6	There is a positive relationship between Poor asset quality and technical efficiency of Islamic banks and conventional banks in the selected countries.	Accepted.
7	There is a positive relationship between the GDP and the technical efficiency of Islamic banks and conventional banks in the selected countries.	Accepted.
8	There is a positive relationship between the Rule of Law and the technical efficiency of Islamic banks and conventional banks in the selected countries.	Rejected
9	There is a negative relationship between non-performing loans and the technical efficiency of Islamic banks and conventional banks in the selected countries.	Rejected

جامعة النجاح الوطنية
كلية الدراسات العليا

تقييم الكفاءة للبنوك العاملة في دول مختارة من منطقة الشرق الاوسط: مقارنة بين البنوك الإسلامية والبنوك التقليدية

إعداد
منى غالب محمود انعيرات

إشراف
د. اسلام عبد الجواد

قدمت هذه الرسالة استكمالا لمتطلبات الحصول على درجه الماجستير في التمويل بكلية الدراسات العليا في جامعة النجاح الوطنية في نابلس، فلسطين.

2024

تقييم الكفاءة للبنوك العاملة في دول مختارة من منطقة
الشرق الاوسط: مقارنة بين البنوك الإسلامية والبنوك التقليدية

إعداد
منى غالب محمود انعيرات
إشراف
د. اسلام عبد الجواد

الملخص

يعد تحسين الكفاءة أمرًا أساسيًا لنجاح أي مؤسسة مالية، لا سيما في بيئة السوق التنافسية اليوم. يساعد التركيز على تحسين الكفاءة الفنية للبنوك على تقليل التكاليف وزيادة الأرباح وتعزيز رضا العملاء وتحسين القدرة التنافسية وتعزيز الاستقرار المالي.

الهدف: يهدف هذا البحث إلى تقييم ومقارنة الكفاءة الفنية وتحديد العوامل الرئيسية المساهمة في كفاءة البنوك الإسلامية والتقليدية في إيران والأردن وفلسطين ولبنان وسوريا.

المنهجية: شارك في هذه (83) بنكاً خلال الفترة 2013–2017، حيث تم الحصول على البيانات الثانوية من التقارير المالية السنوية للبنوك العاملة في المناطق المختارة ومن ثم تحليلها باستخدام تحليل مغلف البيانات (DEA) لتقييم درجة الكفاءة الفنية كما تم استخدام تحليل الانحدار لتحديد العوامل الرئيسية المؤثرة على الكفاءة الفنية.

النتائج: أظهرت نتائج تحليل مغلف البيانات أن البنوك الإسلامية أكثر كفاءة في استخدام المدخلات (الأصول ورأس المال والودائع) لإنتاج المخرجات (السلف والاستثمارات والدخل) من المصارف التقليدية في هذه البلدان، فضلا عن دورها في مواجهة الظروف السياسية والاقتصادية التي تعاني منها هذه البلدان، وأن المصارف التقليدية في سوريا ولبنان اكثر كفاءة من المصارف الإسلامية بسبب القيود الحكومية المفروضة

على المصارف الإسلامية، في حين أن البنوك الإسلامية في إيران والأردن وفلسطين أكثر كفاءة لأن الحكومات لا تفرض قيودًا على عملها.

وأظهرت نتائج تحليل الانحدار أن حجم البنك وكفاية رأس المال والسيولة والربحية والناتج المحلي الإجمالي وجودة الاصول الرديئة والقروض المتعثرة تؤثر بشكل إيجابي على الكفاءة الفنية للقطاع المصرفي في هذه البلدان. وتؤثر سيادة القانون سلبا على هذه الكفاءة الفنية بسبب زيادة التكاليف الإدارية. كما كشفت الدراسة أن البنوك الإسلامية أكثر كفاءة من البنوك التقليدية، ويرجع ذلك إلى استراتيجية الأعمال للبنوك الإسلامية، والتي تركز على خفض التكاليف، مما يؤدي إلى زيادة كفاءتها الفنية.

التوصيات: وبناء على النتائج يقترح الباحث أن تقوم الجهات الرقابية بإصدار قوانين تركز على الكفاءة، وتحديد مستوى الكفاءة التي يجب على البنوك تحقيقها، وتوسيع النطاق الجغرافي والزمني للدراسة للحصول على نتائج ومقترحات أكثر موثوقية لتحسين كفاءة العمل المصرفي.

الكلمات المفتاحية: تحليل مغلف البيانات، الكفاءة الفنية، البنوك الإسلامية، البنوك التقليدية.