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Prepared By
MR.ABDERRAHMANE TAHI

Supervised By
DR.YASSINE BENZAI

ASSESSING THE EFFICIENCY OF ISLAMIC AND CONVENTIONAL BANKS IN MENA BANKING SYSTEM

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In the name of God, the Merciful, the Compassionate

All praise be to Allah, and peace and blessings be upon His honest Messenger Mohammed bin Abdullah and upon his family and companions.

First of all, I would like to thank God for his providence and help.

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My family, mother and father brother and my sister in law .And all my friends whose helped me .especially Mouatacim and Khadidja and Chiraz ,Ikram ,Bachir .

Dedication:

I dedicate this work to my people, family and friends, who always support me and encourage me to more success.

Assessing the efficiency of Islamic and conventional banks in MENA banking system

prepared by
Abderrahmane Tahi

supervised by
Dr. Yassine Benzai

Abstract

Islamic finance has become an important part of the economy; in mean time the Islamic banking play an important role in financial intermediation. Measuring the technical efficiency of the banking sector is essential for further improvement, especially under the dominance of the globalization of the banking system. Data envelopment analysis (DEA) is receiving increasing importance as a tool of evaluating and improving the efficiency of manufacturing and service operations. It has been extensively applied in the performance evaluation and benchmarking.

This study aimed to measure and break down the technical efficiency of the banks working in MENA region through the period from 2010-2014 (KSA, QATAR, KUWAIT, JORDAN, TUNISIA, ALGERIA), In this research, we presented the mathematical background and characteristics of DEA model, and measured the efficiency of 66 banks in MENA region (10 conventional banks and 03 Islamic banks in Jordan , 08 conventional banks and 04 Islamic banks in KSA , 05 conventional banks and 06 Islamic banks in Kuwait , 07 conventional banks and 03 Islamic banks in Qatar, 09 conventional banks and 01 Islamic banks in Tunisia, 08 conventional banks and 02 Islamic banks in Algeria). We focus on commercial banks to enhance the comparability within the banking systems of our sample, as such institutions are homogenous in terms of provided services. After reporting data from errors and other inconsistencies, we obtain an unbalanced panel data consisting of (330) bank-level observations.

We found out that the conventional banks are more efficient than Islamic banks under both technical efficient and pure technical efficient in a comparison study.And that either in MENA region or Middle East and North Africa region separately.

Key words: Islamic banks, Conventional banks , DEA , Technical efficiency

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Abbreviations

IB: **Islamic banking**

CB: **Conventional banking**

DEA: **Data Envelopment Analysis**

SFA: **Stochastic Frontier Analysis**

TE: **Technical efficiency**

DMU: **Decision Making Units**

CRS: Constant returns to scale

VRS: Variable Returns to Scale

Glossary Terms

Allocative Efficiency: This efficiency deals with the minimizing of cost of production with proper combination of inputs to a given level of outputs and a set of input costs. Allocative efficiency measures the DMU ability to minimize cost due to the proper combination of inputs.

Data Envelopment Analysis (DEA): It is a non-parametric quantitative model which is employed for measuring the relative efficiencies of DMU's, it was first put forward by Charnes, Cooper and Rhodes in 1978. of decision-making units (DMU's), (Efficiency = weighted sum of outputs / weighted sum of inputs).

Decision Making Units (DMUs): They are the economic entities or units whose efficiencies will be measured by the model; those units should be homogeneous, work in the same field and have the same inputs and outputs variables.

Economic Efficiency: It means, producing the maximum value of output with a given value of inputs; or equivalently, using minimum value of inputs to produce a given value of output.

Efficiency: The DMU ability to produce the maximum amount of output with a given amount of inputs; or equivalently, using minimum amount of inputs to produce a given amount of output. The DMU is considered efficient if performances of other DMUs do not show that some of its inputs or outputs can be improved without worsening other inputs or outputs.

Stochastic Frontier Analysis (SFA): It is a parametric approach which is a derived from parametric linear regression, and it is used to measure the relative efficiency of DMUs. The original model was proposed by Aigner, Lovell and Schmidt (1977) and Meeusen and Van den Broeck (1977), and it requires an a priori assumption about the shape of the efficiency frontier.

Technical Efficiency (TE): Technical efficiency means producing maximum output with given inputs; or equivalently, using minimum inputs to produce a given output. It is noticed that the input and output variables are expressed in terms of units not values.

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Introduction

The financial sector in many countries plays a key role in the process of economic growth, it deeply affects the allocation of financial resources and help to find their best productive investments by the most effective way that reduces the misallocation or the unnecessary losses of resources. The banking industry is usually the leading player in this process. Banks set prices, value financial securities and manage risks.

Some studies show that banks' performance amplifies economic growth (for example by reducing transaction costs). While other studies demonstrate that bank failures can lead to systemic risks that can cripple the entire economy. Other investigations have even highlighted the significant effect of banks on sustainable development. Given the role of financial institutions and in the process of economic development, it is important to assess their efficiency and their productivity and analyze the determinants of their performance.

Assessing the efficiency of financial institutions is useful to identify the best performing units and the worst performing ones. Such analysis , often by using frontier techniques, require the development of banking models that appropriately capture the banks' objectives and activities. Nevertheless, the literature on the corporate banking and the specification of inputs and outputs implicitly assumed that banks focus in their appreciation of performance on purely accounting and financial criteria that focus on maximizing profits without taking into account other objectives linked to managerial and organizational aspects. In fact, assessing the company's performance also depends on the way that an organization operates and achieves its objectives. This performance refers to the company's ability to achieve its strategic goals by adopting the best practices. This generic notion encompasses various notions such as competitiveness, effi-

ciency, , value creation. In this study , we focus on analyzing the technical efficiency of banks.

The MENA counties have adopted a financial repression policy until the mid-eighties. Then,opted for financial liberalization policies as part of the structural adjustment plans put in place by the Breton Woods institutions. With the financial liberalization under way, banks have begun to look for new sources of income while developing new business models in order to diversify their resources. In this context, in order to determine the real efficiency of the banking sector, the analysis carried out through the traditional tools drawn from the accounting analysis, have become insufficient to the present day. The use of new efficiency indicators is urgently required As a result, it has become imperative in the performance analysis to look beyond the accounting approach that highlights the efficient and effective management of the resources available to banks. Thus, this work aims implicitly to analyze the relationship, often ambiguous, between the efficiency of banks and financial performance. Several studies show that the correlation is no t obvious, and that the most efficient institutions are not necessarily the most profitable.

Islamic banking has become one of the fastest growing segments of the financial market industry, operating through more than 300 institutions in 75 countries. As it deals with the principle of Sharia as laid down by the Holy-Quran and Sunnah.

There has been a lot of recent literature about Islamic banks and their ability to face conventional banks in the light of global openness and fierce competition in global markets. And after the 2008 global financial crisis, the global attention has been focused on restructuring the financial system who could not withstand the crisis, so attention was drawn to the Islamic financial system who has stood

firm in this crisis, because this system prohibits dealing with securitization the financial derivatives so far seen as unethical practices .

Comparative studies between Islamic and conventional banks have become the subject of many specialists and researchers . Efficiency measurement is among the most important investigated issues in comparative studies dealing with performance .

Motivations and importance of the study

The elaboration of this work is mainly motivated by the need to enrich the literature dealing with comparative studies on banking efficiency between conventional and Islamic banks using non parametric techniques . The obtained results would generate relevant information on banks' efficiency scores and help us identify and compare the most efficient practices not only between the two types of banks but also , within the conventional banks and Islamic ones . As we rely on frontier techniques, we expect that calculated efficiency scores are informative for bank managers or any individuals with very little institutional knowledge or experience to :

- *Select the "best practice " banks within the industry.*
- *Aassign numerical efficiency values and broadly identify areas of input overuse and/or output under-production ,*
- *And relate these results to questions of government policy or academic research interest.*

Second, in the hands of individuals with sufficient institutional background, frontier analysis permits management to objectively identify areas of best practice within complex service operations, a determination not always possible with traditional benchmarking techniques due to a lack of a powerful optimizing methodology such as linear programming ".

And on the other hand, obtaining an ambiguous result reveals the most appropriate method to explain the banking efficiency for the Algerian case. This work is also in addition to a very limited literature on the analysis of efficiency in the Algerian banking sector. Indeed, the majority of previous studies have focused more on other countries in the MENA region. The interpretation of the results could have repercussions on the management and regulatory policy of the banks, not only for Algeria, but also potentially in the whole MENA region, in particular North Africa.

Objectives of the study

The main objective of the study is to measure and compare the technical efficiency between the conventional and Islamic banks beyond traditional accounting measures, which emphasize on the profitability of assets and the technology of banking production. Thus, we will try in this work to develop appropriate models for the nonparametric evaluation of the technical efficiency. This study is in line with the objectives behind any efficiency analysis research, which focuses on three main directions that are not mutually exclusive (Berger and Humphrey, 1997):

- The first set of objectives is to inform government decision-makers by assessing the effects of different regulatory policies on efficiency at the industrial level. Variables capturing regulation include deregulation, mergers and acquisitions. Foreign capital inflows, market structure, privatization, and financial liberalization ... etc. Analyzing the impact of these variables on efficiency could generate valuable information to guide policy makers to encourage, discourage or change a particular policy.

- The second set of objectives aims to improve the quality and robustness of methods and research questions in estimation. Questions that relate, for example, to the method of measurement based on the frontier, the definition of Inputs and Outputs, the specification of the functional form .., etc.

- The last set of objectives has been to provide useful information to managers in order to improve the managerial performance of a bank or a banking group. By building a Banchmark frontier , banks located on the efficient frontier or near "best-practice" may share some similarities in their managerial practices. Banks located far from the efficient frontier are considered "worst-practice". By identifying similarities and differences across the best and worst banks, managers tend to adopt best practices and use the worst practices as a benchmark to avoid making bad decisions. The end result would be improved efficiency at the industrial level.

Research question

Islamic banks have become modern in the middle of the economy through many scientists and researchers and try to compare them with conventional banks. Based on the above objectives we addressed the main research question:

What are the most technical efficient banks among Islamic and conventional banks in the MENA region?

In addition, many sub questions can be addressed:

1- Are the middle east's banks(conventional and Islamic) more technical efficient in MENA system banking compared to its peers in the North Africa region

2-The efficiency of the MENA banks (conventional ,Islamic banks) ,is it more related to a pure technical efficiency or to scale efficiency ?

***Research hypothesis**:*

Based on the previous empirical work that has been focused on assessing the efficiency of Islamic and conventional banks, multiple of hypothesis can be formulated:

***H1:** The Middle East's banks are more technical efficient in MENA system banking.*

***H2**: The efficiency of the MENA banks (conventional, Islamic banks) is related to scale efficiency more than pure technical efficiency. Actually , most of MENA countries particularly the gulf region are rich oil exporters which make the public banks well capitalized leading to an increase in scale efficiency.*

***H3:** Conventional banks are more technical efficient than Islamic banks because Islamic finance is still in early stages of development comparing to the traditional Islamic system .*

Methodology and structure of the study

In this study , we have adopted a descriptive methodology in the theoretical chapters and we have applied a linear mathematical programming in the empirical study . We have divided our work in three distinct chapters structured as follows: the first chapter deals with the basic character of Islamic finance and banking.

, In the second chapter we present the measurement of efficiency using parametric and non parametric approaches

, And finally in the empirical study , we apply the Data Envelopment Analysis DEA to measure the technical efficiency of both conventional and Islamic banks in the MENA region .

CHAPTER ONE:

UNDERSTANDIG ISLAMIC FINANCIAL SYSTEM AND BANKING: A BISIC GUIDE

Introduction :

The aim of this specific chapter is to introduce the general concepts of Islamic banking, starting by the history of Islamic banking from the existence of our prophet Mohamed (pbuh). Then we will try to talk about the definition of IB and its most used contracts.Then we will move to what can Islamic banks operate as services. After that we will see mainly risks and challenges faced by IB, specific risks and in common risks with conventional banks. At that time we will show the main reasons that make Islamic banking succeed and developed. After that we will notice the performance of Islamic banks on the global economic crisis 2008, in the end we will compare between Islamic and conventional banking.

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Chapter one: UNDERSTANDIG ISLAMIC FINANCIAL SYSTEM and banking : A BISIC GUIDE

1.1-Background

Islam widely viewed as a religion can also be considered as a comprehensive socio-economic and political system for the Muslims, where it is necessary to apply the ethical principles of the Holy Quran and the 'Sunnah' (Prophet Muhammad's statements and actions). "Islamic economics refers to a system which identifies and promotes economic and financial orders that are consistent with the principles of Islamic law, the Shari'ah" (Abu-Elkhalil ,2012). Particularly, according to the Islamic law, the collection and payment of interest is prohibited. Muslims earnings must come from permissible means, and must also be spent on islamically acceptable categories of expenditure. Consequently, Islam prohibits investing in businesses that are considered illegal or contrary to the Islamic teachings and values. Moreover, the distribution of wealth is considered to be the primary concern in Islamic economics. Wealth in Islam should be shared, not become concentrated in few hands (rich people). For Muslims, concern for others, particularly the poor and the needy, is deeply inscribed in the pillars of Islam. Islam, therefore, encourages Muslims to maximize their wealth as long as they do not create a situation that is socially disruptive or violate the norms of Islamic justice.

Muslims need financing services as much as anyone in order to finance their business ventures, to facilitate capital investment, and/or to undertake trading activities, etc. Muslims attempt to restructure their financial lives on the basis of Islamic law, and consequently to find out the means to fulfill their financial requirements in view of prohibition of interest in a world where the entire financial system is based on interest-usury. Their intent is to create a just, ethical and socially inclusive financial and business system across the broad spectrum of society. It is, therefore, the biggest challenge and the formidable task for them to reform their financial institutions, products and services,

instruments and contracts on an interest-free basis in order to bring them in harmony with the dictates of Islamic law and within the constraints of Islamic regulations.(Abu-Elkhalil ,2012)

1.2-The historical development of the Islamic banking

We will talk in this section about the history of IB and its orgin

1.2-1The history of Islamic banking

The first Islamic saving bank was established in 1963 in Egypt that operates with the principles of profit-sharing, and since then the Islamic banking system has started to develop. Afterwards, the first Islamic financing system appeared in 1983 in Malaysia. Since 1970s, Islamic banking system has taken serious steps to consolidate its work and methods, and has made significant efforts to develop the structure and characteristics of these institutions (Qurrahdaghi, 2011)**.** These two wings can keep dealing with the issues of our day, the requirements of customers, and withstand many challenges that are offset of globalization and gigantism in the developed world. In this regard, in the local economies Islamic banks are growing fast in the market shares.(Nour Sad Alden ,2015)

1.2-2Origin

We can trace the origin of the modern Islamic banks by going back to the birth of Islam when the Prophet himself acted as an agent for his wife's trading operations. Islamic partnerships (mudarabah) .Such partnerships performed an important economic function. They combined the three most important factors of production, namely: capital, labor and entrepreneurship, the latter two functions usually combined in one person. The capital-owner contributed the money and the partner managed the business. Each shared in a pre-determined share of the

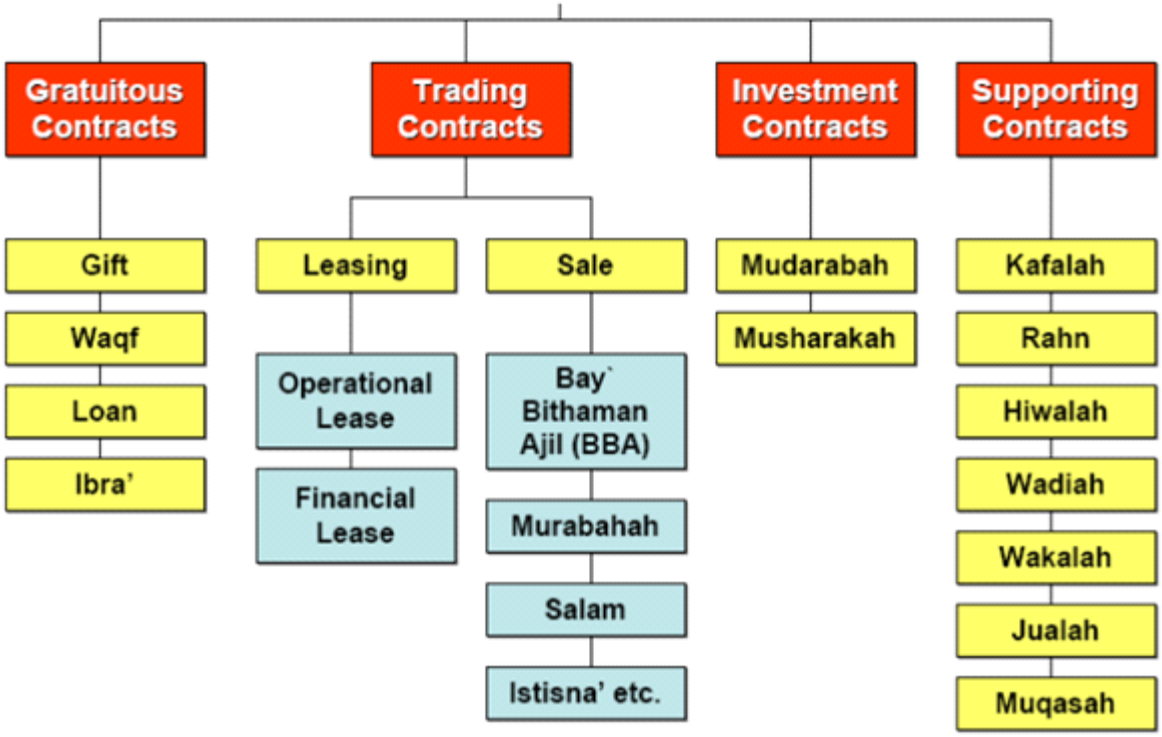
profits. If there was a loss, the capital-provider lost his money and the manager lost his time and labor. (Institute of Islamic Banks and Insurance .(IBII,2018)

1.3- What is Islamic Banking

An Islamic bank is a financial institution which identifies itself with the spirit of the Islamic legal code (*Shari'a*), as laid down by the Holy Quran and Sunnah, (H.Miniaoui,2013). .

As shown in Figure 1 There is a various of financial instruments are adopted by Islamic banking in operating their business. The other banks are known as conventional with an Islamic windowing; that is, they provide services to Muslims in accordance with *Shari'a* principles.(H. Miniaoui ,2013) .

Figure1: Main shari'a contracts applied in Islamic banking



Source: H.Miniaoui (2013)

Through the development of Islamic economics, Islamic banking refers to a banking activity that is regular with the principles of the Shari'ah (Islamic rulings) and its practical application. (IIBI 2018). The payment or acceptance of interest charges (riba) for the lending and accepting of money is prohibited in Shari'ah, as well as trading and do other activities that provide goods or services considered opposite to its principles.

Islamic banking has the same purpose as conventional banking except that it operates in accordance with the rules of Shari'ah, known as *Fiqh al-Muamalat*(Islamic rules on transactions). Many of these principles upon which Islamic banking is based are commonly accepted all over the world, for centuries rather than decades.(IBII ,2018). These principles are not new but arguably, their original state has been altered over the centuries.

The Holy Qur'an and the recorded sayings and actions of Prophet Muhammad (pbuh) – the Hadith is the principle source of the Shari'ah .Where solutions to problems cannot be found in these two sources, the source will based on the consensus of a community leaned scholars.(IIBI ,2018)

1.4 Contracts of Islamic Banking system

Islamic banking and finances are growing faster in the world these days. Lending and development of financial Islamic products are available in each of the Islamic financial institutions. (Siddiqi, 2006), the significant roles of these financial instruments depend on the Islamic law "Shariah". Compared to conventional banks, this system of Islamic banking use different methods. For example; IB avoids interest rate in their transactions. Furthermore, the profits and losses depend on physical investments which are shared between savers and lenders via specific

contracts. The major principal of Islamic banking is that their prohibition of interest rate "Riba", which is originated from the Arabic language, exceeds the prohibition of an interest rate and it also indicates that money should not be considered as an instrument of unjustified profit of earnings.(Siddiqi,2006).

1.4.1 Structure of Equity

- **Mudarabah *(finance by way of trust):***

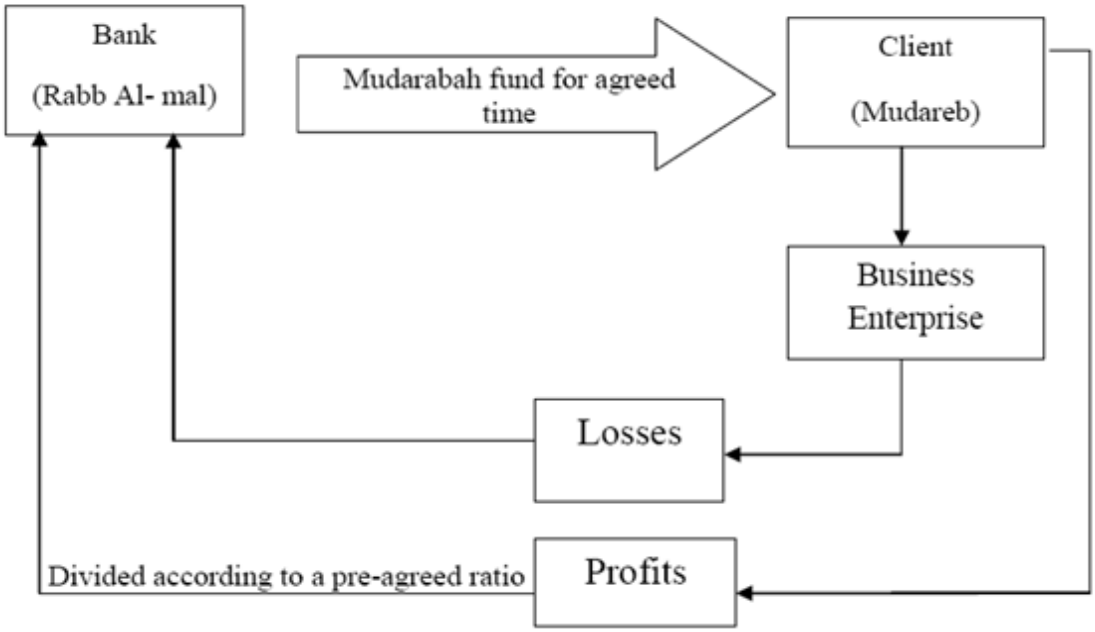
Sharing profits or equity is the reason of this contract, as well as using a partnership between two parts. The first one is "Rub Al mal" who finances the project or all expenses in investment, the second part is called "Mudareb" the one who has experience in the given project and can manage the investment. (Mirzhaywire, 2013).

The distribution shares of loss and profits should explained in this contract , where the profits are distributed there in a fixed or planned ratio.

Islamic banks or Islamic financial institutions usually have the capital for investments that play a role of "Rub Al mal" and in some cases Islamic banks enter this contract as "Mudareb" (Mirzhaywire, 2013).

The mudarabah is mentioned in figure 2:

Figure 2: operating system of Mudarabah

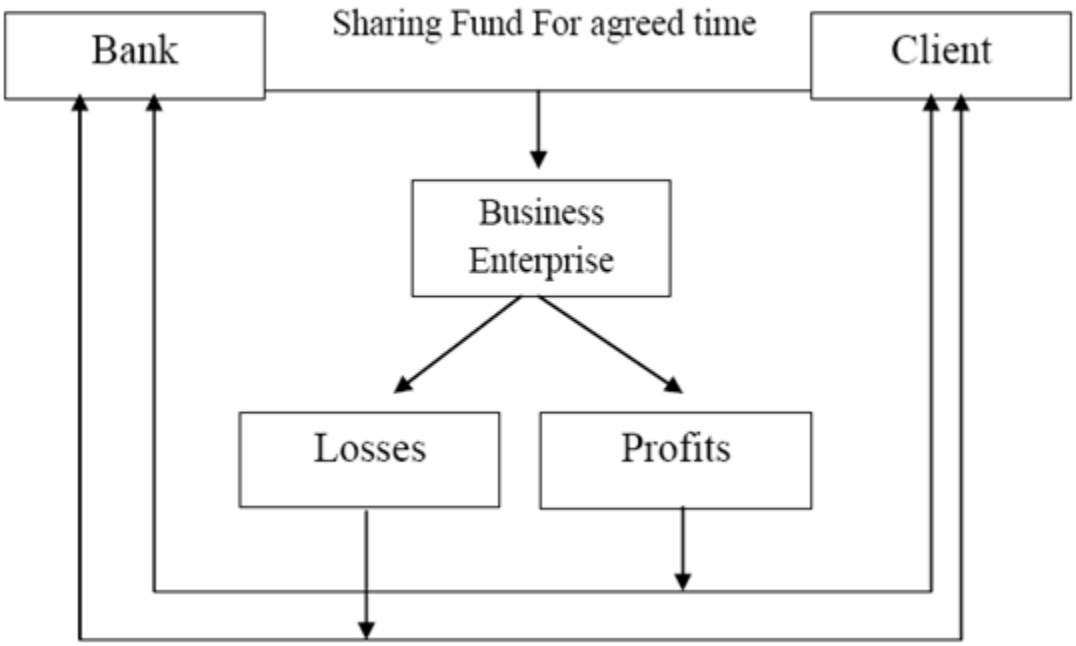


Source :(Mirzhaywire, 2013).

- **Musharaka (partnership):**

This contract is one of the most popular in Islamic finance; it depends on principal of shared profits and losses, All parties are exposed to risks within the project. (Mirzhaywire, 2013)**.** The capital of the project in this contract should be clearly predetermined. For that, profits are distributed between partners according to the predetermined ratio, while losses are distributed depending on the capital proportion of each partner. (Mirzhaywire, 2013). All parties have a right not an obligation to be a part of the project management in this contract. Islamic banks and Islamic financial institutions offer a percentage of capital for investments to the customers that would like a share in the project under an agreed ratio (Mirzhaywire,2013) as affirmed by

Geelani (2005) two or more partners contribute to the joint capital of an investment, hence profits and losses are shared strictly in accordance to the respective capital contributions written within the terms of the contract. Musharakh is mentioned in Figure 3.



Source: (Mirzhaywire, 2013).

1.4-2 Structure of debts

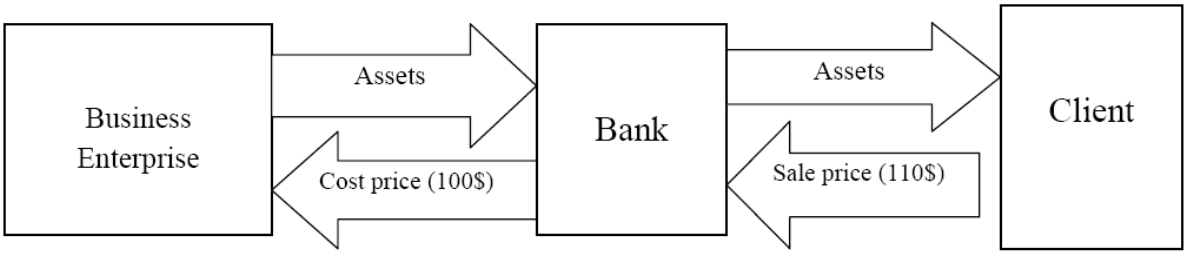
- **Murabaha *(cost-plus financing):***

A murabaha is the sale of a specific asset on terms which expressly include the cost price (of the seller) plus a defined and agreed profit mark-up.(Hans Visser ,2009) The murabaha can be used for financing of assets because it is a very flexible structure.

Since the financier has actually owned the asset (even if only for a very short time), that bring the risks of ownership, profit generated from sale price is

regarded as profit resulting from the asset and not simply, riba (interest).
The word murabaha derives from the Arabic word 'ribh', meaning profit.According to Hans Visser (2009) "A murabaha contract is a trade contract, stipulating that one party buys a good for its own account and sells it to the other party at the original price plus a mark-up. The mark-up can be seen as a payment for the services provided by the intermediary, but also as a guaranteed profit margin. Payment may take place immediately, but also at a later date or in instalments. ".Al-Tiby(2012) also asserts that Murabaha is one of the most primarily used instruments by Islamic banks and constitutes over 70% of their assets.

Figure 4: The diagram below illustrates an example of Murabahah:



source: SANDSTAD (2009)

- **Ijara (leasing)**

This contract is a leasing contract where Islamic banks have the right to use goods such as factories, type of equipment and buildings. In Ijara contract, (Haron and Azmi, 2009).The Islamic bank is still own the assets , which means the assets are still under their responsibility so the bank carries the risk for it during the leasing period, During the Ijara contract the customer does not have an option of buying an asset. Therefore, in the end of the period, the ownership will transfer from the bank to the customer. Additionally, it is closer to the operation of conventional banks that provides equipment in the leasing contact that will finish with ownership (Haron and Azmi, 2009).

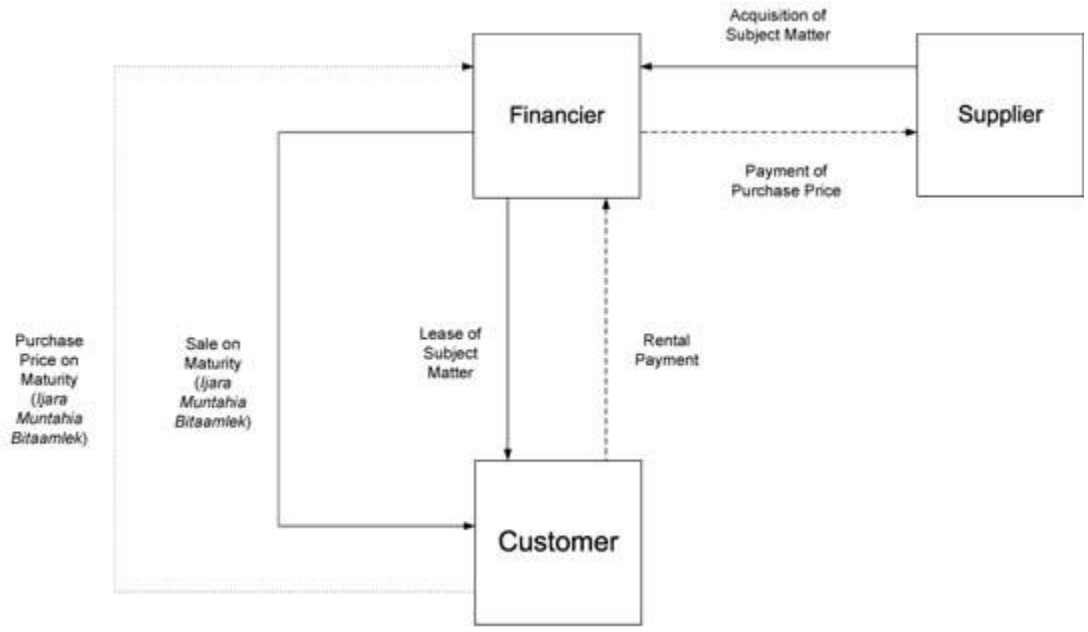
Because the financier owns the asset, thus bearing the risks of ownership, profit generated on the lease is regarded as profit derived from the asset and not simply, riba (interest).(Sandstad ,2009) Legally, the lease contract is not a sale of the object, but rather a sale of the usufruct (the right to use the object) for a specified period of time.(ElGamal,2000)

It is also established by the following "Hadith" narrated by "'Ahmad, 'Abu Dawud, and Al-Nasa'I" on the authority of Sa'd (mAbpwh):

The farmers during the time of the Prophet (pbuh) used to pay rent for the land in water and seeds. He (pbuh) forbade them from doing that, and ordered them to use gold and silver (money) to pay the rent.

Also, "'Ah.mad, Al-Bukharıı "and "Muslim" narrated on the authority of 'Ibn'Abbas (mAbpwh) that the Prophet (pbuh) hired a man to cup [water] for him, and paid him his wages.(El Gamal ,2000) **.**

Figure 5 : The diagram below illustrates an example of ijara



source: SANDSTAD (2009)

- **Salam (advance purchase):**

This contract is the process of selling specific goods that are to be delivered in the future with received payment. .(El Gamal, 2000) **.** Nowadays, this financial transaction is made by money transfer or with cash payment to the trader, who represents the bank and is responsible to deliver the specific goods at the agreed time, while the payment is received in advance. This kind of transaction is usually used in the agricultural sector.

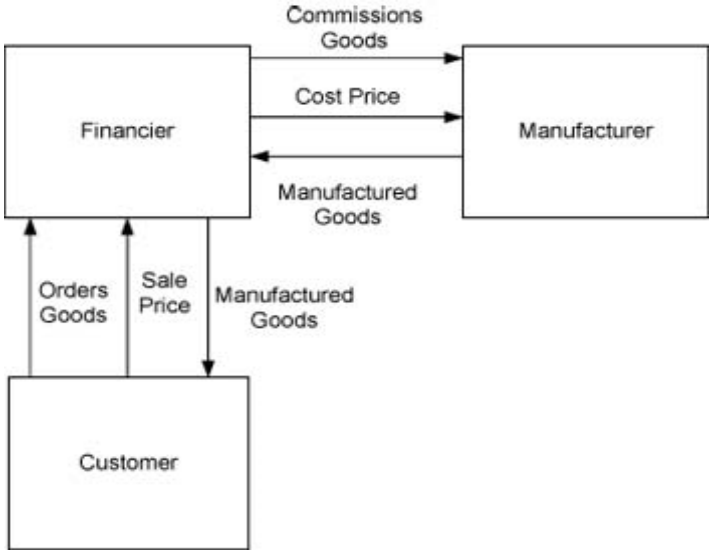
- **Istisna'a (commissioned manufacture):**

Istisna'a contract in Islamic banks are usually used in the finance investments of construction sector. This contract in Islamic bank represents a seller who sells goods to the customer who represents a buyer that requires specific goods. . (N. S. Alden ,2009)**.** Although, Istisna'a contract is similar to Salam contract (where the customer is asked to buy the specific good at the agreed price made from the seller's own raw material) the only difference is that, payment is not made in advance like the Salam contract, instead it is made at the end of the contract. (N. S.Alden,2009)

An *istina'a* is a contract whereby a party undertakes to produce an asset according to certain agreed specifications at a specific price and for a fixed date of delivery. (Sandstad ,2009)**.** *Istisna'a* contracts are somewhat unusual in Islamic finance as they do not require the subject matter (eg. a construction project which has not yet commenced) to be in existence at the time of the contract.

Istina'a is used for the advance funding of major construction, industrial projects or large equipment manufacture, such as ship or aircraft manufacture. (Sandstad ,2009)

Figure 6 : The diagram below illustrates an example of Istisna'a



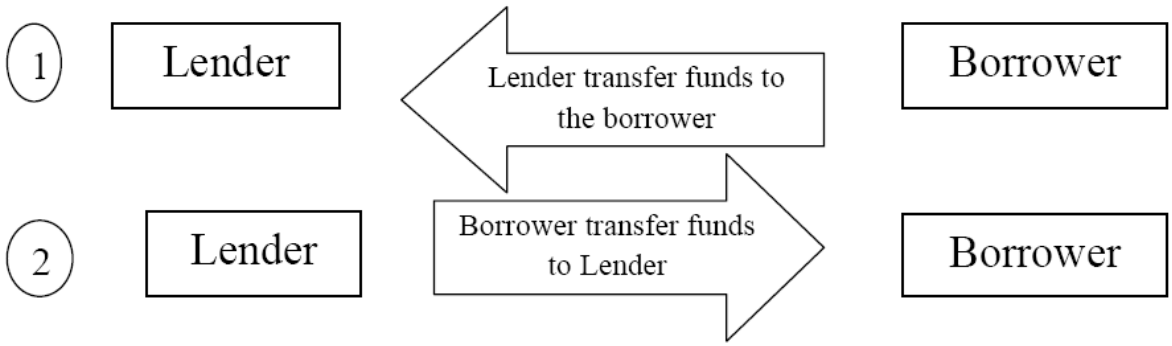
source**:** (Sandstad 2009)

- **Qard Hasan (loan with free interest rate):**

This is the zero return type of loan that the Islam urges Muslims to make available to those who need them, The borrower is obliged to repay only the principal amount of the loan, but is permitted to add a margin at his own choice**.**(Abu-elkhalil,2012)

Qard Hasan is a financial transaction provided by Islamic banks, This is a loan without interest rate to help people on the short term, The borrower has an obligation to repay the loan to the lender who represents Islamic banks at the end of maturity(N. S. Alden ,2009) qard hasan loan is free of any rate of return, although the recipient may wish to reward the provider with a return in excess of the original amount borrowed. (Naughton and Naughton ,2000**).**While banks cannot enforce the payment of additional amounts; some provide the facility to

corporate borrowers in the expectation that these will return sums in excess of the original borrowing.(Naughton and Naughton ,2000).Naughton,S and Naughton,T (2000) illustrate an example of the Qaurd Hassan in this Diagram :



- **Islamic Credit Cards**

In modern economies, Life without a credit card is hardly possible, but credit card purchases may involve interest payments. Generally there is no problem from a Muslim point of view if card holders pay the credit card company within the grace period, so as to avoid paying interest, though not all fuqaha concur. (El-Gamal ,2000)Various sharia councils have made liberal rulings that enabled financial institutions to develop Islamic credit cards that provide credit for longer periods than the usual one-month grace period. With these cards, purchases are automatically financed over a fixed period, usually 12 months. Early payment results in a price reduction (El-Gamal ,2000)

1.5-Business Operations of Islamic Banks

Like any other commercial financial institution. Islamic banks can operate a lot of services, but its activities should be consistent with Islamic principles. In terms of these principles it may perform the following operations:

1.5.1 Acquisition of Funds

In addition to the capital provided by share-holders (equity capital) there are a number of methods which a bank may use to secure more capital. Current, saving and deposit account may be used without any interest dealings as explained below

A.Current Accounts: Current accounts may be offered in the conventional Western banking tradition. Customers are supposed to give their explicit approval to the bank to use their funds, without any return. The bank, however, should guarantee payment of these funds on demand**.** (B. A. Bashir , 1984)

B. Saving Accounts: No return is expected in these accounts and customers may draw their funds anytime without notice. The bank guarantees the return of funds from these accounts on demand. However, since the bank can only keep part of these funds in cash to meet demands and use the rest in other activities, it may also render this service without charge.(B. A. Bashir,1984)

C. Deposit or Investment Accounts: These accounts reflect a departure from the conventional banking system. Customers will be encouraged to deposit their funds in investment accounts on the basis of a predetermined profit-sharing ratio for a specified minimum period. (B. A. Bashir,1984) The profit-sharing ratio is usually predetermined according to the nature of the deposit account, whether the distribution of profits is considered on a short or long-term basis. The long-term deposit accounts usually have a higher profit-sharing ratio because they are more stable and the bank may use the funds for long-term investments. Although depositors (of short or long-term) can demand their funds whenever they like, to share in the profits (or losses), they must keep their money in the bank at least for the contracted period.

1.5.2 Chargeable Services

These are services which the bank could render on fee, commission or fixed charges which are not tantamount to interest charges. These include:

1. Safe guarding jewelry and other valuables.

2. Transferring funds.

3. Acting on behalf of clients to purchase or deliver goods.

4. Offering advice and consultancy services.

These constitute the least profitable kind of investment and will require cash and other liquid holdings (e.g. balances with clients and other banks). These holdings henceforth, are referred to as "funds for bank services".(B. A. Bashir,1984)

1.5.3 Profitable Business

A bank's real investment activities constitute the main source of its profits. There are three kinds of short-term investments which are usually of medium return and risk:

1. Investments on commodities and stocks not subject to monopoly speculation or any of the forbidden kinds of investment.

2. Financing to customers on a participation or profit-sharing basis. Profit-sharing ratios are usually contractually predetermined, and the higher portion of return goes to the partner who undertakes management of the business.

3. Long-term investments are usually the bank's own projects or other long-term joint projects undertaken with individuals or other financial institutions. These require enormous funds and may be the most profitable, greater risk is also

involved.(B.A.Bashir,1984)

To guard against any hidden form of interest or other unlawful transactions, in any type of business mentioned above, Islamic banks may establish supervisory banks to ensure conformity with principles of Islamic Shari'ah (as is the case with FIBS and other Islamic banks).(B. A. Bashir,1984)

1.6-Risks and challenges associated with Islamic banking

The use of financial products that is conforming to the Islamic principles poses special risks and challenges. Consequently, efficient risk management in Islamic financial institutions has assumed particular importance as they try to cope with the challenges of globalization. This, however, requires the development of a suitable regulatory framework and new financial instruments to provide an enabling operational environment for Islamic finance. This section briefly highlights some of these risks and challenges which are particularly associated with Islamic finance.

1.6.1 Risks specific to Islamic banks

The Islamic bank is almost has a similar risk profile face to the conventional interest-based bank. However, the Islamic banks face two types of risks. The first type of risks they have in common with conventional banks such as credit risk, market risk, liquidity risk and operational risk. (Mounira and Anas, 2008)**.** But due to specificities of the Islamic banks the nature of these risks may changes. The second type is of new and distinctive risks that the Islamic banks face as a result of their unique asset and liability structures.

Risk is reasonable when it is necessary for value creating. But when no value is added, it is a form of gambling.(mounira ,2008)**.** The Islamic view will accept when the risk shall be inevitable and came from real value adding transactions.

Islamic banks face other types of risks different from those encountered by their conventional counterparts due to specific requirements to comply with the Islamic teachings:

A. Commodities and inventory risk.

This type of risk arises from holding items in inventory either for resale under a Murabaha contract, or with a view of leasing under an Ijara contract.(mounira ,2008) In a murabaha contract the client has a right to change his mind and may decide not to go ahead with the transaction. It's probable that the client may go back on his terms in the murabaha or ijara contracts which will introduce an element of risk in the transaction. .(mounira ,2008),and the bank will be responsible for the charge. In Ijarah contract, Islamic bank is exposed to the risk on the residual value of the leased asset at the term of the lease or if the client terminates the lease earlier (by defaulting), during the contract.(mounira ,2008)

B. Rate of return risk.

Rate of return risk and interest rate risk are different in that Islamic banks are concerned with the result of their investment activities at the end of the investment-holding period. Such results cannot be pre-determined exactly. This may increase responsibility in managing their investment deposit holders' expectations and their liabilities to current account holders. .(mounira ,2008)

A consequence of rate of return risk may be the displaced commercial risk which arises from the probability of the bank not being able to compete with other Islamic or conventional banks. (Elgari, 2003) , Therefore the Islamic bank may be under market pressure to pay a return that exceeds the rate that has been earned on assets financed by Profit Loss Sharing deposit holders when the return on assets is under-performing as compared with competitors' rates.

C. Legal and Islamic laws compliance risk.

In many countries where Islamic banks coexist with conventional banks, there is a pressure to apply to the same regulation for both types of banks and a common legal framework is generally developed. .(mounira ,2008)**,** No separate regulatory laws have yet been set to govern the operations of Islamic banks, which have been trying to benefit from the support that the conventional framework can provide, expect three country which have their whole financial system Islamized with an Islamic central bank.(mounira ,2008)Islamic banks are more exposed to the risk of changes in government fiscal and monetary policies than the conventional banks as they participate in profit-and-loss of the business enterprises. They are also exposed to reputational risk arising from negative publicity about the Islamic banks' business practices, particularly relating to non-compliance to Islamic laws in their products and services, could have an impact upon their market position, profitability and liquidity.

D. Equity position risk in the banking book

Risks inherent in the holding of equity instruments for investment purposes. In particular, for Islamic Bank, the relevant instruments are typically those based on the Mudarabah and Musharakah contracts.(mounira ,2008) A consequence of the equity position risk is the fiduciary risk which is resulting from the management of investment accounts. This type of risk refers to the probability of the bank being guilty of negligence or misconduct in implementing the deposit, investors' funds, through mudaraba or mucharakah contracts. Such legal liability would expose the bank to direct losses associated with breach of its fiduciary responsibility toward its depositors as well as indirect losses resulting from the decline in the market price of its listed shares.(mounira ,2008) The depositors may, as a result, lose confidence in the bank and withdraw their deposits.

E. Withdrawal risk

Withdrawal risk arises in Islamic banks as they pay depositors a share of the profit that is not fixed ex ante.(mounira ,2008) A variable return on Profit and Losses Sharing accounts introduces uncertainty regarding the real value of deposits. The Islamic banks are under pressure to give returns similar to other institutions, as they believe that the depositors will hold the bank responsible for a lower rate of return and may cause withdrawal of funds by the depositors. In order to increase the public's confidence on the Islamic banks, the interests of depositors and other users of financial services need to be protected.

1.6.2 The most common areas of risks with conventional banks

The types of risks similar to the conventional and the Islamic banks could be set as follow:

A Credit Risk

Credit risk in banking is commonly defined as "the potential that the counterparty fails to meet its obligations in accordance with agreed terms" (Elgari, 2003). In an Islamic bank, credit risk is in the form of payment risk arising when one party to a business transaction pays money or deliver assets before receiving its own assets or cash, thereby exposing it to potential loss(Elgari, 2003). Islamic banks need to be more rigorous in their credit appraisal system than conventional banks. Islamic banks face credit risk in most of the modes of financing they generally use. Credit risk can arise out of Mudaraba and Musharaka contracts in two ways: i) the entrepreneur might face a debt liability when he/she is liable to guarantee the capital in the case of negligence; ii) when the capital of Mudaraba and/or Musharaka is employed in a deferred sale, the capital's owner bears a risk pertains to the ability of the counterparties to repay (Elgari, 2003).

B Operational risks

Operational risk is the risk that arises from human error and/or deficiencies in information systems, internal processes or controls, resulting in direct or indirect loss. In the Islamic banking context, operational risks can impact just as much as in conventional banking, with the additional element of possible operational defects causing failure to comply with the Islamic laws. (Al-Gazzar ,2014) Also the Islamic bank may not have enough qualified professionals (capacity and capability) to conduct the Islamic financial operations.And according to Sundararajan and Errico,(2002) , Operational risks in the Islamic framework may be due to various sources including: the unique corporate governance (CG) and control activates that Islamic banks should perform internally, the non–standardized nature of Islamic financial products and services.

C. Exchange Risk

This risk refers to the adverse exchange rate movements on foreign currency positions taken by the Bank which causes suffering losses. According to the Islamic teaching, currency transactions on a deferred basis are not permissible. Trading of currencies wherever undertaken by an Islamic bank is on a spot basis Letter of credit and trade finance for example often poses an exchange risk. (Al-Gazzar ,2014)

D. Liquidity Risk

Such risk results from the mismatch between the maturities of the two sides of the balance sheet, creating either a surplus of cash that needs to be invested or a shortage of cash that needs to be funded. Also liquidity risk arises from either difficulty in obtaining cash at reasonable cost. As interest based loans are prohibited Islamic banks cannot borrow funds to meet liquidity requirement in case of need. Furthermore, the sale of debt is not allowed.(mounira ,2008)

According to Koch and MacDonald,(2009)**.”** Liquidity risks is the current and

potential risk to earnings and market value of stock-holders equity that result from banks inability to meet obligations as they come due. This is especially when there is an unexpected decline in a bank's net cash flow, or clearing obligations in a timely and cost effective manner. Liquidity risks refer also to the ability of a bank to cheaply and easily borrow a fund."

E.Markets Risk

Like conventional banks, Islamic banks are also exposed to market risks. According to the IFSB, market risk refers to "the potential impact of adverse price movements on the economic value of an asset" resulting in a "loss in on- and off-balance sheet positions". In other words, market risk is the current and potential risk to earnings and stockholder's equity resulting from adverse movements in market rates or prices. (Sarker, 2006)

Additionally, Islamic banks are exposed to commodity price risk because, unlike conventional banks, they typically carry inventory items. They are also directly exposed to equity price risk as the vary nature of Islamic banking is equity financing through the PLS modes. Islamic banks are eventually exposed to the exchange rate risk in the same way as conventional peers (Sundararajan and Errico, 2002).

The risk of adverse deviations of the mark level prices or rates of assets and liabilities due to the market factors, economic changes or external events. Islamic banks take up "risk sharing" funds, whereas conventional banks take "capital certain" deposits where repayment must be made. There is the implicit requirement for both parties to a given transaction to share in the loss as well as the profit.(mounira ,2008)

1.6.3 Challenges facing Islamic banking

Islamic banks are essentially governed by their Shari'a boards – the religious scholars that deem a product Shari'a-compliant. But the challenge is that there is no central authority promulgating Shari'a law, and the understanding of what is hence permissible and what is not varies among Islamic scholars and jurisdictions. (changboard ,2017)

The rapid growth of Islamic banking over the years has resulted in the introduction of complex banking products and structures, which now require Shari'a harmonisation at a global level. At present, that harmonisation is lacking. For example, the Islamic contract of Tawwaruq or Commodity Murabaha is only allowed by certain scholars. Similarly Bai-al-dain, or sale of debt, although disallowed by the majority of Muslim scholars, is allowed by some scholars in Malaysia. Recently, a prominent Shari'a scholar concluded that approximately 85% of Sukuks in the market fall short of basic Shari'a principles. (changboard ,2017)

While conventional banks have harmonised and approved regulatory standards those banks around the world follow, making it easier for them to expand and conduct operations in different countries, there are no approved standards per se for Islamic banks; they follow the conventional banking regulations.

But because Islamic banking differs from conventional banking, it is difficult for Islamic banks to completely follow these global conventional standards. For instance, the capital structure in Islamic banks is different from that of conventional banks. (changboard ,2017)

1.7-The Success Criteria of Islamic Banks

In this section we will show the main reasons that make Islamic banking succeed, and its developments.

1.7-1 Subjective Reasons for the Success of Islamic Banks

The Islamic banking system is argued to be ideal for all Muslim believers. It is claimed that the funds of those who might not want to support the interest banking system are brought to Islamic banks. (B. A. Bashir,1984) Those who deal with interest banks, mainly by having current accounts, are forced to do so in the absence of an Islamic banking system. Once the system has been founded most of these funds are believed to have moved to Islamic banks (B. A. Bashir,1984)**.** These reasons were claimed to explain the inherent success of Islamic banks. These ideological reasons might have been the ultimate cause for the success of the system in its early days. That line of argument is unlikely to be the main reason since the system has expanded and Islamic banks have come into competition with each other. Muslims who supported the system at the beginning must have formed some expectations, meeting of those expectations could be a strong reason for their continuing support of the system. Similarly, fulfilling the objectives of profit maximization may also be a strong reason that attracts funds to Islamic banks A closer look into the objectives of bank dealing is therefore necessary.

1.7-2 Successful Development of Islamic Banks

To ensure future success of Islamic banks, they must be well managed to fulfill customer's objectives as identified above. But if achievement of high returns to equity share-holders of the bank is also an important objective (which might well

be the case of all Islamic commercial banks), then the customers' objectives contradict or at least conflict with maximization of returns to equity-holders. (B. A. Bashir,1984) To achieve high returns to equity-holders would require more profitable investments (which are long-term investments) and a low profit rate to be offered to depositors. That would imply less banking services and short-term investments and lower returns to depositors. But lower depositor returns will cause the withdrawal of funds and possibly lead to failure of the bank. Thus, an optimal policy must be selected to fulfill the customers requirements, to achieve sufficient returns to equity-holders, and to ensure future successes of the bank. A brief demonstration is given below as to how such optimal policy might be achieved. From the above discussion, the following three objectives seem to be the most important for any commercial Islamic bank. (B. A. Bashir,1984)

1. Maximization of returns to equity share-holders.

2. Achievement of sufficient returns to depositors.

3. Minimization of the bank's risk of loss.

1.8- lslamic Finance and the global economic crisis

The whole world is now in the grip of a financial crisis which is far more serious than any experienced since the Great Depression. It has taken more than $3 trillion of bailout and liquidity injections by a number of industrial countries to abate somewhat the intensity of the crisis. (Muhammed .U.C 2009)

However, there are fears that this crisis may have exposed the world economy to a long period of economic slowdown.

There is, hence, a call for a new architecture that would help minimise the frequency and severity of such crises in the future**.** (Muhammed .U.C ,2009)

1.8-1 Primary cause of the crisis

The generally most important cause of almost all crises has been too much and reckless lending by banks. This raises the question of why banks resort to such an unhealthy practice which does destabilize the financial system . There are three factors according to (Muhammed .U.C, 2009) that make this possible. One of these is the insufficient market discipline in the financial system resulting from the absence of profit and loss sharing (PLS). The second is the incredible expansion in the size of derivatives, particularly credit default swaps (CDSs), and the third is the "too big to fail" concept which tends to give an assurance to big banks that the central bank will definitely come to their rescue and will not allow them to fail**.** (Muhammed .U.C, 2009)

According to Kayed & Hassan, (2009) main cause of financial crises is the laxity of lending i.e. greed and appetite for higher returns.

1.8-2 The Subprime Mortgage Crisis

The subprime mortgage crisis in the grip of which the US became deeply engulfed recently, is a classical example of excessive and imprudent lending. (Muhammed .U.C,2009) .What has played a crucial role in this is the Securitization or the "originate-to-distribute" model of financing. Mixing prime and subprime debt with The creation of collateralized debt obligations (CDOs) made it possible for mortgage originators to pass the entire risk of default of even subprime debt to the ultimate purchasers who would have normally been reluctant to bear such a risk(Muhammed .U.C ,2009). Mortgage originators had less incentive to undertake careful underwriting. Therefore loan volume gained greater priority over loan quality and the amount of lending to subprime borrowers and speculators increased suddenly. According to Ben Bernanke, Chairman of the

Board of Governors of the Federal Reserve System, "far too much of the lending in recent years was neither responsible nor prudent. ... In addition, abusive, unfair, or deceptive lending practices led some borrowers into mortgages that they would not have chosen knowingly." (Muhammed .U.C ,2009). The check that market discipline could have exercised on the serving of self-interest did not come into play. Even the supervisors failed to perform their task effectively by not taking serious notice of the unfair practices at an early stage and nipping them in the bud.

According to Wilson R. , (2007) existence of sub-prime borrower causes the financial crises and these borrowers are characterized by the defaults on mortgage obligations, According to Islamic scholars and practitioner current crises are the result of the failed morality (Siddiqui, 2008).

The failed morality is the cause of corruption and greed and as a result of this greed there is failure of relationship between investment originator and investors (Loundy, 2008).

1.8-3 Which Banking System performed better in Financial Crises 2008

According to Parashar and Venkatesh, (2010) because of recent global financial crisis conventional banks badly affected everywhere in the world. Although Islamic bank also affected by the global financial crisis but performance of Islamic banks during global financial crisis is better than conventional banks. Further studied that Islamic banks suffer in term of leverage, capital ratio and return on equity despite of this performance of Islamic banks during 2006-2009 is better than conventional banks.

Report of World Bank by Beck, Asli., Kent, & Quarda, (2010) "*compared the performances of Islamic and conventional banks during recent financial crisis"* and founded that although both Islamic and conventional banks affected by the

crisis but Islamic banks superior in liquidity reserves and credit risk. Performance of Islamic banks is better in financial crisis as compared to conventional banks.

Moreover lending in Islamic finance is based on assets backing and the mortgage loans are provided against solid assets where as in conventional banking the reason of present crises is just because huge amount of loan granted by these conventional banks without the collaterals. Islamic regulatory control system is a system where investors are aware of risks and return both**.** According to Ozturk (2008) implementation of profit and loss sharing transactions results in full disclosure and transparency as a result market discipline can be well understand and as a result there appears a judicious control over unnecessary lending that improves the Islamic financial system.

1.8-4 Performance of Islamic Banks during Financial Crises 2008

Global financial crisis pushed the developed countries to develop a new financial system that face the problem of crisis. Recent global financial crisis forced the developed nation to lowering the bank rates and introducing the new financial system that is based on Islamic principles of interest free financial system. Capitalist system which has failed after global financial crisis looking a system who solve the speculation problems and financial crisis is Islamic financial system that is save from all speculation activities and interest as an alternative . (Ilias, 2010) Capitalist financial system badly affected by the severity of the current financial crisis.

Trabelsi,(2011) identified failure of risk alleviation at different level is cause of crisis.

Capitalist economy is looking for the system that is risk free .Shafique., M. A. Faheem , I. Abdullah, (2012) **"**suggested various ways in which risk in Islamic

finance can be minimized in order to be stable and flexible". It is good time for Islamic finance to get lessons from conventional banking crisis because current financial crisis reveal the weakness of conventional financial system.

Despite of many challenges and crisis Islamic financial instructions is growing steadily. Countries like U.A.E, Bahrain and Malaysia are hub for Islamic finance that working for Islamic finances development.World's leading financial centers like New York, Singapore and Hong Kong using Islamic finance side by side with conventional banking for improving liquidity and risk management. Sukuk bonds are leading example of growth of Islamic finance**.** (Ahmed H. , 2009).

According to Dewi & Ferdian,(2009) speculative transition and careless lending transaction lead to global financial crisis in 20th century.These global financial crisis further lead to crash of capital market, banking crisis and crisis on financial sector.

According to Ariss, (2010) in study: "competitive condition in Islamic and conventional financial system "the author found that Islamic banks are less competitive when we compare with conventional banking system. Profitability of Islamic banks significantly increases but not much as compare to conventional banks. Islamic banks have less financial risk because of higher capitalization. Islamic banks show greater flexibility and durability to global financial crisis of 2007. Western bank also benefited from Islamic banks after global crisis for tackle the crisis for restoration of their financial stability.

According to Chazi & Syed, (2010) "the Islamic financial institutions tackle the recent global financial crisis in terms of management of risk". Finding indicates that Islamic banks are better able to control risk as compare to conventional banks. Islamic banks also have better capital ratio. The finding also indicates that Islamic banks safeguard themselves during recent global financial crisis because of Islamic principles which are interest and Gharar free transaction which remove

uncertainty and risk. Islamic finance based on the ethical and moral principles and proper check and balance which work for interest of all people

.1.9- The differences between Islamic and conventional banking

Commercial banks have become a vital part of the contemporary economic life of most societies. Their main function is the mobilization of the society's savings in order to channel them to economic and social uses. Through extending credits to worthy borrowers, commercial banks act to increase production, expand capital investments, and presumably achieve a higher standard of living. Other services include the convenient method of making payment through cheques and credit cards, the supply of foreign currencies and purchase and sale of securities .However, their main goal is the maximization of profit subject to a reasonable level of liquidity, safety, and soundness in performance. Their profits come from interest rates and the various fees and commissions charged by them from customers. Islamic banking institutions, on the other hand, are based on different philosophic and economic principles. Because Islam is a complete code of life, banking and financial institutions, like other institutions in an Islamic society, ought to derive their guiding principles from Islamic teachings. Islamic banks should therefore be viewed as a particular type of banks, operating without interest rate mechanism, and seeking to maximize an objective function which has social benefit, social welfare and profit as arguments. In addition to their banking services, Islamic banks could be looked upon basically, as investment institutions, using profit-sharing mechanism rather than interest rate mechanism.

Table 1.1 shows the difference between IB and CB

Major Differences between Islamic and Banking System	
Conventional System	**Islamic System**
Money is a product besides medium of exchange and store of value.	Real Asset is a product. Money is just a medium of exchange.
Time value is the basis for charging interest on capital.	Profit on exchange of goods & services is the basis for earning profit.
Interest is charged even in case, the organization suffers losses. Thus no concept of sharing loss	Loss is shared when the organization suffers loss.
While disbursing cash finance, running finance or working capital finance, no agreement for exchange of goods & services is made.	The execution of agreements for the exchange of goods & services is must, while disbursing funds under Murabaha, Salam & Istisna contracts.
Due to non existence of goods & services behind the money while disbursing funds, the expansion of money takes place, which creates inflation.	Due to existence of goods & services no expansion of money takes place and thus no inflation is created.
Due to inflation the entrepreneur increases prices of his goods & services, due to incorporating inflationary effect into cost of product.	Due to control over inflation, no extra price is charged by the entrepreneur.
Bridge financing and long term loans lending is not made on the basis of existence of capital goods. Rather, they are disbursed on the basis of Windo Dressed project feasibility and credibility of the entrepreneur.	Musharakah & Diminishing Musharakah agreements are made after making sure the existence of capital good before disbursing funds for a capital project.
Government very easily obtains loans from Central Bank through Money Market Operations without initiating capital development expenditure.	Government can not obtain loans from the Monetary Agency without making sure the delivery of goods to National Investment fund.
The expanded money in the money market without backing the real assets, results deficit financing.	Balance budget is the outcome of no expansion of money.
Real growth of wealth does not take place, as the money remains in few hands.	Real growth in the wealth of the people of the society takes place, due to multiplier effect and real wealth goes into the ownership of lot of hands.
Due to failure of the projects the loan is written off as it becomes non performing loan.	Due to failure of the project, the management of the organization can be taken over to hand over to a better management.

Debts financing gets the advantage of leverage for an enterprise, due to interest expense as deductible item form taxable profits. This causes huge burden of taxes on salaried persons. Thus the saving and disposable income of the people is effected badly. This results decrease in the real gross domestic product.	Sharing profits in case of Mudarabah and sharing in the organization of business venture in case of Musharakah, provides extra tax to Federal Government. This leads to minimize the tax burden over salaried persons. Due to which savings & disposable income of the people is increased, which results the increase in the real gross domestic product.
Due to decrease in the real GDP, the net exports amount becomes negative. This invites further foreign debts and the local-currency becomes weaker.	Due to increase in the real GDP, the net exports amount becomes positive, this reduces foreign debts burden and localcurrency becomes stronger.

The source : Mabid and Iqbal (2018)

Conclusion

In this chapter we talked about what makes IB's pretty special . and the result was that the Islamic banking's first appearing with the birth of Islam when the Prophet himself acted as an agent for his wife's trading operations .
Then we identified the definition of IB as financial institution which deals with the spirit of the legal code (*Shari'a*), in addition to that we spoke about the contracts of IB which we classified them into two categories , the first one was structure of equity that contains (MUDARABAH , MUCHARAKAH) and the second one is the structure of debt that contains (MURABAH, IJARA , SALAM , ISTISNA'A,QARD HASSAN,ISLAMIC CREDIT CARD) .
After that, we moved to what can IB offer as services plus activities and operations in circle of Islamic principles .Afterward, we mentioned the risks that IB is facing from risks specific to Islamic banks to the most common areas of risks with conventional banks . Next, showed the main reasons that make Islamic banking succeed, and its developments.
And we spoke about the interpretation of lslamic Finance and the global economic crisis and we came up with a result That Islamic banking preformed better than the conventional .In the end we did a visual comparison between the IB and CB and each one of them has different characteristic than the other one.

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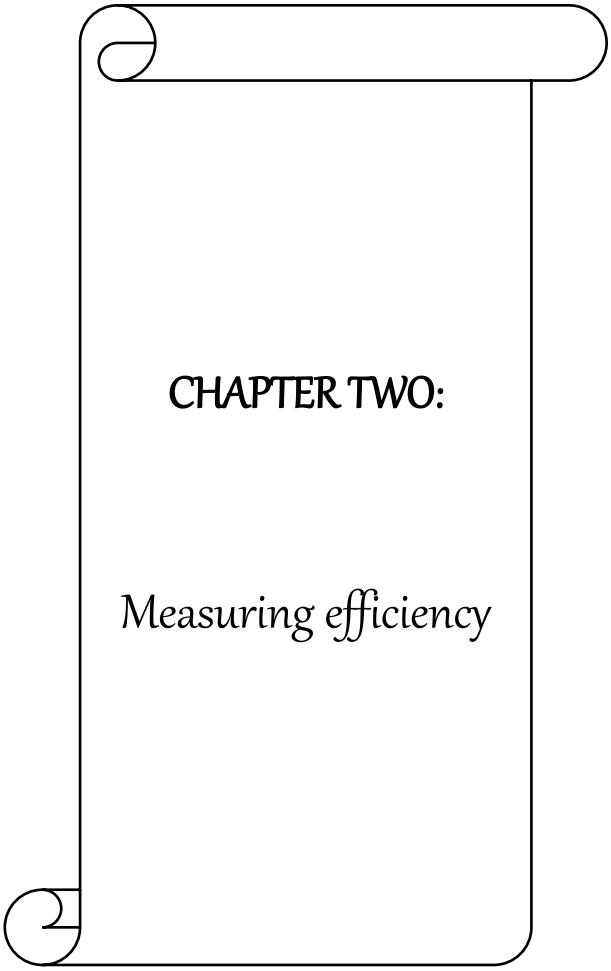

CHAPTER TWO:

Measuring efficiency

Introduction:

The Reason of this Chapter is to introduce the meaning of measuring efficiency, First we will talk about the history and background of efficiency, than we will move to the types of efficiency and later we will mention the determinants of efficiency in banking after that we will compare between parametric and non parametric approach by showing the differences between SFA and DEA.

Chapter two: the measurement of efficiency

2-1-Introduction to efficiency

In recent years, the importance of research into efficiency within the banking sector has increased in recent years, as all banks struggle for efficiency by minimizing inputs, such as expenses, and maximizing their output, i.e. profits. The importance has also risen since there has been a considerable increase in bank mergers. Some studies suggest that mergers and deregulation lead to raised efficiency in the banking sector (Avkiran, 1999)**.** Large banks take over smaller banks for a number of reasons, such as to reduce competition and risk, and to raise capital (Fixler & Zieschang, 1993). However, studying efficiency in banking can be helpful for shareholders, policy makers, managers, market analysts, investors, clients and government regulators (Andries & Căpraru, 2014)**.** According to Aikaeli (2006), when monetary policies are effective, then banks are more likely to be efficient. Efficient banks can use minimum inputs to generate maximum outputs, which could increase the sustainability of banks; Berger and Humphrey (1997) argue that the success or failure of all firms relates to transforming their inputs into outputs. The main aim of banks is to achieve economies of scope and scale through deposits, loans and banking services.

2.2- Efficiency History and Background

The theoretical literature on productive efficiency originated with the work of Koopmans (1951), and Debreu (1951). The first attempt to estimate efficiency was found in Farrell (1957). Farrell (1957) used linear programming techniques to estimate efficiency in U.S. agriculture. Research on efficiency estimation continued on through the development of Stochastic Frontier Analysis (SFA), (Meeusen and van den Broeck 1977, Aigner, Lovell, and Schmidt 1977, and Battese and Corra 1977). DEA was developed at about the same time by Charnes, Cooper, and Rhodes (1978). Each of these techniques has subsequently

been extended and developed. The empirical application of these techniques to estimate efficiency and/or productivity has resulted in a multitude of studies in numerous areas. Researchers have employed SFA or DEA (and in some cases both techniques) to analysis of agriculture, utilities, education, health economics, transportation, labor economics, management science, environmental economics, and financial institutions. As an example of the amount of output, Berger and Humphrey (1997) present a survey of research on the efficiency of financial institutions with a count of 130 studies across 21 countries. The development of SFA and DEA has historically been somewhat independent of each other. In the 1990's proponents of the two techniques started to communicate about the similarities and differences of the two approaches. At about the same time studies appeared that applied both SFA and DEA to the same data set and conducted an clear comparison of results. Ferrier and Lovell (1990) use both approaches on a set of U.S. banks, finding mixed results in terms of efficiency estimates**.** Hjalmarsson, Kumbhakar, and Heshmati (1996) compare SFA, DEA, and deterministic parametric models for a panel of 15 Colombian cement plants.

Although each method finds similar trends in efficiency over time, the correlations between efficiency estimates are mixed. Sharma, Leung, and Zaleski (1997) estimate the technical efficiency of the swine industry in Hawaii using both SFA and three forms of DEA. They find that SFA leads to higher estimates of technical efficiency and that the correlation between rankings from the different approaches is positive. Bauer et al. (1998) also use both approaches and propose a set of conditions for comparing the two. They also find mixed results using a set of U.S. banks. In recent literature, there is a growing body of research on efficiency measurements methods, and as mentioned previously two streams of research can be identified: nonparametric data envelopment analysis (DEA) and (SFA) which is a derivate of parametric linear regression. Despite fundamental differences in their approach, both DEA and SFA provide a single

aggregate efficiency measure. Originally proposed by Charnes, Cooper and Rhodes (1978), DEA is based on production possibility sets constructed by the observed cases (so called 'decision making units' (DMUs).

2.3-Types of Efficiency

Efficiency also could be categorized into many different categories based on scope of efficiency targeted; the followings are mostly mentioned in the literature of efficiency:

A. Technical efficiency: Technical efficiency means producing maximum output with given inputs; or equivalently, using minimum inputs to produce a given output (Yang 2005). Technical efficiency deals with employing labor, capital and machinery as inputs to produce outputs based on the best practice in a given sample of decision making units, which means, given the same technology and the same external environment no waste of input resources is considered in producing the targeted outputs (Bhat 2001).

B. Allocative efficiency: This efficiency deals with the minimizing of cost of production with proper combination of inputs to a given level of outputs and a set of input costs assuming that the entity examined is working with the full technical efficiency, allocative efficiency is expressed as percentage score of 100 for the entity using it's inputs in proportion that minimizing the cost. In other words, an entity may be 100% technically efficient in using the best practice, but not fully efficient in regards to allocative efficiency which means best combination of inputs (Bhat 2001).

C. Cost efficiency: A. N. Berger, L. J. Meste (1997) mentioned that Cost efficiency gives a measure of how close a bank's cost is to what a bestpractice bank's cost would be for producing the same output bundle under the same conditions. It represents a combination of technical and allocative efficiency, an

entity will be cost efficient only if, it is both technically and allocatively efficient. (Bhat 2001).

D. Economic Efficiency: Economic efficiency measures producing maximum value of output with given value of inputs; or equivalently, using minimum value of inputs to produce a given value of output. (Bhat 2001).

2.4- Determinants of efficiency in banking

This part examines the effect of internal and external factors on efficiency in Islamic, conventional and socially responsible banks. Depending on the literature review, the most effective and available internal variables can be bank size, capital ratio, loan intensity, credit risk, financial leverage, return on assets (ROA), bank age, ownerships (foreign, domestic and public) and listing. The external variables can be gross domestic production (GDP), inflation, market capitalisation, global financial crisis and control of corruption. The following section explains the recent studies of each variable.

2.4-1 The internal factors

a. Bank size

The bank size is used as an indicator of efficiency in most studies ,and many found a significant and positive effect on efficiency, which means that larger sized banks are more efficient than smaller sized banks. In other words, more assets owned by banks led to improved efficiency**.** Sufian‟s (2009) study used DEA to measure the efficiency of 36 Malaysian commercial banks in 1990-1999. In the second-stage regression, he found out that larger sized banks are more efficient than smaller sized banks.

b. Capital ratio

The capital ratio is another internal factor that indicates the importance of shareholders equity of firms. Higher capitalisation can increase efficiency in the banking sector. Banks could improve their efficiency based on the relationship between capital ratio and efficiency measures whether increasing or decreasing the capital of the bank.

c. Loan intensity

Providng loans, one of the main roles of the banking system. Most studies in the literature examined loans to assets ratio as a main determination of efficiency. As a result, many studies point out that providing more loans could raise efficiency.

Havrylchyk‟s (2006) found out that loans could improve the technical and cost efficiencies.

d. Credit (liquidity) risk

Lee and Chih (2013) has measured the efficiency of large and small banks in China during the period 2004-2011. This study showed that credit risk (loan to deposits ratio) empirically determined the profit efficiency significantly and negatively in smaller banks. This means that banks needed to focus on increasing loans to raise efficiency**.** Hou et al. (2014) found the same relationship between credit risk and efficiency.

e. Financial leverage

Few studies see financial leverage as a determinant of efficiency such as Abul Alkheil‟s , al. (2012) study. This examined the efficiency as a first stage in Malaysia, the UK, Turkey and GCC over the period 2005-2008. The second stage examined the variables that influence efficiency. Abul Alkheil, al. (2012)

pointed out that there was a negative and significant association between the DEA scores and financial leverage.

f. Return on assets (ROA)

A lot of studies have concentrated on ROA as a helpful variable of efficiency. Most studies have proven that the profitability ratios increase efficiency. This result is expected and rational as banks achieving more returns are able to provide better services which raise efficiency. However, a few studies found that there was a negative and significant relationship between efficiency and profitability ratios.

g. Age:

Abul Alkheil et al. (2012) discovered that older banks were more efficient than new banks in Islamic and conventional banks. This result is rational due to older banks having more experience in banking operations and could provide better quality of service**.** Satub et al. (2010) and Chiou (2009) also state that older banks are more efficient.

h. Ownership

Gardener et al. (2012) has classified the ownership to country-level of state banks, foreign banks and private banks. This study confirmed that foreign banks concentration increased efficiency significantly, while a growth in state and private bank levels affected efficiency significantly and negatively in the South East Asian banking sector during the period 1998-2004. Wanke and Barros (2014) found that an increase in the role of public banks led to better productive efficiency in Brazilian commercial banks in 2012.

i. Listing

This variable can be examined as an additional test to find which banks are performing more efficiently, the (stock market) listed or unlisted banks. Few

studies analyse the effect of listing on efficiency in the banking sector. As an example, Yudistira (2004) found that unlisted Islamic banks achieved better DEA measures than listed banks. Yildirim and Philippatos (2007) and Havrylchyk (2006) found insignificant associations between listing and efficiencies in their studies.

2.4-2 External factors

a. Gross domestic production (GDP)

GDP is considered as a determinant of efficiency in comprehensive studies**.** Hermes and Nhung (2010*) "examined the determinants of DEA in Latin America and Asia for the period 1991-2000"*. The findings exposed that banks located in countries with development in GDP operated efficiently. This finding is consistent with the studies of Hou et al. (2014), Johnes et al. (2014), Tan and Floros (2013), Vu and Nahm (2013), Chortareas et al. (2012), Garza García (2012), Zhang et al. (2012) and Hermes and Nhung (2010)**.** The growth of GDP is the main indicator of the economic situation; the more GDP generated the better the economy. So, banks concentrate on countries with greater GDP to invest. The investment can be through operating more branches, increasing capitalization or mergers and acquisition.

b. Inflation

The inflation is examined as an independent variable by El-Moussawi and Obeid (2010). The relationship between the inflation and efficiency was significant and positive in Islamic banks. On the other side, most studies confirmed that inflation affects efficiency significantly and negatively which is closer to the rational economic condition of Vu and Nahm (2013) Garza García (2012) and Sufian and Habibullah (2009). However, a few studies found that inflation has not impacted efficiency. In general, higher inflation restricted banks from achieving profits due to lack of purchasing power of individuals which

reduced the deposits of banks. As a result of lowering deposits, banks decrease loans that reflect banking operations negatively. Generally, banks need to find ideal strategies such as operating in countries with lower inflation rates.

c. Market capitalization

Market capital is considered as a positive determinant that increases efficiency by Johnes et al. (2014) and Vu and Nahm (2013)**.** On the contrary**,** Grigorian and Manole‟s (2006) studies proved that stock market growth led to reduced efficiency over the period 1995- 1998. Some studies confirmed that the stock market had a positive and negative correlation with efficiency .However, Noor and Ahmed (2012) illustrated that the stock market was not important to efficiency in the Islamic banking system.

d. Global financial crisis (GFC)

The global financial crisis has influenced the efficiency significantly and negatively in the Islamic banking system, this was findings of Noor and Ahmed (2012) similar to (MoradiMotlagh & Babacan, 2015). The economy was affected negatively around the world over the period of the GFC (2007-2009).

e. Control of corruption

There is a lack of research analyzing the correlation between controlling corruption and efficiency in banking. Chortareas‟s et al. (2012) findings claim that stronger supervision on corruption increased efficiency significantly in European banks between “2000-2008”

2.5 Nonparametric and Parametric Approaches to Measuring Efficiency: Measuring efficiency by using parametric and non parametric approaches is the most used in our time

2.5-1 Nonparametric Frontiers.

Nonparametric approaches, such as much of the work in data envelopment analysis (DEA) and Free Disposal Hull (FDH), put relatively little structure on the specification of the best-practice frontier.

A. N. Berger, L.J. Mester(1997) mentioned that The nonparametric methods generally ignore prices and can, therefore, account only for technical inefficiency in using too many inputs or producing too few outputs. They cannot account for allocative inefficiency in misresponding to relative prices in choosing inputs and outputs, nor can they compare firms that tend to specialize in different inputs or outputs, because there is no way to compare one input or output with another without the benefit of relative prices.

However, a key drawback to these nonparametric approaches is that they generally assume that there is no random error. There is assumed to be: (a) no measurement error in constructing the frontier; (b) no luck that temporarily gives a decision making unit better measured performance one year from the next, and (c) no inaccuracies created by accounting rules that would make measured outputs and inputs deviate from economic outputs and inputs. (A. N. Berger, L.J. Mester 1997) any of these errors that did appear in an inefficient unit's data may be reflected as a change in its measured efficiency. What may be more problematical is that any of these errors in one of the units on the efficient frontier may alter the measured efficiency of all the units that are compared to this unit or linear combinations involving this unit. (A. N. Berger, L.J. Mester 1997)

the nonparametric techniques typically focus on technological optimization rather than economic optimization, and do not correspond to the cost and profit efficiency concepts discussed above. (A. N. Berger, L.J. Mester 1997)

2.5-2 Parametric Frontiers.

There are three main parametric frontier approaches. The stochastic frontier approach (SFA) , the thick frontier approach(TFA), and the distribution-free approach (DFA) , specifies a functional form for the cost, profit, or production relationship among inputs, outputs, and environmental factors, and allows for random error(A. N. Berger, L.J. Mester 1997) . Usually the half-normal, while random errors follow a symmetric distribution, usually the standard normal. The logic is that the inefficiencies must have a truncated distribution because inefficiencies cannot be negative. Both the inefficiencies and the errors are assumed to be orthogonal to the input, output, or environmental variables specified in the estimating equation. The estimated inefficiency for any firm is taken as the conditional mean or mode of the distribution of the inefficiency term, given the observation of the composed error term. (A. N. Berger, L.J. Mester 1997)

2.6- Data Envelopment Analysis (DEA).

DEA is receiving increasing attention as a tool of evaluating and improving the efficiency of manufacturing and service operations. It has been extensively applied in the performance evaluation and benchmarking of schools, hospitals, bank branches, production plants, etc (Charnes et al., 1994).

2.6-1 DEA Model

Data Envelopment Analysis (DEA) Second, A Non parametric DEA approach is used to evaluate the efficiency of Islamic and conventional banks and this technique will also help to fulfill the limitations of using ratio analysis technique. Now a day DEA technique has earned well reputation and is very popular among researchers. While analyzing Decision Making Units (DMU's) input oriented measure define that how much input quantity can proportionately be reduced without changing produced level of output quantity.(Sufian Saeed , 2013).

Is a linear programming based tool for measuring the relative efficiencies of decision making units (DMU) with respect to multiple inputs and multiple outputs which are similar for all the DMUs**.** (Charnes et al., 1978, Banker et al., 1984)

DEA is a multifactor productivity analysis model for measuring the relative efficiencies of a homogeneous set of decision making units, the efficiency score in the presence of multiple input and output factors is defined as: **Efficiency = weighted sum of outputs / weighted sum of inputs.**

2.6-2 Strengths and Weaknesses of DEA

Due to its non-parametric feature and its ability to combine multiple inputs and outputs, DEA has been found to be a powerful tool when used appropriately. A few of the characteristics that make it powerful are:

A. DEA can handle multiple input and multiple output models (Liu and Zhuang 1998).

B. It doesn't require an assumption of a functional form relating inputs to outputs.

C. DMUs are directly compared against a peer or combination of peers.
D. Inputs and outputs can have very different units. For example, X1 could be in units of trips taken and X2 could be bus fare of monthly pass.
E. As pointed out in Cooper, Seiford and Tone (2000), DEA has also been used to supply new insights into activities (and entities) that have previously been evaluated by other methods.

The same features that make DEA a powerful tool can also create problems. The following limitations must be considered when choosing whether or not to use DEA(Bhat 2001):

A.Since DEA is an extreme point technique, noise (even symmetrical noise with zero mean) such as measurement error can cause significant problems.
B. DEA is good at estimating "relative" efficiency of a DMU but it converges very slowly to "absolute" efficiency. In other words, it can tell you how well you are doing compared to your peers but not compared to a "theoretical maximum."
C. since DEA is a nonparametric technique; statistical hypothesis tests are difficult and are the focus of ongoing research.

D. Since a standard formulation of DEA creates a separate linear program for each DMU, large problems can be computationally intensive.
E. The DEA method assigns mathematically optimal weights to all inputs and outputs being considered. It empirically derives the weights so the maximum weight is placed on those favorable variables and the minimum weight is placed on the unfavorable variables.

F. The underlying assumption of this method is that it is equally acceptable to specialize in producing any output or consuming any input. In many cases, this kind of free specialization without weight restrictions is not acceptable or desirable and may lead to highly unreliable conclusions.

2.7- Stochastic Frontier analysis (SFA).

Proposed by Aigner et al. (1977) and Meeusen and Broeck (1977)**,** (also known as the econometric frontier approach), is the most commonly used parametric approach (Berger and Humphrey, 1997)**,** It specifies the functional form for production, cost, revenue or profit relationship among inputs, outputs and environmental variables and allows for the random error. SFA provides a composed error model where random error follows a symmetric distribution usually standard normal while inefficiencies are assumed to follow asymmetric distribution usually the half normal (Aigner et al., 1977).SFA has been widely used by a considerable number of studies in evaluating banking efficiency (Kumbhakar et al., 2001; Berger and Mester, 2003; Bikker and Bos, 2004; Koetter, 2005), and specifically both profit and cost efficiency (Kraft and Tirtiroglu, 1998; Hassan and Marton, 2003; Bonin et al., 2005; Fries and Taci, 2005; Bos and Kool, 2006; and Kwan, 2006), Decisive virtues of SFA are that it covers both the random noises, e.g. due to well-known measurement problems, and systematic differences between banks in the sample due to heterogeneity across banks (Kumbhakar and Lovell, 2000)

2.8- The difference between DEA and SFA :

The development of SFA and DEA has historically been somewhat independent of each other. In the 1990's proponents of the two techniques started to communicate about the similarities and differences of the two approaches. At about the same time studies appeared that applied both SFA and DEA to the same data set and conducted an explicit comparison of results. Ferrier and Lovell (1990) use both approaches on a set of U.S. banks, finding mixed results in terms of efficiency estimates. Hjalmarsson, Kumbhakar, and Heshmati (1996) compare SFA, DEA, and deterministic parametric models for a panel of 15 Colombian cement plants.

Although each method finds similar trends in efficiency over time, the correlations between efficiency estimates are mixed. Sharma, Leung, and Zaleski (1997) estimate the technical efficiency of the swine industry in Hawaii using both SFA and three forms of DEA. They find that SFA leads to higher estimates of technical efficiency and that the correlation between rankings from the different approaches is positive.

DEA seems more favorable to measure efficiency, compared to SFA, Table 2 states the differences between DEA and SFA.

Table1: Difference characteristics between DEA and SFA

DEA	SFA
1. Non parametric approach	1. Parametric approach
2. No requirement to infer about the distribution (normal distribution or not)	2. It is necessary to know about the distribution (normal distribution or not) and requires a priori assumption about the shape of the efficiency frontier
3. Can deal with multiple outputs	3. Cannot deal with multiple outputs
4. Relevant for management performance and social science	4. Limited primarily to microeconomics issues
5. Used in linear and nonlinear efficiency frontiers	5. Limited to linear efficiency frontiers
6. Identifies specific DMUs that serve as a benchmark	6. -

Source : (A. Hammad,2007)

Conclusion :

In this chapter we discussed about the general idea of efficiency starting from the history .Then the types and Determinants of efficiency in banking , after that, we mentioned the parametric and non parametric aprraoch and the differences between DEA and SFA.

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CHAPTER THREE:

MEASURING THE TECHNICAL EFFICIENCY OF ISLAMIC AND CONVENTIONAL BANKS: EMPIRICAL INVESTIGATION

Introduction

In this empirical chapter we will investigate the technical efficiency of MENA banks (conventional and Islamic) using DEA model.

First we will talk about the MENA region and why we have chosen it, then we will present the literature conducted in efficiency measurement, After that, we will justify the choice of data and variables used in the DEA model , then we will discuss some methodological issues related to the mathematical technique applied . Finally, we will discuss our results.

3-1 The MENA region

This section explains the economic background of MENA countries. The Middle East and North African (MENA) region is strategically located between Asian economies and the Western world. Except for Turkey, MENA countries were colonized by the French or the British until the mid-last-century. The region is important for a number of reasons. It represents a bridge between Europe and Asia. In the current century, it is a fast growing region in terms of both population and wealth while its banking sector is relatively young with most banks being established since the 1970s. The region includes the rapidly expanding oil rich countries of the Gulf Cooperation Council (GCC) as well as the Arab countries of the Near East and North Africa. The world's largest Islamic banks are located in the MENA region such as in Bahrain and UAE and its mix of conventional and Islamic banks permits a comparison of efficiency and profitability by types of bank, a feat rarely done.

The main purposes of choosing MENA countries are set out below:

1. Most MENA countries have the same culture and language (Arabic).
2. They contain Islamic, conventional banks.
3. There is an appropriate level of availability of data for the MENA region.
4. The first international Islamic bank, the Islamic Development Bank, was located in the Middle East in 1975 in Jeddah, Saudi Arabia (Islamic Development Bank, 2014); whereas the first domestic Islamic bank, namely Dubai Islamic Bank, was established in Dubai, UAE, in 1975 (Dubai Islamic Bank, 2014).
5. Some MENA countries are leading global oil exporters, especially GCC countries whose GDP is based on the oil sector. Eight MENA countries (Algeria, Iran, Iraq, Kuwait, Libya, Qatar, Saudi Arabia, and UAE) out of 12 members are in the Organisation of Petroleum Exporting Countries (OPEC) (OPEC Organisation, 2014). Overall, MENA includes 20 countries: Algeria, Bahrain, Egypt, Iran, Iraq, Lebanon, Libya, Malta, Morocco, Israel, Jordan, Kuwait, Oman, Palestine, Qatar, Saudi Arabia, Syria, Tunisia, UAE, and Yemen.

3-2 Literature Review

Despite the extensive literature conducted in efficiency measurement accross the world , only studies have been done in the context of the MENA region , particularly , the empirical investigations that tackle the comparison between islamic and conventional banks .

Johnes et Izzeldin et Pappas,. (2009) examined the efficiency of Islamic and conventional banks in the GCC countries over the period 2004-2007 using data envelopment analysis. The findings suggested that the average efficiency was significantly lower in Islamic banks than conventional banks. In contrast, Abdul-Majid et Saal et Battisti. (2010) found that the efficiency of the Islamic banks was more than the efficiency of the conventional banks over the period 1996-2002 using data from 10 countries (111 banks).

Mostafa (2007a) examined the efficiency of the top 100 Arab conventional and Islamic banks from 14 countries in 2005 using DEA. The researcher employed two methods of DEA using CCR and BCC. However, the inputs of Mostafa‟s (2007a) study were: the capital and assets of the banks, whereas the outputs were: the profits, the return on equity (ROE) and the return on assets (ROA) of the banks used. The results showed that the Arabian banks of the study were inefficient, as only 4 banks scored 100% efficiency in both BCC and CCR scores. In other words, 96 banks were inefficient as they needed to reduce their inputs and increase their outputs to raise efficiency. The four efficient banks were from Egypt and the United Arab Emirates namely, the Banque de Caire and Egyptian American Bank from Egypt, and the National Bank of UAE and United Arab Bank from the United Arab Emirate. In another study, Mostafa (2007b) examined 50 GCC Islamic and conventional banks using DEA of BCC and CCR in 2005, and he found that 5 banks achieved 100% efficiency of BCC and CCR.

Hadad et., Hall, Kenjegalieva, Santoso,Simper. (2012) utilised a couple of models: „semi-oriented radial measure‟ „slacksbased model‟ or „SORM SBM‟ DEA which was created by Tone (2001), and the rangedirectional (RD) model suggested by Silva Portela et al. (2004) to analyse the efficiency of 130 Indonesian conventional and Islamic banks

over the period 2003-2007. The results suggested that the most efficient bank type was the state-owned and the least efficient bank type was the regional government-owned. Furthermore, the average efficiency in banks varied between 58%-63% for the SORM SBM model, and between 72%-79% for the RD model, which indicated in general, inefficiency in Indonesian banks.

Comparing the cost and profit efficiency of Islamic and conventional banks, Olson and Zoubi (2011) studied the efficiency of 10 Middle Eastern and North African (MENA) countries. There was a large difference between the average cost and profit efficiency, scoring 70.3% and 59.4%, respectively. The conventional banks had higher cost and profit efficiency than Islamic banks with the conventional banks scoring cost and profit efficiency of 71.2% and 74.4%, respectively, whereas Islamic banks scored 66.4% and 59%, respectively. The disadvantage of this study can be observed that the model included many faded coefficients. In addition, macroeconomic variables have not been investigated to find the effect on efficiency.

The literature differentiates between the two fundamental concepts of efficiency, technical and price efficiency. Farrell (1957) defines technical (production) efficiency, essentially, as the ratio between the results (outcomes, outputs) and investments (invested resources, inputs), and describes it as the ability of a company to obtain maximum outputs from available inputs, or in other words, the ability of a company to obtain given (desired) outputs with minimum inputs. On the other hand, he defines price efficiency (cost, allocative or Pareto efficiency) as the ability of a company to engage different inputs in their optimal ratio (combination) regarding their price and production technology. According to this author, the perfect efficiency is achieved if both technical and price efficiency are achieved, and it is called the total (economic) efficiency. Taking into account the specific features of IBs, numerous studies attempted to measure the efficiency of IBs, compare it to CBs and estimate efficiency before, during and after the crisis.

3.3 Data and Variables

3.3.1 Inputs and Outputs

The dataset comprises financial statements of (66) commercial banks between conventional and islamic banks operating in six (06) Middle East and North Africa countries (10 conventional banks and 03 Islamic banks in Jordan , 08 conventional banks and 04 Islamic banks in KSA , 05 conventional banks and 06 Islamic banks in Kuwait , 07 conventional banks and 03 Islamic banks in Qatar, 09 conventional banks and 01 Islamic banks in Tunisia, 08 conventional banks and 02 Islamic banks in Algeria) during the 2010-2014 period. We focus on commercial banks to enhance the comparability within the banking systems of our sample, as such institutions are homogenous in terms of provided services . After reporting data from errors and other inconsistencies, we obtain an unbalanced panel data consisting of (330) bank-level observations.

The choice of the approach defining banking inputs and outputs is at center of debate. A variety of approaches have been proposed in the literature, i.e. the intermediation, the production, the profitability, the portfolio and the Risk-return approaches. This is due to the nature and functions of financial intermediaries. In this study we follow the intermediation approach proposed by Sealey and Lindley (1977). This approach perceives banks as financial intermediaries between savers and investors that collect purchased funds and transform them to loans and other earning assets.

In this study, we follow the asset approach variation and we estimate a DEA model with two outputs and three inputs. The outputs are: *total loans* and *other earning assets*. In relation to the three inputs: we have total fixed assets , deposits and total expenses ,the latter incorporates the *interest expenses e*, the *non-interest expenses (personnel expenses + other operating expenses*). To avoid a potential problem of multi-dimensiality due to the small size of our sample for each country , we aggregate total loans and other earning assets into one output , and we

also aggregate deposits and total expenses into one single input . Therefore, we run the estimation of efficiency for one output and two inputs .

The bank's inputs and outputs data are obtained mainly from *Bankscope Fitch international database* published by Bureau. The database has comprehensive coverage of banks in a large number of countries and accounts for over 90% of all banking assets in each country. The Table (3.1) reports descriptive statistics of input – output variables adopted in this study for each country.

Table (3.1): Descriptive Statistics on input-output variables (values in national currency)

Algeria	**Medium**	**STD**	**Min**	**Max**
Total Outputs	180328,619	661370,238	56077	2100560
Input 1	7526,77273	6311,30178	996	18000
Input 2	497119,563	394074,964	90381	1136900
Tunisia	**Medium**	**STD**	**Min**	**Max**
Total Outputs	5918,33333	2286,45803	3509	8058
Input 1	582,166667	787,181406	39	1598
Input 2	3665,40704	3109,33746	216,7	12802,1
KSA	**Medium**	**STD**	**Min**	**Max**
Total Outputs	139632,59	91035,2668	21185,6	408420,2
Input 1	1494,73333	1178,5132	286,4	5578,9
Input 2	130188,257	87903,8923	21124,4	380102,9
Kuwait	**Medium**	**STD**	**Min**	**Max**
Total Outputs	4720,42364	5069,45965	106	19078,9
Input 1	109,501818	204,175946	1	877,4
Input 2	4739,12364	5171,84594	28,7	20417

Qatar	**Medium**	**STD**	**Min**	**Max**
Total Outputs	29846,375	15793,1531	16133	58662
Input 1	586,333333	559,311958	87	1391
Input 2	51169,268	71486,8961	292,3	352970,1
Jordanny	**Medium**	**STD**	**Min**	**Max**
Total Outputs	2876,75385	4920,80939	76	20016,5
Input 1	45,5676923	53,9926095	1,7	220,7
Input 2	3045,17538	5088,95186	10,9	20584,8

3.3.2 Methodology of the empirical study

A fundamental decision in measuring banking efficiency is which concept to use. This depends of course on question being addressed and more importantly, to the availability of data relative to input and output prices. In this study we measure the technical efficiency.Rather than allocative efficiency. In fact, according to many authors, economic or allocative efficiency (cost and profit) is a wider concept than technical efficiency, since it refers to both technical and allocative efficiency. In fact, a firm is called technologically efficient, when it minimizes its inputs given outputs or maximizes its outputs given inputs reflecting the ability of managers to use the best technology that allows to use the minimum of inputs in producing the same quantity of outputs or to generate the maximum of outputs using the same amount of inputs.

3.3.3. First stage: The Data Envelopment Analysis

The efficiency measurement techniques are based on either parametric or non-parametric frontiers. The parametric methods involve the estimation of an economic function (e.g., production, cost or profit) and the derivation of efficiency scores from either the residuals or dummy variables. This method includes three econometric approaches: the

stochastic frontier approach *(SFA)* which is the most widely parametric method used in the literature related to efficiency analysis , the thick frontier approach *(TFA)*, and the distribution-free approach *(DFA)*. In the present paper we follow the non-parametric Data Envelopment Analysis (DEA) to estimate bank specific efficiency levels . DEA is a linear programming technique that allows calculating relative efficiency of a business unit. It was developed by Charnes , Cooper and Rhodes in 1978 (CCR) in order to measure relative efficiency without knowing what variables are more important or what their relationship is *(Hasan , 2004).*
The non-parametric measurement of DEA creates a piecewise linear convex frontier that envelops the input-output of all banks in the sample relative to which costs are minimized or profit/revenue is maximized. Efficiency scores are then calculated from the frontier generated by a sequence of linear programs. Each bank is assigned an efficiency score between 0 and 1 with higher score indicating the most efficient bank. We opt for the DEA approach because of many advantages these non parametric offers for the analysis. The main reasons is that DEA works relatively well with efficiency analysis involving small samples and it does not require any assumption regarding the distribution of inefficiency and the functional form of the production/ cost function. However, DEA suffers of some drawbacks as it remains sensitive to outliers and assumes data to be free of measurement error.
Under the assumption that managers of banks have higher control over the inputs (e.g personnel or operating expenses) rather than outputs, we adopt the *input-output orientation* in estimating the cost efficiency. The input-output oriented model measures improve in efficiency through proportional reduction of input quantities without altering produced output quantities. Furthermore, this assumption is in accordance with the estimated technical efficiency for cost frontier.
Another issue needs to be addressed is the assumption of the Variable Return on Scale VRS. The Constant Return on Scale is appropriate only when all DMUs (banks in our case) operate at an optimal scale. In vast majority of cases, particularly the banking sector, this assumption is violated due to multiple reasons, such an imperfect competition, diverse regulations and restrictions, .etc. Coelli (1996) pointed out that the use of the CRS specification when not all firms are operating at the optimal

scale, results in measures of technical efficiency (TE) that are confounded by *scale efficiencies* (SE). The use of the VRS specification permits the calculation of TE devoid of these SE effects.

The Input-oriented model under the assumption of variable return to scale VRS is often termed as BCC (Banker , Chames and Cooper) model, which can be written in the following form *(Coelli ,1996)* :

$$\min \theta^*_q \quad \text{subject to}$$

$$\sum_{j=1}^{n} \lambda_j x_{tj} \leq \theta^*_q x_{iq} \qquad i = 1,2,\dots,m;$$

$$\sum_{j=1}^{n} \lambda_j y_{rj} \geq y_{rq} \qquad r = 1,2,\dots s;$$

$$\sum_{j=1}^{n} \lambda_j = 1 \quad \lambda_j \geq 0 \qquad j = 1,2,..n$$

3.4-Discussion of results

1-Jordan

The Table 3.2 displays the technical efficiency scores from the DEA output-input orientation model under the assumption of both Variable Return in Scale VRS and Constant Return on scale CRS of Jordan's conventional and Islamic banks. It is worth mentioning that the technical efficiency is estimated based on a common frontier rather than individual frontier (given *the small size of the sample for each country with regard to Islamic banks*) to enhance the accuracy of the DEA estimates. We do not expect this will affect the efficiency scores as the banks operate in the same financial system and relatively share similarities in terms of economic characteristic, this applies to all countries in our sample.

Table 3.2: Technical Efficiency of Jordan Banks (CRS ,VRS , SCALE)

	Name of bank	Type of Bank	Crste	Vrste	scale
1	*Jordan Commercial Bank*	conventional	0,692	0,804	0,861 drs
2	*Arab Banking Corporate*	conventional	1	1	1 -----
3	*Société général de Banque*	conventional	0,604	0,74	0,817 drs
4	*Arab Bank PLS*	conventional	0,938	1	0,938 drs
5	*Housing Bank for Trade & F*	conventional	0,767	0,962	0,797 drs
6	*Jordan Ahli Bank Plc*	conventional	0,751	0,949	0,792 drs
7	*Jordan Kuwait Bank*	conventional	1	1	1 -----
8	*Cairo Amman Bank*	conventional	0,879	1	0,879 drs
9	*Bank of Jordan Plc*	conventional	0,847	0,928	0,913 drs
10	*Capital Bank of Jordan*	conventional	0,8	0,872	0,919 drs
11	*Jordan Islamic Bank*	Islamic	0,63	0,762	0,827 drs
12	*Islamic International Arab*	Islamic	0,647	0,699	0,925 drs
13	*Jordan Dubai Islamic Bank*	Islamic	1	1	1 ------
	Mean		0,812	0,901	0,897

Source : calculated bu the author using DEAP 2.1 software

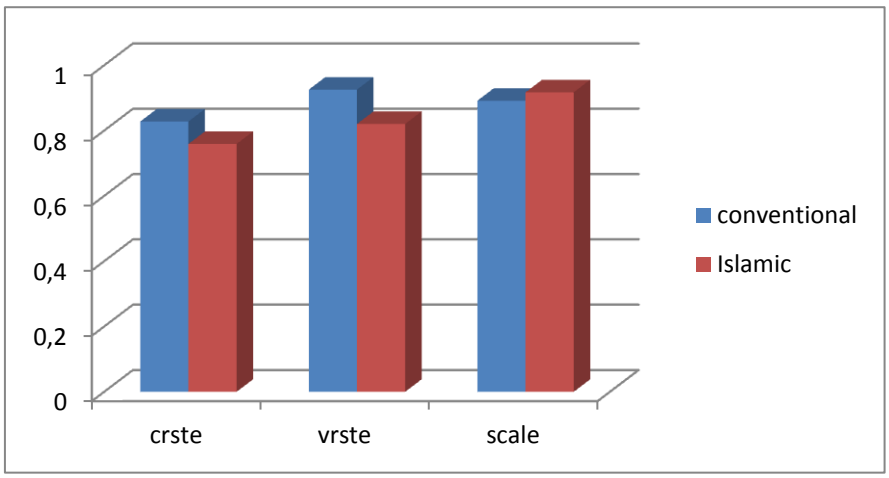
VRS : Variable return on Scale ; CRS : Constant Return on Scale ; drs : Decreasing return on Scale ; Irs : Increasing Return on scale .

Table 3.3 : The overall Mens (CRS-VRS-SCALE) of Jordan's Islamic and conventional banks:

	Islamic	Conventional
mean crste	0,759	0,8278
mean vrste	0,82033333	0,9255
mean scale	0,91733333	0,8916

Source : calculated by the author using DEAP 2.1 software

Figure 3.1 : The differences CRS and VRS and SCALE between CB and IB of Jordan



Looking at the overall mean , we notice that the average technical efficiency estimates is equal to 81.2 % (CRS) and 90.1 (VRS) , this means that Jordan banks , in average , could potentially reduce their inputs by 18.8 % (CRS) and 9.9 % (VRS) comparing to the best practice-bank (or to match their performance with the best-practice-bank) for the given conditions within the observed data .

The results suggest also that technical efficiency of Jordan banks is more enhanced by the pure technical efficient rather than scale efficiency (90.1 % > 89.7 %) **(H2: rejected in the case of jordan)** which reflects the ability of Jordan banks' managers to manage efficiently the available resources (the fixed assets , deposits and total expenses) to produce a set amount of loans and other earning assets . These results corroborate with the decline of the return on scale for all Jordan banks (DRS) .

The table (3.3) shows the overall mean of technical efficiency of Islamic banks and conventional banks separately. We notice that Jordan Conventional banks are more technical efficient that Islamic banks under both CRS and VRS assumptions (**H3: accepted).**For instance, the Islamic banks are 10% less efficient than conventional banks (VRS) .

2-Kingdom of Saudi Arabia KSA

The Table 3.4 displays the technical efficiency scores from the DEA output-input orientation model under the assumption of both Variable Return in Scale VRS and Constant Return on scale CRS of KSA's conventional and Islamic banks.

Table 3.4 : Technical Efficiency of KSA Banks (CRS ,VRS , SCALE)

	Name of bank	Type of bank	Crste	vrste	scale
1	*Saudi Investment Bank (The)*	conventional	0,944	0,986	0,958 irs
2	*Saudi Hollandi Bank*	conventional	0,929	0,964	0,963 irs
3	*Arab National Bank Public Joint Stock Company*	conventional	0,918	0,921	0,997 irs
4	*Banque Saudi Fransi JSC*	conventional	1	1	1 ------
5	*Saudi British Bank JSC (The)*	conventional	0,967	0,967	1 ------
6	*Riyad Bank*	conventional	1	1	1 ------
7	*Samba Financial Group*	conventional	0,963	0,978	0,984 drs
8	*National Commercial Bank (The)*	conventional	0,91	1	0,91 drs
9	*Al Rajhi Bank Public Joint Stock Company*	Islamic	0,897	0,952	0,942 drs
10	*Alinma Bank Public joint stock company*	Islamic	0,976	1	0,976 irs
11	*Bank AlJazira JSC*	Islamic	0,88	1	0,88 irs
12	*Bank AlBilad*	Islamic	0,855	1	0,855 irs
	MEAN		0,937	0,981	0,955

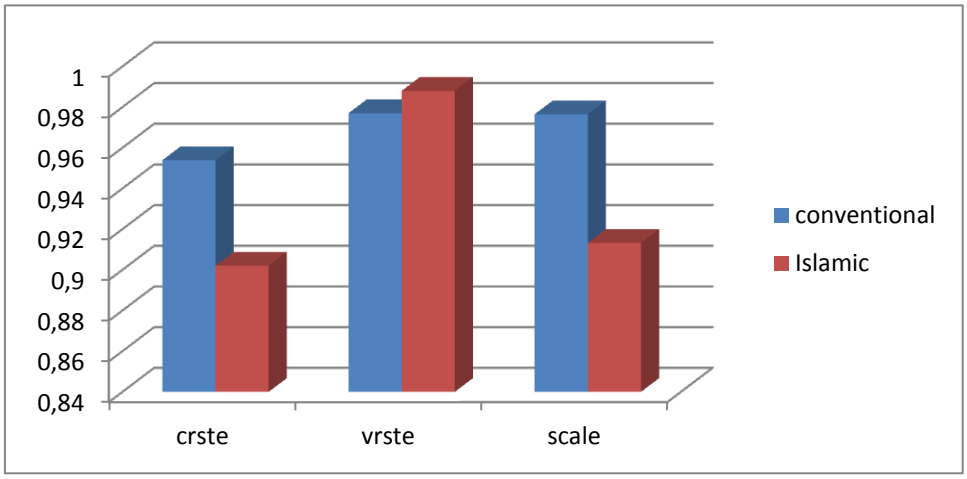
Source : calculated by the author using DEAP 2.1 software

Table 3.5: The overall Mens (CRS-VRS-SCALE) of KSA's Islamic and conventional banks:

	Islamic	Conventional
mean crste	0,902	0,953875
mean vrste	0,988	0,977
scale	0,91325	0,9765

Source : calculated by the author using DEAP 2.1 software

Figure 3.2: The differences CRS and VRS and SCALE between CB and IB of KSA



Looking at the overall mean , we notice that the average technical efficiency estimates is equal to 93.7% (CRS) and 98.1 (VRS) , this means that KSA banks , in average , could potentially reduce their inputs by 6.3 % (CRS) and 1.9 % (VRS) comparing to the best practice-bank (or to match their performance with the best-practice-bank) for the given conditions within the observed data .

The results suggest also that technical efficiency of KSA banks is more enhanced by the pure technical efficient rather than scale efficiency (98.1 % > 95.5 %) **(H2: rejected)** which reflects the ability of KSA banks' managers to manage efficiently the available resources (the fixed assets , deposits and total expenses) to produce a set amount of loans and other earning assets . Nevertheless, many KSA banks show an increasing return on scale.

The table (3.5) shows the overall mean of technical efficiency of Islamic banks and conventional banks separately. We notice that KSA Conventional banks are more technical efficient than Islamic banks under CRS, and Islamic banks are more efficient under VRS assumptions. .**(H3: not conformed)** For instance, the Islamic banks are 1.1% more efficient than conventional banks (VRS) .

3-KUWAIT

The Table 3.6 displays the technical efficiency scores from the DEA output-input orientation model under the assumption of both Variable Return in Scale VRS and Constant Return on scale CRS of Kuwait's conventional and Islamic banks

Table 3.6: Technical Efficiency of Kuwait Banks (CRS ,VRS , SCALE)

	Name of Bank	Type of bank	crste	Vrste	Scale
1	***National Bank of Kuwait S.A.K***	**conventional**	0,66	1	0,66 drs
2	***burgan bank sak***	**conventional**	0,574	0,944	0,608 drs
3	***gulg bank***	**conventional**	1	1	1 ------
4	***al Ahli bank***	**conventional**	0,626	1	0,626 drs
5	***comercial bank of Kuwait***	**conventional**	0,79	0,976	0,81 drs
6	***Kuwait Finance House***	**Islamic**	0,498	1	0,498 drs
7	***Ahli United Bank KSC***	**Islamic**	0,772	0,952	0,811 drs
8	***Boubyan Bank KSCP***	**Islamic**	0,946	1	0,946 drs
9	***Kuwait International Bank***	**Islamic**	0,574	1	0,574 drs
10	***A'Ayan Leasing & Investment Company***	**Islamic**	0,245	0,649	0,378 drs
11	***First Investment Company K.S.C.C.***	**Islamic**	1	1	1 -------
	MEAN		0,699	0,957	0,719

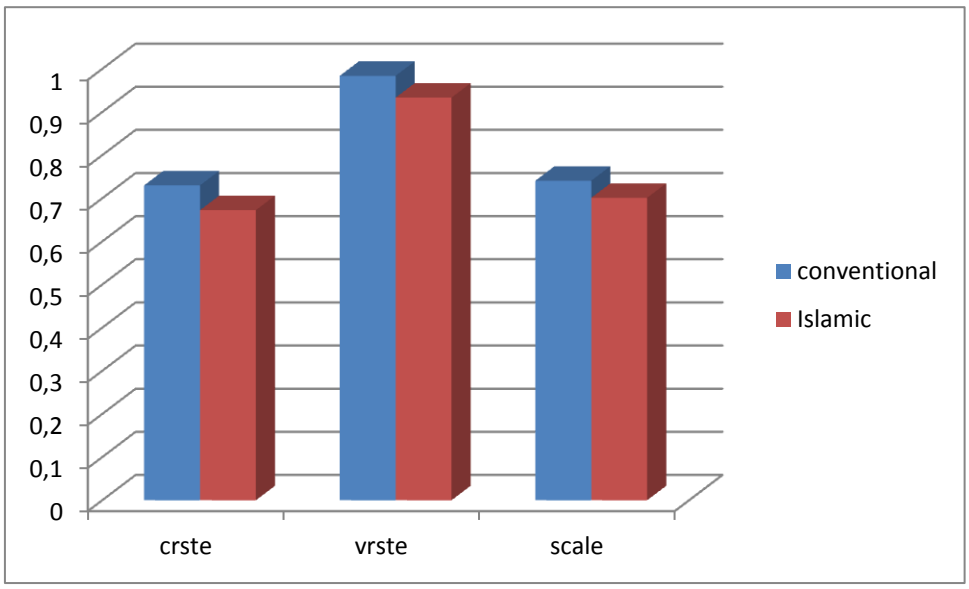
Source : calculated by the author using DEAP 2.1 software

Table 3.7: The overall Mens (CRS-VRS-SCALE) of Kuwait's Islamic and conventional banks:

	Islamic	Conventional
mean crste	0,6725	0,73
mean vrste	0,9335	0,984
mean scale	0,70116667	0,7408

Source : calculated by the author using DEAP 2.1 software

Figure 3.3 : The differences CRS and VRS and SCALE between CB and IB of Kuwait



Looking at the overall mean , we notice that the average technical efficiency estimates is equal to 69.9 % (CRS) and 95.7 (VRS) , this means that Kuwait banks , in average , could potentially reduce their inputs by 30.1 % (CRS) and 4.3 % (VRS) comparing to the best practice-bank (or to match their performance with the best-practice-bank) for the given conditions within the observed data .

The results suggest also that technical efficiency of Kuwait banks is more enhanced by the pure technical efficient rather than scale efficiency (95.7 % > 71.9 %)**(H2:rejected) .** which reflects the ability of Kuwait banks' managers to manage efficiently the available resources (the fixed assets , deposits and total expenses) to produce a set amount of loans and other earning assets . These results corroborate with the decline of the return on scale for all Kuwait banks (DRS) .

The table (3.7) shows the overall mean of technical efficiency of Islamic banks and conventional banks separately. We notice that Kuwait Conventional banks are more technical efficient that Islamic banks under both CRS and VRS assumptions **(H3:Accepted)**. For instance, the Islamic banks are 10% less efficient than conventional banks (VRS) .

4-QATAR

The Table 3.8 displays the technical efficiency scores from the DEA output-input orientation model under the assumption of both Variable Return in Scale VRS and Constant Return on scale CRS of Jordan's conventional and Islamic banks.

Table 3.8 : Technical Efficiency of Qatar Banks (CRS ,VRS , SCALE)

	Name of bank	Type of Bank	Crste	Vrste	scale
1	**Qatar National Bank**	**conventional**	0,73	1	0,73 drs
2	**Commercial Bank of Qatar (The) QSC**	**conventional**	0,351	0,887	0,396 drs
3	**Doha Bank**	**conventional**	0,363	0,842	0,431 drs
4	**Barwa Bank**	**conventional**	1	1	1 -------
5	**Ahli Bank QSC**	**conventional**	0,495	0,596	0,831 drs
6	**International Bank of Qatar Q.S.C.**	**conventional**	0,522	0,623	0,839 drs
7	**Al Khalij Commercial Bank**	**conventional**	0,864	0,873	0,99 drs
8	**Qatar Islamic Bank SAQ**	**Islamic**	0,558	0,864	0,646 drs
9	**Masraf Al Rayan (Q.S.C.)**	**Islamic**	1	1	1 --------
10	**Qatar International Islamic Bank**	**Islamic**	0,356	0,695	0,512 drs
mean			0,624	0,838	0,738

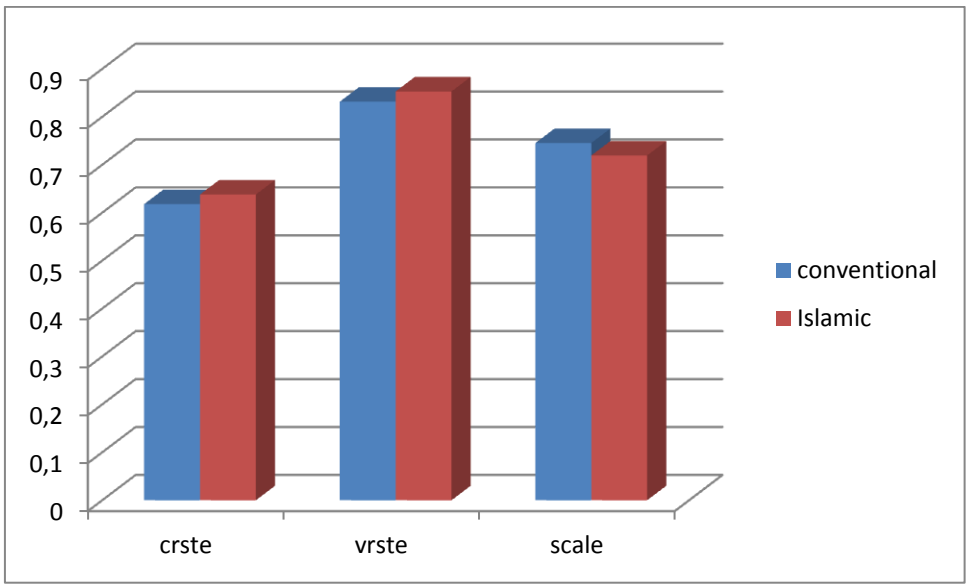
Source : calculated by the author using DEAP 2.1 software

Table 3.9: The overall Mens (CRS-VRS-SCALE) of Qatar's Islamic and conventional banks:

	Islamic	Conventional
mean crste	0,638	0,61785714
mean vrste	0,853	0,83157143
mean scale	0,71933333	0,74528571

Source : calculated by the author using DEAP 2.1 software

Figure 3.4 : The differences CRS and VRS and SCALE between CB and IB of Qatar



Looking at the overall mean , we notice that the average technical efficiency estimates is equal to 62.4 % (CRS) and 83.8 (VRS) , this means that Qatar banks , in average , could potentially reduce their inputs by 37.6 % (CRS) and 16.2 % (VRS) comparing to the best practice-bank (or to match their performance with the best-practice-bank) for the given conditions within the observed data .

The results suggest also that technical efficiency of Qatar banks is more enhanced by the pure technical efficient rather than scale efficiency (83.8 % > 73.8 %) **(H2: rejected)** which reflects the ability of Qatar banks' managers to manage efficiently the available resources (the fixed assets, deposits and total expenses) to produce a set amount of loans and other earning assets. These results corroborate with the decline of the return on scale for all Qatar banks (DRS).

The table (3.9) shows the overall mean of technical efficiency of Islamic banks and conventional banks separately. We notice that Qatar Islamic banks are more technical efficient that Conventional banks under both CRS and VRS assumptions.**(H3:rejected)** For instance, the Islamic banks are 0.215% more efficient than conventional banks (VRS) .

5-TUNISIA

The Table 3.10 displays the technical efficiency scores from the DEA output-input orientation model under the assumption of both Variable Return in Scale VRS and Constant Return on scale CRS of Tunisian's conventional and Islamic banks.

Table 3.10 : Technical Efficiency of Tunisian Banks (CRS ,VRS , SCALE)

	Name of bank	Type of bank	Crste	vrste	scale
1	Arab Banking Corporation	conventional	1	1	1 ------
2	Banque Nationale Agricole	conventional	0,914	1	0,914 drs
3	Banque Zitouna	Islamic	0,717	0,724	0,99 irs
4	Union Internationale de Banques	conventional	0,863	0,931	0,928 drs
5	Banque de Tunisie	conventional	1	1	1 -------
6	Union Bancaire pour le Commerce et l'Industrie SA UBCI	conventional	0,939	0,98	0,958 drs
7	Attijari Bank	conventional	0,814	0,881	0,925 drs
8	Société Tunisienne de Banque	conventional	0,72	0,793	0,909 drs
9	Banque Franco-Tunisienne	conventional	0,378	0,368	0,999 ----
10	Fransabank El Djazair SPA	conventional	0,832	1	0,832 drs
	MEAN		0,817	0,868	0,946

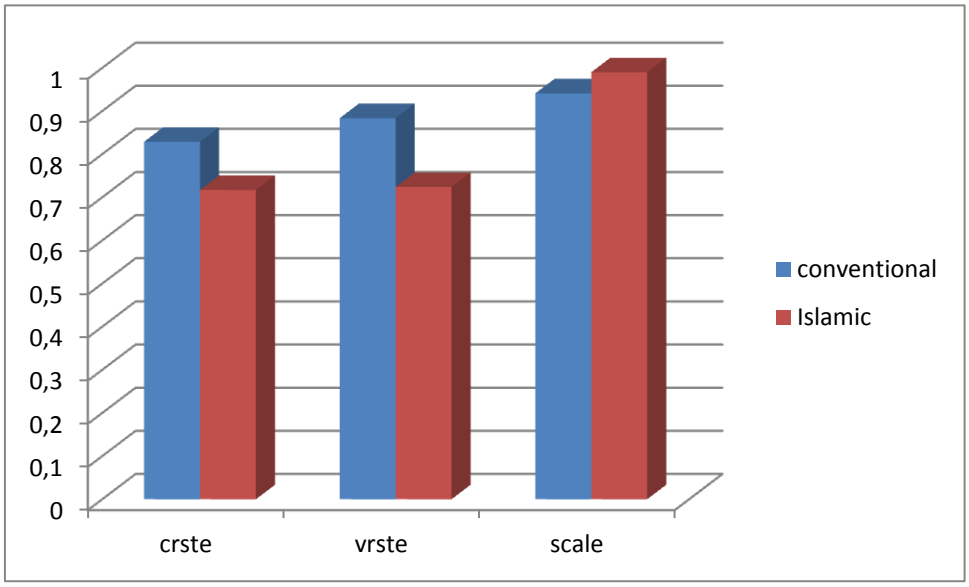
Source : calculated by the author using DEAP 2.1 software

Table 3.11 : The overall Mens (CRS-VRS-SCALE) of Tunisian's Islamic and conventional banks:

	Islamic	Conventional
crste	0,717	0,82888889
vrste	0,724	0,88366667
scale	0,99	0,9411

Source : calculated by the author using DEAP 2.1 software

Figure 3.5: The differences CRS and VRS and SCALE between CB and IB of Tunisia



Looking at the overall mean , we notice that the average technical efficiency estimates is equal to 81.7 % (CRS) and 86.6 (VRS) , this means that Tunisian banks , in average , could potentially reduce their inputs by 18.3 % (CRS) and 13.4 % (VRS) comparing to the best practice-bank (or to match their performance with the best-practice-bank) for the given conditions within the observed data .

The results suggest also that technical efficiency of Tunisian banks is more enhanced by the scale efficient rather than pure technical efficiency (86.6% < 94.6 %)**(H2:accepted)** . Nevertheless, many Tunisian banks show a decreasing return on scale.

The table (3.11) shows the overall mean of technical efficiency of Islamic banks and conventional banks separately . We notice that Tunisian conventional banks are more technical efficient than Islamic banks under both CRS and VRS assumptions**.(H3:accepted)** For instance, the Islamic banks are 0.215% more efficient than conventional banks (VRS) .

6-ALGERIA

The Table 3.12 displays the technical efficiency scores from the DEA output-input orientation model under the assumption of both Variable Return in Scale VRS and Constant Return on scale CRS of Tunisian's conventional and Islamic banks.

Table 3.12 : Technical Efficiency of Algerian Banks (CRS ,VRS , SCALE)

	Name of bank	Type of bank	Crste	Vrste	scale
1	***Société Générale Algérie***	**conventional**	0,91	1	0,91 irs
2	***Banque Nationale d'Algérie***	**conventional**	1	1	1 ------
3	***Fransabank El Djazair SPA***	**conventional**	0,754	1	0,754 irs
4	***Banque de l'Agriculture et du Developpement Rural***	**conventional**	0,778	0,778	1 ------
5	***BDL***	**conventional**	0,775	0,779	0,995 drs
6	***CPA***	**conventional**	0,78	0,788	0,99 drs
7	***BNP***	**conventional**	0,687	0,697	0,986 drs
8	***BEA***	**conventional**	1	1	1 ------
9	***Albaraka of Algeria-Banque***	**Islamic**	0,69	0,699	0,986 drs
10	***AL SALAM-BANK***	**Islamic**	1	1	1 ------
	MEAN		0,8374	0,8741	0,9621

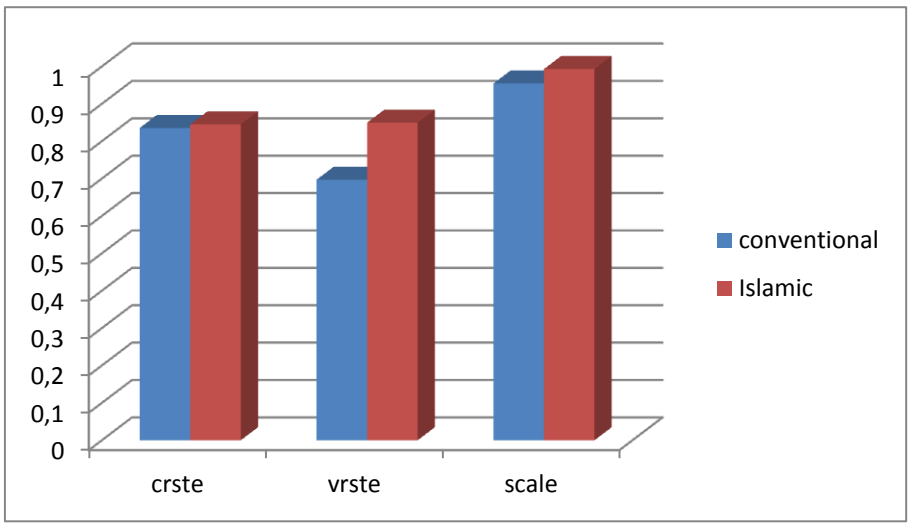
Source : calculated by the author using DEAP 2.1 software

Table 3.13 : The overall Mens (CRS-VRS-SCALE) of Tunisian's Islamic and conventional banks:

	Islamic	Conventional
IB crste mean	0,845	0,8355
IB vrste mean	0,8495	0,697
IB scale mean	0,993	0,954375

Source : calculated by the author using DEAP 2.1 software

Figure 3.6: The differences CRS and VRS and SCALE between CB and IB of Algeria



Looking at the overall mean , we notice that the average technical efficiency estimates is equal to 83.74 % (CRS) and 87.41% (VRS) , this means that Tunisian banks , in average , could potentially reduce their inputs by 16.26 % (CRS) and 12.59 % (VRS) comparing to the best practice-bank (or to match their performance with the best-practice-bank) for the given conditions within the observed data .

The results suggest also that technical efficiency of Algerians banks is more enhanced by the scale efficient rather than pure technical efficiency (87.41% < 96.21 %) **(H2: accepted).** Nevertheless, many Algerian banks show a decreasing return on scale.

The table (3.13) shows the overall mean of technical efficiency of Islamic banks and conventional banks separately . We notice that Algerian's Islamic banks are more technical efficient than conventional banks under both CRS and VRS assumptions**(H3:rejected)** . For instance, the Islamic banks are 15.25% more efficient than conventional banks (VRS) .

7-Middle East region

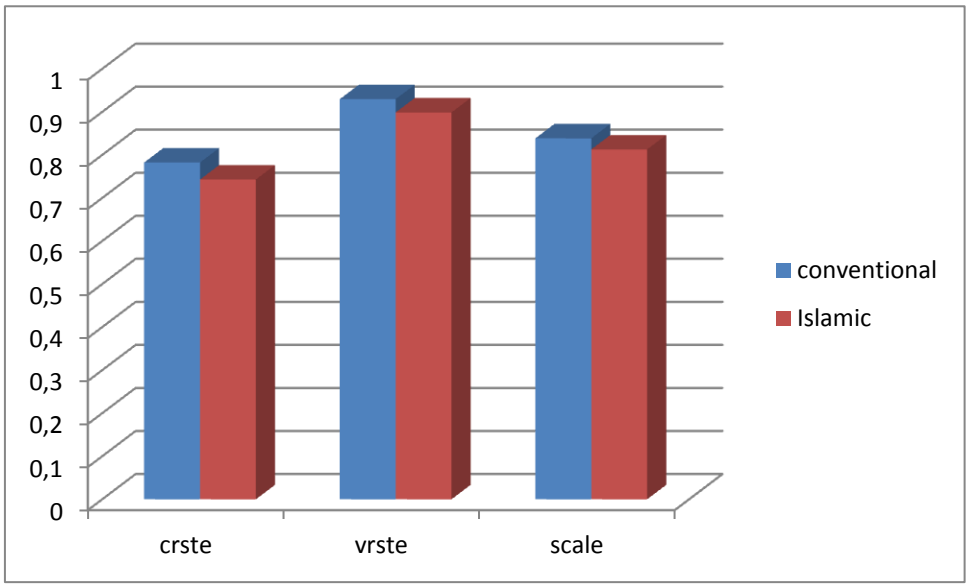
The table (3.14) shows the overall mean of technical efficiency of Islamic banks and conventional banks separately

Table 3.14 : The overall Mens (CRS-VRS-SCALE) of Middle East's Islamic and conventional banks:

	conventional	Islamic
crste	0,78238304	0,742875
vrste	0,92951786	0,89870833
scale	0,83854643	0,81277083

Source : calculated by the author using DEAP 2.1 software

Figure 3.7: The differences CRS and VRS and SCALE between CB and IB of Middle East



The table (3.14) shows the overall mean of technical efficiency of Islamic banks and conventional banks separately . We notice that Middle East's Conventional banks are more technical efficient than Islamic banks under both CRS and VRS assumptions**(H3:accepted).** For instance, the Conventional banks are 3.08% more efficient than Islamic banks (VRS)

7-North Africa Region

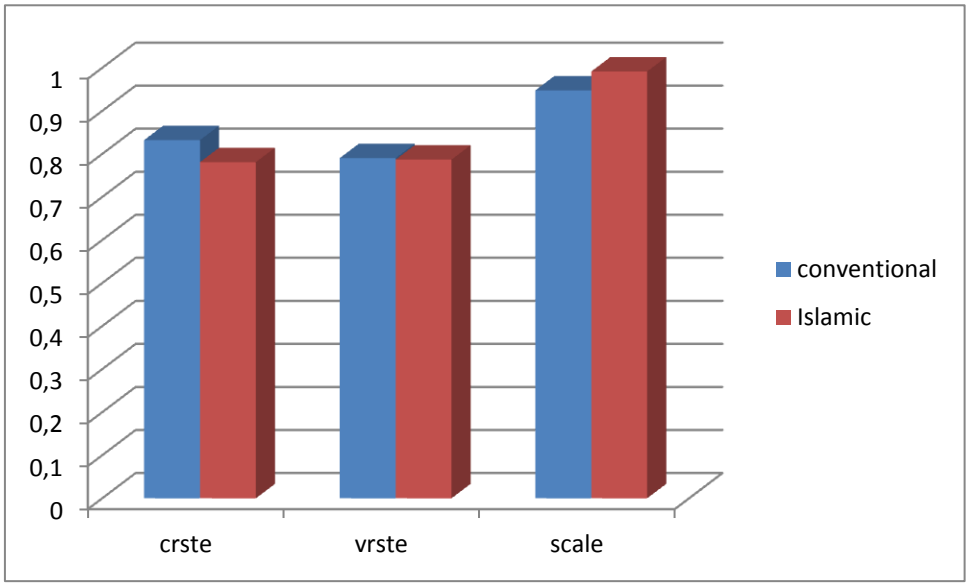
The table (3.15) shows the overall mean of technical efficiency of Islamic banks and conventional banks separately.

Table 3.15 : The overall Mens (CRS-VRS-SCALE) of North Africa's Islamic and conventional banks

	Conventional	Islamic
crste	0,83219444	0,781
vrste	0,79033333	0,78675
scale	0,9477375	0,9915

Source : calculated by the author using DEAP 2.1 software

Figure 3.8: The differences CRS and VRS and SCALE between CB and IB of North Africa



The table (3.15) shows the overall mean of technical efficiency of Islamic banks and conventional banks separately. We notice that North Africa's Conventional banks are more technical efficient than Islamic banks under both CRS and VRS assumptions**.(H3:accepted)** For instance, the Conventional banks are 0.4% more efficient than Islamic banks (VRS)

The table (3.14) and (3.15) show that both of conventional and Islamic banks in North Africa are more technical efficient compared to its peers in Middle East **(H1:rejected)**

8-MENA Region

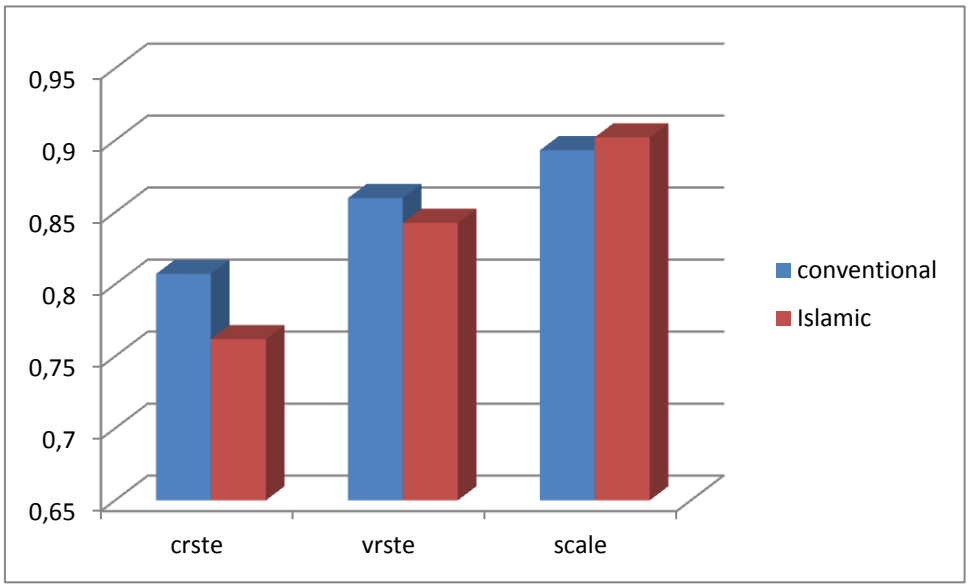
The table (3.16) shows the overall mean of technical efficiency of Islamic banks and conventional banks separately.

Table 3.16 : The overall Means (CRS-VRS-SCALE) of MENA's Islamic and conventional banks

	conventional	Islamic
crste	0,80728874	0,7619375
vrste	0,8599256	0,84272917
scale	0,89314196	0,90213542

Source : calculated by the author using DEAP 2.1 software

Figure 3.9: The differences CRS and VRS and SCALE between CB and IB of MENA



The table (3.16) shows the overall mean of technical efficiency of Islamic banks and conventional banks separately. We notice that MENA's Conventional banks are more technical efficient than Islamic banks under both CRS and VRS assumptions **(H3: accepted).** For instance, the Conventional banks are 1.72% more efficient than Islamic banks (VRS)

Conclusion:

In this empirical chapter we have investigated the efficiency of 66 banks in MENA region over 6 countries. This study found that the conventional banks are more technical efficient in both CRS and VRS than Islamic banks in Jordan and Kuwait and Qatar.

The findings also indicated that KSA Conventional banks are more technical efficient than Islamic banks under CRS, and Islamaic banks are more efficient under VRS assumptions, the study about Algeria and Tunisia found that Islamic banks are more technical efficient under both CRS and VRS compared with conventional banks . These findings also observed in the case of the Middle East and North Africa regions separately. Also both of conventional and Islamic banks in North Africa are more technical efficient compared to its peers in Middle East. In the end we found that the conventional banks are more technical efficient than Islamic banking under both CRS and VRS in the whole MENA region .

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GENERAL CONCLUSION:

Conclusion and recommendation

1- General Conclusion

The purpose of this dissertation is to assess the technical efficiency of Islamic and conventional banks in a comparison perspective. We have focused in the theoretical background on explaining the fundamental principles and characteristic of Islamic banking, the thesis firstly introduces the understanding Islamic financial and banking, as it will be difficult to appreciate the resultant financial techniques without an understanding and appreciation of these principles. It then compares the objectives of Islamic banking with that of conventional banking, Later on that, the different modes of financing in Islam have been explained. The focus then moves to create some understanding of the specific risk profile and challenges which are particularly associated with Islamic finance.

Islamic banking and finance has emerged as one of the most rapidly expanding sectors in the global financial system. Therefore, we attempt, in this thesis, to explore the emergence and the continual growth of Islamic banking and finance which is widely spread inside as well as outside the Islamic countries, specifically during the global financial crisis of 2008 and the consequent adverse market conditions. However, the Islamic perspective on this crisis is also presented to show how Islamic economic system might help to bring stability to the world's economy.

Under the previous academic composition, we have conducted a detailed study on conventional banks Compared to Islamic banks which we did not address, This is why we discussed in this thesis Islamic banking in particular.

From an empirical point of view, the aim of this dissertation has been to investigate the efficiency of 66 MENA banks (conventional and Islamic) . We measured the technical efficiency and found out the score for each bank relative to its peers. The results suggest that there are differences among banks in their technical efficiency scores. The findings also suggest that the average scores of technical efficiency (CRS) and pure technical efficiency (VRS) for the banking sector in MENA region as a whole are 78.46% and 89.76% respectively, And as a comparison between Islamic and conventional banks in MENA region, we found that the conventional banks are more efficient in both technical efficiency (CRS) and pure technical efficiency (VRS) than Islamic banks , So that the results were (80.72 % >76.19 %) in CRS and (85.99 % > 84.27 %) in VRS which provide relative answers to our research question .

2-Recommendation

A- Banks Management should take care about the improvement of the scale efficiency as well as pure technical efficiency and the potential improvements that come from the analysis results of this research in order to improve the efficiency the inefficient banks.

B- It is recommended to apply the DEA analysis for economic sectors other than banks, such as insurance companies, it will give new insights about their indicators of efficiency and will help in the strategic planning.