Performance and Risk Analysis of Islamic and Conventional Banks in Pakistan: An Empirical Investigation using Classification Techniques

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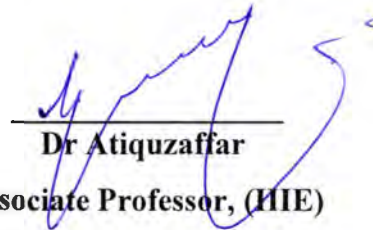
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Performance and Risk Analysis of Islamic and Conventional Banks

(An Empirical Investigation using Classification Technique)

by
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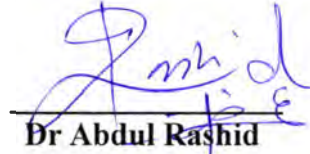
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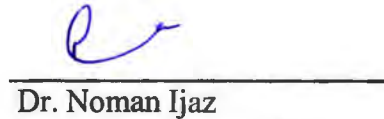
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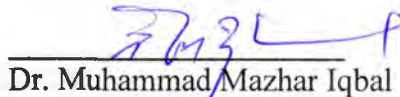Assistant Professor, IIIE
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Dedication

To my Parents (Riaz Cheema and Khalida Nasreen)

&

My Brothers (Khuram and Zeeshan)

Declaration

I hereby solemnly declare that all the literature presented in following dissertation is entirely based on research work carried out in defense of my thesis topic. This publication is pioneer in its context and has neither similarity to any previously submitted thesis nor any copied material in its contexts from any source except where due reference is clearly mentioned. All of the published data is result of my own efforts, research and analysis with support of those mentioned in acknowledgement, in specific my supervisor(s). If at some later stage plagiarism is detected in the submitted research based on literature, I will be fully responsible for all the consequences as per the prevailing rules and law of approval committee.

Mamoona Riaz

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Abstract

This study contributes to the empirical literature on Islamic finance by investigating the feature of Islamic and conventional banks in Pakistan over the period 2003–2010. We use parametric and non-parametric classification models (linear discriminant analysis, logistic regression, and neural network) to examine whether financial ratios can be used to distinguish between Islamic and conventional banks. Descriptive results show that Islamic banks are, on average, less profitable, more liquid, better capitalized, and have lower credit risk than conventional banks. We also find that Islamic banks have more operating leverage than their conventional peers. The results from classification models show that the two types of banks may be differentiated in terms of credit and insolvency risk, operating leverage, and efficiency but not in terms of profitability and liquidity. More interestingly, we find that the recent global financial crisis has a negative impact on the profitability for both Islamic and conventional banks. Finally, the results show that neural model obtained slightly higher classification accuracies than the other models used in the analysis.

JEL classification: C44 C45 C25 G21 G28

Keywords: Islamic finance, Pakistan banking, classification techniques

Chapter 1

Introduction

1.1 Background

Banking system is a significant source for both firms and customers in terms of finance. In the modern time, its presence is necessary to run a financial system and ensures its development. Banking system is an important part of the global economy. For such purposes, both Islamic and conventional banks are operating simultaneously in different countries.

During the previous decade, many financial difficulties were faced by conventional banks due to financial crisis 2007-08. This crisis has disrupted financial sector as well as the real economy badly. Many banks just failed to perform during that period (Belanes et al., 2015). On the opposite side, for Islamic banks the situation was different as compared to their conventional counter parts. Islamic banks (IBs) performed better during 2007-08 financial crises. Many scholars have mentioned that this success is due to the principles of Islamic finance which strongly prohibits interest and encourage rule of sharing in profit and loss account backed by real assets (Beck et al., 2013). As a result, Islamic banking caught attention of policy makers, academics, and investors which is getting more success especially in recent years.

Globally, institutions of Islamic finance grew to a great length and more than 450 institutions that are based on Islamic principles are working. These institutions include mutual funds, insurance companies, mortgage companies, and banks. Some banks of western countries (Citigroup etc.,) have also introduced Islamic windows in

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their mainstream banking environment (Islam et al., 2014). This success of the expansion of Islamic banking and Islamic finance can be attributed to many factors. These two fundamental factors are interest-free banking, which is the core principle of Islamic finance, and increasing demand for the products which are Shariah compliant. For the diversification purposes, investors of conventional banks also seem very much interested. The industry of Islamic banking does have the ability and capacity to introduce and do innovations for products that are according to an investor's needs and fulfill their demands (Khediri et al., 2015).

Market share of the assets of Islamic banking and deposits in banking sector in Pakistan has increased to 11.4 percent and 13.2 percent, respectively, by the end of 2015. Profitability of Islamic banking industry was recorded Rs. 12.3 billion by the end of December 2015. Investment of Islamic banks has also expanded by 10.1 percent to get Rs. 439 billion by the end of 2015. As a sign of positive development, non-performing financing (NPFs) to financing of Islamic banks is lower as compared to overall sector of banking (Islamic Banking Bulletin, December 2015).

Over the passage of time, the competition in banking industry has intensified and there is a huge amount of pressure on the banks in terms of returns and profitability. To expand the business and to get better performance than conventional sector of banking, most of the financial institutions are making their way into the new markets and offering different kind of services and products to strengthen their position and boost the level of profitability. Islamic banking is expanding since 1975 and it has made a significant place in the world of finance.

The financial crises of 2007-08 were started due to the credit shocks left bad impact on the performance of conventional banks. These crises were seen as worst crisis

(financially) since the Great depression in the 1930s (Bourkhis and Nabi, 2013). Many economists reconsidered their approach and understanding towards the capitalization of economic system. The disaster of 2007-08 had taken hold of money markets and brought uncertainty and anxiety in the global economy regarding its fate. In this period, many experts of Islamic banks, officials and many other institution of finance stated that impact of these crises was limited on IBs because they implement different rules than CBs which function on Shariah's principles (Shapra, 2008).

The theories of conventional banks suppose that generally banks gain profit by getting deposits from depositors at a low rate of interest and then reselling such funds at the higher interest rate. The difference between deposit and lending rate depends on the competitive advantage and gathering of information and the risk which is possibly underwriting. Islamic banks, distinctively, perform the same task by not charging interest rate over the transactions by following the rule which is set by the law of Shariah. Profits are normally generated from the agreement which is based on PLS principle with borrowers as well as depositors. Due to such distinction Islamic banks have made their different place in the market.

At the international level, Malaysia was the first one to have two different types of banking system operating at the same time. In this way, more services and products were introduced for the customers who attracted them to a huge level and this is how IBs starting making their own place even in the presence of other conventional banks and their popularity level rose to great heights. The number of Islamic banks started growing considering the good demand by the customers. In the GCC region, Islamic banking also made noises with their performance and made a permanent place in the gulf countries. Today, IBs are functioning in many countries e.g., Pakistan, Iraq, Iran,

Kuwait, Saudi Arabia, Malaysia, Turkey, Bahrain, Qatar, Bangladesh, Egypt, United Arab Emirates, Indonesia, Sudan etc.

Islamic banking Industry has made instrumental and significant contributions. The banking sector has impacted positively the economy of many Muslim countries. Therefore, this contribution attracted and compelled many investors and bankers to see that it is not just an ordinary phenomenon. Over the passage of time, many countries like Maldives, Tanzania, Uganda, Oman etc., have launched different new projects relevant to the Islamic finance and banking. This step is boosting and encouraging the bankers and financial institutions of other countries to take step forward and offer some more products and services according to the needs and demands of the customers, followed by the jurisdiction of the Shariah.

Dynamic and stable financial industry contributes positively to the global financial system. State Bank of Pakistan (SBP) is playing an instrumental role in the promotion of Islamic banking which is in accordance to the rules of Shariah. The SBP promotes Islamic banking in three different ways: (i) Conventional banks that already exist with standalone Islamic branches (ii) Conventional banks having subsidiary of Islamic banks (iii) Full-fledged Isla mic banks (Review of Islamic Banking sector, 2003-2007). The SBP have also made a strategic plan for the further improvement in economic development by promoting Islamic banks.

The performance of Islamic banks and their competitive banks can be analyzed through different methods. Profitability, analysis of risk, role of efficiency and power of liquidity can be used to differentiate the features of banks mainly based on the Shariah's rules (Khediri et al., 2015). However, several studies empirically have shown that analysts of finance use accounting ratios in order to measure the

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weaknesses and strengths of the system of banking. Internal factors such as profitability, solvency risk, credit risk, efficiency, liquidity etc., are used in studies to determine the performance of the banking industry (Metwally, 1997; Iqbal, 2001; Olson and Zoubi, 2008; Calim and Acaravci, 2013).

1.2 Gap in the Literature

Several studies have been conducted at the international level emphasizing on the performance of banking sector e.g., Olson and Zoubi, 2008; and Khediri et al. 2015. In the context of Pakistan, the empirical literature is relatively limited. Several researchers highlighted financial risk in Islamic banking, but mainly in terms of theory. However, some of the studies (Hassan and Bashir, 2003) emphasized on the determinants of profitability of Islamic banks. Another study of Akhtar et al. (2011) focused on the aspect of profitability using only descriptive analysis. Our study adds up to the literature in terms of performance, efficiency and risk analysis in Pakistan. In our best knowledge, no study has been carried out using non-parametric and parametric techniques for differentiation of Islamic banks from conventional banks in Pakistan.

1.3 Objectives of the Study

Following are the objectives of this research:

1. To inspect whether financial ratios are useful to differentiate between conventional and Islamic banks using parametric and non-parametric methods.

2. To investigate whether Islamic banks are more profitable, capitalized, liquid, and have lower credit risk as compared to conventional banks in Pakistan using classification techniques.

1.4 Research Questions

This study includes the following research questions:

1. Are Islamic banks more profitable than conventional banks?

2. Do Islamic banks hold liquidity more than counterparts' conventional banks?

3. Are Islamic banks less efficient as compared to their competitive system of conventional banking?

4. Is level of risk less in Islamic banks than conventional banks?

1.5 Significance of the Study

Banking system is an old phenomenon in the world but like every other sector, this sector also evolved over the years. Many evolutions and introduction of the new banking system that operates on Shariah's methods helped the economies in various possible ways. Over the period of time, Islamic banking made its impact through various successful events and it helped the institutions of finance in a very significant ways. Islamic banking slowly and gradually emerged on the international arena and made a huge instrumental effect even when conventional banks failed to overcome the crisis.

Governments, investors, different policy makers, and academic areas are showing high level of interest in IBs so it's a huge step forward for this sector of banking. If said differently, Islamic banks proved to be the alternatives in difficult times when things went drastically wrong for the CBs. IBs can be proved to be a permanent substitute when it comes to CBs for investors and their greater performance cannot be neglected at any cost. The purpose of this research is to encourage the policy makers

and government to get more involved in the system where customers have more reliance to get even better outcome.

This study can be beneficial for the further growth of the banking industry (Islamic) in Pakistan on the basis of religious preferences. Being a Muslim country, customers do have preference for their sentiments which are religious and for the system which is accordingly to the norms of Shariah. Hence, this study can a noteworthy endeavor for the ruling government to take the required and most necessary steps for the positive growth of banking which is based on rules of Shariah in Pakistan. This research can provide guidance for the economy because the sector of banking is vital for the stability and the growth of economy.

This research will also be a meaningful contribution in the field of literature as well of the banking sector in Pakistan. It can provide the required information of the banking system and also about the factors which need concentration after the financial crisis (2007-08) for the improvement especially in Islamic banking. It will also help the investors and bankers to control and improve the negative variables which are harming the performance of banking sector. So, Islamic banking will get the further push in the positive direction.

1.6 Scheme of the Study

This chapter consists of introduction, gap in the literature, objectives, research questions and significance of the study. Chapter 2 covers Islamic banking in Pakistan and its recent trends while Chapter 3 presents literature review and hypothesis. Chapter 4 discusses methodology, estimation techniques, data, and variable description. Chapter 5 presents empirical framework. Conclusion, policy implications and limitation of the study are presented in Chapter 6.

Chapter 2

Trends of Islamic Finance

2.1 Islamic Banking Features

In the last three decades, many countries including both Muslim and non-Muslim countries have shown so much interest in Islamic banking due to their noticeable growth. There are countries like Sudan, and Iran where whole banking system is Islamic. There are other countries where conventional banks are working but they have opened Islamic windows and some of the banks who are mainly working on principle of Islamic finance are also there (in case of Pakistan). In the current scenario, there is concentration of Islamic banks in South Asia and Middle East. But the remarkable progress of Islamic banks is not limited in the Muslim majority areas anymore. It has gone very far now. There are Shariah compliant products which are also available in the offices of the United States as well as in Europe. These steps of the progress of Islamic banking is worthy of huge importance.

Islamic finance is different from conventional banking. And Islamic finance is based on some principles which make it features unique. These features of Islamic finance are based on Islamic law which provides guidance in every walk of life. Examples of these features are given below;

1. There is prohibition of interest and riba (which is basically an additional amount or interest on principle amount) is a very instrumental and prominent feature of Islamic banking/finance.

2. In Islamic finance, PLS principle which is sharing of profit and loss is one of the significant features. Lenders and borrowers do not transfer the risk on one another

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rather they share the profits and losses as well. There is a sharing of business risk. It differs from conventional banking where rate of return is already fixed even before the execution of transactions.

3. There is a principle in Islamic finance which emphasizes that transaction should be backed by real assets.

4. There are many things related to business which are prohibited in terms of business in Islam and they have no compliance with Islamic law. Prohibited activities related to business include products related to pork, alcoholic products, gambling (lotteries online gambling) and entertainment (strip clubs etc.).

Islamic banking business is spreading in different ways. Islamic banks offer different kind of products and they can be based on the modes of financing of Islamic banks, for example, Mudarbarah, Musharakah (joint venture or participation according to their share), Istisna (commissioned manufacture), Ijara (lease) etc. In Islamic finance, there is need of Shariah committee to ensure that all Islamic products are in compliance with Islamic finance. The people of Shariah committee need to have an extensive knowledge about Islamic jurisprudence and law about Islamic transactions and they should have qualifications which are needed for their post. Well accepted and people with good reputation should be appointed for such position for the implications of Islamic laws.

2.2 Islamic Banking in Pakistan

Banking in Pakistan started with the partition in 1947 (Ahmad, 2010). There were 45 scheduled banks and related to these banks there were 631 branches. 487 branches were located in West Pakistan and remaining offices (114) were located in East

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Pakistan. Some of the foreign banks were also operating in Pakistan but their role was very much limited. But the situation got more critical when bankers of India started immigration and moved their business in India. There was a drastic decrease in the offices of East and West Pakistan. For West Pakistan, number of offices fell drastically to 81 and for East Pakistan; they fell down to 69 by June 30th, 1951. Later on, some of the Muslims shifted their business of Habib Bank and Australian Bank shifted in Pakistan. At the time of independence, Pakistan did not have the central bank and in the initial period Habib Bank started its operation in 1941, filled in the gap and then on 1948, the State Bank of Pakistan (SBP) was inaugurated. At that time, domestic banks also did not have much role to play. After that State Bank made policies and paid attention to the new channels of commercial banking. As a result, National Bank, Habib Bank and Allied Bank started their operations with the help and guidance from the central bank.

The growth of commercial banking in Pakistan was very much visible until 1974. Then prime minister of that era Zulfiqar Ali Bhutto implemented the policy of nationalization and thirty banks came under the control of government of Pakistan. This was supposed to improve the performance of banking sector but long term gains were not fruitful as much as they were expected. But over the time, financial sector started to serve businesses of large corporate and government.

Furthermore, significant efforts were made in the 80s to convert conventional banking into Islamic banking. Banking Companies Ordinance (1962) was amended to certain level in order to accommodate interest free transactions and the banking industry was given a particular timeline in order to apply Islamic principles into business transactions. Later in 90s, this exercise was challenged in Federal Shariah Court because un-Islamic ways were adopted in many products. Then in the early nineties,

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two of the major banks were privatized which included Muslim Commercial Bank and Allied Bank and process of privatization kept going on.

In Pakistan, Meezan bank got the very first license of Islamic banking in 2002 and officially became the first Islamic bank of Pakistan. There are problems and hurdles in a way of Islamic banking but despite of all the hardships, banking based on Islamic finance is not slowing down but rather moving forward. The licenses are given to five Islamic banks (full-fledged) and to over fourteen Islamic windows by SBP (State bank of Pakistan) which is also counted a process to more growth. In the current period, the speed of growth is double digit and quite praise-worthy. Pakistan is enjoying double digit growth in median Islamic banking which is 10% in years 2010-14, according to the Ernst and Young report 2016.

The SBP recommended and applied some policies for the enhancement of this sector. The authorities of government are also nurturing this sector. The SBP made strategic plan of 5-years and banking sector (participation) showed more improvement than CBs. Islamic banks are flourishing and customers' encouragement also pushes this business in an upward way. This progress is enough indication that Islamic banks have brighter future in Pakistan and the growth rate of this sector can be considered quite successful.

Decade	Efforts
1970s	The start of some efforts brought no perceptible results.
1980s	Comprehensive initiatives and bold strategies were adopted. Pakistan got spot amongst the first three countries for starting for starting banking which was not based interest. Different Legislations (Negotiable Instrument Act (1882), Companies ordinance (1984),

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	State Bank Act etc., were analyzed to form the system following Islamic rules. An instrument TFC (Term Finance Certificate) which was not based on interest was introduced for business purposes. In CBs, counters which were interest free were inaugurated on 1st July, 1981. Furthermore, for the needs of working capital and the industry of trade, principles of Musharakah were introduced on 1st July, 1982. The rule of PLS was adopted in CBs on 1st April, 1985. Court of Federal Shariat was established in Pakistan in the era of 80s.
1990s	Following the ruling of Shariat court, There was an announcement about the transactions which involve interest in the sector of banks would not have any kind of effect by 30th June, 2001.
2000s onward	For the purpose of transformation of the financial system, commission was announced in SBP. Task of the elimination of interest was assigned from the financial transactions of government. Nevertheless, IBs and CBs are still working with parallel strength.

2.3 Recent Trends of Islamic Finance

The industry of Islamic finance extended rapidly during the previous decade and the annual growth rate was 10% to 12%. According to the recent analysis, financial assets which are Shariah-compliant are estimated roughly around US 2 trillion dollars. They cover banking institutions, Takaful (insurance), money market and capital market. In most of the Muslim countries, assets of Islamic banking are growing faster than the assets of conventional banks. Many non-Muslim countries like South Africa, United Kingdom, Hong Kong, and Luxemburg have also shown greater interest in

Islamic finance. Islamic banking is heading to the direction of growth. Many evidences from the financial markets show that Islamic finance has a good potential to address the extreme problems and challenges of poverty (stated in report of World Bank, 2015).

Recently, in Turkey and Egypt different banking operations are performed where government got the help of Bank Group to design frameworks which are according to the Shariah in order to expand the funding or financing for enterprises which are of medium and small scale. General Council IBs and FIs (Financial institutions) signed a MoU for the improvement, development and progress of Islamic finance at the global level to even expand Islamic finance worldwide including the countries which are non-Muslim during July 2015. World Bank is making efforts to promote Islamic banking and raise the awareness about the instrument which are Shariah-complaint despite many challenges; these efforts are not slowing down.

The industry of Islamic banking got the most expansion in the GCC's region followed by countries like Sudan, Iran, and Malaysia. Furthermore, banks of Pakistan also moving forward and filling the gap of the growth of banking related and following the Islamic principles. The recent growth shows that it is an indicator about the expansion of the business of Islamic banks. For Islamic banking, demand for services and products for is rapidly increasing. Now, this business also has extended to consumer finance, retail investments, mutual funds, commercial banking, insurance, project financing, public offerings etc. Another feature in cap is that internationally Sukuks of Pakistan got the recognition in Kuala Lumpur as the "Deal-of-the-Year". (SBP Report, 2015).

Ernst & Young (2013) in their IB's competitiveness report worldwide has shown the rate of growth of assets of Islamic banks. They stated that assets grew 17% (average rate of growth) between the years 2008-2012. The competitive report of Ernst and Young (2016) reported that assets of commercial banking and Islamic retail continue their growth at 16% in the years 2014-2015. Participation banks have share of approximately 34% in the Gulf countries. The report stated that QISMUT countries (Qatar; Indonesia; Saudi Arabia; Malaysia; UAE; Turkey) are holding 80% assets of Islamic banking.

Pakistan, Jordan, Bangladesh, Turkey and Jordan are witnessing significant growth. The rate of growth in these countries shows improvement by the strategies of regulatory bodies and government agencies. The central bank of Pakistan aims to increase the share of domestic market of Islamic banking to 20% by 2018, from 9.8% in 2014. In 2014, the share of participation market of Turkey is 5.7% and government aims to increase it to 15% by 2023. Jordan and Bahrain have domestic share of IBs 11.7% and 12.7% by 2014 respectively.

Chapter 3

Literature Review

3.1 Introduction

Many empirical studies have been carried out in order to compare conventional banks and emerging Islamic banks with the aim to find the fundamental differences in their feature e.g., Iqbal (2001), Naqvi (1982), Rosly and Bakar (2003), Hassan and Bashir (2003), Cihak and Hesse (2008), and Ariss (2010). The literature also finds the impact of Islamic banking during several tough periods when banking of conventional sector could not deliver the expected outcomes. While on different note, in the turmoil period Islamic banks by following their principle of prohibition of interest rate and PLS made their mark and competed with conventional banks. Several studies have highlighted the profitability aspect of the banking sector. However, the performance is not only confined to profitability. Therefore, different researches e.g., Bashir (1983), Arrif (1998), Rosly and Bakar (2003), Olson and Zoubi (2008), Johnes et al. (2009), Venkatesh (2010), Muda et al. (2013) have shed light on the risks, liquidity, and efficiency in both banking types. Some other studies have highlighted the factors or features which play important role for the better execution of the banking sector.

3.2 Growth and Emergence of Islamic Banks

Khan (1987) explained in his study that conventional banks failed during financial crisis. Islamic banks strengthen the position of the banking system. Their study suggested that failure could also be removed by following the theoretical model of IBs. Conventional banks on other side could not live up to the expectations demanded by them. Investment funds were usually separated from the deposit funds in Islamic

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banking and 100% reserve was applied on the latter. On the other side, moderate views were given by Shamshad Akhar and he claimed that IBs showed stability and resilience at the time of crisis but they were not totally immune but somehow damage was minor against the huge losses of conventional banks.

Islamic banking is helpful in various ways, they provide stability and set the level of performances really high Turen (1995). BIB (Islamic Bank of Bahrain) was used in that study as an example. That study was conducted by using financial ratios and result indicated that BIB provided or offered return which is basically higher than conventional banks. Naqvi (1982) and Qureshi (1984) claimed in their studies that financing which is based on equity can maximize the exposure of IBs to risk. But on the other hand Islamic scholars are of the opinion that removal of interest rate can be very beneficial for the stability of Islamic banking in the long run. Pervez (1990), Zarqa (1983), Kahf (1982) and Chapra (1985) also were of the opinion that principle of sharing profit and loss is fruitful for stability of this industry in the long run.

The study of Bashir (1999) compared bank performances in Sudan using the data from annual reports of banks. The performance of Islamic banks was attributed to the size of the bank, the larger the size of the banks, the more profit they generate in Sudan. However for leverage, higher size of the bank also had higher level of leverage and there is a decrease in operating risks. In short, performance of the banks can be affected by the scale of the functions and operations. Zeitun (2012) argued in his study which was performed in the region of GCC carrying the data of the period 2002 to 2009 that size of the institutions matters only for Islamic banks not for CBs.

Islamic institutions were established in numerous parts of the world and they not only covered Islamic countries but also some western countries Iqbal (2001). The

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expansion of these institutions of Islamic finance is gradual but praiseworthy. Countries like Pakistan, Iran, Sudan etc., have banking system which was conventional but later these countries tried to convert their banking system according to the principles and rules of Shariah. Conventional banks have launched Islamic windows which supported the spirit and faith of the people of Muslim countries. Western countries on the other hand found it intrigued and took interest in the business of Islamic banks due to their progress. The evaluation results of IBs are satisfactory. The results state that Islamic banks outperformed banks functioning conventionally but the process involves variation (Iqbal, 2001).

Yudistira (2003) critically highlighted the level of efficiency in Islamic banks. That study particularly analyzed the efficiency of IBs. The level of efficiency was observed during different periods. Yudistira (2003) analyzed the time period (1997-2000) by using non-parametric approaches for the measurement of efficiency. The empirical results showed that the efficiency was present in IBs during certain years. However, in years-wise study, it was statistically proved that the year 2000 was the most efficient year as compared to the rest. Some periods also witnessed inefficiency mainly from year 1998 to 1999. But these were the years of great turmoil and global economy was hit by it. The inefficiency of year 1998 was attributed to the technical inefficiency and not scales inefficiency. And after the period of tough survival, IBs performed better. Overall, the inefficiency level is small (10% across 18 IBs), that was considerate as compared to CBs.

Rosly and Bakar (2003) examined the profitability and efficiency levels across the Islamic. In their study, IBs achieved more ROA than the other mainstream banks. But considering the fact that profitability is higher does not translate the efficiency in higher terms too, but in contrast IBs were found inefficient to some extent. Erol et al.

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(2014) selected the banks of Turkey for their empirical research. Turkey is considered a model in banking that is interest free for the world. And performance of IBs is compared against CBs there for the years 2001-09 by using technique logistic regression. Islamic banks are termed as participation banks and they are better in holding liquidity, asset quality and earnings with respect to performance.

While comparing flexibility of banks, Hassan and Bashir (2003) described that Islamic banks have the more flexibility of becoming or gaining the level of shareholder as well as firm's creditor going by their charter. Services that are based on investment banking are also beneficial and have advantage for Islamic banks. So, in this way, Islamic banks are gaining popularity and growth of local economies is satisfactory and even at the international level they expansion is significant and satisfactory. Conventional banks were affected from the crisis at big scale whereas IBs were insulated financial crisis. (Yilmaz, 2009; Willison, 2009). So, after this success, functions of Islamic finance had a great appeal for the western world's investors and now tables have turned on the other side.

Despite of the fact that the state of Bahrain is small, it is very instrumental financial centre in the region of gulf. Interest free banks and interest based banks were examined for the period 1991-2001 (post period of Gulf war) in the study of Samad (2004). There are no big significant differences in terms of profitability of the banks and liquidity. But in terms of credit performance of the banking sector, differences were found. The empirical results stated that IBs were superior to the conventional banks in terms of the credit performance by applying t-test. There was a less credit risk exposure for IBs. On the other hand, conventional banks were exposed to that kind of risk. In spite of the fact that IBs were newcomers, they quite made their presence felt in the arena of banking sector.

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Iqbal and Molyneux (2005) examined the return on deposits and their sustainability in CBs and IBs. In case of Malaysia, authorities were aiming to run Islamic banks along with conventional banks and as a result the competition was intensified between them. But the competition got more intense after the launch of IBS (i.e., Islamic Banking Scheme) and this step was initiated by the Malaysian government which later helped in the product's growth of Islamic banking. This further lead to the expansion of Islamic products with the participation of conventional banks as well. Islamic banks had 10.20% of total deposits of Malaysia by the end of year 2002. The effect of this immense growth was seen in the later years as well.

Dusuki and Abdullah (2007) studied the success of IBs through different ways. They elaborated the role of the good reputation and quality of services that is offered by Islamic banks to their customers in Malaysia. By using the technique of questionnaires, customers' views about the service quality and their priority for products designed using the rules of Islamic finance. But other factors are also likely to be considered for the further success of IBs like social responsibility, price of product etc. Wilson (1995) mentioned in his study that with the rate of growth Islamic banking is moving forward, it is not only about the religious principles but also now it is a vast business which is spreading throughout the world but opening doors for many others.

The expansion of Islamic banks in conventional world was a vital step in the growth of Islamic finance, the study of Sole (2007) highlighted this aspect. Despite the growth of banking related to Islamic principles to many areas and regions of the world, there are still many authorities who are unable to implement or introduce the functionality principles of Islamic banks into the world of conventional banks. This

paper highlighted those challenges which are coming into the way of Islamic finance. There are insufficient instruments which can be used for the hedging purposes in banks pursue the Islamic finance's principles. So, this becomes difficult task for the authorities to monitor such risks in the daily basis. There are hurdles in a way but still Islamic economics is overcoming such problems and many conventional banks in the later years have opened Islamic windows in the western world as well.

Hasan and Zaher (2008) mentioned the growth of Islamic finance and how western world started adopting the methods and techniques of Islamic economics. This research emphasized that challenges should be addresses in Islamic finance for the further growth. Growth of Islamic banks mainly depends on the quality of their services and innovative products which intrigued the customer to remain loyal to such sector and adoption of new technologies becomes vital for such aspect. Islamic finance has a capability to offer the alternative products at the level of microfinance. Islamic banks are very instrumental for the development and progress of economic system not only in Muslim countries but also in western countries. Islamic banks have higher value of asset quality and their intermediation ratio is also high in terms of their comparison with the banks that are conventional in nature (Beck, Merrouche, and Kunt 2013). Islamic banks attract the attention of investors during the financial crisis. Islamic banks were not affected like the conventional banks during the period of crisis. Conventional banks failed the expectations whereas Islamic banks filled that gap. Many products which were Shariah compliant got the attention of many people who had strong religious beliefs. The segment of loyal customers with strong religious beliefs really helped in the growth and expansion of Islamic banking.

Cihak and Hesse (2008) described the strength of IBs and CBs in various ways by reviewing eighteen banking systems. The empirical findings showed that IBs were

stronger as compared to small banks that were operating conventionally. However, large CBs had an edge over the small Islamic banks. In terms of performance, small IBs are ahead of large IBs, that was a major challenge and concern of management of credit risk in Islamic banks. The research study of Samad and Hassan (1999) evaluated the performance of IB in Malayasia. They analyzed the data of BIMB (Bank-Islam-Malaysia-Berhad) with respect to risk, solvency, liquidity and profitability for the time frame of 1984-1997. The ratios were used to determine the results for evaluation by applying t-test. The results showed that profitability wise Islamic banks did better and made their existence felt. Some of the higher returns were even attributed to the risk factor, but in comparison to the other conventional banks, this Islamic bank in terms of performance lagged behind. This bank empirically said to be a less risky but it was more solvent.

Haque et al. (2009) shed light on the importance of the banking based on the set and rules of Islamic finance. Islamic banks eventually started making waves and got the required attention of the customers for its long run. The products of high quality were offered by IBs. Despite of the fact that competition was high, Islamic banks were expected to perform better in terms of services. They had to excel in all areas to keep moving forward and by following the principles set by Shariah. This study reflected major factors and points which showed the level of the satisfaction of the customers and their perception. The combination of all these factors played a role in the positive mindset of customers towards IBs. The study indicated that social and religious values also have significant effect on customers. And by highlighting such issues more, Islamic bank can go at far places in terms of their success and performance.

By analyzing the growth factor, Ariss (2010) highlighted the competitive nature and environment of Islamic and conventional banks. The profitability on both

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sides was also investigated. This research study was performed for the period (2000-06) by extracting the bank level data from thirteen countries. This study empirically highlighted the results that in terms of capitalization, conventional banks are lagging behind and IBs are ahead of CBs. Financing activities in IBs involve greater amount of asset than CBs. But on the other side, some measures indicated that CBs are more competitive than IBs. Findings of this study also stated the concern of the banks of west and their involvement in the Islamic banking. The explanation revolved around the performance of the GCC region which is making noises everywhere around the world with their good performance in tough time when conventional banks couldn't perform better than them. So, investors are more interested to take part in Islamic banking.

Boumediene (2010) further highlighted the importance of Islamic banking and its importance in the future period. Credit risk exists in IBs and CBs, but the level of presence differs. Investments of Islamic banks involve the principle of PLS. This gives strong and powerful securitization to the Islamic banks. The results empirically showed that Islamic banks involved less risk of credit as compared to conventional peers. Nienhaus(1983) in his study stated that during the eras of 60s and 70s, IBs were operated on PLS principle. The advocate of that concept mentioned the interest free Islamic banking was superior to interest based banking. For the purpose of increase in profitability, IBs faced competition from CBs and by making business strategics following Shariah rules. They had given tough competition to conventional banks.

The growth and satisfaction level of the products of IBs among customers in Pakistan was examined by Ahmad, Rehman, and Saif (2010). According to the results, majority had a satisfying view about the products of the new growing sector. Findings of their study also declared that Islamic banking have a positive and good

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relationship between customer satisfaction and quality of service compare to CBs which is a very positive and diversifying change for the banking industry in Pakistan. People are showing trust and acknowledging the offers of IBs because they are mirror of their religious faith which is a big factor in the contribution and growth of IBs.

Kaouther et al. (2011) analyzed the characteristics of Islamic and conventionally operated banks. The profitability and leverage of conventional and Islamic banks were analyzed by three different methods including t-test, discriminant analysis and regression (logistic regression). The study performed over the period 2004-08. These aspects of banking sector were observed by the ratios. The researchers pointed out many differences empirically between CBs and IBs on the leverage and profitability front. This research mainly focused on structural side of the banks. This research proved that ratios of leverage as well as profitability used in this study are helpful and termed as good predictors which can are influential in order to discriminate between the types of banks mentioned earlier. But in this period IBs are said to be less profitable because the industry of IBs was still new.

Jaffar and Manarvi (2011) by using CAMEL technique compared different areas of banks in Pakistan. They compared features of IBs which include quality of assets, quality of management, the position of liquidity and earning position. These features are differentiated from the banks operating conventionally using 5 Islamic and 5 conventional banks to measure the performance from the year 2005 to 2009. The results were more inclined towards Islamic banks in terms of the position of liquidity and adequate capital. However conventional banks were capable of more earnings and they had better quality of management. These two types were competing with each other and tried to outdo the performance of each other by playing at their strong point and minimize their weaknesses.

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Structural differences were analyzed in the study of Kaouther et al. (2011) regarding Islamic and banks functioning conventionally. They identified that bank following Islamic economics' principles mainly have the reliance on equity, on the opposite side, conventional banks have mainly rely on borrowing in financing. As a result IBs have more tendencies to absorb the shocks while comparing to mainstream banks. Jaffar and Manarvi (2011) used CAMEL approach in their comparative study. The results depicted that Islamic banks have upper hand in liquidity and also in adequate capital, Islamic banks by following the principles like sharing of loss and profit and not using interest rate are heading towards right direction and are also emerging strong as each passing day.

Around the globe, many countries are embarking on the banking system that is dual i.e., Islamic and conventional (Alam, 2012). Over the years, IBs have established themselves remarkably and are now standing as the alternative for banks that are operating conventionally due to their well improved and good performance. The research study of Alam (2012) particularly analyzed the risk factors and also efficiency of the banks markets that are emerging with the passing time. Alam (2012) compared 165 banks (commercial) with seventy Islamic banks from the emerging market covering a decade of 2000-2010. The results stated that efficiency related to cost is higher for CBs than the other banking system (Islamic). In spited of the fact that Islamic banks have lower level of efficiency, they have lower chances of risk.

Hussain and Ajmi (2012) investigated the process of risk management of different banks that are operating in Bahrain. Banks shared their views through the process of questionnaires in order to examine the practices of risk management, and if they are associated directly or significantly with bank's type (CB or IB). This study indicated that banks have clear views about the about the identification of the risks

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and also for the management of risk. But Islamic and conventional banking sector have a different way to handle such risks. The results pointed out that Islamic banks have a higher level of risks significantly than other banks that are executing conventionally. Moreover, risk of liquidity, country, operational are also tend to be higher in IBs than CBs.

Another comparison was made in the study of Khan et al. (2013). They compared IBs' performance across different countries. They used the data spanning over years 2006-2011. Their research mainly focused on solvency and riskiness system of Islamic banks of Pakistan and Malaysia. The findings showed stated that Malaysian banks attracted more depositors as compared to the banks of Pakistan therefore they were exposed more to default risk. IBs in Pakistan turned out to be more solvent but less risky. Haron (1996) stated that principle of loss and profit sharing in IBs was fruitful for depositors and for the progress of the banks. Hence, as a result more depositors were attracted to the system of Islamic banks.

Beck et al. (2013) analyzed the functioning of Islamic banks based on the level of their profitability. Islamic banks have more assets' allocation as compared to their opponents so this feature is helpful for differentiation. After the launch of IBs based on the principles and rules of Islamic finance, both categories were facing the pressure to perform better and outdo each other. The competitive environment had intensified the pressure on both sides. Different techniques were introduced which included spectrum of different products. The findings proved Islamic banking had significant role to play in the growth of banking sector. Their study also focused on the fact which IBs were getting attention from the western countries due to their significant results and positive contribution.

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3.3 Comparison by Employing Financial Ratios

Bashir (1983) in his research highlighted the fundamental principles which involved the interest rate and how strongly it is prohibited in Islamic finance. Despite the exclusion of interest rate in this kind of banking system the growth was praiseworthy. And profitability is also going upward. Metwally (1997) described those different ratios which measure liquidity, credit risk and leverage are helpful in differentiating the performance of conventional and Islamic banks but results about profitability between of both types of banks are not providing significantly difference.

Islamic Banking cannot be neglected considering its growth which is faster and praiseworthy. It is not a temporary phenomenon but things are heading in the right direction. Positive growth is also a proof that there will be further expansion in the future. (Arrif, 1998). Rosly and Bakar (2003) showed in his research that profitability of Islamic banks was greater than mainstream conventional banks during the period (1996-1999) in Malaysia. On the differentiation aspect, empirical results show that financial ratios like ratio of profitability, indicators of asset quality, efficiency and cash are very cooperative in the region of GCC. Ali and Karim (1989) said that IBs collected funds from depositors than shareholders in the period of expansion of economy.

The research study of Bashir (2001) shed light on the performance measures in IBs and characteristics of banks. This research showed that profitability is directly linked to the capital and loan ratios. These ratios provided brighter picture empirically in order to explain the performance of IBs. Higher the ratios of loans to asset and leverage, higher can be the profits in future. Kamaruddin and Mohammad (2013) stated in their study that IBs in Malaysia were making good progress since the launch of very first Islamic Bank. The trend of progress for Islamic banks is upward, annual

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growth (average) was reported 48.5% for the period 2006-09 with respect to assets. The sector of Islamic banking registered strong growth even in the later years. The results of this study proved that the business of IBs is profitable in Malaysia. But in terms of efficiency, conventional banks are leading and ahead of Islamic banks (Rosly and Bakar, 2003).

Olson and Zoubi (2008) differentiated Islamic banks from conventional banks based on their financial characteristics. There are many differences between both types of banks practically and theoretically. Islamic banks strictly avoid interest rate which is a vital source of earning for conventional banks. IBs work on the principle of profit-risk sharing and they differ from conventional banks in this line of rule as well. This research also shows that accounting ratios which include profitability ratios (PM, ROE, ROA), efficiency ratios (OEA), indicators of asset quality (PEA, APL), liquidity ratios (CTD, CTA) and risk ratios (DTA, ETA) can be instrumental to differentiate the level of performance and risk analysis between conventional and Islamic banks. This research reveals that on the scale of efficiency, conventional banks are topping over Islamic banks whereas in the area of profitability Islamic banks are ahead of conventional banks.

Bader et al. (2008) covered the period 1990-2005 for their study to compare profit efficiency, cost and revenue using 37 banks which were conventional and 43 banks which were Islamic in about 21 countries. The findings of this study show that on average Islamic banks are cost efficient more than their opponents. Parashar and Venkatesh (2010) in their study analyzed the performance of IBs and CBs not only in terms of profitability but also considered capital ratio, leverage and liquidity. It is generally stated that IBs are safer options for customers than CBs. Financing which is asset backed supports this argument. It is infamous fact that IBs suffered hugely

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during crisis (2007-08) but IBs also suffered in terms of ratio of capital, average equity's return (ROE) and leverage as well. And CBs lacked behind in terms of liquidity and average asset's return (ROA). Their study was comprised for over four years (2006-09) covering the region of GCC.

Sufian and Noor (2009) explored the area of banking sector by following the rules of Islamic finance and comparing the performance in the region of MENA. Efficiency is analyzed by using Analysis of data development technique in approximately 16 countries from the time period 2001-2006. Findings indicate that Islamic banks are not much efficient in exploiting and exploring the resources to the fullest. Results showed that those banks are more efficient that have small ratio of NPLs and they have little market share compare to enormous market shares of other banks. This study found out that more efficient are the banks, more the rise in their level profitability. Hence, they have significantly positive relationship.

Johnes et al. (2009) performed a research using ratios of finance to find the results about the banking sector of GCC region during the period (2004-2007). The results indicated that Islamic banks generate more profit and revenue than conventional banks and have low cost efficiency. The level of efficiency is certainly higher in conventional peers than IBs. Due to their good performance, the sector of Islamic banks in the GCC has steady growth and greater opportunities for Islamic banks. But still IBs have grabbed the attention of investors worldwide due to their performance in the financial crisis that focuses on transparency and avoidance of unwanted risk (Willson, 2009). Kasman and Carvallo (2005) highlighted the important point in their study that due to the usage of high technology, competitive environment has been intensified. This pressure proved to be a helpful procedure for the growth of banking industry.

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Badreldin (2009) also emphasized on the modifications which are still needed for the banks backed by Islamic finance. This research suggested Islamic finance needs proper tools for proper measurement and these banks' performance should be evaluated time after time after taking required measurement for the betterment of the banking system. For such purpose, accounting ratios are very significant for comparison of the banks. This research then analyzed the performance by using the ratios of profitability like ROE and found that bank's financial health can be viewed by the usage of financial ratios for reliability and accuracy.

Wasiuzzaman and Tarmizi (2010) emphasized on the indicators which mostly impact and change the performance of the banks. They got the data from approximately 16 banks. Indicators like capital, operational efficiency, asset's quality, liquidity etc., affect the profitability of IBs in Malaysia, these result were found out by using the OLS regression method using accounting ratios. It is visible through the research that profits generated by IBs are related positively to liquidity. While they inverse relation with capital and quality of asset. This study did not really related size of the bank with the profitability significantly.

Loghod (2010) threw light on the comparison of IBs and CBs in the region of Gulf countries. In that region, dual (Islamic and conventional) banking system runs simultaneously. This paper concentrated on comparing the financial performance of both types of banking system covering the time period 2000-05. The results are calculated by accounting ratios using the technique of Logit model. This research profitability wise could not find out any significant result or difference. But found that IBs have less or little exposure to the risk of liquidity. The reliance of conventional banks is mainly on liabilities that are external compare to IBs. As system of Islamic

banking is growing in the region of Gulf countries, clients and customers are more inclined to get the products which are offered to them by IBs.

The study of Akhtar et al. (2011) was performed in Bangladesh for the purpose of comparing performance of banking institutions by using accounting ratios. They retrieved data from annual reports of banks for the period (2009-2011) for their research. Profitability through ratios like ROE and ROA are investigated for IBs and CBs, in spite of the fact that Bangladesh is Islamic country but still the business of these banks in their initial phases and progress is under way. They provided the results that Islamic banks are not more profitable than conventional banks, because still there is not much awareness for the Shariah compliant services and product in the country but still Islamic banks are catching up the pace. Rehman (2012) argued that conventional banks are more profitable because they invest without any restriction whereas Islam prohibits certain businesses and Islamic banking operated accordingly.

Siraj and Pillai (2012) examined the banking sector by using six different performance indicators in the Gulf countries for the period 2005 to 2010 using 6 IBs and 6 CBs. Rather than differences, this study also focused on finding the similarities in growth of the dual systems of banking (i.e., conventional as well as Islamic banks). These indicators were operating expenses, total equity, operating income, assets and profit. Analysis of this study showed that IBs are richer in equity than CBs. Banks executing conventionally registered growth in several periods but during the crisis period, the indicators of CBs were affected to great extent. Empirical results found many similarities and also dissimilarities while making the comparison. IBs reported ROA at higher terms but it does not follow the similar pattern between CBs and IBs while on the different side, ROE finds the pattern which is similar. Also operating income of conventional banks slowed down while IBs continued moving forward.

Muda et al. (2013) carried out a study for the comparison of the determinants of Islamic banks (domestic and banks that are foreign but operating in Malaysia) and the research was conducted from the period 2007-10. And results of this study showed that domestically IBs are ahead in profitability. Akhtar, Ali, and Sadaqat (2011) conducted a research to find out that which factors are specifically affect the performance of IBs over the period 2006-09 in Pakistan. This study also found that NPL ratio has also negative effect with profitability ratios (ROE and ROA). Another study (Shaffer and Sacket, 2006) declared with their research experiment that Profitability measure which is ROA is in a negative relationship with NPL ratio.

Zehri and Herck (2013) proved in their empirical work that IBs and CBs can be differentiated on the basis of financial ratios. In other words, their performance can be determined by accounting ratios and they provide the brighter picture how banks performed during different periods with the help of logistic model despite of the fact that Islamic banks follow the different set of rules. Syed and Ghazi (2009) observed that IBs mainly confronted crisis according to the management of risk. Capital ratios normally are very instrumental for measuring the level of riskiness. Later in their study, it was stated that less riskiness is involved in IBs since they follow the rule of PLS, that harmonizes the bond between debtor and creditor because both have interest in the soundness of welfare of investment project because it is directly concerned with the project's success.

Bourkhis and Nabi (2013) empirically found the effects of financial crisis of 2007-08 on IBs and conventional banks' soundness. This study performed empirical research by applying two methods which include parametric methods and also non-parametric methods to see the significant results. In this study, 34 banks that were Islamic and 34 that were conventional were selected from about 16 countries.

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Financial crisis were reviewed or studied in the light of profitability, quality of asset, liquidity, efficiency and capitalization. According to the results, both types of banks couldn't be differentiated in terms of nonperforming loans and cash ratios which are used for liquidity. This study also found out that during the crisis 2007-08, Islamic banks literally outperformed conventional banks in terms of indicator which is ROA (return to asset) in the MENA region. And this different could be the result of the strategies which were used by the banks during those crises and due to better efficiency's cost of Islamic banks during 2009.

Another comparison was made over the period (2003-2010) in the study of Khediri et al. (2015). They provided different aspects about profitability, efficiency and risks in the banking sector of both types. Financial crisis provide a better view about the financial situation of the banks as well. During those crises (2007-08), Islamic banks maintained their momentum which was lacked by the conventional banks. The rate of profitability, risks, and also level of efficiency differs in Islamic banks compare to conventional banks. For the purpose of comparison, the study used financial ratios in order to find significant results for comparing the performances of banks and risk analysis also provide the better and clear picture of this financial sector. This research states that banks in the GCC region are better in terms of capitalization and profitability.

3.4 Summary

Islamic finance is in practice mainly in Muslim world but after the proving the ever lasting impact, the methods of this banking sector became the centre of attention for western world too but conventional banks could not do better or maintain their performance. For the objective of comparison mostly researchers considered and

adopted the process of financial ratios. These ratios by the help of existing literature are significant for the different between CBs and IBs. Above mentioned studies have collected the mixed response in terms of performance of the banking sector. Most of the countries have positive trend of the profitability but some countries around the world are still lacking behind due to the infancy factor of Islamic finance there. In most of the studies, it is prominently mentioned that banks backed by Islamic economics' principles hold higher level of liquidity and but mostly inefficiency was reported in Islamic banks. Whereas, conventional banks proved to be more efficient and more risky, but the different note, Islamic banks reported less riskiness. Islamic banks also got the trust of Muslim world for launching their services and products based on Shariah and Western world also following their path by adopting such techniques.

Chapter 4

Data and Methodology

4.1 Introduction

For the purpose of accessing the performance of financial institutions, researchers normally rely on the process of using ratios of finance (Olson and Zoubi, 2008). Usage of financial ratios can capture many fundamental aspects of IBs and CB's features as well (Khediri et al., 2015). Conventional banks usually have followed financial-accounting rules, established by board of International Accounting Standards (Hussain et al., 2002). Islamic banks follow financial-accounting rules set by The Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI).

4.2 Parametric and Non-Parametric Techniques

For the discrimination of Islamic banks from banks operating conventionally, parametric methods which include logistic regression and linear discriminant analysis and non-parametric methods which include neural network are used. Based on the empirical studies (Khediri et al., 2015), dummy variable is a dependent variable which assigns 1 value for Islamic banks and conventional banks get the value 0. These methods are very useful for assigning values to two different groups. These methods differ from each other, for instance, 1st two techniques (LDA and logit model) use variables in the model which are statistically significant. While, neural model use the variables in hierarchical manner based on their importance.

4.2.1 Parametric Methods

There are many multivariate statistical techniques which analyze the data and variables with categorical outcomes. Logit model and Linear-discriminant analysis are widely used techniques. Logistic regression is useful in many ways. The purpose of logit model is to search the best model which can describe the relationship of the independent variables and outcome. Another parametric method which is a linear discriminant analysis can be helpful to distinguish between the variables which are useful for the differentiation between two types of banks (Islamic and conventional). Logit model shows more flexibility compare to linear discriminant analysis. Linear discriminant analysis performs the task based on the assumptions which include normality of data, large sample size, variance and homogeneity of covariance-matrix homogeneity. Due to the absence of one of the assumptions, LDA does not provide proper results and logistic regression can easily take upper hand and outperform linear discriminant analysis in such scenarios.

4.2.1.1 Linear-Discriminant Analysis

Linear-discriminant analysis (LDA) is a method of statistics which facilitates to find the features of linear combination which helps to differentiate between two or more than two classes of events. This approach is used widely for the purpose of classification of samples of classes that are unknown (Fisher, 1936). Observations are classified according to the set of variables called predictors. For the objective of comparison between two categories of banks or institutions, LDA is used in other studies as well (Spector and Leshno, 1996, and Rashid and Abbas, 2011).

List of Conventional Banks is presented in the following table:

Table 4.2: List of Conventional Banks

No.	Conventional Banks
1	Allied Bank
2	Askari Bank
3	Bank Al Habib
4	Bank Alfalah
5	Bank of Khyber
6	Habib Bank Limited
7	Soneri Bank
8	Faysal Bank
9	JS Bank
10	National Bank
11	Muslim Commercial Bank
12	Standard Chartered Bank
13	Summit Bank
14	Silk Bank
15	United Bank Limited

4.4 Variables

This study has adopted thirteen financial ratios based on the empirical literature (e.g., Pasiouras et al. 2009; Olson and Zoubi, 2008; Srairi 2013). There are basically five classifications of these ratios in this research consist of profitability, liquidity, insolvency risk, credit risk, and asset structure.

Profitability

Profitability is basically an ability to gain profit for any business. And ratios of profitability are also used to retrieve ability of a business to generate more earnings as compared to relevant cost and expenses incurred during certain period. The ratios used for this purpose in this study are;

- Return on Assets (ROA)
- Return on Equity (ROE)

Liquidity

Liquidity is a degree where security or an asset can be sold or bought quickly in market without the effect on the price of an asset. Following ratios of liquidity are served for this purpose;

- Cash to Assets (CTA)
- Cash to Deposits (CTD)

Efficiency

Efficiency signifies performance where amount of lowest inputs are used to get output of greater amount. And efficiency is related to all kind of inputs while producing any level of output which also includes energy and personal time. It can be measured by the determination of following ratio;

- Operating Expenses to Total Assets (OEA)

Credit Risk

Credit risk is a risk of losing principal amount or it can be a loss of financial reward caused by the failure of borrower to unable to pay the role or otherwise fulfill a

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contractual obligation. Credit risk also arises when borrower also uses cash flows of future to make payment for current debt. Following ratios are used to provide a clear picture of credit risk in banking sector.

- Non-Performing loans (NPL)
- Loans to Assets (LTA)
- Loans to Deposits (LTD)

Insolvency Risk

Insolvency risk arises when any individual or an organization cannot be able to meet financial obligations. Insolvency can proceed further, where legal actions can be taken against the entity that is insolvent and as a result for the payment of outstanding debts, assets may also be liquidated. Following mentioned ratios are used to measure such risk.

- Equity to Assets (ETA)
- Deposits to Assets (DTA)
- Deposits to Equity (DTE)

Asset Structure

Asset structure refers to the financial health of the particular business. Following proxies are used to explore the asset structure of any company or business.

- Fixed Assets to Total Assets (FAA)
- Off-Balance Sheet Items (OBSIA)

Table 4.3: Variables' Description

Ratios	Definitions
Profitability	
ROA	Return on assets = Net income/Total assets
ROE	Return on equity = Net income/Stockholders' equity
Liquidity	
CTA	Cash to assets = Cash/Total assets
CTD	Cash to deposits = Cash/Total customer deposits
Credit risk	
NPL	Non-performing loans over gross loans
LTA	Loans to assets = Loans/Total assets
LTD	Loans to deposits = Loans/Total customer deposits
Bank efficiency ratios	
OEA	Operating expense over assets = operating expense/average total assets
Insolvency risk	
ETA	Equity to assets = Total equity/Total assets
DTA	Deposits to assets = Deposits/Total assets
DTE	Deposits to equity = Deposits/Stockholder's equity
Asset structure	
FAA	Fixed assets over assets = Fixed assets/Total assets
OBSIA	Off-balance sheet items over assets = Off-balance sheet items/Total assets

4.5 Hypotheses

Financial characteristics can be used to distinguish between conventional and Islamic banks and our study focuses on this aspect. For this purpose, we have made hypotheses. First hypothesis of the study states on the basis of previous empirical works e.g. Hassoune, (2002); Olson and Zoubi (2008); Khediri et al. (2015).

In the light of the studies, our first hypothesis is about the profitability and it states that IBs are more profitable than conventional banks. Islamic banks came into existence later on; initially the focus was mainly on the business of conventional banks. But after the emergence of Islamic banks, conventional banks were outperformed by the Islamic banks. Hassoune (2002) explained that this can be attributed to the reliance of Islamic banks on their funding and higher level of the amounts of deposits that are non-profit bearing. There is also an argument about the sentiments of Muslims because they have their loyalty for their religion and they prefer Islamic banks for investing or deposits and they are even willing to take returns which are low compare to returns of banks that are conventional. So, there is a less volatility in the profitability of Islamic banks than conventional banks. Another study by Abedifar et al., (2013) stated that factor of religious sentiments plays very instrumental role for Muslims. Islamic banking is making its roots strong worldwide. In Islamic countries, it is the top priority, because it allows Muslims to invest money according to their beliefs which are religiously related to Islamic law and these are basics of Islamic banking. So, these clients tend to pay more attention to Islamic banks which considerable plays significant role in the profitability of Islamic banks. But this study also argues that Islamic banks may affect factor of religiosity of their clients, they may charger borrowers higher rate and for depositors they may give lower rates. Different studies (Hasan and Bashir, 2003; Khediri, 2009) projected the

positive relationship of profitability and capital of the banks. Hence, profitability of IBs is likely to be higher than conventional banks. The proxies return on equity (ROE) and return on assets (ROA) are used in this study are based on the previous literature. (Iqbal, 2001; Olson and Zoubi, 2008; Bourkhis and Nabi, 2013; Khediri et al., (2015). So, based on the previous researches and studies, our hypothesis s formed in the following way:

H1. IBs are profitable in comparison to conventional banks.

The 2nd hypothesis which is part of our study revolves around the liquidity of the bank. In the business of banking sector, banks face many problems related to liquidity. Even a little negative factor can be very harmful for the liquidity of the banks. Banks at times face problems when people excessively withdraw from the saving as well as current accounts. There are some liquidity ratios which measure the bank's ability to meet the obligations in the short term and these are called cash ratios. Generally, higher ratios of liquidity depict less risk for the banks. In terms of Islamic banking, the investments are limited to certain businesses which are halal or permissible in Islamic law. For instance, Islamic banks are not allowed to enter into the transactions which are against the rules of Islamic law, they have their own limitations. Businesses of alcohol, clubs etc. are strongly prohibited in Islam. So, investments of IBs are less diversified than conventional banks because conventional do not run according to such rule and these things can be a big challenge for the management of liquidity. Hence, Islamic banks take measures in terms of capital so risk of liquidity can be minimized. Hasan and Dridi (2010) mentioned in their study that management of liquidity can be a problem for IBs because to their restricted opportunities of attracting investments. Empirical literature (Metwally, 1997; Olson and Zoubi, 2008; Khediri et al., 2015) shows that despite of the fact that Islamic

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banks' restricted capability of attracting new investments, the level of liquidity is higher than conventional banks. The proxies which are used for liquidity are cash to deposit ratio (CTD) and cash to asset ratio (CTA). These proxies were also used in the studies (Metwally, 1997; Olson and Zoubi, 2008; Bourkhis and Nabi, 2013; Khediri et al., 2015). Higher ratios are preferable for higher level of liquidity. So, our hypothesis is formulated in the following way;

H2. IBs hold higher level of liquidity as compared to conventional banks.

Third hypothesis is about efficiency in the banking sector. Since the business of Islamic banking is still growing and the size is still expanding but conventional banks have more coverage in terms of size and business opportunities. Rosly and Bakar (2003) show that Islamic banks are less efficient as compare to their conventional counterparts. Another study of Yudistira (2003) proved with empirical work that in terms of cost efficiency, Islamic banks are still behind than conventional banks. Inefficiency of Islamic banks can be attributed to different factors. For instance, economies of scale can be lacked for IBs and like we already mentioned, the size of Islamic banks which is still small in comparison to conventional banks can also be a factor. The efficiency proxy OEA (operating expenses to asset ratio) is used in the previous literature as well (for instance, Olson and Zoubi, 2008).

H3. Conventional banks are more efficient than IBs.

Fourth hypothesis of this study focuses on risks of credit and insolvency. These risks can really be harmful for any organization and banking sector. Credit risk can be defined as a risk that counter party or even borrower will be unable to fulfill its repayment's obligations according to the conditions of the contract. So, in short, inability of failure to return or repay the amount can cause losses for creditor, hence it

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is a risk for bank. Furthermore, insolvency risk occurs when the liabilities of the bank are greater than the assets of the bank. Olson and Zoubi (2008), Beck et al. (2013) proved in their study that the level of credit risk is low in Islamic banks.

The mechanism of PLS allows IBs the maintenance of their net worth and the unexpected fluctuation in their financial position under tough economic situations. According to the PLS mechanism, losses can be absorbed on the liability side if they occurred on asset side because here principle as well as returns are not guaranteed. In this way Islamic banks have the ability to transfer the risk of credit from assets to the side of liability. In this way, decrease in the assets' value shows its results on the liability's side in the form of decrease of liability as well. This was further explained by Olson and Zoubi (2008) that under the principles of PLS, credit risk can be minimized.

The principle of PLS also encourages the participation of equity. Other modes of Islamic finance like Murabaha, Istisna, Ijara etc require the transactions to deal in real economy and they involve real assets. These kinds of transactions in IBs provide bright view about the allocation of funds and uncertainty and speculations can be minimized. Again in the minimization of credit risk, the factor of religiosity plays an important role, customers become loyal therefore a relationship builds between depositors and banks (Abedifar at al., 2013). Siddiqui (2006) threw light on the equity participation and explained that hazard problems and adverse selection can be minimized through equity participation. In Islamic laws, gambling is also prohibited so excessive which is there in conventional banks can be avoided here. Problem of asset substitution can be reduced with the use to tangible assets. Hence, level of risk should be low for IBs.

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The proxies which are used for credit risk are NPL (non-performing loans), LTA (loan to asset ratio) and LTD (loan to deposit ratio). For the purpose of measuring the risk of insolvency the proxies are ETA (equity to asset ratio), DTA (deposit to asset ratio), and DTE (deposits to equity ratio). ETA usually measures the strength of capital as well as capitalization. Higher the ratio of ETA lower the risk and it is an indicator of lower leverage. Hence, higher value of ETA indicates that there is more risk of solvency in banks. Proxies (NPL, LTA, LTD, ETA) are used in the previous studies as well. (For example, Olson and Zoubi, 2008; Bourkhis and Nabi, 2013; Khediri et al., 2015)

H4. IBs have lower level of risk compare to conventional banks.

Chapter 5

Empirical Framework

5.1. Introduction

This chapter presents the results by using techniques; parametric models which consists of logistic regression and LDA (linear discriminant analysis). It also includes neural model which is part of non-parametric methods, as discussed in the previous chapter. We provide descriptive analysis in Table 5.2. We also differentiate Islamic banks from conventional banks through linear-discriminant analysis, logit model, and neural model in this chapter.

5.2 Univariate Analysis

In Table 5.1, we present means of the financial ratios for CBs and IBs. The sample consists of three parts. First part of the data set consists of the period 2005 to 2014 and second part consists of pre-crisis/crisis period (2005 to 2008). The last part shows the means of period (2009 to 2014) which covers the after crisis period in the financial sector. Following Table 5.1 provides univariate analysis. Different other researches also adopted this procedure for the comparison between two or more types of banks and firms (Olson and Zoubi, 2008; Khediri et al., 2015).

Table 5.1: Univariate Analysis for Financial Ratios

<u>Overall period (2005-2014)</u>

Variables	CB	IB	T-value	P-value
ROA	1.68	-0.11	2.882***	0.004
ROE	10.87	2.89	3.028***	0.003
CTA	9.51	12.17	-2.393***	0.020
CTD	14.01	17.65	-1.542	0.126
NPL	9.07	3.09	8.433***	0.000
LTA	7.78	6.73	0.519	0.606
LTD	11.78	10.65	0.291	0.772
DTA	73.91	71.60	0.651	0.518
DTE	965.9	692.6	3.188**	0.020
ETA	11.30	16.95	-2.070**	0.043
OEA	1.19	3.14	-5.429***	0.000
FAA	12.77	51.77	-2.376**	0.022
OBSIA	28.04	27.09	0.216	0.830

Note: Financial ratios' means are reported in this table for both Islamic as well as conventional banks, *p*-value is reported for the differences of *t*-test between the two groups of different kind of banks in means. And the *t*-test is reported by using sample variances that are equal for mean's equality.
*Significance at the 10% level.
**Significance at the 5% level.
***Significance at the 1% level.

5.2.1. Univariate Analysis of the overall period (2005-2014)

To investigate whether IBs and CBs can be differentiated on the basis of financial characteristics, Table 5.1 shows univariate statistics of both forms of banks. Table 5.1 provides the outcome of t-test for mean's equality by using thirteen accounting ratios between IBs and CBs. The t-test is calculated by assuming unequal variances of sample. Table 5.1 reports mean value of all explanatory variables, for different periods. Overall, mean values of 8 ratios are different statistically between two kinds of banks. The values of mean for ratios e.g., return on assets (ROA), return on equity (ROE), cash to assets (CTA), non-performing loans (NPL), operating expenses to assets (OEA) are different statistically at the significant level of the 1% between IBs and CBs. Furthermore, the means of remaining three ratios e.g., deposit to equity (DTE), equity to assets (ETA) and fixed assets (FAA) are also different statistically at the level of 5%. However, the ratios cash to deposit (CTD), loans to assets (LTA), loans to deposits (LTD), deposit to assets (DTA), off balance sheet items (OBSIA) do not provide any significant difference. Table 5.1 also presents t-values for thirteen independent variables. The t-values for ratios CTA, CTD, ETA and OEA are negative while rest of the ratios ROA, ROE, NPL, LTA, LTD, DTA, DTE, and OBSIA get positive t-values.

For verifying the 1st hypothesis, the two profitability ratios ROE and ROA provide mean values of 2.89% and -0.11% respectively. On the other hand, ROE for conventional banks averages 10.89% and ROA for conventional banks averages 1.68%. The t-values are positive for ROA and ROE and they are 2.882 and 3.028 respectively. These differences are significant at the level of 1%. The mean values are higher for conventional banks. Hence, these profitability ratios show that Islamic banks in Pakistan are not yet profitable as compared to conventional peers. This result

is consistent with the research studies of Akhtar et al.(2011) and Jaffar and Manarvi (2011). In Pakistan, Islamic banks are relatively new as compared to the giant system of conventional banking. So, by considering the results of profitability, we reject the hypothesis 1.

Consistent with prediction of 2nd hypothesis, the liquidity ratios confirm the empirical work of authors who state that Islamic banks have more liquidity as compared to conventional banking system (Wasiuzzaman and Tarmizi, 2010). The differences show that there is difference in Islamic and conventional banks, in terms of liquidity. CTA ratio states that Islamic banks hold more cash because it averages 12.17% compare to conventional banks where it averages 9.51% at the significant level of 5%. CTD ratio averages 14.01% for conventional banks and 17.65% for Islamic banks but it does not provide significant results.

Our 3rd hypothesis states that Islamic banks are less efficient than conventional banks. Operating expenses to total assets ratio gives us information about the difference of efficiency in Islamic and conventional banks. The results are significant at 1% level of significance and OEA ratio averages 1.19% for conventional banks and 3.14% for Islamic banks. This lack of efficiency by incremental cost of Islamic banks (IBs) is due to the factor of avoiding the interest which is fixed and risk which they share with their customers and it is also on the principle rule of Islamic banking. So, we accept our third hypothesis which states that Islamic banks are not ahead of conventional banks in terms of efficiency. This result is consistent with the study of Srairi (2008).

Our 4th hypothesis is about the riskiness which is commonly found in the banking sector. The average loans to assets ratio and average loans to deposit ratio do not provide the significant results. However, non-performing loans give us the significant

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results at 1% significance level and these ratios averages 9.07% for conventional banks and 3.09% for Islamic banks. On the other hand, in terms of insolvency, average equity to assets ratio and deposits to equity for Islamic banks are 16.95% and 692.6%. While for conventional banks, they are 11.30% and 965.9%, respectively. The significance level for these ratios is 5%. These results indicate that Islamic banks are better capitalized than their competitive conventional banks. These results show that Islamic banks are less risky than conventional banks and these results support our 4th hypothesis which says that Islamic banks are not risky when we compare them with conventional peers, as it is also proved in the empirical study of Khediri et al. (2015). Hence, the findings of this study indicate that IBs have lower insolvency risk and credit risk as compared to conventional peers.

We also analyze the ratios of asset structure in our study and their impact differently across conventional and Islamic banks. These ratios of asset structure are off balance items to total assets (OBSIA) and fixed assets to total assets (FAA). The mean value of FAA for IBs averages 51.77% and it averages 12.77% for conventional banks. It shows that Islamic banks have more operating leverage as compared to the system of conventional banks. This difference is significant at the level of 5%. The OBSIA ratio has an average of 28.04% for CBs and 27.09% for IBs which predicts that IBs do not have involvement in off balance sheet activities as compared to conventional banking system. However, the difference is not statistically significant.

5.2.2 Univariate Analysis of Pre crisis/crisis and Post crisis Analysis

We repeat the univariate analysis for different periods in order to check sensitivity of results. The periods include pre-crisis, crisis (2005-2008) and post crisis (2009-2014), in order to study the evolution of conventional and Islamic banking sector. For the period of pre-crisis, ROA and ROE have average value of means -0.07% and 2.52% for Islamic banks, 2.85% and 16.8% respectively for conventional banks. These results also depict that the Islamic banks in terms of profitability are still lagging behind in Pakistan.

In terms of liquidity, the ratio of CTA does not provide us significant results but the ratio CTD averages 26.98% for Islamic banks and 16.82% for conventional banks. This difference has significance at the 10% level. This indicates that Islamic banks keep more cash, than their opponents banking sector. In terms of efficiency, DTA averages 60.16% for Islamic banks and 74.87% for conventional banks at 5% level of significance and DTE is 411.2% for Islamic banks and 910.4% for conventional banks at the significance level of 1%. These findings show that Islamic banks have lower level of credit risk.

Table 5.2: Univariate Analysis for Pre-crisis/crisis and Post crisis period

Variables	Pre /Crisis period (2005-2008)				Post crisis period (2009-2014)			
	CB	IB	T-value	P-value	CB	IB	T-value	P-value
ROA	2.85	-0.07	1.926*	0.059	0.92	-0.12	3.007***	0.004
ROE	16.8	2.52	3.350**	0.020	7.42	3.24	1.229	0.222
CTA	10.85	15.05	-1.542	1.145	8.82	11.73	-3.071***	0.004
CTD	16.82	26.98	-1.763*	0.093	12.46	14.7	-1.229	0.222
NPL	6.08	0.79	6.009***	0.000	10.96	4.29	7.714***	0.000
LTA	5.66	10.87	-0.989	0.342	9.13	5.39	1.942	0.59
LTD	8.91	14.01	-0.640	0.533	13.63	9.90	0.788	0.436
DTA	74.87	60.16	2.302**	0.039	74.16	81.33	-3.666***	0.000
DTE	910.4	411.2	3.686***	0.001	1009.8	860.9	1.527	0.131
ETA	15.01	24.12	-1.634	0.119	9.20	14.97	0.506*	0.0.67
OEA	1.15	2.75	-2.401**	0.028	1.22	3.53	-5.355***	0.000
FAA	10.48	32.40	-2.703*	0.059	14.29	63.55	-2.055**	0.049
OBSIA	30.40	44.02	-1.337	0.198	26.94	21.55	1.295	0.201

Note: Financial ratios' means are reported in this table for both Islamic as well as conventional banks, p-value is reported for the differences of t-test between the two groups of different kind of banks in means. And the t-test is reported by using sample variances that are equal for mean's equality.
*Significance at the 10% level.
**Significance at the 5% level.
***Significance at the 1% level.

If we observe the evolution of banking sector in post crisis period, ROA is -0.12% for IBs and 0.92% CBs. These findings show that conventional banks are more profitable than Islamic banks and these results are significant at 1% level. In post crisis period, IBs are more liquid as compared to their competitor CBs. NPLs have higher ratio for conventional banks as compared to Islamic banks and this ratio averages 10.96% for conventional banks and 4.29% for Islamic banks at the significant level of 1%. On the other hand, DTA ratio is higher in Islamic banks than conventional banks. In Islamic banks, it averages 860.9% and for conventional banks, it averages 1009.8%. This difference is significant at the level of 1%.

5.3 Analysis based on Linear-Discriminant Analysis

Following Table 5.3 represents the differences in the banking sector of Pakistan, which consists of IBs and CBs that are working simultaneously. Table 5.3 provides information about ratios which are significantly discriminating IBs and CBs. Firstly; linear-discriminant analysis provided the results by investigating the data of the overall period which is (2005-2014). We re-do the analysis for pre-crisis period, crisis period and post crisis period.

Table 5.3: Results of Linear Discriminant Analysis

Variables	Overall Period (2005-2014)	Pre/Crisis Period (2007-2008)	Post Crisis Period (2009-2014)
NPL	-0.638***	-0.567***	-0.655***
	(0.000)	(0.000)	(0.000)
DTA	-0.327***		0.280***
	(0.000)		(0.000)
OEA	0.521***		0.498***
	(0.000)		(0.000)
FAA	0.700***	0.893***	0.688***
	(0.000)	(0.000)	(0.000)
Canonical Correlation	0.616	0.718	0.671
Wilks' Lambda	0.621	0.651	0.550
Chi Square	89.172	25.723	69.401
P-value	0.000	0.000	0.000
Hit rate (%)	86.2%	87.3%	82.5%
No. Obs	192	72	120

Note: This table reports the results from linear discriminant analysis model. *P*-values are reported in parentheses.

*** Significance at the 1% level of coefficient.

In the technique linear-discriminant analysis, we use thirteen ratios in the model, to find best model with significant ratios that can differentiate IBs from CBs based on their different financial characteristics. These thirteen ratios are return on equity (ROE), return on assets (ROA), cash to deposits (CTD), cash to assets (CTA), non-performing loans (NPL), loans to deposits (LTD), deposits to assets (DTA), loans to assets (LTA), deposits to equity (DTE), equity to assets (ETA), fixed assets to total assets (FAA), operating expenses to assets (OEA), and (off balance sheet items to total assets (OBSIA) as mentioned in the previous chapter. However, out of thirteen ratios, linear-discriminant analysis selected only four significant ratios as shows in Table 5.3. The table shows that four ratios non-performing loans (NPL), operating expenses to assets (OEA), deposits to assets (DTA), and fixed assets to total assets (FAA) are the most significant in discriminating between Islamic and conventional banks. Table 5.3 provides the additional information about canonical correlation, chi square and the accuracy rate (hit rate) about the classification in the linear-discriminant analysis.

The procedure of discriminant analysis present mainly significant variables and remaining insignificant variables are excluded for further investigation as shown in Table 5.3. The cut off value for Islamic and conventional banks is zero. The negative coefficient on deposit to assets (DTA) shows that Islamic banks rely less on deposits compare to their competitor conventional banks. The positive coefficient of FAA shows that Islamic banks have more of fixed assets compare banks that are conventional and they indicate that Islamic banks have high operating leverage.

The negative coefficient of non-performing loans (NPL) shows that conventional banks face the risk of credit more than IBs. This result further strengthens the statement of fourth hypothesis. The positive coefficient of operating expenses to

assets (OEA) shows that Islamic banks are less efficient which also supports our 3rd hypothesis. These results are significant at 1% level of significance. We observe that ratios of liquidity and profitability are unable to provide the discrimination between two types of banks. In this technique, it is shown that the ratio of FAA discriminates the most with highest discriminant magnitude 0.700 followed by the ratio OEA and DTA. NPL ratio is discriminating the least.

The model gained 86.2% prediction accuracy for overall period when it is used to forecast differences on the underlying data. The value for canonical correlation is 0.616. Wilk's Lambda (as reported in Table 5.3) evaluates the fitness of determinant function. We get the value (0.621) of Wilk's Lambda, which is significant at 99% confidence level. Wilk's Lambda refers potential practical applicability of the model. The value of Chi square for the overall period is 89.172.

We re-estimate the model for different periods which include the periods of pre-crisis, crisis, and post crisis. The discriminant analysis procedure shows that in the period of pre-crisis and crisis (2005-2008), only two ratios can discriminate between two different types of banks out of thirteen ratios. The significance level of these ratios is 1%. These two ratios are non-performing loans and fixed assets to total assets with FAA ratio discriminating the most followed by NPL. Unlike the results for overall period, the ratios OEA and DTA do not differentiate the banks in the period of pre-crisis and crisis. We analyze that the results of FAA and NPL are similar to overall period. These results indicate that Islamic banks have higher level of operating leverage and they are less risky as compared to CBs.

In the post crisis period, four significant ratios were selected and remaining insignificant ratios were excluded for more analysis out of thirteen ratios. The results

are similar to overall results except for DTA ratio, which shows that Islamic banks rely on deposits as well. The positive coefficient of OEA shows that Islamic banks are less efficient. The ratio of NPL indicates that conventional banks are more risky. The ratio of FAA depicts that operating leverage is high in Islamic banks. These results are significant at 1% level. FAA ratio discriminate Islamic banks from the conventional banks the most. NPL ratio discriminate the least.

The discriminant analysis evaluates the values of canonical correlation, Wilk's Lambda, and Chi square for pre-crisis, crisis and post crisis sub-periods. For pre-crisis, and crisis period (2005-2014), the value of chi square is 25.723. Canonical correlation provides the value 0.616; it shows the fitness of model. The applicability is provided by Wilk's Lambda which is 0.621. The prediction accuracy rate is 87.3% for this sub-period (2009-2014). While post crisis sub-period shows the value of canonical correlation (0.671). The overall Wilk's Lambda is provided for this period which is 0.550 at 99% confident level. The success rate of forecasting for post crisis period is 82.5%.

Our results compliment the previous literature about the operating leverage, riskiness and less efficiency in the studies of Cihak and Hesse (2008), Khediri et al. (2015), Ghosh (2015). Khediri et al. (2015) show that Islamic banks can be discriminated from the banks functioning conventionally by using classification models. These classification models specifically show that Islamic banks can be differentiated in terms of insolvency, credit risk and operating leverage. On the other hand, Islamic banks cannot be differentiated in terms of liquidity and profitability.

5.4 Analysis of Logistic Regression

Table 5.4 consists of financial ratios, which provides the information about the performance of Islamic banks and also of conventional banks by running logistic regression. Table 5.4 provides the results about the period which covers all the years mentioned in this research (2005-14), crisis period and also the period before crisis (2005-08) and the period past crisis (2009-14).

Table 5.4: Logit Model Results

Variables	Overall Period (2005-2014)	Crisis Period (2005-2008)	Post-crisis period (2009-2014)
FAA	0.389***		0.526***
	(0.000)		(0.002)
NPL	-4.148***	-6.601**	-4.499***
	(0.000)	(0.03)	(0.000)
OEA	5.905***	7.194***	8.407***
	(0.000)	(0.01)	(0.002)
Constant	-0.113	0.159	-1.476
	(0.009)	(0.114)	(0.111)
Chi Square	97.880	39.572	94.848
P-value	0.000	0.000	0.000
R squared	0.399	0.423	0.546
Hit rate (%)	83.3%	84.7%	86.7%
No. Obs	192	72	120

Notes: This table reports the results from stepwise logit model. *P*-values are in the parentheses.
*** Significance at the 1% level of coefficient.
** Significance at the 5% level of coefficient.

The classification of logistic regression results has a sensitivity of high correlation between independent variables. So, due to the problem of multicolinearity, we excluded some of the independent variable to get the perfect model. Firstly, we executed the possible combinations of all explanatory variables. These different models are selected according to the maximization function of the log of likelihood. Later, these models are compared with elimination of forward and backward results within stepwise logistic regression by using rule of cutoff at 5%. Due to the problem of multicolinearity, addition significant results lower the power of independent variables which were previously significant. In other words, one significant variable lost its significance due to the addition of new variable. Finally we get best model using backward stepwise method.

The results for the logistic regressions are reported in Table 5.4. We run thirteen ratios; return on equity (ROE), return on assets (ROA), cash to deposits (CTD), cash to assets (CTA), non-performing loans (NPL), loans to deposits (LTD), deposits to assets (DTA), loans to assets (LTA), deposits to equity (DTE), equity to assets (ETA), fixed assets to total assets (FAA), operating expenses to assets (OEA), and (off balance sheet items to total assets (OBSIA) For the whole period (2005-2014), only three predictors out of thirteen are significant and can be used to differentiate between Islamic as well as conventional banks. These variables are fixed assets to total assets (FAA), operating expenses to assets (OEA) and non-performing loan (NPL). The positive coefficients of FAA shows fixed assets are present more in Islamic banks as compared to conventional banks. The positive coefficient of OEA supports the hypothesis that conventional banks are more efficient than IBs. The negative coefficient of non-performing loans also supports our 4th hypothesis and it shows that Islamic banks bear less credit risk than conventional banks.

We have re-run logistic regression over the sub-periods by executing thirteen ratios for differentiating characteristics of IBs and CBs. We use the backward stepwise procedure for the period 2005-2008. After eliminating variables several variables we get the best model, and only two ratios are able to differentiate between two kinds of banks. These predictors are operating expenses to total assets at the significance level of 5% and non-performing loans at 1% significant level. This shows that Islamic banks are not as efficient as compared to conventional banks. It also proves that Islamic banks are less risky in the pre-crisis and also in crisis period.

In the post crisis period, we entered thirteen ratios into the model. We used the backward stepwise elimination procedure of ratios. The indicators; fixed assets to total assets (FAA), non-performing loans (NPL), and operating expenses to total assets (OEA) are able to differentiate IBs and CBs in logit model. These results support our hypothesis and show that Islamic banks have high level of leverage, less risky and less efficient as compared to banks operating conventionally. It shows that Islamic banks have increased their reliance on deposits.

The logistic regression provides the information about chi square, R-squared and hit rate as well. For overall period value of chi square is 97.880, significance level is 1%. R-squared shows variations in dependent variables by the movements of independent variable. For overall period the value of R-squared is 0.399. In terms of success rate (%) of the model, overall period have achieved 83.3% hit rate. In the pre-crisis/crisis and post crisis period, it is classified as 84.7% and 90.8% respectively.

The results of about the risk analysis of this study are consistent with the previous literature of Olson and Zoubi (2008) and Espinoza and Prasad (2010). Espinoza and Prasad (2010) show that Islamic banks are less risky as compared to conventional

banks. The principle of PLS play significant role in it. Zoubi and Olson (2008) have shown in their work about the less efficiency of Islamic banks. These results prove that conventional banks rely on interest income usually earned on loans. While Islamic banks gain part of net income from sources which are interest free.

5.5 Findings of Neural Model:

There is a certain criterion of the neural network which is used to determine the facts about the results. In case the units of output are greater and equal than 0.5 (≥ 0.5) than that observation represents 1st group (G1). On the different side, if the unit of output is less than and equal to 0.5 (≤ 0.5), and that observation represents group 2nd (G2).

Table 5.5 shows the importance as well as normalized importance of all thirteen variables in the classified neural model. The thirteen ratios return of equity (ROE), return on assets (ROA), cash to deposits (CTD), cash to assets (CTA), loan to assets (LTA), non-performing loans (NPL), loans to deposits (LTD), operating expenses to total assets (OEA), deposits to equity (DTE), deposits to total assets (DTA), equity to total assets (ETA), off balance items (OBSIA), and fixed assets (FAA) are used in the neural network.

For the period (2005-2014), the results show that fixed assets to total assets (FAA) scored the highest importance followed by non-performing loans (NPL), operating expenses to total assets (OEA), and deposit to total assets (DTA) which indicated that FAA strongly predicts the value of the model. These four ratios also support the results of discriminant analysis and logit model, as these ratios differentiated two categories of bank. On the other hand, return on equity (ROE) has less value as compared to other ratios which predicts that there is no influence of profitability in prediction the model.
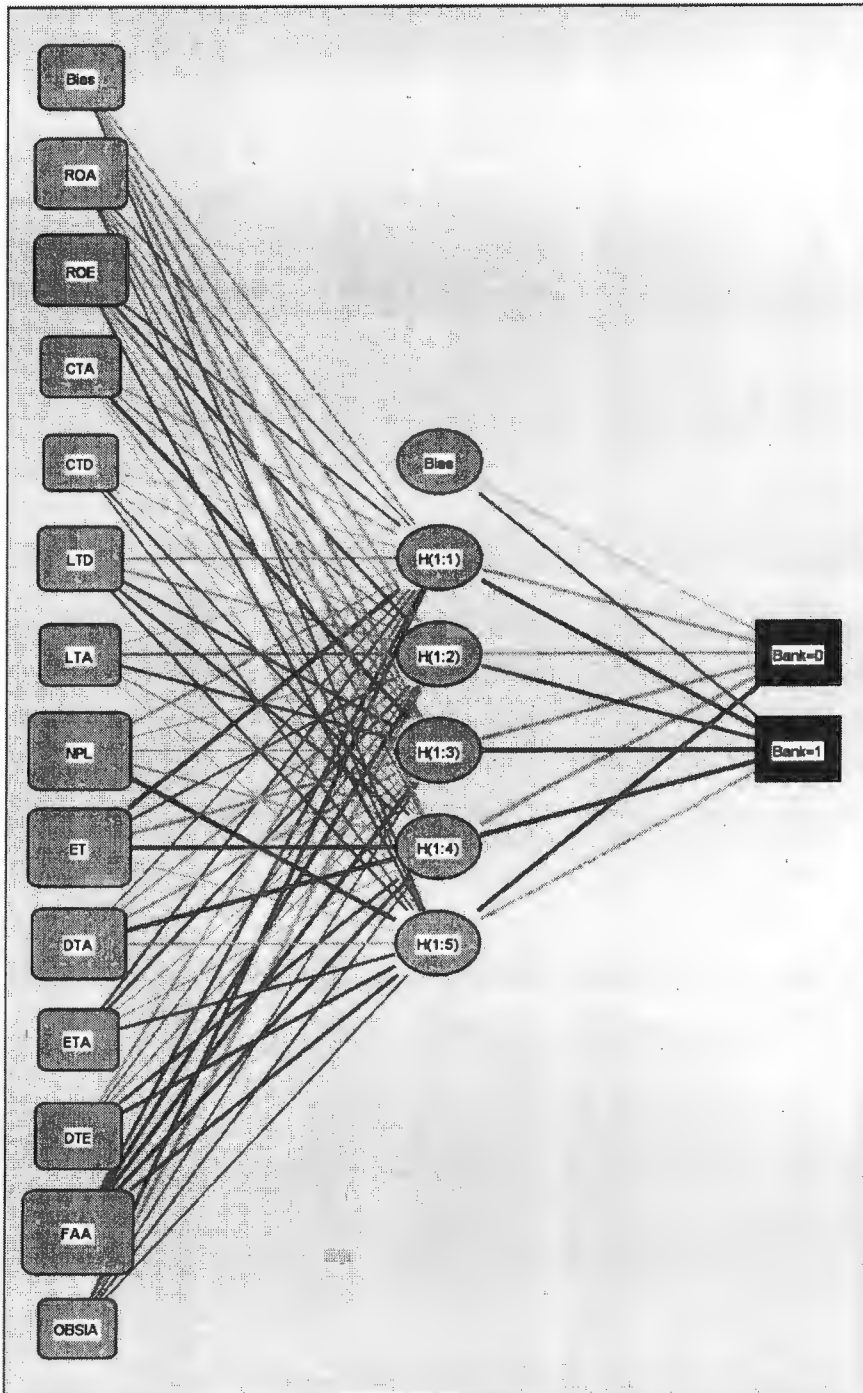
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Table 5.5: Results of Neural Model

Variables	Overall period (2005-2014)		Pre/Crisis period (2005-2008)		Post-crisis period (2009-2014)	
	Importance	Normalized Importance (%)	Importance	Normalized Importance (%)	Importance	Normalized Importance (%)
ROA	0.047	30.5%	0.093	66.6%	0.075	56.6%
ROE	0.039	25.2%	0.102	73.0%	0.042	31.7%
CTA	0.075	49.1%	0.059	42.6%	0.057	42.8%
CTD	0.066	43.2%	0.043	30.6%	0.056	42.6%
LTD	0.074	48.0%	0.053	38.1%	0.072	54.6%
LTA	0.063	40.8%	0.031	21.9%	0.103	77.9%
NPL	0.115	74.7%	0.119	85.7%	0.099	74.6%
OEA	0.102	66.5%	0.139	100%	0.127	95.9%
DTA	0.082	53.6%	0.101	72.3%	0.117	88.5%
ETA	0.068	44.3%	0.044	31.9%	0.056	42.4%
DTE	0.068	44.1%	0.036	26.0%	0.041	31.1%
FAA	0.154	100%	0.067	48.2%	0.132	100%
OBSIA	0.048	31.1%	0.113	80.9%	0.023	17.2%
Hit rate (%)	86.9%		94.1%		90%	

Notes: This table reports the classification neural model results, specially the importance and normalized importance for independent variables.

Figure 5.1

Neural Network

Hidden layer activation function: Hyperbolic tangent
Output layer activation function: Softmax

Figure 5.1 shows that graphical representation of neural model. In figure 5.1, financial ratios are entered in the input layer and in the output layer 0 is a representation of conventional banks while 1 represents Islamic banks. Hidden layer can be seen between input and output layer.

For the pre-crisis and crisis period (2005-2008), operating expenses to total assets (OEA) have the maximum impacts over the prediction of the model, followed by non-performing loans (NPL), off-balance sheet items (OBSIA), return on equity (ROE) and return on assets (ROA). The ratios OEA and NPL support the results of previous techniques (LDA and logit model). The ratio loans to assets (LTA) have no effect on the prediction of the model.

For the post crisis period (2009-2014), fixed assets have the highest amount of influence over the model and after that deposit to assets (DTA) have an impact on the model. These results are also in accordance with logistic regression and linear-discriminant analysis. In terms of least effect, the ratio of off-balance sheet items proves that it cannot predict the model. The rate of success for the period 2005-2014 is 86.9% and for the period 2005-2008 is 94.1%. The accuracy rate for the post crisis period in the neural network technique is 90%. These results depict that neural model have higher rate of accurate predictability.

Chapter 6

Conclusion and Implication of Policies

6.1 Introduction

The growth of Islamic finance has been intensified especially in previous three decades. Banking which is interest free grabbed the attention from almost every part of the world. This rapid growth of the banking system which is free of interest caught the attention at the academic and research level for different purposes but also of numerous bankers and investors which belong not only to Muslim world but also to non-Muslim countries as well. In the previous studies, the main discussion and research covered the areas of the principles and their implications in varied and upcoming scenario and also different instruments which are part of the banking which follows Shariah's rules. The researches started exploring different areas and varied results were provided regarding the risks, liquidity, profitability and efficiency in the system of dual banking (covers conventional, Islamic banks).

This research can be serves as a guideline in numerous ways. This study uses 15 conventional banks and 5 Islamic banks for the comparison. This research highlights the different kind of behavior of conventional and other type of banks which follow Shariah's principles and rule (Islamic banks). This study focused on comparing the different kind of features of Islamic banks as well as conventional banks in Pakistan by using accounting/financial ratios covering the time period of 2005-2014. Different techniques are applied to get the results which are significant. These techniques include Parametric (Linear-discriminant analysis and Logit model) as well as other methods which are non-parametric (neural network). The purpose of this research is

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also to enhance the literature empirically by testing four hypotheses investigating the presence of efficiency, risks, liquidity and also profitability in IBs and CBs.

6.2 Major Findings

This research documents many interesting facts and findings. First, it turns out that both types of banks (Islamic and conventional) somewhat have different behavior in different circumstances and periods. Profitability area of Islamic banks lacked behind in the t-test and also conventional banks are more efficient than the interest free banks. Islamic banks also through t-test show that they have less risk as compared to their competition but they hold liquidity more than CBs. Secondly, it becomes obvious through the whole researching process that on the basis of financial ratios these types of banks mentioned up can be distinguished. Classification approaches state that operating expenses, fixed assets, risk of insolvency and credit risk are able to differentiate but on the other side, liquidity and ratios of profitability are unable to find any such difference. Lastly, classification models are very helpful for exploring the results and their accuracy rate gives a brighter view about the approaches and which one is more useful and more accurate.

6.3 Policy Implications

This research is very instrumental for policy makers to implement or adopt certain measures according to the findings of this study in Pakistan since this research is capable of discriminating between both type of banks (CBs and IBs) in terms of risk of insolvency and credit. So, regulators and authority can make their policies accordingly. Hence, regulatory which is well defined, tools of risk management, supervisory framework for IBs, taking account unique and special features of contract

that are Shariah compliant are very much needed and necessary for the effective and proper functioning.

For the progress of economy and financial sector, it is important to take steps which become mandatory for the growth because Islamic banks are important for the development of economy. Their efficiency and profitability can also be improved if authorities pay more attention to them so that more full-fledged banks based on principle of Shariah can emerge in the long run. Moreover, government should also push the envelope and persuade the banks to adopt more advanced technologies for the progress and for competitive advantages as well. In this way, Islamic banks can earn more profit and inefficiencies can be minimized as well.

6.4 Limitations of the Study

Islamic banks have limited set of data. There are only 5 full-fledged Islamic banks that are functioning in Pakistan by the end of year 2016. Even though Meezan bank got license in 2002 but some other banks have commenced their business in 2007. Hence, the data of years 2005 and 2006 is limited. So, small size of sample and insufficient data of IBs will have an effect on the results.

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