

# **UNIVERSITY OF SOUTHERN QUEENSLAND**

## ***AN ASSESSMENT OF RISK FACTORS AND THEIR EFFECTS ON THE RATIONALITY OF LENDING DECISION-MAKING: A Comparative Study of Conventional Banking and Islamic Banking Systems***

A dissertation submitted  
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For the award  
*of*

**Doctor of Philosophy**

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*CERTIFICATION OF DISSERTATION*

I certify that the ideas, results, analyses and conclusions reported in this dissertation are entirely my own effort, except where otherwise acknowledged. I also certify that the work is original and has not been previously submitted for any other award, except where otherwise acknowledged.

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Date

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### ***DEDICATION***

*For the spirit of my oldest brother Abdalla who passed away as  
a result of a heart problem and I could do nothing for him,*

*For my parents who don't know the meaning of "can't".  
Thank you for your tireless encouragement*

*And*

*For my wife Aziza and my two sons, Mohamed and Abdullah, for  
their years of patience and support during my PhD Journey.*



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## ABSTRACT

The current turmoil in the financial markets raises important questions regarding the risk-taking behaviour of conventional banks and other financial institutions in Western countries. In this context, it is important to compare the risk taking behaviour of conventional banking to that of Islamic banking. Today, Islamic banking is increasingly being scrutinised and compared by investors, depositors and researchers around the world (Muslim and non-Muslim). Because of the differences in the nature of transaction instruments, goals and the obligations between conventional banking and Islamic banking institutions, it is important to differentiate which banking system is more efficient in terms of risk assessment and decision-making on lending. This study aims to identify the similarities and differences between Islamic banking (IB) and conventional banking (CB) systems on issues related to risk taking behaviour and the rationality of lending decision making. Hence, the research question is: *How do banking institutions determine and assess risk factors and how do those factors influence the rationality of lending decision policies in conventional and Islamic banking systems?*

The main objectives of this study are to investigate the differences between IB and CB in terms of (1) risk-taking behaviour (risk assessment), (2) making rational lending decisions and (3) lending policy effectiveness (banking efficiency). To achieve these objectives, two focus groups—Islamic and conventional banks—in five different countries in the Middle East region (Bahrain, Qatar, United Arab Emirates, Jordan and Libya) were selected to participate in this study. The study was based on a sample consisting of observations from annual reports and financial statements of 48 Islamic and conventional banks (24 banks each) for the period from 2002 to 2006. The study also utilised a questionnaire survey to collect data from five managers in each bank. Thus, primary and secondary data collection methods were used to obtain the required information for the analysis.

Multivariate and principal component analyses were conducted to evaluate how conventional banking and Islamic banking systems determine and assess risk factors. Furthermore, how those factors influence the rationality of lending decisions was investigated. The results revealed that each of these banking systems performed this function in different ways. The study also contrasts the lending policies and instruments under each system. Results show that risk factors influencing lending decision making are *dissimilar* between these banking systems. These differences in risk-taking behaviour may contribute banks' efficiency. To investigate this point, the Data Envelopment Analysis (DEA) technique was applied to banking groups separately in order to isolate technical efficiency scores (large, medium and small banks' categories). The analysis revealed that Islamic banks—with medium and small bank size—operate and allocate their resources with a higher degree of efficiency than all other banking groups. This finding raises some very interesting evidence that may surprise the stakeholders of conventional banks.



## **Publications arising from this Dissertation**

### **Refereed Publications in Proceedings of International Conferences**

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## ABBREVIATIONS

<i>AAOIFI</i>	-	<i>Accounting &amp; Auditing Organisation for Islamic Financial Institutions</i>
<i>ADIs</i>	-	<i>Authorised Deposit-taking Institutions</i>
<i>AT</i>	-	<i>Agency Theory</i>
<i>ANOVA</i>	-	<i>Analysis of Variance</i>
<i>BCC</i>	-	<i>Banker, Charnes and Cooper (1984) model</i>
<i>BR</i>	-	<i>Business Risk</i>
<i>CB</i>	-	<i>Conventional Banking</i>
<i>CBs</i>	-	<i>Conventional Banks</i>
<i>CCR</i>	-	<i>Charnes, Cooper and Rhodes (1978) model</i>
<i>CRS</i>	-	<i>Constant Returns to Scale</i>
<i>CSR</i>	-	<i>Capital Structure Requirements</i>
<i>DEA</i>	-	<i>Data Envelopment Analysis</i>
<i>DGK</i>	-	<i>Deshmukh, Greenbaum and Kanatas (1983) model</i>
<i>DMU/s</i>	-	<i>Decision Making Unit/s</i>
<i>DRS</i>	-	<i>Decreasing Returns to Scale</i>
<i>DMT</i>	-	<i>Decision-making Theory</i>
<i>EAD</i>	-	<i>Exposure at Default</i>
<i>EL</i>	-	<i>Expected Loss</i>
<i>EMH</i>	-	<i>Efficient Market Hypothesis</i>
<i>FA</i>	-	<i>Factor Analysis</i>
<i>FIFI</i>	-	<i>The First Islamic Financial Institution</i>
<i>FT</i>	-	<i>Finance Theory</i>
<i>GCC</i>	-	<i>Gulf Cooperation Council</i>
<i>GR</i>	-	<i>Governance Risk</i>
<i>IAH</i>	-	<i>Investment Account Holders</i>
<i>IAIB</i>	-	<i>International Association of Islamic Banks</i>
<i>IB</i>	-	<i>Islamic Banking</i>
<i>IBCA</i>	-	<i>International Business Companies Association</i>
<i>IBs</i>	-	<i>Islamic Banks</i>
<i>IFIC</i>	-	<i>Islamic Financial Institutions Council</i>
<i>IFI/s</i>	-	<i>Islamic Financial Institution/s</i>
<i>IFSB</i>	-	<i>Islamic Financial Services Board</i>
<i>IRS</i>	-	<i>Increasing Returns to Scale</i>
<i>IT</i>	-	<i>Investment Theory</i>
<i>KMO</i>	-	<i>Kaiser-Meyer-Olkin (for measuring sampling adequacy)</i>
<i>CoLD</i>	-	<i>Concepts of Lending &amp; Default</i>
<i>LCB</i>	-	<i>Large Islamic Banks</i>
<i>LGD</i>	-	<i>Loss, Given Default</i>
<i>LIB</i>	-	<i>Large Islamic Banks</i>
<i>LP</i>	-	<i>Lending Policy</i>
<i>MA</i>	-	<i>Multivariate Analysis</i>
<i>MCB</i>	-	<i>Medium Conventional Banks</i>
<i>MIB</i>	-	<i>Medium Islamic Banks</i>

<i>NDRS</i>	-	<i>Non-decreasing Returns to Scale</i>
<i>NIRS</i>	-	<i>Non-increasing Returns to Scale</i>
<i>PCA</i>	-	<i>Principal Component Analysis</i>
<i>PD</i>	-	<i>Probability Default</i>
<i>PLS</i>	-	<i>Profit-and-Loss-Sharing</i>
<i>POST</i>	-	<i>Point of Sale Terminals</i>
<i>PT</i>	-	<i>Portfolio Theory</i>
<i>PTE</i>	-	<i>Pure Technical Efficiency</i>
<i>RTS</i>	-	<i>Returns to Scale</i>
<i>RM&amp;C</i>	-	<i>Risk Management and Control</i>
<i>ROA</i>	-	<i>Returns on Assets</i>
<i>ROE</i>	-	<i>Returns on Equity</i>
<i>SCB</i>	-	<i>Small Conventional Banks</i>
<i>SE</i>	-	<i>Scale Efficiency</i>
<i>SIB</i>	-	<i>Small Islamic Banks</i>
<i>SPSS</i>	-	<i>Statistical Package for the Social Sciences</i>
<i>SSB</i>	-	<i>Shari`a Supervisory Board</i>
<i>SR</i>	-	<i>Systematic Risk</i>
<i>ST</i>	-	<i>Social Theory</i>
<i>TE</i>	-	<i>Technical Efficiency</i>
<i>TCT</i>	-	<i>Transaction Cost Theory</i>
<i>TR</i>	-	<i>Transaction Risk</i>
<i>TyR</i>	-	<i>Treasury Risk</i>
<i>VRS</i>	-	<i>Variable Returns to Scale</i>





## CHAPTER ONE

### INTRODUCTION AND RESEARCH STRATEGY

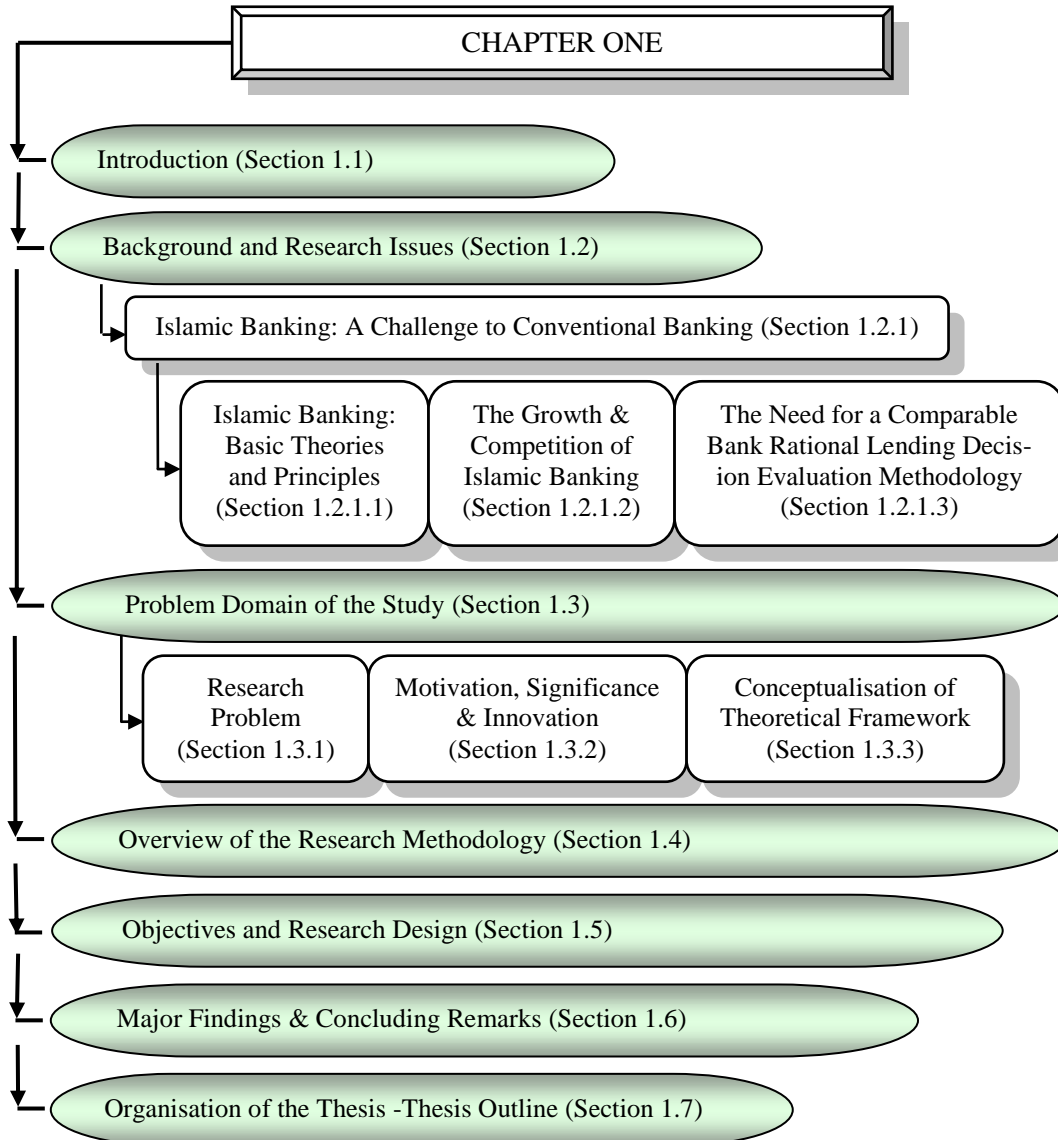
#### **1.1 Introduction**

In the beginning, should be identified two different identities of banking systems ‘Islamic banking’ (IB) and ‘conventional banking’ (CB). IB identifies financial institutions that provide products and services based on the principles of Islamic law (known as *shari`a*) and guided by Islamic economics. The two main principles are ‘sharing of profit / loss’ and the prohibition of the collection (giving) and payment (charge) of interest. However, CB identifies financial institutions that provide services such as accepting deposits from depositors, corporate bonds government bonds, and providing business loans to consumers and businesses. It is guided mainly by the profit maximization Principle.

Because of the special features of Islamic banking (IB), one cannot analyse IB lending policies and strategies by simply downloading models used to analyse lending policies in conventional banks (CB). Effective risk management in banks deserves priority attention. Risk taking behaviour entails many complex issues that need to be better understood in order to be successfully addressed. Islamic finance is now reaching new levels of sophistication. In this regard, many problems and challenges relating to Islamic regulations, lending instruments and risk taking behaviour must be addressed and resolved. Therefore, with recognition of growth in these new financial institutions, a comparison of managing risk and measuring performance of similar units within different organisations is the main objective of this study. The purpose of this chapter is to introduce a design/model of a study that attempts to compare Islamic and non-Islamic frameworks and contribute to knowledge about similarities and differences between IB and CB—theoretically and empirically—in issues relevant to risk taking behaviour and rational lending decision-making.

This chapter is organised as follows. Section 2 provides a brief descriptive background and introduces specific research issues in three areas: 1) banking history and principles; 2) banking growth and competition; and 3) the need for comparable banking systems. Section 3 highlights the specification of the study problem. In this section, the significance and motivation of the study, in addition to the theoretical basis and the study’s conceptual framework is presented. An overview of the research methodology is offered in section 4. Section 5 introduces objectives and the study design. Contribution to the advancement of knowledge, and major findings and concluding remarks are provided in section 6. Finally, the organisation of the study is presented in section 7. Figure 1.1 provides a visual overview of the structure of this chapter.

Figure 1.1: Outline of Chapter 1 Interrelations



## 1.2 Background and Research Issues

Both IB and CB systems have experienced substantial changes over the last 30 years or so (Levine, Loayza & Beck 2000) as banks transformed their operations from relatively narrow activities to those of full service financial institutions. Business banking is broadly defined to include all aspects of financial activities—including securities operations, insurance, pensions and leasing (Casu, Girardone & Molyneux 2004). To this extent, the performance of financial institutions is, without doubt, significantly influenced by the actions of banks against risks and strategies guiding lending decisions<sup>1</sup>. It seems very important to evaluate whether the conventional banking (CB) system is different to the Islamic banking (IB) system in terms of risk-taking behaviour. The next section highlights

<sup>1</sup> *Rational decision making model* is a process for making logically sound decisions. It is the process of realizing a problem, establishing and evaluating planning criteria, creating alternatives, implementing alternatives, and monitoring progress of the alternatives and is known as '*rational planning model*'. This multi-step model aims to be logical and follows the orderly path from problem identification through to solution.

the reasons for conducting research that involves the comparison of two different systems—CB and IB—in the banking and finance industry.

## **1.2.1 Islamic Banking: A Challenge to Conventional Banking**

### **1.2.1.1 Islamic Banking: Basic Theories and Principles**

Exclusively, prior research divided contracts governing economic activities into transactional and intermediation contracts in the Islamic banking and finance industry (Ahmad 2000; Anwar 2003; Fuad & Mohammed 1996). A combination of transactional contracts with intermediation contracts in these institutions offers a set of instruments with varying purposes, maturities and risk sharing aimed at satisfying a diverse group of economic agents. In reality, there is no absolute difference in products and services between CB and IB (Driver, Lomonaco & Zaidi 2005). However, income sources need to be a foremost area of comparison due to the fact that CBs' and IBs' income sources are extremely different (Al-Jarhi & Iqbal 2001). CB income comes from fees, commission and net interest (the difference between interest revenues from lending and the interest cost on deposits). In contrast, the main sources for IB profit derive from *Morabaha*, *Mushraka*, *Modaraba* and *Ijara*.<sup>2</sup>

Islamic finance differs from conventional debt finance. It is attractive to a large number of individuals—not only Muslims—who believe in a financial system with a socioeconomic development outlook that combines goals of efficient economic growth and social justice (El-Gamal 2006). Islamic finance is governed by the precepts of *shari`a*, which are to establish social security, property rights and rights of progeny (Chapra & Ahmed 2002). In addition, a study by Mondher and Siwar (2004 p. 445) concluded that 'Islamic finance is directly involved with spiritual values and social justice through an equitable distribution of wealth'—which is completely absent from the conventional mode of finance.

Islamic banks are at the forefront of ethical and socially responsible finance. They are prohibited from funding gambling, prostitution, alcohol, nightclubs and narcotics—activities which are often seen as the main vehicle for money laundering and terrorism (Fuad & Mohammed 1996). Rather, 'Islamic financial institutions provide asset-based finance and closely monitor the business of their clients. An axiomatic belief in Islamic finance is that the payment of a fixed and/or determined rate of interest on deposits and loans—*rib'a*—conflicts with fundamental principles of justice and participation in a productive economic life' (Hassan & Lewis 2007, p. 155). Instead, capital is rewarded with a variable rate of return depending on the profit or loss made by the bank during a given period, and return on assets varies with the mode of financing.

### **1.2.1.2 The Growth and Competition of Islamic Banking**

Islamic banking and finance have increased dramatically around the world. There are approximately 370 Islamic financial institutions (IFIs) which operate in Islamic and non-Islamic countries, managing assets estimated at over \$270 billion (Hassan & Lewis 2007). While total funds under management are not, by themselves, considerable when compared to the volume of operation of large multinational banks, the average growth rate of 15% realised over the past three decades is impressive (Iqbal & Llewellyn 2002).

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<sup>2</sup> Discussion of these Islamic instruments is provided in the next chapter, and relevant definitions are presented in Appendix A.

Several Muslim countries, such as Iran and Pakistan, have fully pledged their financial systems to *shari`a* principles and, in some countries such as Middle East countries, IBs operate alongside CBs. Indeed, the practice of IB is not restricted to Islamic countries (details in section 2.5), and major banking corporations such as Citibank and HSBC offer Islamic financial services.

Recently, ‘the growth of IFIs was matched by progress on the legal, accounting and auditing, and regulatory and governance fronts’ (Kahf 2002, p. 9). For example, in 1991 the accounting organisation for IFIs was mandated to prepare accounting auditing, governance, ethics and *shari`a* standards for IFIs. Also, ‘the Islamic Development Bank (IDB) took the lead in establishing the International Financial Market (IFM) in April 2002 to develop liquidity management instruments and create an Islamic financial market’ (Kahf 2002, p. 10) and, more recently, the International Islamic Rating Agency (IIRA) conducted research analysis and rating of the IF instrument and institutions.

### **1.2.1.3 The Need for a Comparable Bank Rational Lending Decision Evaluation Methodology**

Typically, conventional instruments of finance have exhibited considerable drawbacks, resulting in the emergence of a number of new requirements in the banking and finance sector worldwide. Among these requirements, risk management and making rational lending decisions are regarded as considerable challenges by financial institutions. Although the discipline of IB and finance has progressed, it still faces the following major challenges (Hakim, Neaime & Colton 2005, p. 122).

- ‘Firstly, similar to CB, IBs have to deal with moral hazard and adverse selection problems. Entrepreneurs with bad credit risk may seek funding on a profit and loss basis and take advantage of the financier, even though religious principles govern honesty and contractual responsibility.
- A second problem with IBs is the lack of consistency regarding instruments that are legally permissible. It is not uncommon for the *shari`a* boards of IBs to have different views regarding the lawfulness of certain products and services, and cross border transactions may be hampered by this uncertainty.
- A third more serious and common problem of conventional and Islamic banking is the asset liability mismatch between sources and uses of funds. Deposits are generally of a short term nature, limiting banks’ ability to engage in profitable long term investment’.

Banking laws and/or regulations in most countries are fashioned on the Western model of finance. The recent expansion of IB, however, calls for re-assessment of these regulations on several fronts. For instance, IB in most countries operates under the supervision of central banks and IBs cannot receive interest on reserve requirements with central banks: other options are needed to provide them with fair returns. Therefore, central banks need to understand the nature of IB techniques which are different from debt-financing.

The performance and efficiency of both IB and CB needs to be studied and compared. Several studies have assessed the performance of IB (e.g.(Ahmad & Hassan 2007; Grais & Kulathunga 2000; How, Abdul Karim & Verhoeven 2005; Kahf 2002; Kuhn 1990), and others studies were applied on CB (e.g.(Beck, Cull & Jerome 2005; Berger & DeYoung 1996; Berger & Humphrey 1992; Berger & Humphrey 1997; Berry, Crum &

Waring 1993), but no comparative cross-banking system study has been conducted to compare the performance of IB with CB taking into consideration risk factor assessment, or to determine their influence on the rationality of lending decision.

## 1.3 Problem Domain of the Study

### 1.3.1 Research Problem

Risk, in general, arises from the uncertainty of a project's survival. The higher probability of insolvency, the higher the risk to banks that loans cannot be repaid. Operations and procedures of lending are somewhat different in conventional and Islamic banking systems (Powell et al. 2004). This difference is a consequence of the nature, role and goals of both systems. Therefore, risks in both systems need to be considered from different angles, because risk assessment<sup>3</sup> and risk determination are also practically different. Today, the Islamic banking system is being given more consideration by investors, depositors, and researchers (Archer & Abdel Karim 2006). It is important to determine how banking systems differ in terms of risk-taking behaviour and decision-making on lending; and whether these banks are capable of better control and rational decision-making when formulating and implementing lending decisions.

In general, rational lending decisions would be based on an in-depth study of several criteria. There are previous studies in the literature (Bessler & Norsworthy 2003; Deshmukh, Greenbaum & Kanatas 1982; Stomper 2005) wherein bankers reported some significant difficulties in both types of banking. These included difficulties in accumulating the information to evaluate customers and their projects, difficulties in encouraging borrowers to repay, and difficulties with seizing collateral and using legal action in collecting bad debts. Indeed, there are many variables surrounding lending decisions in banks which need to be considered (Andersen, Ewald & Northcott 2005; Jacobson & Roszbach 2003). Therefore, the process of making lending decisions in both systems needs further investigation and evaluation to fill the gap in the literature related to successful and safe lending decisions (Stanton 2002). Many problems of risk assessment are universal, and others seem specific to banks' lending policies. Hence, this study aims to address the following research question:

***How do banking institutions determine and assess risk factors and how do those factors influence the rationality of lending decision policies in conventional and Islamic banking systems?***

To address this research problem successfully, three sub-problems need to be considered:

1. How do Conventional Banks and Islamic Banks determine and assess risk factors? In terms of:
  - What risk factors are considered?
  - How are they measured?
  - What is the relative importance of each factor in lending decisions?
2. How do these factors influence the rationality of lending decisions policies in CB and IB systems?
3. Is there a difference in efficiency performance in lending between the two banking groups?

---

<sup>3</sup> **Risk Assessment** means the process of what is being evaluated to make sure the right areas are being considered and minimise occurrence of unpredictable events.

The sound assessment of risk factors increases the chances of making rational lending decisions and contributes to improvement of overall banking efficiency. The assessment of risk factors in CB and IB is investigated and the factors that influence the rationality of lending decisions policies in CB and IB are determined. The study also aims to identify how similarities and differences of lending policies and risk-taking behaviour influence banking efficiency in lending, thus further investigation has been taken to answer the third question which has been incorporated in order to provide contextual completeness to the analysis.

### 1.3.2 Motivation, Significance and Innovation

Measuring risks has been a major focus in recent studies (Jimenez & Saurina 2003). Thus, the prime motivation of this study is to identify, investigate and evaluate whether risk factors have influenced lending decisions in Islamic and conventional banks. Furthermore, the study provides a basis for understanding the reasons for the fluctuating level of decision quality and for examining factors that can be used to remove or reduce credit defaults in both systems. A review of the literature, for example, El-Hawary, Grais and Iqbal (2004), Zaman and Movassaghi (2001) and Thomas (Thomas 2000), showed there is significant debate in Islamic countries about starting and operating financial transactions according to Islamic law—*shari`a*. Managing credits and measuring their risk is a basis of banks' performance and development. Thus, making a comparison between conventional and Islamic systems about managing risk and credit activities provides strong motivation to study credit risk evaluation and management in both systems (Hakim & Neaime 2001).

Making lending decisions has not always been successfully achieved (Elsas, McNamara & Bromiley 1997). Furthermore, decisions need to be based on clear information and the possibility of drawing the objectives/variables as inputs and presenting accurate marginal contribution as outputs (Fujiwara 2003). These issues have provided the impetus for this study which seeks to identify and reduce the volume of risk factors, thereby increasing the efficiency of decisions in Islamic and conventional banking systems. This can be achieved through gaining a better understanding of how risk factors impact on quality of decision-making and efficiency.

A previous study by Cowling and Westhead (1996) emphasised that credit risks are able to be controlled and managed in the public or private financial environment by applying a correct evaluation of costs and profits of loans. The study found that most default loans occur as a result of the loan's cost (input) being greater than the return on asset (output). Overall, the relationship between borrowers and the actions taken by banks at different decision-making levels is a relatively under researched area. This study will consider these aspects and provide a basis that may contribute to the avoidance of an increase in default loans as a consequence of weak decisions, which ultimately result in an increase in banks' losses.

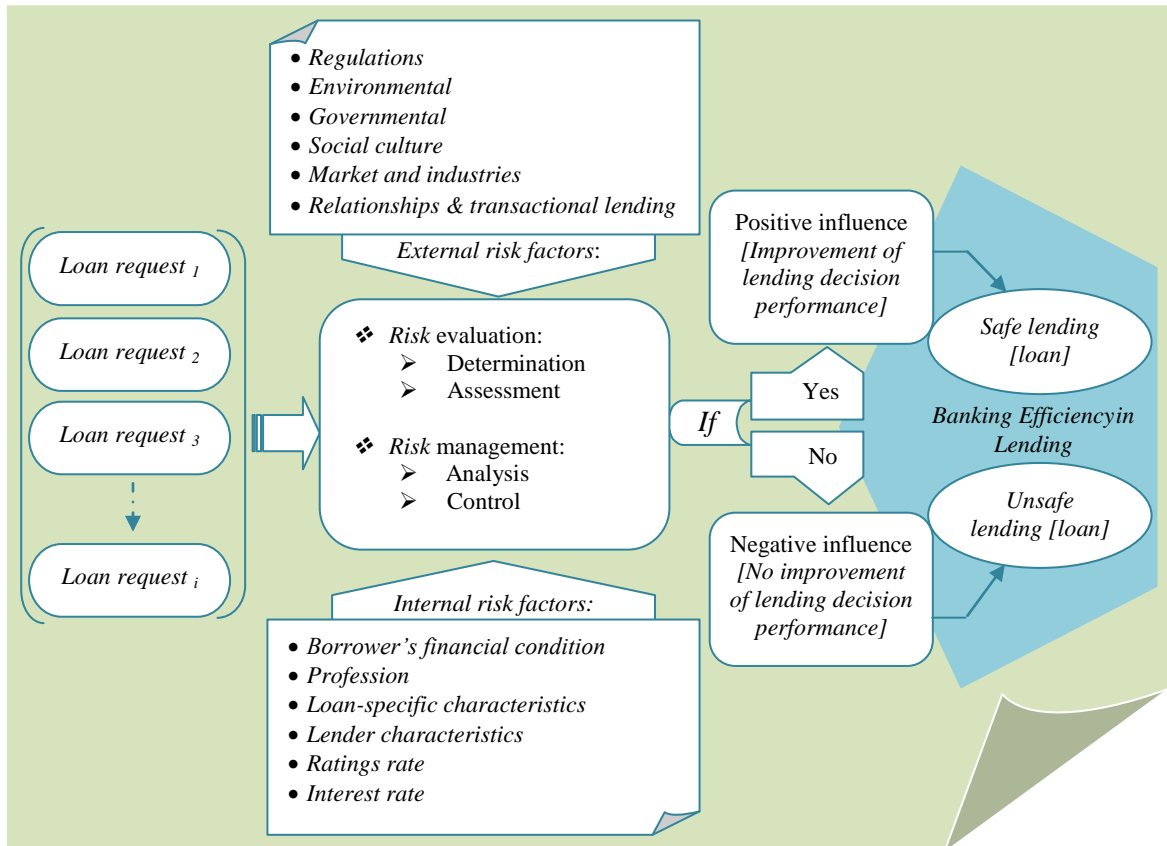
### 1.3.3 Conceptualisation of Theoretical Framework

Theoretically, the study adopts a combination of *four theories*: 1) Transaction Cost Theory; 2) Decision-making Theory; 3) Agency Problem Theory; and 4) Social Theory, as well as the rationality of lending decision model (DGK) model. Joining of these theories has contributed a basis of methodology testing in this area. Also it implements Deshmukh Deshmukh, Greenbaum and Kanatas's (1983) model: to discuss outcomes of risk

factors/effects involving credit risk assessment which influence the rationality of lending decisions in banking institutions.

There are many different types of risk factors and they can be summarized empirically in groups. In the related literature, total risk can be categorised into five main areas: transaction risk, business risk, treasury risk, governance risk and systematic risk (see section 3.4). However, for this study, recognising that total risk can be classified into two groups (internal and external) may assist in effective assessment of the risk factors as presented in Figure 1.2.

**Figure 1.2: Conceptualisation and Theoretical Framework of the Study**



Source: developed by the author for this study, 2008.

The main consideration in this research is determining the conceptual relationships among risks in Islamic and conventional banking systems, and the conceptual relationships among those factors and the rational lending decisions in both systems. Hence, referring to the related literature survey and the nature of the research questions, the conceptualisation and theoretical research framework has been suggested above (Figure 1.2). Essentially, this framework illustrates that lending application processes begin with an evaluation of external and internal risk factors, and then banks seek successful loans by managing and controlling these factors. Basically, the framework is developed on the basis of the difference between banks that have considered risks and those that have not.

## 1.4 Overview of the Research Methodology

The target population is CBs and IBs in five different countries in the Middle East region, namely, Bahrain, Qatar, United Arab Emirates, Jordan and Libya. These countries have undergone a variety of economic and financial experiences, making them an interesting

case study to examine risk factors and the influence of risk factors on the rationality of lending decision processes (Zopounidis et al. 2002). Moreover, these countries in particular have directed much attention and resources to improving the scope and operation of their financial markets.

**Sample selection:** By early 2000, when there were at least 176 Islamic banks worldwide, only 47 of those banks were located in the ME region. According to recent statistics, in terms of assets, ME countries—including GCC countries<sup>4</sup>—held the largest amount of assets [67%] of IBs worldwide (Zaman & Movassaghi 2001). 48 banks (24 IBs and 24 CBs) have been selected for data collection. Because the banking population in ME is small, the sample of 24 IBs and 24 CBs consists 75% and 25% respectively from the targeted population. Banks that were considered to be dual-system have been excluded. This limits the number of banks. A sample consisting of at least 20% from the population is likely to be representative (Groves et al. 2009). Therefore, one can say a sample of at least 24 banks from each banking system is acceptable.

**Data collection:** To cover the study's requirements, two different methods were used for data collection: primary and secondary data. The first data set is for five financial periods from 2002 to 2006 that are available from financial statements such as annual balance sheets, operation income statements, administration documents and reports. This data—secondary data—typically focuses on a particular aspect of behaviour<sup>5</sup>. Thus, this study used this method to collect data used for banks' efficiency behaviour analysis to answer sub-question 3 of the study. The second data set is a questionnaire survey—primary data—which used to answer sub-questions 1 and 2. Five respondents in each bank were surveyed with a focus on decision makers in these banks: the credit department manager, financial department employees, executive manager and *shari`a* board member. The objective was to receive approximately 120 (5 x 24) questionnaire booklets from each banking group—IB and CB—which would facilitate a valid analysis.

**Study instruments:** The research develops the links between theory and model, and phenomenon by deductive methodology (testing theory). Neuman (2006) argues that the deductive approach involves formulating a theory and model which is compared to observations of the phenomena that the theory and model seek to explain to discover if it is consistent with the facts. Statistical instruments will be used to test the hypotheses, and to make a statement about the statistical validity of the results (Sekaran 2000). There are, hence, three major constructs in this project: risk factors assessment, the rationality of lending decisions and banking efficiency in lending. Such constructs are multidimensional and they have multiple variables that incorporate multiple items of assessment for each variable. Accordingly, Multivariate Analysis was chosen for this study, because research statistics such as those yielded by Leedy and Ormrod (2005) and Levine, Loayza and Beck (2000) point to MA being more appropriate for assessing the direction and strength of relationships between independent and dependent variables.

**Data analysis:** The information obtained from 48 banks (24 banks in each group) using the questionnaire method was analysed using parametric statistical techniques with SPSS software. Accordingly, factor analysis and factor scores derived from the principal component (PC) were used to answer sub-question 1, and used as input values for the multiple regression analysis to answer sub-question 2 of the study. Regression was carried

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<sup>4</sup> GCC stands for *Gulf Cooperation Council*, consisting of Bahrain, Kuwait, Qatar, Saudi Arabia and United Arab Emirates (UAE).

<sup>5</sup> The behaviour is quantified in some way for the measurement purpose.

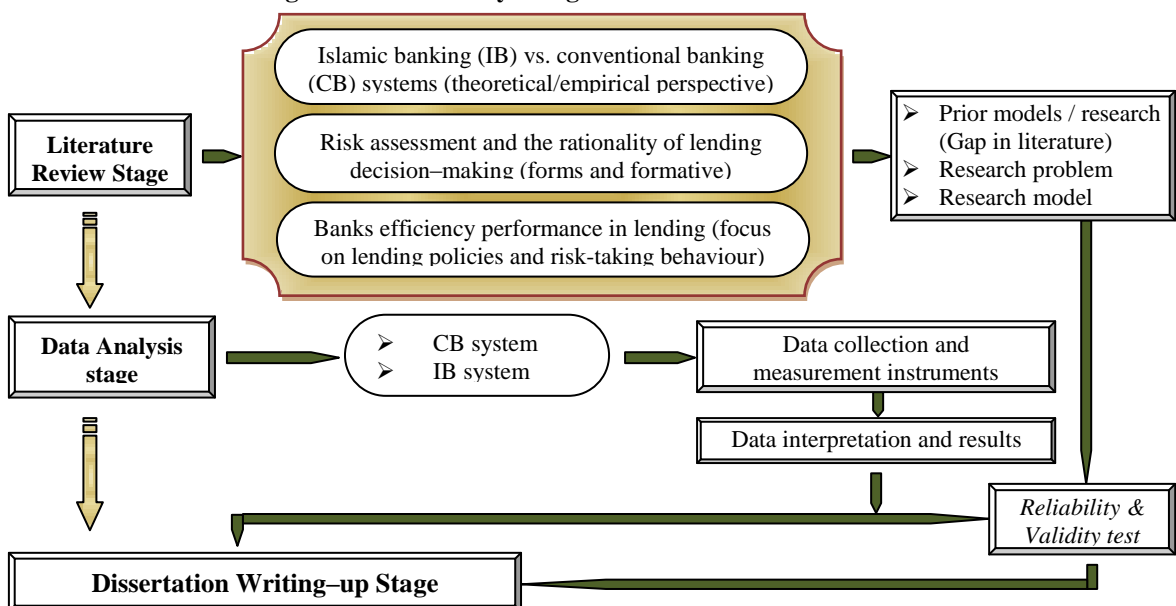


out to measure the association between the project variables which are measured by interval scales. Data gathered from five financial periods was used to answer sub-question 3 of the study. It was analysed using two analytical software packages: non-parametric techniques with E.Views econometric software and DEA-Solver performance software. Data Envelopment Analysis (DEA) was used to analyse the decision performance (efficiency and quality). Finally, this study used a non-linear *Tobit* econometric model to establish which factors are relevant to the lending decision-making process and, further, how much each factor affects the outcome.

## 1.5 Objectives and Research Design

Although, generally, decisions made in banking institutions are ultimately the responsibility of an individual, often a group of people participate in the decision-making process (Huczynski & Buchanan 2001). Also, typically, major errors in decision-making can arise because the original decision problem has been incorrectly formed (Davis 2000). In particular, in lending decision-making the decision can be formulated in a way which fails to take into account fundamental changes that have occurred and affect loans' compensation rates (Goodwin & Wright 2004). Therefore, the primary purpose of this study is to uncover risk factors which affect the banks' performance, especially credit policies, by evaluating the process of lending decisions in CB and IB systems, evaluating whether both banking systems are managing the different risk factors, and recognising the lending and risks relationships. This focus will offer a potentially powerful tool for clarifying how risk factors influence the rationality of lending decisions in both CB and IB systems. Moreover, there are many default credit issues referred to higher financial authorities and the courts, in addition to issues registered at the public/private supervision sector (Banks 2004; Bashir 2000). This study, thus, attempts to investigate reasons beyond these issues by exploring the particular risk factors which influence the rationality of lending decisions. A further purpose of this study is to illustrate and explain the similarities and differences between IB and CB systems in aspects related to the default risk field and performance. Thus, a comparison between both banking systems reflects each system's ability to administer default risks.

Figure 1.3: The Study Design and Achievement Guideline



Source: developed by the author for this study, 2008.

Overall, investigating and developing more advanced techniques for risk factor assessment is an interesting and exciting field for research. Thus, in order to achieve the research objectives, Figure 1.3 shows the research design which has been developed as an achievement diagram of the study.

## 1.6 Major Findings and Concluding Remarks

The scope of the analysis is a comparison of banking systems: Islamic banks with conventional banks which operate in the Middle East region (Libya, Qatar, Bahrain, United Arab Emirates and Jordan). All banks in each banking sample are grouped together, and are stratified into small, medium and large size according to their total assets. Two different analyses have been performed in this study.

Firstly, questionnaire survey method (primary data), principal component analysis, t-test and regression analysis are used to test the relevant research hypotheses (*H1* and *H2*) and answer the first and the second sub-questions of the study. After testing these hypotheses (*H1* and *H2*), the main findings are:

- **Risk factors assessment:** To some extent, there is a difference between CB and IB in terms of risk *visibility*, but risk *feasibility* is almost the same. In addition, results indicate these counterparts of Islamic banking system are more efficient than non-Islamic banking system in terms of risk assessment. This means banks with Islamic law perform differently to banks without Islamic law in terms of risks assessment but, statistically, not significantly so. However, some differences were revealed: some risk factors which are *applicable* to CB, are *inapplicable* to IB (e.g. some transaction risks), and vice versa (e.g. sharing risk).
- **Approaches and importance of measuring risk factors:** There are no specific *models of risk measurement* that have been used by both systems to measure such types of risk. However, banks in both IB and CB systems often follow a similar pattern in terms of measuring risk factors. Moreover, results confirm that the incentive of quantifying risk models designed by researchers and practitioners in the finance fields for the agent principals is beneficial in controlling risk exposure and banks' consistency.
- **Risk factors and rationality of lending decision relationship:** Results reveal that relationships—positive/negative—exist between risk factors and the policies of lending portfolio management. Furthermore, results suggest that risk factors which influence the rationality of lending decisions are somewhat varied between IB and CB systems. Basically, to some extent, the results provide evidence that risk factors influence the rationality of the lending decision and these are different in IB and CB. Additionally, the rationality of lending decision is impacted by applying some risk measurement models/approaches that are broadly used in the finance industry. To sum up, even though the rationality of lending decision making in each banking system has been influenced by different risk factors, the correlation between some of them is not clearly formed.

Secondly, annual reports from 2002 to 2006 (secondary data) and Data Envelopment Analysis (DEA) technique are used to estimate scores efficiency (technical efficiency). Then, the efficiency scores are regressed as dependent variables with an independent

explanatory variable to examine whether lending policies in the IB and CB are significantly different. At this stage, the relevant research hypothesis—*H3*—can be tested and answer the third sub-question of the study. The third hypothesis is tested and it was revealed that:

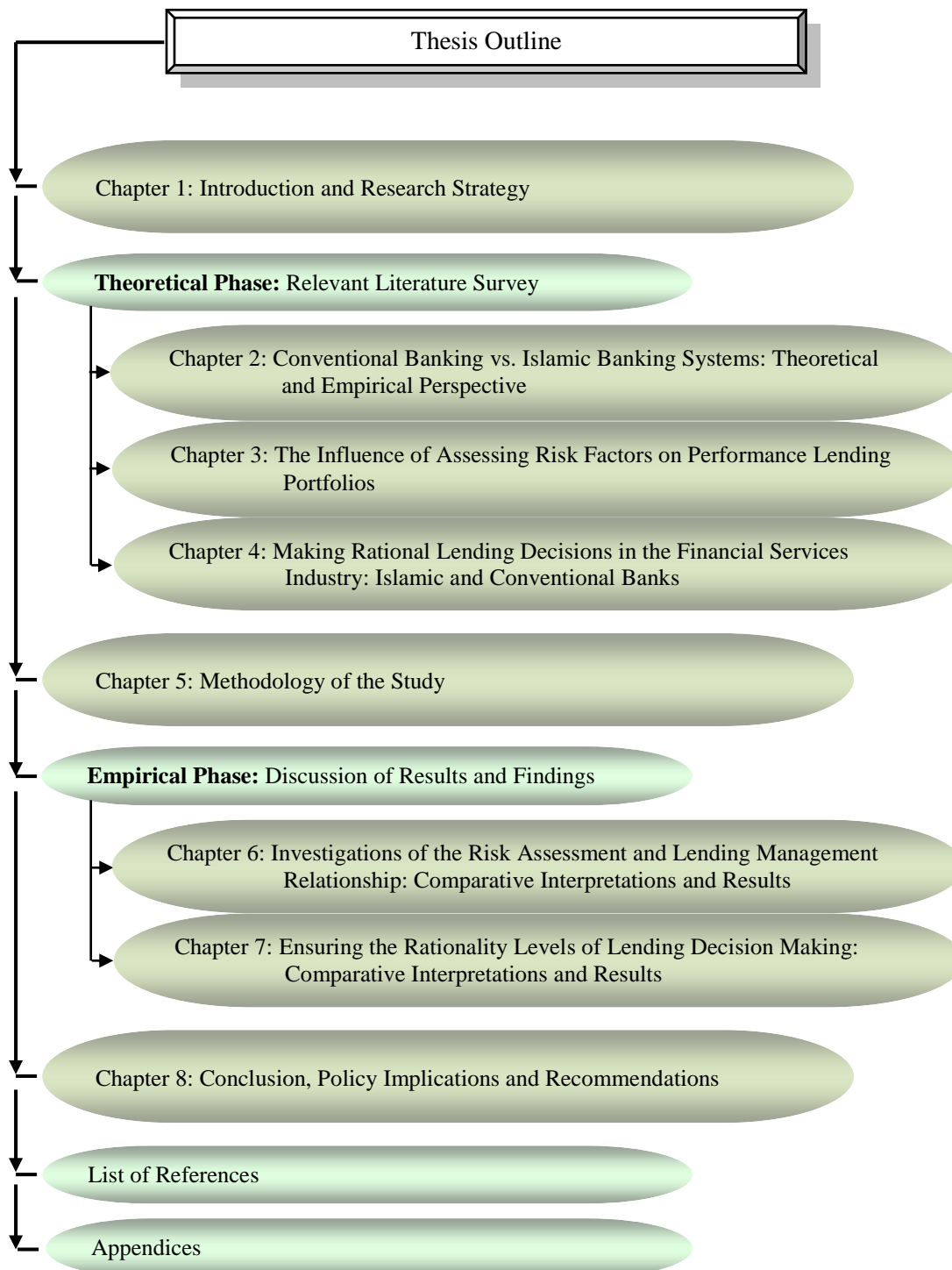
- 1. Banks' efficiency and competition:** A profile of a bank's risk-return is affected by its mix of debt and equity securities used to finance its asset portfolio. In particular, no banks with lower efficiency are even remotely ready to enter into competition with banks of higher efficiency. At the same time, the growth and experience of the Islamic banking system has allowed it to operate closer to efficient scales and with comparable or even better levels of managerial efficiency than conventional banks. Even though the Islamic banking system was established later than conventional banking, it appears to be the very best competitor amongst other systems in the finance industry, whereas the results suggest that the Islamic banking system, even the large, medium or small ones, have proved to be the expected formidable competitor.
- 2. Risk Assessment Experience:** Results revealed banks that have greater monitoring incentive and capabilities, higher risk, and greater control over borrowers, operate at higher yield efficiency and are sustainable for longer maturity of loans. Moreover, banks with lower monitoring of these factors actually attain lower performance. Islamic banks, despite their experience compared to conventional banks, appear to perform much better in terms of risk management and risk taking behaviour (risk sharing).
- 3. Lending Decision Success:** In making efficient or rational lending decisions, results presented indicate that many aspects need to be considered, but the success in Islamic banking mostly results from using the unique rule (*shari`a law*). Along with this rule, the Islamic banking 'outperformance' may be attributable to the instruments of finance which have been used in this system.

## **1.7 Organisation of the Thesis—Thesis Outline**

The organisation of this thesis broadly falls under two segments, firstly, the comparative theoretical component and, secondly, comparative empirical investigation and discussion of the study results. After surveying and integrating the information available in the existing banking and finance literature regarding the role and nature of IB and CB, theories and evidence, banking experiences and capability, contemporary banking crises are elaborated on further in Chapter 2. Next, the rule of risk management and control are presented in Chapter 3. Third, the theoretical and empirical perspectives of managing and making rational lending decisions in both IBs and CBs are provided in Chapter 4. Sets of sampling selection, data collection methods used and testing instruments are outlined in Chapter 5. The remaining two chapters are integrated to present the comparative discussions and results. Chapter 6, therefore, provides comparative discussions on how IBs and CBs assess risk factors and whether these risk factors influence the rationality of their lending decision polices, and Chapter 7 provides comparative discussions on the banks' efficiency in terms of making rational lending decisions. Lastly, the conclusion, limitations and suggestions for future research are elaborated in Chapter 8, along with a

discussion on some of the implications arising from this study. Figure 1.4 provides a visual overview of the structure of this thesis.

**Figure 1.4: Organisation of the Thesis**



## **CHAPTER TWO**

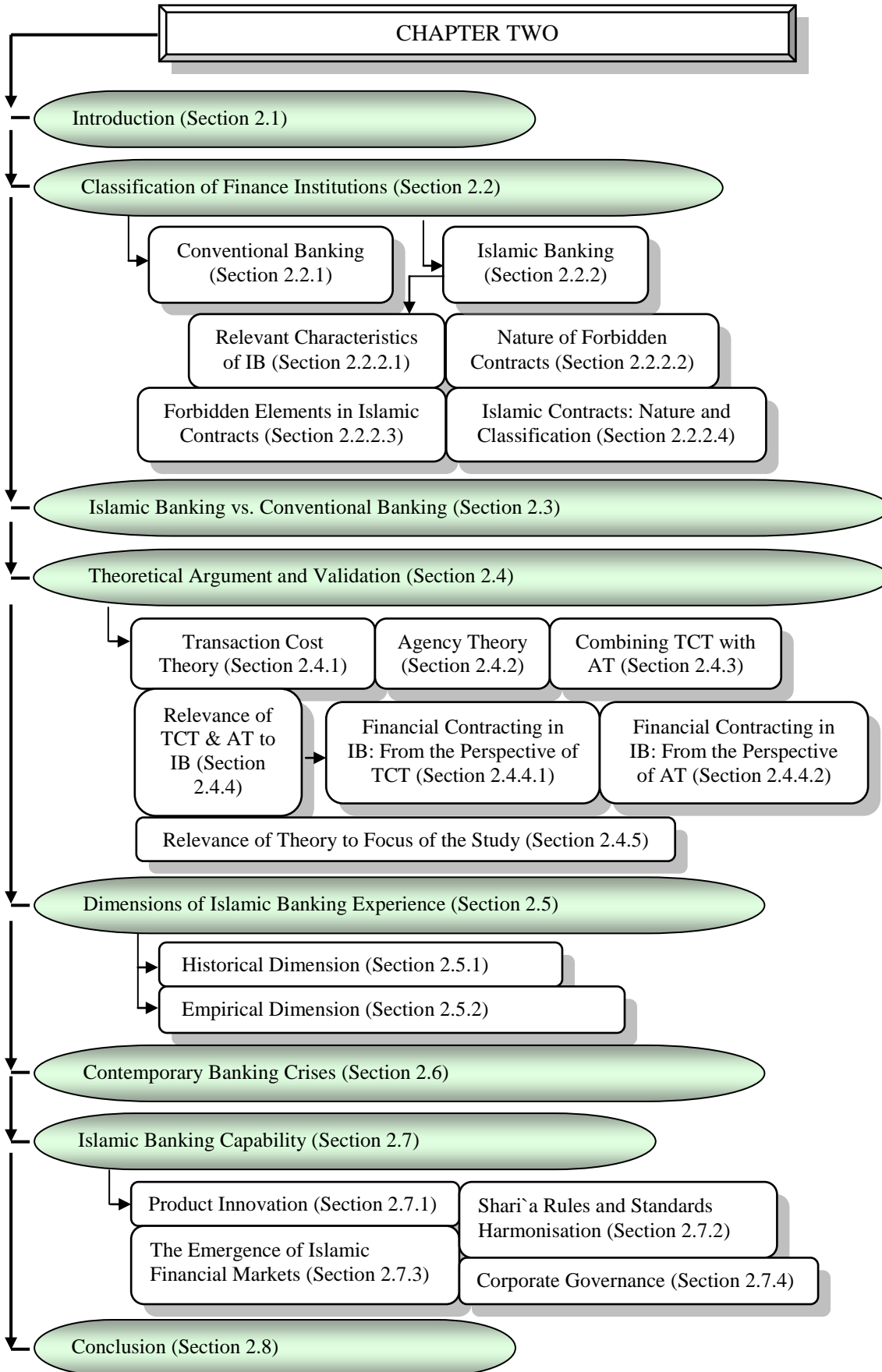
### **CONVENTIONAL BANKING VS ISLAMIC BANKING SYSTEMS: THEORETICAL AND EMPIRICAL PERSPECTIVES**

#### ***2.1 Introduction***

The primary objective of this chapter is to review the literature related to Islamic Banking (IB) and Conventional Banking (CB) in terms of the structure of the respective financial systems. The secondary objective is to provide a contrast between banks that are providing similar financial products and services, but hold different policies and principles (IB and CB), with a focus on the relevance of Transaction Cost Theory and Agency Theory to Islamic finance and conventional finance. Approximately three decades ago, Islamic banking was virtually unknown. Now, more than 55 developing Islamic countries have some current involvement with Islamic banking and finance. According to the International Association of Islamic Banks, Islamic financial institutions are operating not only in Islamic countries, but also in non-Islamic countries and regions such as the North and South Americas, Europe, Cayman Islands, South and South Eastern Asia, and Australia (Ahmad & Haron 2002). Regardless of the location, however, Islamic banks are required to operate under Islamic financing principles.

The chapter is organised as follows. Section 2 reviews the classification of finance institutions by focusing on Conventional Banking and Islamic Banking contracts. Section 3 covers the similarities and differences between IB and CB systems. Section 4 discusses the relevance of selected theories to Islamic banking and finance. The foci of section 5, section 6 and section 7 are Islamic banks' experience, banking crises, and capability respectively. Section 8 provides a summary of conclusions. Figure 2.1 provides a visual overview of the structure of this chapter.

**Figure 2.1: Outline of Chapter 2 Interrelations**

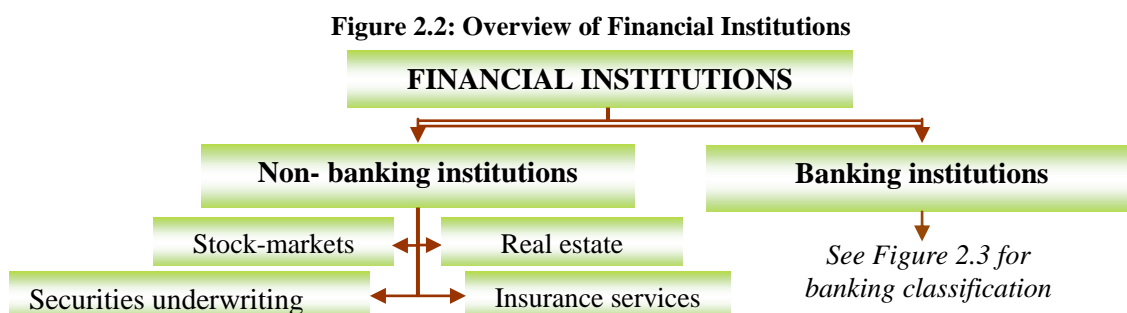


## 2.2 Classification of Financial Institutions

Banks perform many functions, some central to their main role in financial intermediation and others more peripheral. Practically, there are three major interrelated banks' functions:

1. The creation of money accomplished through lending and investing activities;
2. The holding of deposits; and
3. The provision of a mechanism for payments and transfers of funds or intermediation.

These functions match the different types of banks. Roussakis (1997) argues that there are several ways of classifying a system of banking/financial institutions. From a regulatory perspective, however, banks are classified on the basis of different market segments as shown in Figure 2.2. Basically, banks are classified into seven groups based on their scheme of involvement: activities, operational structure, bodies, ownership, location, performance and their main objective. Definitions of some existing banks are provided in Appendix C.



*Source: developed by the author for this study, 2008*

These groups are depicted in Figure 2.3. Consequently, a comparison of banking systems requires an understanding of the characters of such systems. More specifically, it requires an understanding of reason as to why each banking system differs from other systems. The first comparative observation on aspects of banking institutions shows that there is enormous variation of rules applicable to Islamic banking and other banks. The foremost aspect is that IB transactions are restricted to the concepts of Islamic law (*shari`a*)<sup>6</sup>.

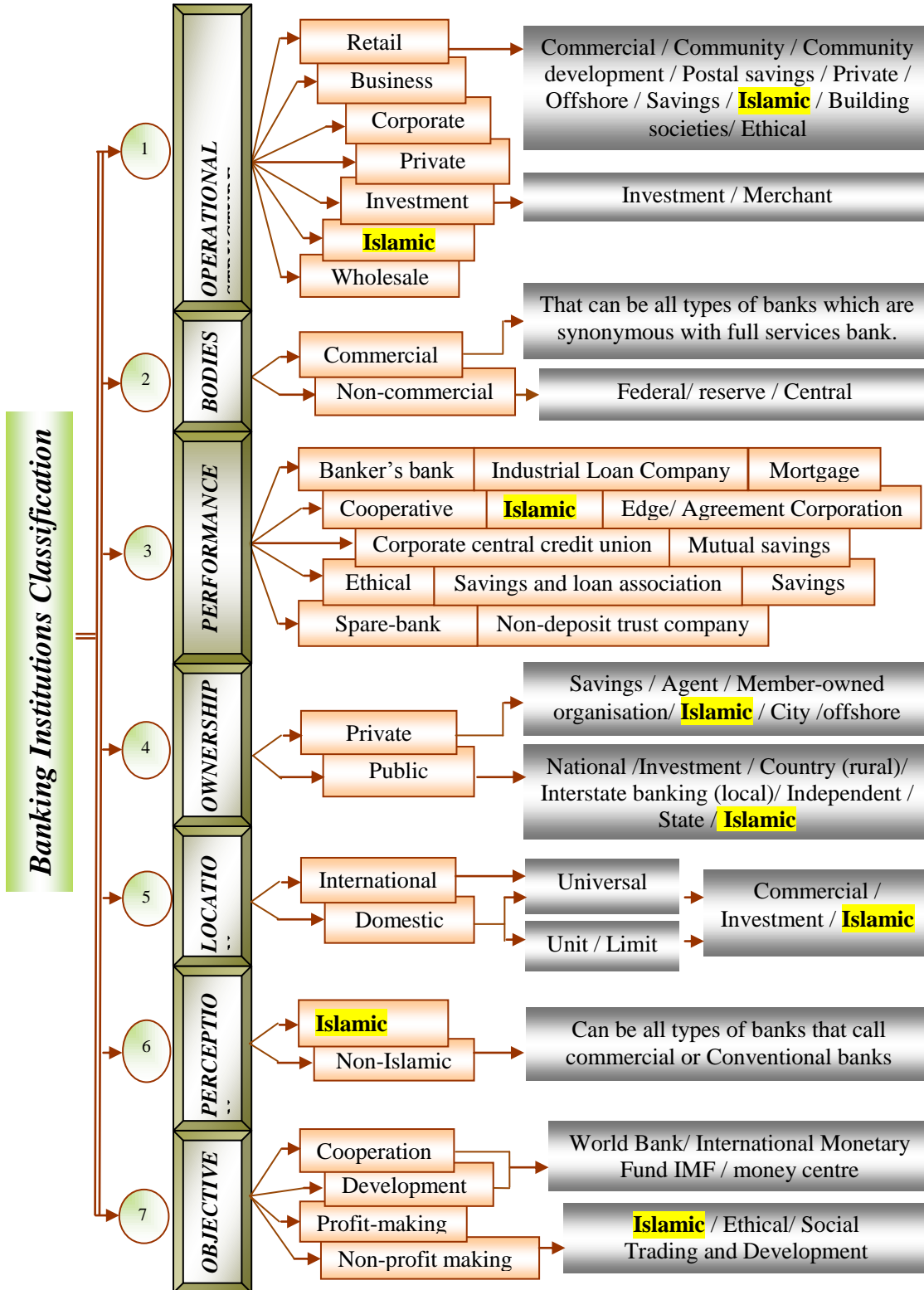
### 2.2.1 Conventional Banking

Conventional banks (CBs) are usually the major type of financial intermediary in any economy. They are the main providers of credit to households and the corporate sector. CBs are typically partnership and corporation ownership (joint stock) companies and may be either publicly listed on the stock exchange or often privately owned (De Lucia & Peters 1993). Furthermore, Casu, Girardone and Molyneux (2006, p. 5) state 'CBs deal with both retail and corporate customers, have well diversified deposit and lending bases and generally offer a full range of financial services'. While CBs refer to institutions

<sup>6</sup> *Shari`a* is the sacred law of Islam. It is derived from the *Qur`an* (the Muslim Holy Book), *Sunna* (the saying and deeds of Prophet Mohammed), *Ijma* (consensus), *Qiyas* (reasoning by analogy), and *Maslaha* (consideration of the public interest or common need). These *shari`a* sources are ordered from the most strength (*Qur`an*) to the weakest (*Maslaha*).

whose main business is deposit taking and lending, they are also engaged in the provision of other services such as investment banking, insurance and financial planning services and investment advisory services. They also hold a major share of the retail banking market.

Figure 2.3: Classification of Financial and Banking Institutions



Source: created by the author. 2008



Casu, Girardone and Molyneux (2006) report that CBs are authorised deposit-taking institutions (ADIs) and are also known as monetary financial institutions (MFIs). They also emphasised that MFIs play a major role in a country's economy in that deposit liabilities form a major part of a country's money supply and MFIs are, therefore, indirectly responsible to governments and central banks for the transmission of monetary policy. Economists generally argue that bank deposits function as money; as a consequence, an expansion of bank deposits results in an increase in the stock of money circulating in an economy.

The conventional financial system has experienced a metamorphosis in the last few decades. This was brought about by three major factors:

1. The concomitant decisions by the monetary authorities to adopt more market oriented policies in achieving their stated objectives (Brown & Skully 2003).
2. The impact of new technology on communication and data transmission which inexorably linked local financial systems to the international financial community and allowed specialist financial services providers to compete directly with traditional financial services organisation (James & Smith 1994).
3. A decade or more of world economic instability led to an unregulated environment and resulted in misleading information on the quality of investment portfolios.

Recently, MacDonald and Kock (2006) examined the operational and regulatory environment, as well as five fundamental forces of change that have changed the banking landscape, namely, market-driven competitive factors, product innovation in response to deregulation, securitisation, globalisation, and technological progress. In order to understand the development of modern banking systems, one must understand the changes in banking regulations (Barth, Caprio & Levine 2006). Notably, barriers that once separated banking from the other 'non-bank' activities have rapidly disappeared after regulatory changes in the banking and financial services industry. This has created opportunities for efficient banks and related firms, but has also imposed pressure on management to bring about more competitive banking practices.

As operational differences among CBs, savings and loans institutions, credit unions, investment banks, and insurance companies rapidly disappear, the concepts and business models identified in the finance and banking literature become generally applicable to any firms involved in the lending and deposit taking business. However, CBs have continued to be heavily regulated industry partners of financial institutions in worldwide business sectors (Brown & Skully 2003). This largely reflects the critically important role banks play in the financial services industry.

The literature on finance presents five reasons for regulating banks, namely:

1. To ensure the safety and soundness of banks and financial institutions.
2. To provide an efficient and competitive financial system.
3. To provide monetary stability.
4. To maintain the integrity of a nation's payments system.
5. To protect customers from abuses by credit-granting institutions.

Goodhart (1998, p. 44) argued that 'parliaments enact laws, impose regulations and supervise the banking and financials to prevent them (especially banks) from taking undue risks'. Obviously, these five goals are not independent because the achievement of dependability cannot be self-sufficient.

As mentioned above, the metamorphosis in banking has, for the most part, occurred in the operational and regulatory environment. The introduction of changes had a significant impact on the structure, conduct and performance of the banking sectors—not only in the transition-economies, but also in developed-economies. In Australia, for instance, the first major development occurred after 1945 with the formation of the Reserve Bank (RB) as a separate entity from the Commonwealth Banking Corporation (Arpa et al. 2001). In the USA, the introduction of new technology has produced a wide range of product innovations such as point of sale terminals (POST), videotex, and delivery innovation such as automated teller machines to serve customers (Graddy, Spencer & Bransen 1985).

Since the formation of monetary policy in 1959, and leading up to the late 1980s, some governments recognised the independence of the banks and their responsibility in the achievement of monetary policy targets. In recent years, the Central Banks have taken steps to ensure that monetary policies and their tools are transparent. A study by Jeon and Miller (2003) emphasised that, unlike past practice, changes in finance policy and related regulations are now clearly announced and explained by monetary authorities. In addition, banks have improved their public commentary on the economic outlook and monetary policy settings through the media and regular quarterly reporting.

Such changes have given consumers more choices than ever before when purchasing financial services. Not surprisingly, firms in the financial services industry compete aggressively for new market niches and increased shares in existing markets. This means they need to work constantly on innovations in product and delivery services and ensure they provide personalised financial services for individuals and businesses. In some cases, however, opportunities are not the same for all service providers because the industry is yet to achieve a level playing field (Strandvik & Liljander 1994). Even though CBs have gained greater flexibility in diversifying their asset bases across geographic boundaries and the introduction of new product lines in recent years, disparities between regulatory regimes often place them at a competitive disadvantage compared with IB.

### 2.2.2 Islamic Banking

There are no clear-cut definitions of the terms of ‘IB’ or ‘Islamic banking business’ in the relevant contemporary literature. Instead, a flexible approach to defining such an institution and its business has been adopted. For example, Mudawi, cited in Archer and Karim (2002, p. 123), reported that the International Association of Islamic Banking (IAIB) has defined IB as follows:

‘The Islamic Banking basically implements a new banking concept, in that it adheres strictly to the rulings of the Islamic law—*shari`a*—in fields of finance and other dealings. Moreover, the bank, when functioning in this way, must reflect Islamic principles in real life. The bank should work towards the establishment of an Islamic society; hence, one of its primary goals is the deepening of the religious spirit among the people’.

The above definition has failed to provide an accurate account of the very meaning of IB. It tends to highlight the objectives of IB more than anything else. The fact remains that ‘an Islamic bank is a company that is acting as a financial intermediary between depositors or borrowers as the case may be, and fund users, as well as providing various other banking services’ (Archer & Karim 2002, p. 75). Therefore, the functions of IB seem parallel to those of a conventional or interest-based banking, as both act as a financial intermediary.

In order to carry out banking business, IBs must comply with Islamic standards as well as the prudential requirements of the regulators. Thus, it is important to closely examine the meaning of the term ‘Islamic banking’. According to the Islamic Finance Act 1983 of Malaysia (section 2), an Islamic banking business is defined as one whose aims and operations do not involve any element which is not approved by the religion of Islam (Archer & Ahmad 2003). Thus, it appears that the term ‘Islamic banking business’ has not been properly defined.

In general, an Islamic bank is a company or corporation licensed by the relevant authority to carry out Islamic banking business according to the rules and principles of *shari`a* law (Zaher & Hassan 2001). Islamic banking business, on the other hand, means accepting deposits or investment from customers and providing financing facilities to customers (financial intermediation), as well as performing related services to customers under the purview of normal banking practices (Zaman & Movassaghi 2001). All of these activities must, however, follow the *shari`a-compliance*.

Before considering an appropriate definition of IB and Islamic banking business, it is important to examine the recent development of the Islamic financial industry that is occurring in various parts of the world. Islamic law prohibits the payment of *riba*<sup>7</sup>—interest—but does encourage entrepreneurial activity (Zaman & Movassaghi 2001). As such, banks that wish to offer Islamic banking services have to develop and offer products and services that do not charge or pay interest. Their solution is to offer various profit-sharing-related products whereby depositors have to absorb a share in the risk of the bank’s lending investment.

It is useful to note the specific characteristics of Islamic Banking Institutions (IBIs) which outline financial transactions under the rule of financial legislations and Islamic law, the method of funds re-deployment, and wealth distribution to benefit all members of the banks in accordance with the provisions of Islam or Islamic law—*shari`a* (Saeed 1999). The Islamic financial industry also accommodates customer expectations by introducing many Islamic investment techniques, such as speculation (*Mudaraba*)<sup>8</sup>, bargaining (*Murabaha*)<sup>9</sup>, and profit-sharing, to enhance its contribution to the financing of government and private sector projects (Mondher & Siwar 2004).

### **2.2.2.1 Relevant Characteristics of Islamic Banking**

Islamic banks are funded organisations based on Islamic ethics and are established with the mandate to carry out their business and financial transactions in strict compliance with Islamic *shari`a* principles. To do so, every IB must have a board of *shari`a* scholars, a *shari`a* supervisory board (SSB), to review the juristic correctness of the bank’s transactions (Archer & Karim 2002). Additionally, broad-based economic well-being, social and economic justice, and equitable distribution of income and wealth are the primary objectives of Islamic finance (Sarker 1999). To achieve these commitments of

<sup>7</sup> *Riba* (interest): this is any return/reward or compensation charged on a loan contract as well as charged in rescheduling debts; it is strongly prohibited in Islam.

<sup>8</sup> *Rabb -ul- mal* (capital’s owner) provides the entire capital needed to finance a project while the entrepreneur offers his labour and expertise. Profits are shared between them at a certain fixed ratio, whereas financial losses are exclusively borne by *rabb -ul- mal*. The liability of the entrepreneur is limited only to his time and effort.

<sup>9</sup> The seller informs the buyer of his cost of acquiring or producing a specified product. The profit margin is then negotiated between them. The total cost is usually paid in instalments.

Islam, different Islamic investments products have been established by Islamic institutions.

*Morabaha*, for instance, which is equivalent to mark-up financing, ultimately creates instruments to provide financing of such economic transactions. Consequently, *Morabaha* is '[a] common instrument used for short-term financing based on the conventional concepts of purchase finance' (Dhumale & Sapcanin 2003, p. 34). The seller reports to the buyer the cost of acquiring or producing a good, and then a profit margin is negotiated between the two parties. 'Typical asset-backed security in the conventional system is a claim against a pool of assets; Islamic instruments are claims against individual assets' (Anwar 2003, p. 63). A distinct feature of such financial securities is that they resemble conventional debt securities characterised by a pre-determined pay-off with the difference being that Islamic instruments are collateralised against a real asset or economic activities.

In a *Modaraba* contract, an equivalent for a trustee finance contract, an economic agent with capital can develop a partnership with another economic agent who has expertise in deploying capital in real economic activities with agreement to share the profits (Hasan 2002). Accordingly, losses are borne by the capital owner only, as the other does not hold any capital. Further, though the capital owner is exposed to a loss or risk, he is not entitled to participate in the management of the funds; this is exclusively left to the other partner.

In the case of *Mushraka*<sup>10</sup>, which is similar to equity participation, the capital owner enters into a partnership by contributing equity with others in return for sharing profits and losses at a predetermined ratio. The partners' contributions need not be equal, and contributions may be in the form of physical or intangible capital, such as labour, management, skill and goodwill (Lewis & Algaoud 2001). Accordingly, profits are shared in pre-agreed ratios, but losses are borne in proportion to equity participation. It conforms to the principle of profit and loss sharing and it is suitable for long-term project financing; hence, it is considered to be the purest form of Islamic finance. Thus, *Mushraka* financing is closer to a traditional equity stake with rights of control.

In between these three mainly used instruments of *Mushraka*, *Modaraba* and *Morabaha*, there are other collateralised securities, such as *Ijara*<sup>11</sup> (similar to a lease, lease purchase arrangement), *Kifala* and *Amana* contracts. Figure 2.4 shows an exclusive classification of contracts governing financial activities into transactional and intermediation contracts in an Islamic financial system. Transactional contracts govern retail sector transactions that include exchange, trade and other financing activities. The intermediation contracts not only govern indirect financial instruments, but also facilitate the efficiency and transparency of the execution of transactional contracts (El-Hawary, Grais & Iqbal 2004). Transactional and intermediation contracts offer a set of financial instruments which could be used for varying purposes, such as aspects related to:

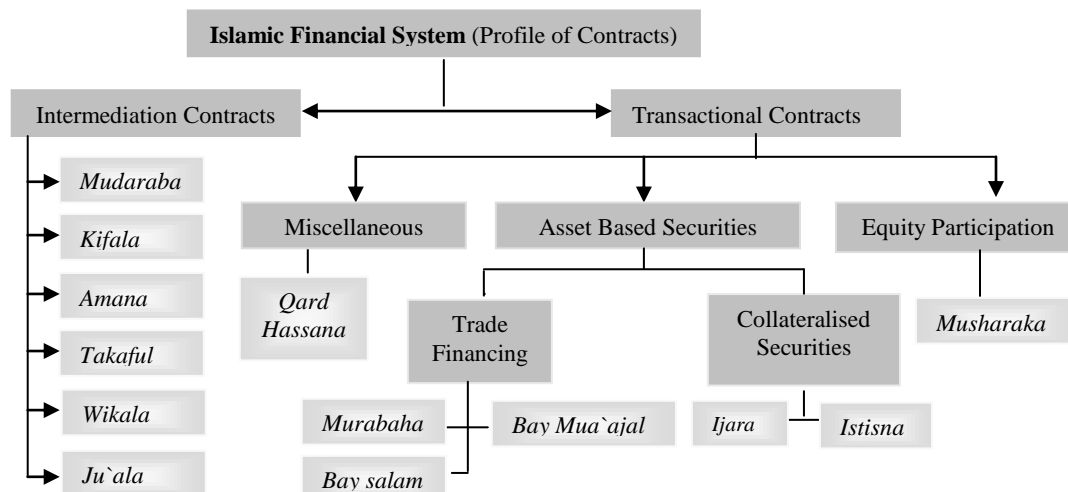
- Medium and longer maturity investments, and
- Degrees of exposure risk to satisfy a diverse group of financial principals.

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<sup>10</sup> The bank enters into an equity partnership agreement with one or more partners to jointly finance an investment project. Profits (and losses) are shared strictly in relation to the respective capital contributions.

<sup>11</sup> A party leases a particular product for a specific sum and a specific time period. In the case of a lease purchase, each payment includes a portion that goes toward the final purchase and transfer of ownership of the product.

Figure 2.4: Islamic Financial System



Source: El-Hawary, Grais and Iqbal (2004).

### 2.2.2.2 Nature of Forbidden Contracts

The term ‘forbidden contracts’ in Islam arises from a number of barter arrangements peculiar to non-Islamic trading markets which are expressly forbidden by the *shari`a*. It is from the explicit prohibition of such barter arrangements that Islamic law developed its strict rules about the definition of the objects and terms of contract. Examples of forbidden contracts are found in: *Muzabana*, *Muqaqalah*, *Mulamsah* and *Munbudha*<sup>12</sup>. Generally, permissible contracts in Islamic law should be: 1) *Halal* trades or transactions (permissible products and services); 2) based on mutual agreement (both parties agree); and 3) in line with requirement of *shari`a* (e.g. not based on *riba*, *haram* or fraud).

### 2.2.2.3 Forbidden Elements in Islamic Contracts

Generally, the practice of including or excluding publicly traded securities from investment portfolios or mutual funds is based on the religious and ethical precepts of the Islamic law *shari`a*, and this is known *shari`a* screening function. This means Muslim investors seek to own profitable companies that make positive contributions to society. Certain transactions are incompatible with *shari`a*. Consequently, stocks of companies whose primary business is not permissible according to the Islamic law *shari`a* are excluded, such as companies that receive a major portion of their revenues from alcohol, tobacco and pork-related products or interest based financial institutions. ‘Among the most important teachings in Islam for establishing justice and eliminating exploitation in business transactions is the prohibition of all sources of unjustified enrichment’ (Sarker 1999, p. 17). There are three aspects of forbidden elements in Islamic contracts which may induce investors to seek unjustified enrichment; *Riba*, *Gharar*, and *Maysir*. These are explained as follows.

1. **Riba or Interest** is completely prohibited under Islamic law. *Riba* is seen as a permanent source of unjustified advantage because *shari`a* does not consider money as a commodity with a price for its use (Saeed 1999). However, the term of *riba* or interest is used in the *shari`a* in two senses, *riba-an-nasiah* and *riba al-fadl*<sup>13</sup>.

<sup>12</sup> For further information, see Appendix A.

<sup>13</sup> For further information, see Appendix A.

The absolute prohibition of *riba* or interest in the *Qura`n* and *Sunna* is a command to establish an economic system from which all forms of exploitation are eliminated; in particular, ‘the injustice of the financier being assured of a positive return without doing work or sharing in the risk, while the entrepreneur, in spite of his management and hard work, is not assured of such a positive return’ (Sarker 1999, p. 24). The prohibition of interest is a way to establish justice between the financier and entrepreneur.

**2. *Gharar* or Dubiousness in Contract:** the *shari`a* determined that in the interest of fair and transparent dealing in the contracts between the parties, any unjustified enrichment that arises out of uncertainty or from an effort to define the essential pillars of the contract is prohibited. Thus, *gharar* originated out of deception through ignorance by one or more parties to a contract. Sarker (1999) clearly states several types of *gharar*, all of which are forbidden (*haram*) in Islam, such as:

1. Selling goods that the seller is unable to deliver.
2. Selling known or unknown goods against unknown prices.
3. Selling goods without specifying the price.
4. Selling goods without a proper (or with a false) description.
5. A contract conditional on/with an unknown event.
6. Selling goods without allowing the buyer to properly examine them.

The above points indicate that, in order to avoid *gharar*, the contracting parties must: 1) ascertain that both the object and the price of the sale exist and subjects are able to be delivered; 2) specify the characteristics and amounts of the counter value; and 3) define the quantity, quality of goods/services and date of future delivery, if any.

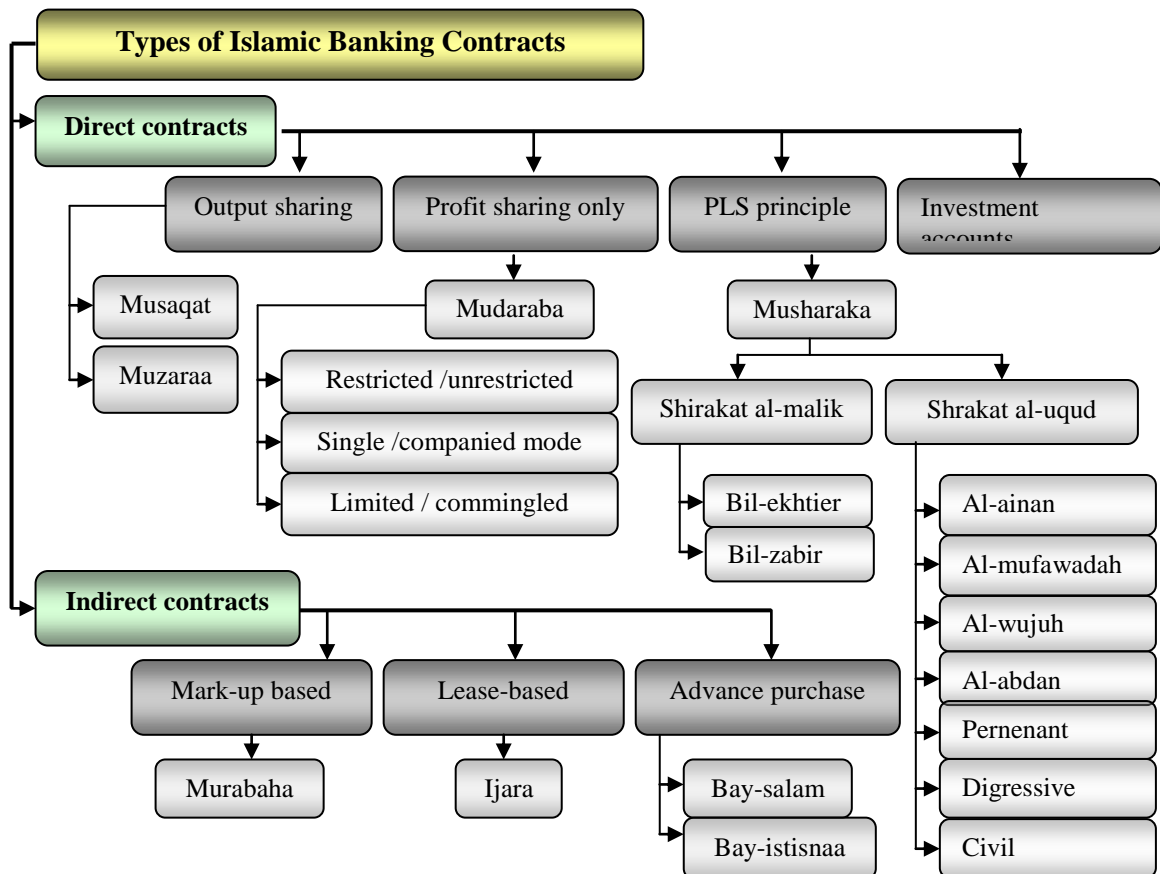
**3. *Maysir* or Gambling:** it is important to know what is the difference between speculation and gambling. Every trade involves speculation: the purchased goods may go up or down in price. Speculation in productive trade and investment creates value for society and, therefore, cannot be equated to gambling. In contrast, in pure gambling, money changes hands based on chance, without any underlying productive activity taking place. Of course, if a business’s primary activity is deemed unproductive (e.g. a casino, or a beer brewery), then Muslims are not be permitted to own shares in that company since owning such shares constitutes an implicit participation in the business’s activity. Thus, the prohibition of *maysir* arises from the premise that an apparent agreement between the parties is, in actuality, the result of immoral inducement provided by false hopes in the parties’ minds that they will profit unduly by the contract (Graiss & Pellegrini 2006; Lewis & Algaoud 2001).

#### **2.2.2.4 Islamic Contracts: Nature and Classification**

The legal form of an Islamic contract sheds light on how capital is raised, how labour is employed, how factors are remunerated, who makes decisions, how many enterprises or contracts are dissolved, and who bears the risk of failure. Those types of contracts that were in use before and during the time of the Prophet (Mohammed) and did not prohibit are accepted as legal forms of Islamic venture or contracts (Archer, Abdel Karim & Al-Deehani 1998; Sarker 1999). Therefore, the *shari`a* provides various modes of finance or business contracts, each of which has its own distinctive features and utilisation methods. The implementation of the distinctive features of the above individual contracts is summed up by Sarker (1999), and Archer, Abdel Karim and Al-Deehani (1998) as follows:

1. *Bay-salam* and *Murabaha* (mark-up) can be regarded as debt-based modes of contract because the finance user is obliged to pay back the entire financing, while in *Mudaraba* and *Musharaka* the finance user pays according to the profit-loss sharing.
2. In the *Mudaraba* and *Bay-salam*, the financier has no role in the management of funds in the contract. With *Murabaha* and *Ijara*, the financier has full control over the funds maturity.
3. In *Mudaraba* mode, the owner (capital provider) is responsible for bearing all financial loss, while in *Musharaka*, the owner will bear the financial loss in proportion to the capital in the total investment.
4. In *Mudaraba* and *Musharaka*, uncertainty of the role of return on capital is very high due to asymmetric information which creates moral hazard and adverse selection problems. Further, the rate of return is fixed and pre-determined in other modes of contracts. Figure 2.5 shows different modes of Islamic contracts<sup>14</sup>.

Figure 2.5: Islamic Banking Contracts—Conceptual Relations Outline



Source: created by the author, 2008

Under corporate Islamic banking, the main consideration of these institutions is providing services to their customers free from interest, and the giving or charging of interest is prohibited in all transactions. Islam principles ban Muslims from charging or giving interest. This prohibition makes an Islamic banking system functionally different from a

<sup>14</sup> Due to the diversification of financial contracts, Islamic scholars and practitioners found that grouping them by some common characteristics is helpful in making empirical judgments. Accordingly, Islamic contracts can be classified into two broad categories: direct and indirect, as shown in Figure 2.5 above.

conventional banking system<sup>15</sup>. Recall, also, that ‘technically, *rib`a* refers to the addition in the amount of the principal of a loan according to the time for which it is loaned and the amount of the loan’ (Lewis & Algaoud 2001, p. 2). According to Vogel (2000), while previously there was a debate as to whether *rib`a* relates to interest or usury, there now appears to be consensus of opinion among Islamic scholars that the term extends to all forms of interest.

Nevertheless, the term *rib`a* in Islamic law (the *shari`a*) means an addition. Lewis and Algaoud (2001, p. 3) defined the *rib`a* as ‘[a]n addition, however slight, over and above the principal’. Furthermore, according to Khan and Mirakhor (1990, p. 359), ‘the term *rib`a* means that the concept is extended to cover both usury and interest; is not restricted to doubled and redoubled interest; and applies to all forms of interest, whether large or small. Thus, the Islamic injunction is not only against exorbitant or excessive interest, but also against a minimal rate of interest’.

As previously asserted, an Islamic bank must comply with Islamic law; the *shari`a*. This involves a number of elements as follows:

1. *Rib`a* is prohibited in all transactions.
2. Business and investment are undertaken on the basis of *Hallal* (legal, permitted) activities.
3. Transactions should be free from *Gharar* (speculation or unreasonable uncertainty).
4. *Zakat*<sup>16</sup> is to be paid by the bank to benefit society.
5. All activities should be in line with Islamic principles, with a special *shari`a* board to supervise and advise the bank on the priority of transactions.

In the context of Islamic banking and finance, studies by Lewis and Algaoud (2001) and Iqbal (2006) have commented on these five elements. In brief, their comments assert that both Islamic finance centres and Islamic trading law in general are dominated by the doctrine of *rib`a*.

Some Islamic scholars have put forward a range of economic reasons to explain why interest is banned in Islam; others have taken a somewhat different tack by arguing that modern economic theory has not provided a justification for the existence of, or the need for, an interest rate (Khan & Mirakhor 1990). However, those arguments are strictly secondary to the religious underpinning. The fundamental sources of Islam are based on the Holy *Qur`an* and the *Sunna*. Thus, financial systems based on Islamic tenets are dedicated to the elimination of the payment and receipt of interest in all forms (Lewis & Algaoud 2001). It is this taboo that makes Islamic banks and financial institutions different in principle from their conventional counterparts.

In Islam, the whole fabric of Divine Law (DL) is contractual in its conceptualization, content, and application. Islam forcefully places all economic relations on the firm footing of ‘contracts’. Vogel (2000) claimed that contractual foundation of the *shari`a* judges the virtue of justice in a person not only for his/her material performance, but also by the essential attribute of his/her forthright intention (*niyya*) with which he/she enters into every contract. ‘This intention consists of sincerity, truthfulness and insistence on rigorous and loyal fulfilment of what he/she has consented to do (or not to do). This

<sup>15</sup> The similarities and dissimilarities between these two banking systems of CB & IB are discussed on pp. 28-31.

<sup>16</sup> This is a religious tax that has to be deducted from wealth to be paid to the needy.



faithfulness to one's contractual obligations is so central to Islamic belief that when the Prophet Mohammed was asked 'who is the believer?', the Prophet said, none of you will have faith till he wishes for his (Muslim) brother what he likes for himself (*narrated by Anas*)<sup>17</sup> (Sa`îdî 1995, p. 32) . This means a believer is a person in whom the people can trust their person and possessions.

The above discussion has presented the principles of Islamic banking. Islamic institutions also collect deposits from investors in the form of investment accounts and other deposit accounts on one side of the balance sheet, and then invest these funds in a variety of Islamically acceptable forms on the other side. This is mainly considered to be how they operate in financial intermediation in financial markets (Chapra & Ahmed 2002). Nevertheless, they conduct financial intermediation in ways quite different from conventional banks, as seen in profit and loss sharing PLS modes of finance and investment in trade, and also in features of commodity exchangeability in their activities. In contrast to the IB model, CB uses different interest-based investment activities sorted under different investment portfolios.

An Islamic banking and financial services system provides a variety of religiously acceptable products and services to Muslim communities. In addition to this special function, the Islamic banking and financial institutions, like all other firms of Islamic society, are expected to 'contribute generously to the achievement of the major socio-economic goals of Islam...' (Chapra 1985, p. 34). Iqbal and Llewellyn (2002) point out that the most important of these goals is economic well-being with full employment and resultant high rate of economic growth, socio-economic justice and an equitable distribution of income and wealth, stability in the value of money, and the mobilisation and investment of saving for economic development in such a way that a fair profit/loss is shared among all parties involved.

The validity of these goals is seldom questioned. However, there is no consensus about the structure of the overall financial system needed to achieve them. From an Islamic perspective, the main objectives of Islamic banking and finance can be summarised as follows:

1. The abolition of interest from all financial transaction and the performance of all bank activities in accordance with Islamic principles.
2. The achievement of an equitable distribution of income and wealth.
3. The promotion of the objectives of economic development.

### **2.3 Islamic Banking vs. Conventional Banking**

To understand how banks work generally, it is necessary to understand the role of financial intermediation in an economy. This understanding is of assistance in finding answers to many questions about banking systems. Mainly, banks as other financial intermediaries play a pivotal role in the economy, channelling funds from units in surplus to units in deficit (transformation function<sup>18</sup>). Allen and Santomero (1998) defined banks as financial intermediaries whose activities are to provide loans to borrowers and to collect deposits from savers (depositors), and perform assets securitisation. Therefore,

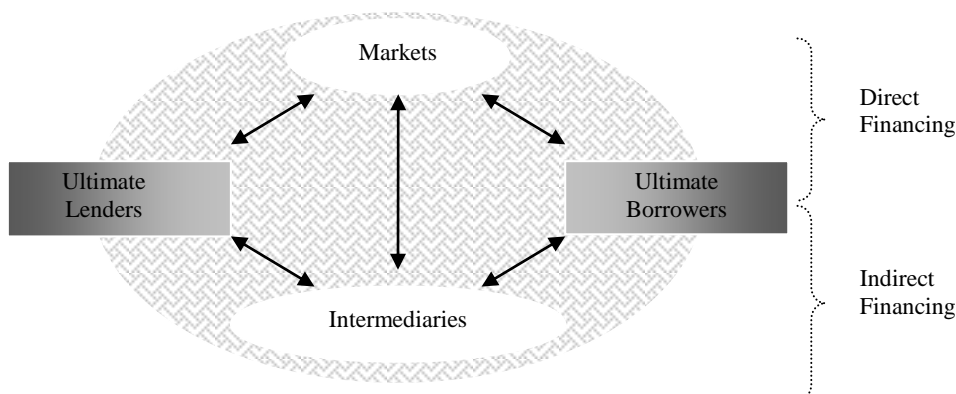
<sup>17</sup> In Sahih Al-bukhari, belief chapter (*Volume 1, Book 2, Number 12*) for more information, see:

<http://www.usc.edu/schools/college/crcc/engagement/resources/texts/muslim/hadith/bukhari/002.sbt.html>

<sup>18</sup> Its means the reconcile the different needs of borrowers and lenders by transforming, small size, low risk, and highly liquid deposits into loans which are of larger size, higher risk, and illiquid.

banks bridge the gap between the needs of lenders and borrowers by performing a transformation function, as shown in Figure 2.6.

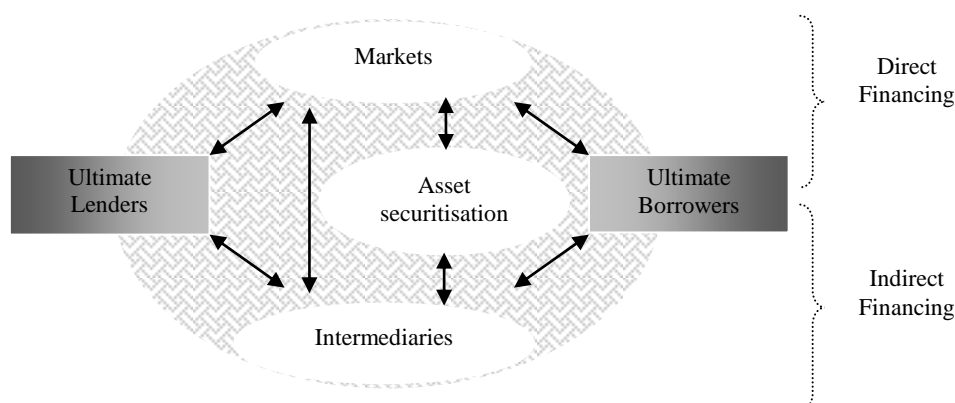
**Figure 2.6: Direct and Indirect Financing**



Source: developed by the author, based on Casu, Girardone and Molyneux (2006)

Figure 2.6 illustrates the function of financial intermediation with the working model of direct and indirect financing. It is necessary to point out that financial intermediaries create additional costs for borrowers and lenders for the transformation products and services. However, Allen and Santomero (2001) have concluded that intermediated finance is more advantageous than direct finance in that the benefits of such activity to the users outweigh the cost associated with the provision of intermediation. In the modern market environment, the role of financial intermediation has become more complex as intermediaries perform additional roles such as providing brokerage services and securitisation, thus creating an extra layer of intermediation (Elton et al. 2003). This role of financial intermediation is illustrated in Figure 2.7.

**Figure 2.7: Modern Financial Intermediation Functions**



Source: created by the author, 2008

When financial institutions hold claims issued by other financial intermediaries, they create an extra layer of financial intermediation. Given the increased complexity of credit flows in modern financial systems, it is not uncommon to have more than two layers of intermediation. Neave (1991), Allen and Santomero (1998), Howells and Barin (2000), Stomper (2005), Barth, Caprio and Levine (2006), and Faisal (2006) have advanced five reasons (or so-called theories) for the existence of banks as follows:

1. *Delegated monitoring theory*, whereby the existence of banking relates to the role of banks as monitors of borrowers. Monitoring of the potential credit risk in

- lending is costly, and a difficult task for surplus units (depositors). Therefore, it is efficient to delegate the task of monitoring to specialised agents such as banks.
2. *Information production theory*, which states that if information about possible investment opportunities is not free, then economic agents may find it worthwhile to produce such information in a market driven environment (Allen & Santomero 1998).
  3. *Liquidity transformation theory*, whereby banks provide financial and secondary claims to surplus units—depositors—that often have superior liquidity features compared to direct claims such as equity or bonds.
  4. *Theory of consumption smoothing*, which suggests that banks perform a major function as consumption smoothers, and financial institutions (especially banks) enable economic agents to smooth consumption by offering *insurance agent shocks*<sup>19</sup> to a consumer's consumption path.
  5. *Commitment mechanism theory*, which aims to provide a reason why illiquid bank assets-loans are financed by demand deposits that allow the banks' consumers to demand liquidation of these illiquid assets.

To illustrate, banks have the expertise and economies of scale in processing information on the risks of borrowers, while depositors would find it costly to undertake this activity and delegate responsibility to the banks. If there were no banks, there would be duplication of transaction costs as surplus units would individually incur considerable search costs before they committed funds to a borrower (Rose 2002). As banks acquire this information, they become experts in the provision of an information search. As such, they have a comparative advantage in information search and depositors are willing to place funds with a bank knowing that these will be directed to the appropriate borrowers without the former having to incur search costs.

Nevertheless, banks' depositors can be viewed as contractors who offer high liquidity and low risk. These deposits are held on the liabilities side of a bank's balance sheet. As Casu, Girardone and Molyneux (2006) pointed out, the better banks are at diversifying their balance sheets, the less likely it is that they will default on meeting deposit obligations. MacDonald and Kock (2006) have argued that bank deposits have evolved as a necessary device to discipline banks. Accordingly, financial intermediaries in general, and banks in particular, provide these liquidity assets via lending and this helps to smooth consumption patterns for individuals.

Consequently, the question of how an IB and CB financial system is organised and why financial systems assume certain configurations are important topics for an understanding of the financial services industry. These questions have not yet been addressed extensively. Rather, financial theorists have focused on explaining various specialised aspects of financial system functions. Elton et al (2003) and Turner, Turner and Voysey (1996) have suggested that modern financial theory and its applications consider some financial system components in great detail in both the context of IB and CB.

It is important to conclude with a financial services definition. The provision of financial services attempts to meet the needs of individuals and organisations which can be

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<sup>19</sup> The argument is that the economic agents have uncertain preferences about their expenditure and that this creates a demand for liquid assets; banks provide these assets via lending and this helps smooth consumption patterns for individuals (Casu, Girardone & Molyneux 2006, p. 16).

measured in money terms. Turner, Turner and Voysey (1996) have clearly defined those services which are provided by independent agencies and institutions on an existence basis but, in some cases, organisations may have their own specialist divisions which provide the services internally. The theoretical underpinning discussion to differentiate between IB and CB is presented in the next section.

## 2.4 Theoretical Argument and Validation

### 2.4.1 Transaction Cost Theory (TCT)

One of the fundamental issues in the analysis of financial intermediaries is the effective application of transaction cost theory (TCT). In this context, financial intermediaries incorporate mutual funds, banks, and consumer finance companies. Benston and Smith Jr. (1976) concluded that an intermediary has a comparative advantage over a direct market exchange in serving a particular group. Accordingly, such intermediation exploits the returns to scale implicit in the structure of the transactions cost of exchange by purchasing large blocks of securities, packaging those securities in a form that is demanded by some individuals, and selling the package at a price which cover all its costs (Jones 1997). More specifically, there are three types of cost relevant to contracts:

1. Search and/or information cost (including information asymmetry cost).
2. Bargaining and decision cost (including opportunity cost).<sup>20</sup>
3. Policy and enforcing cost (excluding sunk costs).<sup>21</sup>

Benston and Smith Jr. (1976) argued that the demand for the services produced by financial intermediaries in general is derived from the consumer's ability to achieve a higher level of utility by incurring lower levels of these transaction costs. Since the above costs are significant (Jones 1997), they frequently determine whether a company uses internal or external resources for products or services. However, the addition of these costs would suggest that individually efficient opportunity sets would differ not only with the size of banks' portfolios, but also with physical location and the opportunity cost of portfolios. Thus, as banks face contracts, demands are also a function of the distribution of wealth among consumers might be considered.

In the TCT literature, Williamson (1975; 1996) and Hart (1995) have considered the contractual bases on which IBs operate from the standpoint of TCT. In particular, consideration was given in that literature to the contractual arrangements under which IB accepts depositors' and other investors' funds on an Islamic PLS basis. A modified breakdown of transaction costs in the Islamic and conventional finance setting has been identified by Horngren, Foster and Datar (2000). In the context of CB, the following equation (2.1) shows the formula for the transaction cost function.

$$y = a + b_1x_1 + b_2x_2 + \dots + b_nx_n + \mu \quad (2.1)$$

where:

y : Full costs of the product to be predicted (exact transaction).<sup>22</sup>

<sup>20</sup> The contribution to income that is forgone—rejected—by not using a limited resource in its best alternative use.

<sup>21</sup> In economics and financial decision-making, sunk costs are those costs that cannot be recovered once they have been incurred—cannot be changed no matter what action is taken. In microeconomic theory, in general, these costs are irrelevant to a decision.

$a$ : Fixed costs.<sup>23</sup>

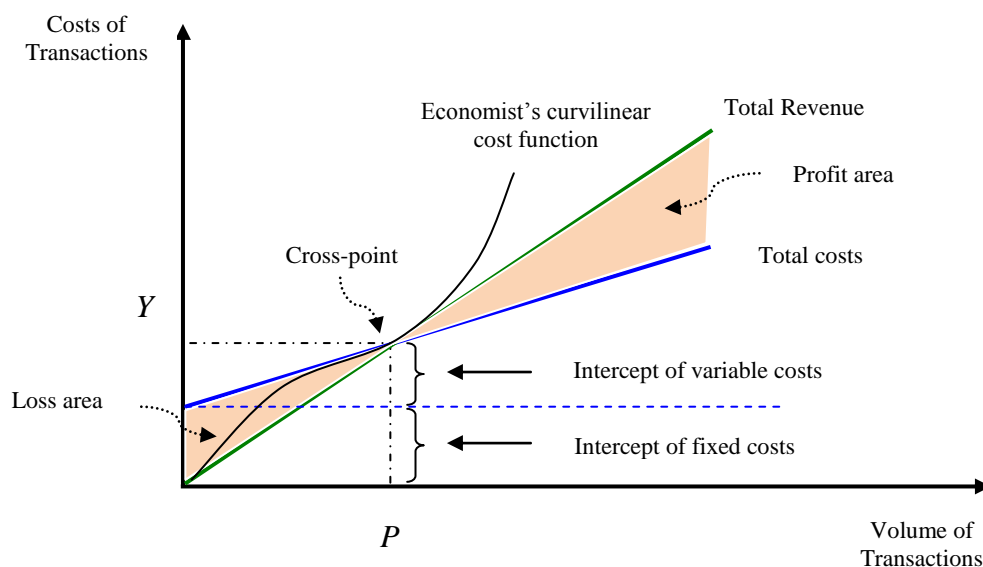
$b_1, b_2$ : Variable costs (direct costs) which relate to the transaction itself.<sup>24</sup>

$x_1, x_2$ : Independent variable on which the production is to be based (transactions volume).

$\mu$ : Residual term that includes the net effect of other factors not in the model and measurement errors in the dependent and independent variables.

Hart (1995) argues that in financial transactions (such as loans), and trade-offs that exist among these various ways of production, define one's self as a lender increasing the down payment required, pledging collateral, and inserting restrictive covenants in the credit contracts implies different combinations of information and monitoring costs over the maturity of the credit. In contrast, Islamic banking institutions provide contracts radically opposite to those of CBs in that IB embodies a number of interesting features such as equity participation. Thus, risk and profit and loss sharing PLS arrangements are considered as the basis of Islamic finance. Sarker (1999) pointed out that the combination of Islamic instruments would be such that the marginal reduction in expected costs would be equal for all instruments employed.

**Figure 2.8: Relationships among Return, Production Volume and Cost-behaviour Pattern**



Source: developed by the author, 2008 based on Horngren, Foster & Datar (2000)

Transaction theory suggests that as IB and CB institutions gain economies of scale, the average cost of financial products distribution should decline due to greater efficiencies and lower default rates (Mitton 2002). Figure 2.8 depicts the path of curvilinear cost and how economists deal with variable costs. In the economic field, economists argue that many costs that might be classified as variable costs actually behave in a curvilinear fashion (Garrison, Noreen & Brewer 2006). Garrison, Noreen and Brewer (2006) have also commented that although many costs are not strictly linear when plotted as a function of volume, a curvilinear cost function can be satisfactorily approximated with a straight

<sup>22</sup> The sum of all variable and fixed costs in all the business functions in the value chain, R&D, design, production, marketing, distribution and customer services.

<sup>23</sup> The cost that remains unchanged in total for a given time period despite wide changes in the related level of total activity or volume, and which is related to most of the administration costs.

<sup>24</sup> Variable cost changes in total in proportion to changes in the related level of total activity or volume, and relates to lending cost, mobilisation cost, operation cost and default cost.

line within a narrow band of activity known as the relevant range of the product completion cycle<sup>25</sup>. The relationship among costs, production (volume of transaction) and gain of economies scale are clearly outlined in Figure 2.8.

To demonstrate, the cost per unit in various value-chain areas for transacting financial products decline as units produced increase. Furthermore, the cross-point indicates the lowest possible costs that correspond to offer a certain amount of products—transactions—within the productive capacity employed to meet consumer demand in the current period.<sup>26</sup> This is important in employing information and available financial resources adequately for sustaining an advantage for banks working within efficient market strategy/policy (Chapra 1985). Thus, conceptually, transaction costs and products are a function in normal and abnormal modifications of strategy, which are typical acts in contract arrangements.

It is essential that financial transaction costs are identified and measured in advance for achieving rationalisation of returns on banking transactions—a task not easily accomplished. Williamson (1979, p. 233) has pointed out that transaction costs have ‘a well deserved bad name as ...there is a suspicion that almost anything can be rationalised, by involving suitably specified transaction costs’. Typically transaction costs have been identified as the *ex ante* costs of search and negotiation, and the *ex post* cost of enforcement (Benston & Smith Jr. 1976). However, given the existence of complexity and uncertainty, in conjunction with bounded rationality, decision makers are necessarily incapable of making a fully informed choice between alternative organisation modes<sup>27</sup>. The argument above implies that the boundary of agency problems and agency principals’ interests are of concern.

## 2.4.2 Agency Theory (AT)

‘Agency’ is that conductive mechanism by which the production functions of business enterprises are managed or conducted. The agency function is related to the policies of decision making and, more specifically, it is governed by the modalities of the agency principals’ contracts (Sarker 1999). Agency Theory (AT) deals with the issues arising from the existence of the principal-agent problem; these are quite relevant to the majority of finance partnerships. According to the economic literature, the principal-agent problem arises from incomplete and asymmetric information when the principal hires an agent (Archer, Abdel Karim & Al-Deehani 1998). Agency Theory employed here is referred to by Williamson (1996, p. 172), following Jensen and Fama (1983), as ‘the positive theory of agency’. In contrast to the more formal AT, which is concerned with the technique of efficient risk bearing (Eisenhardt 1989), AT applied here is concerned with the monitoring and bonding of contracts and organisations.

Agency cost occurs in all types of financial contracts. In general, the differences in interests between principals and their agents, and the asymmetry of information may contribute additional cost to the contingent nature of the compensation contract. Different theories of agency show that the correlation between reward and productivity determines

<sup>25</sup> Relevant range is that range of activity within which the assumptions made about cost behaviour are valid.

<sup>26</sup> As addressed in Figure 2.8, that cross-point occurs when a production at the level when total revenue is equal to total cost and the normal profit is showed.

<sup>27</sup> Many economic models assume that people are rational and would never do anything that violates their preferences; the concept of bounded rationality is in fact a revising assumption that accounts for the fact that perfectly rational decisions are often not feasible.

the growth of the enterprise and the behaviour of the agency (Eisenhardt 1989). However, in reality, that ‘more-less’ competition markets of complete information, perfect foresight and castles transacting are not able to accommodate a number of important finance phenomena sufficiently. This has led financiers to focus on ‘the process of contracting’—particularly its hazards and imperfections<sup>28</sup>.

Adverse selection prior to the contract, and moral hazard during its performance, arise when the principal cannot cost or observe or monitor the agents’ characteristics and/or actions. However, the issue is how the principal can induce the agent to act in such a way as to maximise the principal’s utility. Typically, the contracts provide the framework for a complex set of interactions between the parties to economic relationships. Therefore, agency cost problem is an important determinant of reward-sharing in a production process which may be solved through efficiency attained in allocation of resources and the inclusion of a package of incentives in the reward-sharing structure (DeGeorge 1992).

### 2.4.3 Combining TCT with AT

Such theories focus on the transactions of financial institutions from different perspectives. The creation of new and specific advantages by applying these theories and combining their perspectives may require not only comparing perspectives using a case of banks’ utilisation, but also the development of capabilities within banks, especially Islamic counterparts (DeGeorge 1992). Initially, it is most significant to start with the distinction of these perspectives. From the theoretical perspective, TCT and AT are contrasted according to general criteria, as listed in Table 2.1.

**Table 2.1: Transaction Cost Theory (TCT) Vs Agency Theory (AT)**

<b>Criterion</b>	<b>T C T</b>	<b>A T</b>
<i>Unit of analysis</i>	Transaction	Principal-agent contract
<i>Focal dimension</i>	Various type of asset specificity Mal-adaptation For IB: Prohibition of taking/giving of interest	Incentive, Residual loss For IB: Comply with teaching of Islam ( <i>Shari`a</i> compliance)
<i>Focal cost concern</i>	Hold-up problem	Maximisation of interests & wealth
<i>Contractual cost</i>	Choice of <i>ex post</i> , Governance mechanism	<i>Ex ante</i> incentive arrangement Monitoring mechanism
<i>Theoretical orientation</i>	Comparative assessment	Constrained rationalisation
<i>Strategic intent</i>	Point view of shareholder & investment accounts holders (IAH)	Point view of shareholder & investment accounts holders (IAH)
<i>Fundamental behaviour</i>	Bounded rationality/uncertainty Risk neutrality Information asymmetry opportunism Assets specified	Information asymmetry Un-observable Risk avoidable. Moral hazard arises by agents mostly

Principally, differences between TCT and AT arise from the fact that for TCT the basic unit of analysis is the transaction or contract, while for AT it is the contracting agent. Basically, TCT considers the dimension of the transaction itself, whilst AT is interpreted as the principal-agent contractual relationship (Benston & Smith Jr. 1976). Based on the research of Archer, Abdel Karim and Al-Deehani (1998), the relevance of the above

<sup>28</sup> The meaning of hazards and imperfections here relates to the condition under which the principal cannot be sure if the agent has put forth maximal effort. (For more information see, Eisenhardt 1989, p: 57-74).

theoretical differences and their application to the financial services industry (including Islamic banks) is presented in Table 2.2.

**Table 2.2: Application of TCT and AT to Financial Services Institutions**

<b>Criterion</b>	<b>T C T</b>	<b>A T</b>
<i>Unit of analysis</i>	Individual trust Contractual transaction	Donor principal Implementing partner
<i>Focal dimension</i>	Interdependence in funding decision (donors decision on project selection restricted to <i>shari`a</i> acceptance )	Incentive of unit operators (implementing partner may diverge from other donors, customers need and satisfaction )
<i>Focal cost concern</i>	Mal-adaptation costs Potential (strategic) holdout	Cost of monitoring and residual loss from imperfect incentive alignment
<i>Contractual cost</i>	Choice of efficient governance mode for both investment accounts holder and shareholders	Implement monitoring mechanism
<i>Theoretical orientation</i>	Comparative assessment; choice between (imperfect) discrete structural form in modes of Islamic transaction	Theory of the second best rational contract in the presence of constraints; information asymmetry and non- observable
<i>Strategic intent</i>	Shareholder view; minimise transaction cost in order to create shareholder value (value added cost)	Investment account holders view; utility maximisation and pay off in terms of objectives
<i>Fundamental behaviour</i>	Bounded rationality, and information asymmetry, in evaluating productivity	Information asymmetry, risk management & moral hazard by agents, imperfect observable mode

Because neoclassical economics is concerned with the effect that values, rules and governance standards might have upon the boundaries of the firm's maximised profit, both TCT and AT are subject to the standard neoclassical modelling of the firm as a production function to which a profit-maximising objective has been established, as depicted in Figure 2.8 (Ferris 1981). In terms of profit-maximisation, empirical research demonstrates that TCT regards the firm as a governance structure and AT considers it as a nexus of contracts. Therefore, fundamental behaviour assumptions of TCT are bounded rationality and opportunism (for example, self-interest plus guile); the former assumption has as a consequence incomplete contracting or involvement of misleading contract terms, whilst the latter assumption entails additional contractual hazards (Sarker 1999).

AT exponents have been hesitant to adopt the assumption of bounded rationality, but notions of *ex post* 'selling up' in AT as a means of mitigating *ex ante* incompleteness of contracts are consistent with bounded rationality. As can be seen from Table 2.2, while AT uses the term 'moral hazard' rather than opportunism<sup>29</sup>, the two terms are virtually synonymous. Much the same may be said of information asymmetry (as used in the AT literature) and information impactedness (as used by Williamson 1996), the difference being that AT is concerned with principal-agent relations whilst TCT addresses all types of contracting relations. Finally, both theories normally assume risk neutrality on the part of contracting parties.

Regarding efficient contracting, TCT examines alternative forms of financial organisations with reference to their capacity to economise with respect to the consequences of bounded rationality while safeguarding the transactions in question

<sup>29</sup> Definitions and detailed explanation are provided in Appendix A.



against the hazards arising from opportunism (Benston & Smith Jr. 1976). The focus of AT has been more on the latter aspect. Additionally, while AT examines contracting primarily from the perspective of the *ex ante* alignment of incentives, TCT is more concerned with developing a governance structure that offers *ex post* measures to achieve the integrity of the contract. Moreover, for both theories, the board of directors has a function that arises endogenously as an instrument of residual claimants. This point is significant for the analysis of Islamic financial transactions.

## 2.4.4 Relevance of TCT and AT to Islamic Banking and Finance

### 2.4.4.1 Financial Contracting in IB: From the Perspective of TCT

The market behaviour of the IB transactions has been intensely controlled in the application of Islamic rules and in research on Islamic banking in recent years. One of the goals of this argument has been to clarify patterns displayed in Islamic transactions instruments and to establish their consistency with the assumption of the rational, PLS rule of Islamic institutions behaviour. However, in Islamic finance the technical term for a transaction between an entrepreneur and the suppliers of funds is *mudaraba*. The bargaining between the two parties involved in the transaction (*mudaraba* contract) can vary substantially and is determined by contracts. However, the literature separates Islamic banking into three main activities: concessionary financing (minimum rate/cost), trade financing, and finance by participatory manner (Dhumale & Sapcanin 2003). Within these activities are various contractual forms that conform fully to the tenets of PLS such as *mudaraba*, *musharaka*, *muzar`ah*, etc. (see Figure 2.4).

Moreover, as mentioned previously in this chapter, Islamic finance construes ‘equity’ differently in some crucial respects. It involves a combination of both investment account holders (IAH) and shareholders. Therefore, it is somewhat like ‘debt-equity’ in reverse, rather like debt with management discretion to present contractual rules so as to preserve value-enhancing investment projects (Suleiman 2000). For instance, *mudaraba* is like equity (share capital) in giving a residual PLS claim, and differs from it (equity) by either (a) contracting for the duration of the firm or (b) having the benefit of a board of directors to monitor management on its behalf.

### 2.4.4.2 Financial Contracting in IB: From the Perspective of AT

AT extends its coverage to the appropriate use of incentive systems to encourage positive behaviour by front-line staff in achieving the organisation’s overall objectives (Eisenhardt 1989). In Islamic finance, contracts used by IBs (i.e. *mudaraba*) for mobilising and managing investors’ funds may involve complex agency problems (Archer & Abdel Karim 1997). The banks’ management acts as an agent for shareholders, while the bank as *mudarib* acts as agent for the investment account holders (depositors). Those who provide funds to the agent, and the agent (bank) do not allow them to intervention in the management of their funds like shareholders, and in the bank their position is only as *Modaraibs* (entrepreneurs). This raises the possibility of a conflict of interest facing banks’ managers, not just in their dealing with the interests of shareholders and investment account holders, but also between interests of the two categories of investors (shareholders and IAH).

From the previous argument, the relation between IAH and Islamic finance institutions presents a distinctive type of agency problem that is hardly paralleled in the finance

literature. It has been noted by (Archer, Abdel Karim & Al-Deehani 1998) that the basic condition of the *mudaraba* contract is the separation of ownership from management of funds. This does not allow IAH to interfere in the management of their funds, which raises a possible conflict of interest between IAH and the IB—a problem that also exists in the principal-agent relationship in conventional banks. Accordingly, from the perspective of the finance literature, operationally, the obvious advantage of IB is its greater ability to allocate risk management through the sharing of project returns between the owner of the capital and the entrepreneur (Al-Deehani, Karim & Murinde 1999). Despite this positive risk sharing benefit, the PLS mode in Islamic banking also faces severe principal-agent problems arising from asymmetric information and costly monitoring (Archer & Abdel Karim 1997).

The main focus of the PLS principle is placed on agency costs. Employment and investment decisions are also analysed in light of the cost of agency. However, the agency theory literature concerning the financial institution shows the relationship between various agents in the institution's production processes, especially the structure relationships between the capital-owner and entrepreneur. According to the PLS principle, there are many contractual aspects in financial production relations and processes which may also be developed within Islamic finance, for instance, accounts of net-income sharing, gross-income sharing and agriculture outcomes sharing which are incorporated on the basis of *muzara`a* and *musaqat*.

## 2.4.5 Relevance of Theory to the Focus of the Study

The focal point of section 2.4 is that the analysis of transactions costs and the principal-agent problem is central to the theory of PLS. IBs not only offer financial products which can be invested in different ways, but also determine consumption decisions within the ethical framework of Islamic finance (DeGeorge 1992). However, providing trading information and continuously monitoring may be most useful for such financial transactions as loans and deposits, and also in reducing fraud, litigation and misunderstandings which can be more costly than the direct cost of the transaction itself. Although IBs use financial contracts which require performance analysis of transactions cost and principal-agent problems, they may have various principals which are rewarded by the *shari`a* committee board according to the PLS principle. However, concerning the theory of IB, it may be assumed, considering all internal and external active forces in the functions of Islamic financial institutions, that such institutions have an efficient entrepreneur seeking to maximise production at a level when total revenue equals total cost.

The finance literature shows that TCT and AT have been adopted by several authors in their studies (Benston & Smith Jr. 1976; Ferris 1981; Jensen & Meckling 1976; Jones 1997; Williamson 1975; Williamson 1996). Additionally, most of these studies highlight the importance of providing finance efficiently to institutions implementing partnerships, with restricted *shari`a* law offering the most cost effective processes. Therefore, the theory of transaction cost and theory of agency-problem with PLS principal provides an approach that might be used in IBs as a basis for assessing the impact of lending decisions. This is seen as the main focus of the study in terms of comparing factors that influence lending decision making in IBs and CB (this will be discussed more fully in Chapter 4).

It is important to ask whether the conventional banking system is in fact different to the Islamic banking system in terms of transactional operations aspects. Both systems have experienced substantial changes over the last 30 years or so as banks transformed their operations from a relatively narrow range of activities to ‘full services’ financial institutions (Levine, Loayza & Beck 2000). The literature surveyed has obvious implications for the theory and practical viability of Islamic banking. Four main points of comparison between CB and IB—income sources, competitive environment, customer focus and strategic focus—are identified in Table 2.3.

**Table 2.3: Conventional Banking (CB) versus Islamic Banking (IB)**

<i>Points of Comparison</i>	<b>CB</b>	<b>IB</b>
<i>Income sources</i>	The main sources of CB income are: net interest income ( <i>interest revenue from lending activities</i> ), fee and commission income ( <i>selling non-traditional banking products</i> )	The main sources for IBs income are: <i>Modaraba</i> [trustee finance contract], <i>Morabaha</i> [mark-up financing], <i>Mushraka</i> [equity participation] and <i>Ijara</i> [lease, lease purchase]
<i>Competitive Environment</i>	Due to increasing competitiveness between banks, they have sought to diversify their earnings, focusing on meeting the needs of a more diverse and financially sophisticated client base ( <i>high competition</i> )	It has some restrictions which can be outlined in legitimate investment ( <i>Islamic principles or shari`a</i> ), the prohibition of interest ( <i>Rib`a</i> ), and religious supervisory board for supervision and control of the rules ( <i>fatwa committee</i> )
<i>Strategic Focus</i>	The strategy of CB is to be able to meet as broad a range of customer financial service demands as possible, such as returns to shareholders, creating shareholder value ( <i>generating return-on-equity (ROE)</i> ),	Strategically, IB focuses on profit-loss-sharing and other forms of arrangements that enable a financial institution to operate without the use of interest ( <i>prohibition of interest</i> ); also maximising their asset value and banking growth in general.
<i>Customer Focus</i>	CB focuses on demand led community growth, and creating value for customers ( <i>strengthens clients' relationships and should boost returns to the banks over the longer period</i> ).	The main mission of IB has been the achievement of social and economic development through the delivery of financial services in line with the principles and teaching of Islam ( <i>customers' satisfaction or attitude toward a product/service after it has been used</i> )

Accordingly, there are universal products and services provided in the financial industry, which are called ‘banks’ activities’, such as accepting deposits, granting loans, insurance, securities investment banking, pensions, etc. For instance, Saunders and Walter (1994) argue that, under the universal banking model, banking business is broadly defined to include all aspects of financial activities such as securities operations, insurance, pensions and leasing. Thus, there is no absolute difference in the range of products and services between CB and IB.

There are a large number of aspects associated with the rationality of debt contracts. Rational, bilateral financial contracts depend on a variety of factors such as;

1. The cost of output verification and/or monitoring against moral hazard;
2. The presence of adverse selection;
3. The degree to which wealth constraints bind the parties involved; and

4. The parties' attitude towards risk. Furthermore, particular features of real-world debt contracts, among them the use of collateral, credit rating and financing of loans, gain theoretical support as being incentive-compatible.

Economists have argued that debt contracts are defensible in theory, given that they figure so prominently in financial arrangements and have done so for a very long time in conventional banking markets (Lucia 2003). This is rather less than reassuring from the viewpoint of the theory of Islamic banking. As a result of the standard of debt (*rib`a*) contract, collateral requirements, loan covenants, and enforced work outs—measures to ameliorate adverse selection and moral hazard—are all prohibited in Islamic financing (Rice & Mahmoud 2001). At the same time, Islamic banks exceed pure financial intermediation of the transactional sort, and have direct participation in business and investments with PLS along equity lines.

Islamic economics is based on a set of contracts and instruments which form the backbone of Islamic finance, in addition to some elaborate transaction frameworks (Nomani 2003). In spite of this, several financial instruments acceptable in the pre-Islamic period have been further developed and widely practiced after confirming their compatibility with the principles of *shari`a*; for instance, the elimination of *riba* and *gharar*. Further, the Islamic Financial Institutions Council (IFIC) is preparing standards for management control by focusing on how the development of control and guideline approaches will ensure the protection of the owners' rights and the accounts of investors (Anwar 2003; Pervez 1990).

The rejection of interest raises the question of what replaces the interest rate mechanism in an Islamic framework. If the paying and receiving of interest is prohibited, how do Islamic banks operate? In responding, Lewis & Algaoud (2001, p. 3) indicated that 'the PLS principle applies in substituting PLS for interest as a method of resource allocation'<sup>30</sup>. Although a large number of different contracts feature in Islamic financing, certain types of transaction are central in Islamic contracts; these include trustee finance (*Mudaraba*), and transaction contracts such as equity participation (*Musharaka*), and mark-up methods (*Murabaha*)'.

In order to conform to Islamic rules and norms, Lewis and Algaoud (2001, p. 28) have reported 'five religious requirements, which are well established in the literature, must be observed in investment behaviour features. These features are as follows:

1. The absence of interest-based (*rib`a*) in financial transactions.
2. The introduction of a religious levy or almsgiving (*zakat*).
3. The prohibition of the production of goods and services which contradict the value pattern of Islam (*haram*).
4. The avoidance of economic activities involving gambling (*maysir*) and uncertainty (*gharar*).
5. The provision of *takaful* (Islamic insurance).

These five features give Islamic banking and finance a distinctive religious identity'. The following section highlights the experience of this identity through both historical and empirical dimensions.

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<sup>30</sup> For more information see, Lewis, M & Algaoud, LM 2001, *Islamic banking*, Edward Elgar, Cheltenham, UK.

## 2.5 Dimensions of Islamic Banking Experience

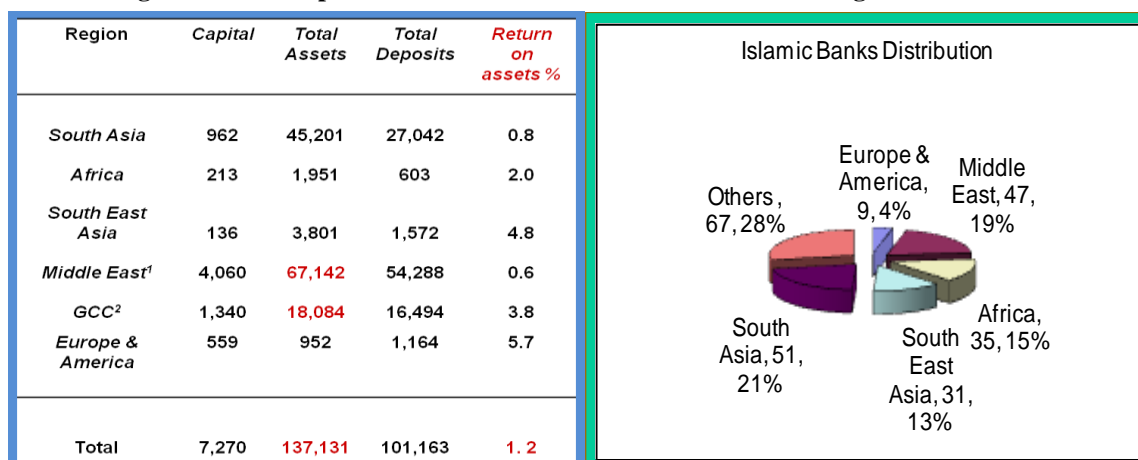
### 2.5.1 Historical Dimension

In the 1970s, Middle Eastern countries experienced a major need for financial transactions and investment dealing within their religious affiliation. According to Iqbal and Llewellyn (2002), IB outside and inside Islamic countries had limited capacity to absorb the high cost of investment, which was often handled by conventional financial institutions. This situation was a major impetus in the development of Islamic banking institutions.

Another major impetus came from the growing sense of Islamic identity and religious consciousness in these independent economies. The first Islamic Financial Institutions (IFIs) can be traced back to the late 1950s, even though the main development of such institutions did not actually start until the mid-1970s (Zaman & Movassaghi 2001). With the passage of time and with other socio-economic forces demanding more involvement of interest-free banks in such economies and financial activities, interactions with the banks became more common practice in Muslim countries. Basically, therefore, the need to engage in banking activities became more urgent (Haron, Ahmad & Planisek 1994). These dealings attracted the attention and concern of Muslim intellectuals. Thus, one could say, the story of interest-free or Islamic banking effectively began at this point.

Over the last three decades, 'interest-free' has attracted more attention, especially among various economists (Muslim and non-Muslim). Also, the involvement of Islamic religious awareness in institutions and governments in different economies resulted in the establishment of the first interest-free banks (Nomani 2003). Islamic institutional developments came to a head at the third Islamic conference of foreign ministers, held in Jeddah in 1972, when the programme to eliminate interest from Islamic financial institutions was presented by the finance ministers of eighteen (18) participating countries. A comprehensive plan to reform the monetary and financial system of the Islamic communities according to *shari'a* principles was laid out concurrently (Lewis & Algaoud 2001). Consequently, several countries undertook various efforts, including the establishment of Islamic banks, to support and realise these ambitions.

**Figure 2.9: Descriptive statistics of Islamic Institutions: Practicing & Distribution**



1. Middle East includes Egypt, Iran, Iraq, Jordan, Lebanon, Turkey, Sudan and Yemen

2. GCC stands for *Gulf Cooperation Council*, consisting of Bahrain, Kuwait, Qatar, Saudi Arabia and United Arab Emirates (UAE)

Source: (Archer & Karim 2002; El-Hawary, Grais & Iqbal 2004; Fuad & Mohammed 1996)

According to the data collected by the International Association of Islamic Banks (IAIB) in 1998 in Jeddah, there were more than 200 Islamic banks and financial institutions in Muslim and non-Muslim countries by 1997. Figure 2.9 shows the distribution of IBs and Islamic financial institutions; there were 9 in Europe and America, 47 in the Middle East (including 21 in the Gulf Cooperation Council countries (GCC countries), 35 in Africa, and 82 in Asia (of which 31 were in South East Asia and 51 in south Asia). This is in addition to a number of public and private banks which had not yet become members of IAIB: the IAIB database does not include the rapidly expanding deposits accepted by a number of conventional banks on an Islamic basis.

## 2.5.2 Empirical Dimension

As mentioned previously, the Islamic financial system was introduced into many Muslim and non-Muslim countries in the late twentieth century. In general, Islamic financial institutions were created mainly for the import-export requirements of the different enterprises, although Muslim traders avoided non-Muslim banks for religious reasons (Zaman & Movassaghi 2001). Khan and Mirakhor (1990) argued that, over time, Islamic financial industries found it difficult to engage in trade and other activities without making some use of the commercial banks, even though many confined their involvement to transaction services such as current accounts and money transfers.

Consequently, IBs moved to offer a wide spectrum of financial services that comply with the *shari`a*. These services are provided to the retail savings and investment markets, as well as the market for consumer credit. The growth of Islamic finance continued in the following decades and, as Wilson (1990) showed in an evaluation of the Islamic financial system, there were more than 300 IFIs worldwide, managing assets and savings in excess of US\$ 200 billion and US\$ 160 billion respectively, in 1990. Thus, IB has made substantial progress worldwide, even though the position that it has created is very small when compared to the total volume of international or even Muslim world finance. What counts, however, is not the volume, but rather the respectability that the interest-free financial intermediary has attained and the positive evidence that its existence provides both workability and viability within the system (Archer & Karim 2002).

While in the 1950s Islamic banking was only an academic dream of which few persons, even among educated Muslims, were aware, it has now become a practical reality. In addition, in the most advanced economies Islamic banks are characterised by a relatively high level of government control and restriction that inhibits competition and maintains a protected banking environment. Wilson (1990, p. 29) comments that, ‘...IB has attracted the attention of Western banks, as well as the involvement of stockholders and researchers’ (see Figure 2.9 above).

## 2.6 Contemporary Banking Crises

Banking industry crises have been an integral part of the global financial landscape of the last several decades. Such crises reflect the central role of banks in crises-prone economies or instability in the banking sector itself. In general, banks’ crises concentrate on two main aspects: liquidity availability and successful investment opportunity. These are necessary for stability of the banking sector and competitive conditions. Wilson and Caprio (2002) examined the role of loan concentration, or the lack of diversification, as a factor in banking industry crises. The risk-reduction and efficiency benefits of diversification create a benchmark against which the risk-taking activities of banks can be

judged. Their analysis concluded that loan concentration plays a significant role in major banking crises.

Deregulation and financial liberalisation, in addition to the introduction of technological developments, has also changed the environment in which banks are operating (Barth, Caprio & Levine 2006). Furthermore, globalisation and religious affiliations have affected the operations of the financial industry in general and of banks in particular (Stomper 2005). For instance, in addition to the development of IB practices in parts of the world where the Islamic faith is an integral feature of the socio-economic make-up of the population, there has also been a growing interest from CBs in developing such services for their customers. In response to these pressures, banks have attempted to adopt strategies aimed at improving efficiency, in order to expand their output and increase the range of services offered.

The role of financial intermediary undertaken by IBs raises issues of corporate governance over and above those that arise in the case of conventional banks. The latter receive deposits on the basis of what is essentially a debt contract, under which the depositors' capital and returns are not at risk (subject to the banks' solvency). Islamic banks, by contrast, receive deposits on the basis of a profit-sharing (*Mudaraba*) contract, under which both returns and capital bear risk similar to that borne by shareholders (El-Hawary, Grais & Iqbal 2004). However, the depositors, that is, holders of profit-sharing investment accounts, do not have any rights, unlike shareholders in the corporate governance of the bank. This raises a number of regulatory issues, as discussed by Archer and Karim (2002).

In terms of corporate governance in Islamic banking, Badr El-Din (2006) observes that the agency-principal of governance of Islamic banks includes a *shari`a* supervisory board (SSB) which is responsible for supervising the *shari`a* compliance of the banks' transactions and practices. According to Sarker (1999), Islamic finance involves a specific set of legal issues within *fiqh al mu`amalat*.<sup>31</sup> Kahf (1999) emphasises that contract law, which concerns the *shari`a* permissibility and validity of different contractual forms that may be used in IBs transactions, is essentially a focus of contract partners. In addition, attention is drawn to problems of the enforceability of such contracts in secular courts from an international perspective.

The future of banking will likely be shaped, to a large degree, by the environment (regulatory, technological and competitiveness) in which it operates. General macroeconomic conditions and demographic factors will impact highly on banks' performance (El-Gamal 2006). However, economic stability will ensure low bank failure rates and strong profit growth for both Islamic and conventional banks, whilst demographic trends in some countries could change savings demand and investment patterns (Williamson 1975). Hence, new regulatory structures will likely be necessary as banks become bigger in size and more exposed to risk originating from abroad, as well as risks of global finance instability. The capability of the IB system in terms of competition and ability to survive with other banking systems needs to be highlighted in terms of banking capability aspects as this system becomes part of the global financial system.

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<sup>31</sup> Islamic commercial jurisprudence: a branch of Islamic law—*shari`a*—jurisprudence. It focuses on contracts; it lays down what types of contracts are permissible or valid and what types are impermissible or invalid. In particular, contracts are impermissible if they involve *Rib`a* (interest), *Gharar* (uncertainty or ambiguity as to subject matter, terms or conditions) or *maysir* (gambling or speculation).

## 2.7 Islamic Banking Capability

The achievement of integrative management functions with particular application in the context of IB or Islamic finance differentiates this system from other systems. The literature surveyed in the Islamic finance and Islamic banking field has several implications for the capability of Islamic banking. This section highlights the general trends that have characterised the Islamic banking sector in most transition economies. Some of the most common capability aspects are presented.

### 2.7.1 Product Innovation

The future development of the Islamic financial industry—and IB in particular—depends crucially on its ability to innovate in order to offer a more complete and competitive range of financial products and services comparable in scope and pricing to that offered by the CB industry. Kahf (2002) observes that IB managed its risks efficiently to become more competitive. Consequently, a major factor in productivity development will be the ability of contemporary *shari`a* scholars to cope with the need for innovation in the products of financial institutions that are *shari`a-compliant* to meet present-day market needs.

### 2.7.2 Shari`a Rules and Standards Harmonisation

One of the most important of those needs is for the harmonisation of *shari`a* rules through the acceptance of *shari`a* standards. This will allow scholars to promote and monitor the implementation of these standards, in contrast to a situation in which they reduce individual and diverse solutions to *shari`a* issues (Lewis & Algaoud 2001). However, the work of *shari`a* scholars needs to take place in a context of innovation based on research and development directed towards new transactional modes and solutions to problems of financing in a *shari`a* compliant context.

### 2.7.3 The Emergence of Islamic Financial Markets

The next major feature in this development will be the emergence of Islamic financial markets and institutions, such as insurance companies (*takaful-based*), and the organisation of a sufficient volume of *shari`a-compliant* assets in which such institutions can properly invest which called in Islam *takaful-based* companies (Grais & Pellegrini 2006). It is operating on the basis of periodic contributions of a sum of money by the participants (policyholders) to the *takaful* fund, which is administrated by the *takaful* companies. The contribution is based on the concept of donation which is used to create a *takaful* fund to meet indemnities or claims in accordance with the conditions stated in the contract of *takaful*. The need for more engineering and assets specialists has labour market implications, notably in terms of challenges regarding competence and compensation. Relevant research and educational programmes have the capacity to help in raising awareness of problem areas that require attention and solutions to these problems (Grais, Pellegrini & Svetová 2006).

Islamic financial and capital markets currently lack the information intermediaries, in terms of component financial analysts and commentators, who play an important role in making such markets efficient in developing economies (Honohan, Caprio & Vitas 2002). The stock markets in countries where they operate do not exhibit informational efficiency, breadth or depth and, therefore, offer limited opportunities for financial institutions in these countries, including IFIs, to raise equity capital in the form of public



share issues (Al-Deehani, Karim & Murinde 1999). However, these problems are due to a lack of volume which could be mitigated by the stock exchanges in certain Islamic economies merging—as their counterparts in efficient markets have done. This would be likely to engender the interest of financial analysts contributing to informational efficiency.

## 2.7.4 Corporate Governance

Greuning and Iqbal (2007, p. 24) argued that ‘corporate governance relates to the manner in which the business of bank is governed, including setting corporate objectives and a bank’s risk profile, aligning corporate activities and behaviours with the expectation that management will operate in a safe and sound manner, and running day-to-day operations within an established risk profile, while protecting the interests of depositors and other stakeholders’. In general, corporate governance is defined by a set of relationships between the bank’s management, its board, its shareholders, and other stakeholders. However, Greuning and Iqbal (2007) and Greuning and Brajovic (2003, p. 15) stated ‘the key elements of sound corporate governance in Islamic banking include:

- A well-articulated corporate strategy against which the overall success and the contribution of individuals can be measured.
- Assigning and enforcing responsibilities, decision-making authority and accountabilities that are appropriate for the bank’s risk profile.
- A strong financial risk management function (independent of business lines), adequate internal control systems (including internal and external audit functions), used to ensure compliance. This includes special monitoring of a bank’s risk exposures where conflicts of interest appear (e.g. in relationships with affiliated parties).
- Financial and managerial incentives to act in an appropriate manner offered to the board, management and employees, including compensation, promotion, and penalties. That is, compensation should be consistent with the bank’s objectives, performance, and ethical values’.

Finally, Belton (1993) suggest that there is a need for firms that are active in financial markets to have a high quality of corporate governance which, in turn, depends on ethical standards being observed. In this respect, the role of financial regulators needs to be considered. For IB, a new regulatory body has been established on a consortium basis by the central banks of a number of countries in which IFIs operate. This body, the Islamic Financial Services Board (IFSB), will issue voluntary standards for Islamic financial services (Archer & Karim 2002; Casu, Girardone & Molyneux 2006).

IFIs have another major body, the Accounting & Auditing Organisation for Islamic Financial Institutions (AAOIFI) (Kahf 2002), that will promote international standards of excellence in key aspects of their operations, such as corporate governance, risk management and financial reporting. Provided the labour market challenges can be met so that the necessary expertise is on hand, these developments provide the ingredients for the potential success of the Islamic banking services in international, as well as regional, financial circles.

## 2.8 Conclusion

To conclude, this chapter denoted that banks, as the other financial intermediaries, play a role in the economy, channelling funds from units in surplus to units in deficit. They reconcile the different needs of borrowers and lenders by transforming small-size, low-risk and highly liquid deposits into loans which are of large size, higher risk and illiquidity (transformation function). In addition, in the absence of IFIs, the western-style financial institutions were introduced in Muslim or non-Muslim countries because of the need for financial services and they thereby turned to the western-style, conventional banks and insurance companies, without giving too much attention to their non-compliance with *shari`a* rules and principles. In the case of savings, an alternative was simply to hold them in the form of cash.

A number of such instruments have existed for hundreds of years without the existence of Islamic Financial Institutions (IFIs). Because Islamic finance is based on contracts between providers and users of funds (or of financed assets) it was able to take place without the need for financial intermediaries. This chapter therefore highlighted the differences between Islamic and conventional finance instruments that take the form of contracts. In regard to the theoretical phase, surveyed literature showed that several banking and finance studies used TCT and AT. This chapter provided an explanation about how/why TCT and AT have been used for a justification of the study model; and what the relevance is of adopting these theories in this study.

This chapter also detailed how the combination of these theories and the PLS model provide a sound basis for risk assessment and determining their impact on rationality of lending decisions in IB. This provides the main focus of the study in terms of comparing factors that influence financial decision makers in IBs and CBs. In short, this chapter provides relevant literature supporting the fact that there is a high consideration with reference to the financing behaviour and financing risks in both IBs and CBs industries. This indicates that financing patterns in demand dominate the risk factors in these banks and this aspect will be discussed in more detail in the following chapter (Chapter 3).

## **CHAPTER THREE**

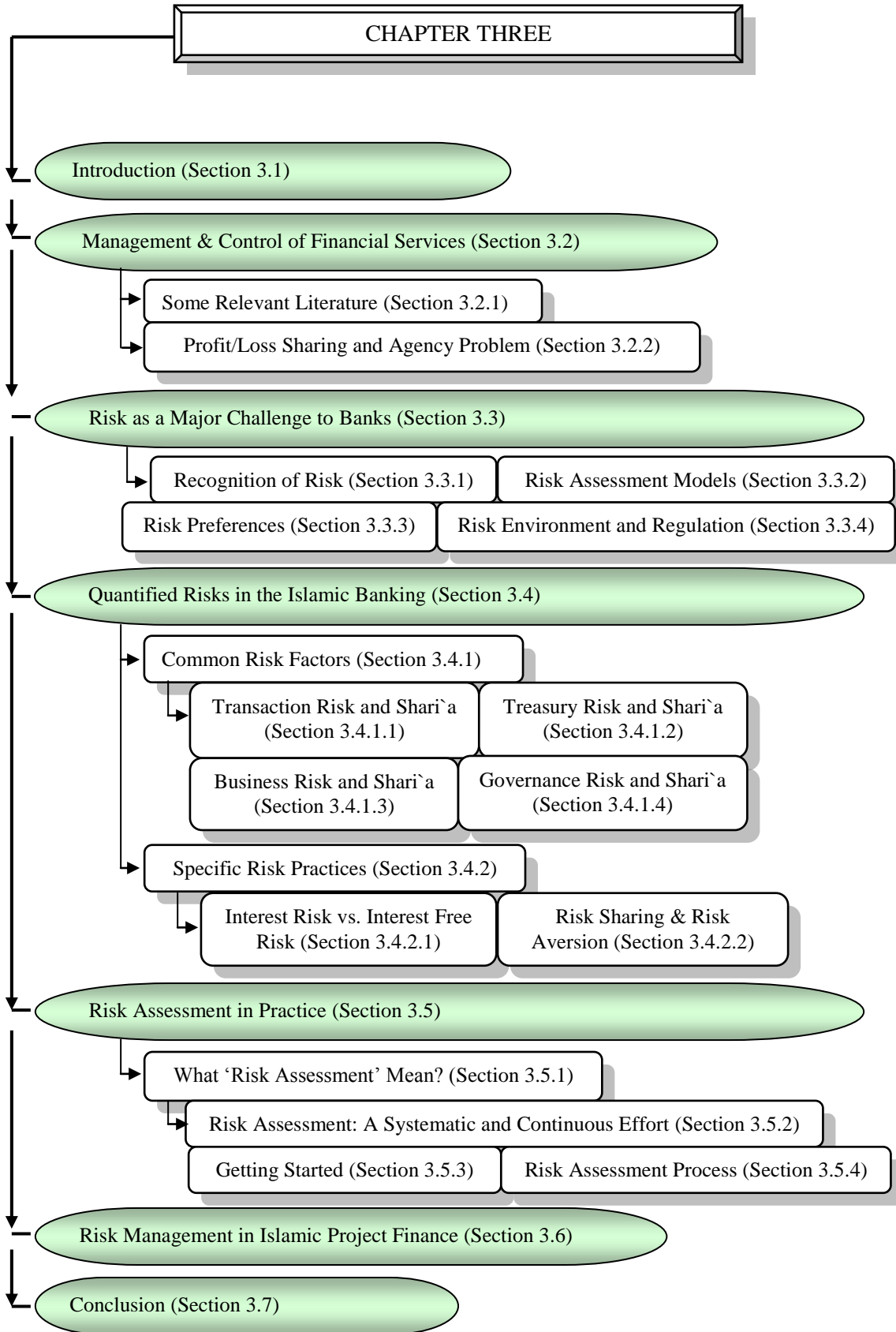
### **THE INFLUENCE OF ASSESSING RISK FACTORS ON PERFORMANCE LENDING PORTFOLIOS**

#### **3.1 Introduction**

Risk management is well recognised in the banking industry and encompasses an entire set of risk management processes and models, permitting banks to apply risk-based policies and practices. These risk models apply techniques and management tools required for measuring, monitoring and controlling risks (Abdullah 2003; Beasley, Clune & Hermanson 2005). Any uncertainty that might lead to losses has been designated as a risk. This chapter aims to shed some light on the risk taking behaviour in Islamic and conventional banking institutions. Traditionally, some banks have not fully examined the risk of their corporate strategies (Abdullah 2003). Many portfolio managers do not fully understand risk factors; and risk management is often left, by default, to those responsible for service promotion or transaction processing. Therefore, this chapter also describes how both IB and CB banking systems treat risks and the relative importance of risk factor assessment in lending decision-making.

This chapter is organised as follows. Section 2 reviews finance products management and control. Section 3 discusses risk quantification as a major challenge in the finance industry. Section 4 covers quantified risks in the Islamic finance industry with a focus on: 1) common risk factors in CB and IB; and 2) specific practices such as risk sharing. Section 5 outlines risk assessment and risk management policies in practice. Section 6 addresses risk and project finance management in Islamic banking, a subject more often known as ‘managing corporate risk’. Finally, section 7 concludes the chapter. Figure 3.1 provides a visual overview of the structure of this chapter.

Figure 3.1: Outline of Chapter 3 Interrelations



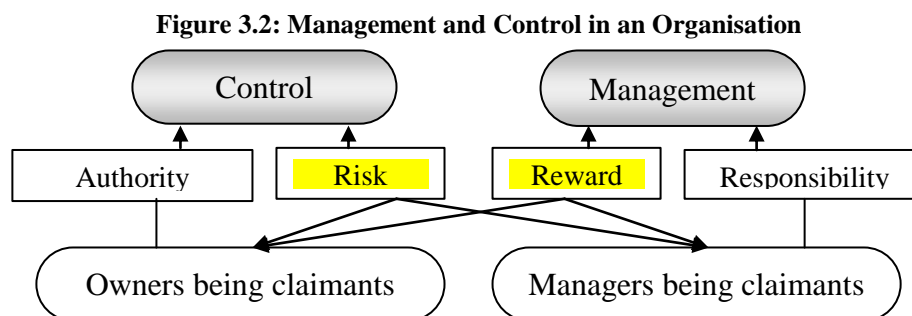
## 3.2 Management and Control of Financial Services

### 3.2.1 Some Relevant Literature

Natural forms of control and management are features of management functions. However, Dar and Presley (2000) differentiate between management and control, as a firm may be controlled without actual participation in management. Jensen and Fama (1983) defined control as an accurate management tool to approve the initial proposals and supervise the projects through internal monitoring or external mechanisms. Basically, control is viewed as the implementation of authority. In theory, within organisations the context of management and control functions have not been defined individually—perhaps in the past, in owner-managed firms, a single individual performed these functions (Fraser, Gup & Kolari 2001; Jensen & Meckling 1976). However, with the expansion of businesses and their enhanced performance, these functions became more complicated. Thus, the distinction between the ownership and management functions meant the allocation of these functions to those who could most efficiently perform them. This allocation of management and control functions becomes even more important with an increase in the size of an organisation.

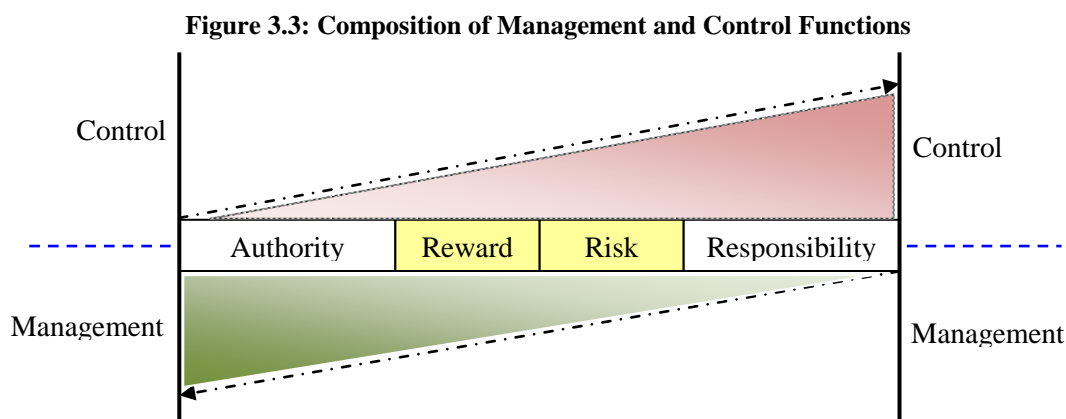
In large organisations, however, separation between ownership and management functions causes conflict between the agents' and principals' interests, and gives rise to agency problems within the institutional structure. In this regard, several ways of controlling a corporation have been applied such as achievement control, majority control, quality control and management control (Berle & Means 1968). Therefore, the term 'control' refers to agency problems and conflicts that occur between managers and owners/shareholders (Delfino 2007). Thus, a function of control is the action of measurement taken by owners to ensure managerial behaviour that corresponds with their interests. To extend this argument, the interrelation of management and control functions needs to be explained.

The interrelation between functions of management and control consists of four basic elements: risk, reward, authority and responsibility. The management literature considers authority as a basic ingredient of ownership (Shen & Chih 2005; Sinkey 2002). Jensen (1996) argues that, [economically], the investment in resources limit and make the owners residual claimants on the return from the business activity in which decision-making (responsibility) is delegated to the managers. The main focus of the agency cost problem is the sharing of risks between managers and owners. Forcing the managers to share risk with the owners can mitigate the agency problem. Accordingly, Dar and Presley (2000, p. 16) suggest the inter-relations of authority, responsibility, risk and reward—as depicted in Figure 3.2.



*Source: (Dar and Presley 2000, p.16)*

Figure 3.3 shows the changes in the size of functions between management and control through the organisational structure elements (shown by shaded areas). The influence of control and management changes with the increase in size of these functions. For instance, replacement of a function with another (control/management) will be the highest at responsibility for control function, while risk in both Islamic and conventional agents needs control rather than management. Figures 3.2 and 3.3 indicate that management and control functions have commonly-shared risks and rewards when both agents and principals are residual claimants. As a consequence of sharing risk and reward, complete specialisation of management and control functions is seldom achievable in the modern financial services industry.



*Source: Dar and Presley, 2000*

To illustrate, the diversity in banks' product types that 'cause risk and the variety of control options available for each product can make the control of operating risks seem unduly complicated' (Mayland 1993, p. 87). Most banks are well-positioned to make the necessary decisions because the risk-taking infrastructure is already in place. Nevertheless, management of risks is an integral part of banking operations. Crook, Edelman and Thomas (2007) argued that as a result of the variety of choices there were no absolutely right or wrong ways to manage operating risks.

A bank's processes for managing operating risk should evolve gradually as its business grows, and the pace of evolution should be determined by management's analysis of the business trade-offs between the overall costs and benefits of risk control (Mayland 1993). In other words, the results of management's analyses are likely to be different for each bank's product. Further, control process concepts imply that different products offered by banks could require different levels of control (Giudici & Bilotta 2004). Accordingly, high risk products require stronger risk control than low risk products. It is not surprising that the existence of current risks may mean potential losses in the future. Research has seen the emergence of a number of risk models and risk management methods for quantifying and monitoring risk (Rosman 2009). Such methods significantly augment perspectives on risks and the ability to control them.

In terms of risk control and management, the most important element of risk control and management refers to the use of information designed to reduce the unpredictability and variability of outcomes. According to transaction cost theory, banks will use the information thus obtained as a basis for lending decision-making to reduce costs (Bol et al. 2003; Simkins & Rogers 2006). Some bankers may favour 'case-based' and others 'class-based' decision-making in producing products—loans—to business or personal

customers<sup>32</sup>. But modern financial branches consider computer-based product assessment useful in the management and control of risk, and also welcome the standardizing effect of this assessment on the processing of product applications. As the focus of any bank is minimising losses, a suitable approach to assessing risks must be chosen. Thus, the study seeks to determine if this is applicable to IB.

### 3.2.2 Profit/Loss Sharing and Agency Problem

In a typical PLS arrangement, an Islamic finance organisation identifies/ notifies the risk in investment to an agent—which is basically *ghrar* (speculation or unreasonable uncertainty). Executive and *shari`a* boards—Islamic agent boards—are responsible for making strategic and operational decisions. According to the PLS concept, the IB is liable for any financial loss, and shares in any profits. In this context, one can ask, is a combination of management and control rights with profit/loss sharing an agency problem? Normally, banks are able to comply with the Islamic financial law. Thus, no serious problems arise with this arrangement and in supervising the business operations of the agent (Iqbal & Mirakhor 1999).

In the case of *Mudaraba*, proper monitoring mechanisms are yet to be devised for PLS, especially since IAH<sup>33</sup> does not allow any control rights. The literature on Islamic financial transactions—*Fiqh-al-muamlat*—recommends serious reconsideration of this aspect. For example, Ahmed & Khan (2007) lists three rights and one responsibility of the IAH in a *Mudaraba* arrangement. The rights include the borrower being made aware of contract conditions, of profit sharing according to the contract, and of limited legal responsibility in the case of losses. But, IAH are also responsible for handing over the *Mudaraba* investment. The *shari`a* outlines two rights and two responsibilities of the entrepreneur. The rights include conducting the business in a completely free manner, and making accounting decisions (Alessi 1983). The entrepreneur is responsible for the terms of the agreement and liquidation of the *Mudaraba* business at the end of the contract.

Recently, the contemporary usage of Islamic instruments as a method of financing (such as *mudaraba*, *musarkah*, *murabaha*) has required more than such initial arrangements of rights and responsibilities. Dar and Presley (2000, p. 17) have reported that, ‘there is a necessity for construction of standardised PLS contracts, or bylaws, in the light of the Islamic/legal frameworks of Muslim countries’. These constructions should include the rights and responsibilities of various agent-principals within the organisational structure. It is often asserted that, where agency problems exist, IB arrangements are more critical than for CBs and Non Bank Financial Institutions (NBFIs). Some solutions are provided in the modern finance literature (Jensen & Fama 1983; Jensen & Meckling 1976; Williamson 1979). These solutions are summarised as follows:

1. Managing and monitoring arrangements.
2. Management separation (initiation and implementation of decisions).
3. Control (approval and monitoring of decisions).
4. Capital provision performance.
5. Other control measures as discussed previously are also considered relevant.

<sup>32</sup> ‘Case-based’ means the decision to lend a new loan is based on the processes of similar past loans, while the term of ‘class-based’ means the decision to lend is based on the recorded character sheet or policy recorded in an advance.

<sup>33</sup> Islamic banking in this case

The first two solutions—management separation and monitoring arrangements—are referred to as agency-solutions within the financial structure; while the other two—control and capital provision performance—refer to venture capital financing. However, these solutions are also applicable to the agency problems faced by institutions using PLS as a primary approach of financing.

Therefore, from both a theoretical and practical perspective, risk management and measurement are current issues in the contemporary finance industry (Woo & Siu 2004). However, the task of risk measurement is not an easy one, as credit risk methodologies are still diverse and it is very much a developing field. Existing literature supports the view that CBs and IBs in some economies have not performed well. However, their financial markets are rapidly expanding, with a resultant increase in the number of transactions on one hand, and limited relevant financial information on the other (Dietsch & Petey 2002). Therefore, one may question; are these markets performing well in terms of measuring risk?

### **3.3 Risk as a Major Challenge to Banks**

Since risks are so important in banking, it is surprising that risk quantification and assessment remained a limited exercise in some institutions until recently. The quantitative finance literature addresses extensively the problem of risk in capital markets (Bessis 2001). However, Chapra and Ahmed (2002) argue that the extension to the various risks of financial institutions—capital markets—has remained a challenge for multiple reasons:

1. Risks are less tangible and visible than income.
2. Academic models provided functions for risk modelling, but did not provide instrumental tools to help decision-makers.
3. A large fraction of the finance literature addresses the gap between conceptual models and banking risk management issues, rather than quantifying the risks.
4. The regulators' focus on risks is still relatively recent.

Despite recognition of these reasons, the prerequisites needed for quantifying instrumental risk remained non-existent. A survey of the finance literature sheds further information on the quantification problem. This is discussed below in terms of: risk recognition, risk assessment models, risk preferences and regulation related to risk environment.

#### **3.3.1 Recognition of Risk**

Risks remain intangible until they materialise into losses. Therefore, simple solutions do not help to capture all risk factors (Chavez-Demoulin, Embrechts & Neslehova 2006). For instance, a risk exposure from a loan is not the risk. The risk depends on the likelihood of losses and the magnitude of repayment of credit, in addition to the size of the value at risk. Brooks and Persand (2003) argued that observing and recording losses and their frequencies could help. However, loss histories are insufficient, and it is not easy to link absorbable losses and earning declines with specific sources of risks. In contrast, recording the fluctuations in interest income is easy, but tracking such changes to interest rates changes is less obvious (Galluccio & Roncoroni 2006). Thus, without links to instrumental risk controls, earning and loss histories are of limited interest because they do not help in taking forward-looking corrective actions.



### **3.3.2 Risk Assessment Models**

Over the last two decades, models of risk assessment have been invented and improved (Woo & Siu 2004). Furthermore, Kurth, Taylor and Wagner (2002) argued that, in the approach to credit modelling, there are some key factors which have a strong influence on the practical implementation of theoretical models. Both the designer and user of risk evaluation models need to clearly understand the deep interrelation among variables and parameters, and thus understand the priority of the sequences in applying variations to the model of evaluation (Piramuthu 2004). Decisions based on financial risk evaluation are important for the financial institutions involved due to the high level of risk associated with less than rational decisions.

In essence, the most appropriate way to quantify invisible risks is to model them. However, multiple risk aspects are considered as qualitative, and not substitutes for quantified measures. Observation of risk includes various items, for example, exposure size, watch list for credit risk, or value changes triggered by volatility in the markets (Fraser, Gup & Kolari 2001). These indicators capture the multiple dimensions of risk, but they cannot be quantified. Gardner (1997) pointed out that missing links between future losses from current risk and risk drivers, which are instrumental for controlling risk, make it infeasible to monitor risks in a timely manner. Therefore, the main contribution of modelling risk is it addresses such issues and provides quantified measures of risk.

As noted above, there have been significant revolutionary changes in the structure of banks, and how these institutions can be used to provide new investment opportunities and ways of managing risk (Merton 1995). To some extent, those financial innovations can be attributed to a wide array of new security designs; advances in telecommunications technology; and important advances in the theory of finance. Consequently, the ability to quantify risk fostered major innovations in pricing market transactions and options that serve for investing and hedging risks, and in setting benchmarks and guidelines for the portfolio management of market instruments (stocks and bonds) (McGrath & Viney 2000). Innovations made it possible to customise products for matching investors' needs with specific risk-return bundles. It also allowed both financial and corporate entities to hedge their risks with derivatives.

### **3.3.3 Risk Preferences**

The basic prerequisites for using risk management in banks are: first, risk measuring and valuation and, second, tracing risk back to risk drivers under management control. Pastor (2002) pointed out that jumping to the use of market instruments for measuring risks without prior knowledge of exposures to the various risks is meaningless; it is necessary to know the magnitude of the various risks to be controlled and what they actually mean in terms of potential losses. However, credit risk assessment remains a matter of judgment, a characteristic of 'the credit culture' focusing on fundamentals: all qualitative variables that drive the credit worthiness of a borrower. Thus, the fundamental view on credit risk still prevails, and it will obviously remain relevant.

### **3.3.4 Risk Environment and Regulation**

The risk environment has changed drastically in the last few decades (1970s to 2000s). In addition, mutual lending–borrowing and trading creates strong interdependencies among

banks. A failure of a large bank might trigger the ‘contagion’ effect through which other banks suffer unsustainable loss and eventually fail (Bessis 2001; Ramos, Jose & Santander 2000). However, a trend towards more internal and external assessment of risk and returns has emerged and is prominent in several areas of research (Altman, Giovanna & Saunders 1998). Through successive accords among transaction counterparts in the financial markets, regulators promoted the building up of information on all inputs necessary for risk quantification, and accounting standards evolved as well.

In terms of regulation, the latest new Basel Accord promotes the ‘three pillars’ foundation of supervision as follows (Basel Committee 2006):

1. New capital requirements for credit risk and operational risks.
2. Supervisory process.
3. Disclosure of risk information by banks.

Together, the three pillars allow external supervisors to audit the quality of information, a basic condition for assessing the quality and reliability of risk measures in order to gain more autonomy in the assessment of capital requirements and structures. Regulatory requirements for operating risks, plus the closer supervision of interest rate risk, pave the way for a comprehensive modelling of banking risks and a tight integration with risk management processes, leading to bank-wide risk management.(Barnhill & Maxwell 2002).

As a direct consequence, in terms of shifting from models to management approaches, there is a wide spectrum of modelling building blocks differing across and within risks. These ‘block’ approaches share the ‘risk-based capital’ and the ‘value at risk’ concepts that are basic foundations of the new views on risk modelling, risk controlling and risk regulations (Mayland 1993). In contrast, risk management requires an entire set of models and tools for linking risk management problems with financial views on risks and profitability. Therefore, together they make up the risk management ‘tool box’ which provides the necessary inputs to improve the risk management policies to finally close the gap between risk models and risk management.

In terms of quantification, generally, use of risk models has two major benefits: measuring risks and relating these measures. Schroeck (2002) showed that modelling risks helps to manage and controls various risk. It pushes further away the frontier between measurable risk and invisible-intangible risk and, moreover, it links risks to the sources of uncertainty that generate them. Campbell and Huisman (2003, p. 121) observed that ‘credit spreads change over time for many reasons, such as market condition, change in credit ratings, change in expectations regarding recovery rate...’. This means that risk factors need to be taken into account. However, there is no reliable method for combining these risk measures into one overall portfolio risk assessment as a consequence of risk factors’ diversity.

### **3.4 Quantified Risks in Islamic Banking**

#### **3.4.1 Common Risk Factors**

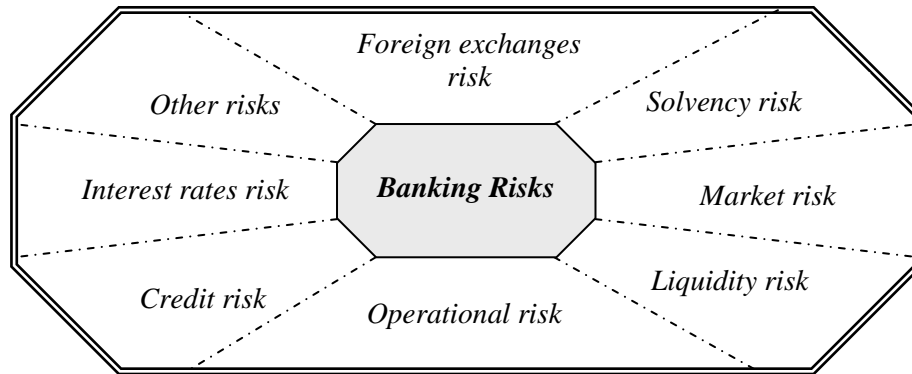
As indicated in Chapter 2<sup>34</sup>, there is a differentiation across business lines, but risk management tools and borrowing apply the same techniques across the entire spectrum of banking activities that generate financial risks. However, ‘risks and risk management

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<sup>34</sup> See section 2.2 in this study.

differ across business lines of lending activities' (Bessis 2001, p. 3). Risks are often considered the result of uncertainties, leading to adverse variations of profitability or losses (Allen, F & Santomero 1998). Whilst a substantial number of risks are well-known in the banking industry, there has been significant progress from traditional qualitative risk assessment towards quantitative management of risks due to the development of risk management practices and the existence of strong regulatory incentives.

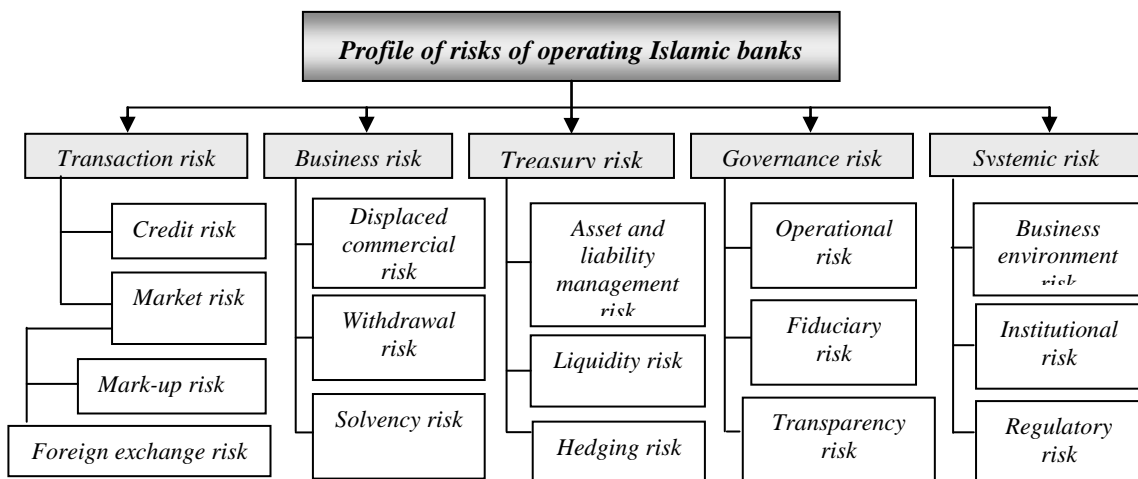
Figure 3.4: Main Categories of Risks Quantified in the Banking and Finance Industry



Source: created by the author, 2008

Risks in banking are also defined as 'unfavourable impacts on profitability' and represent distinct sources of uncertainty. Figure 3.4 shows risk categories that can be quantified. It demonstrates the risk types that capture the sources of uncertainty and the extent of their potential adverse effect on profitability in terms of both accounting and market-to-market measures (Archer & Abdel Karim 2009; Bansal et al. 1993; Bruni et al. 1996; Cade 1997; Santomero 1997; Schroeck 2002).

Figure 3.5: Profile of Risks



Source: El-Hawary, Grais & Iqbal 2004

Risks in IB are similar to CB. A classification of risks in IB is presented in Figure 3.5. Islamic finance is based on a set of contractual instruments for a relatively complex and elaborate framework. However, several financial instruments, listed in the pre-Islamic period, were further developed and widely practised after confirming their compatibility with the principles of *shari'a*; for instance, the elimination of *riba* and *gharar*. Furthermore, in the last few years, the Islamic Financial Institutions Council (IFIC) is currently preparing standards for financial management and control by focussing on the development of controls and guidelines to ensure the

protection of shareholders' and IAH rights. Figure 3.5 classifies the risks typically faced in the Islamic banking and finance. The overview of the profile of operating risks in IB shows risks grouped into five broad categories: transaction, business, treasury, governance and systemic risks (El-Hawary, Grais & Iqbal 2004). While these categories are also applicable to non-Islamic finance, specific risks within them are more relevant to IB, and the nature of contracts it uses.

The discussion above (section 3.4) focuses on risks related to: 1) financial or market movements; 2) risks relevant to make lending decisions; 3) risks relevant to financial transactions; and 4) risks relevant to the change of the banking environments, in particular for Islamic and conventional banks. Appendix D provides a brief definition of risks that need to be considered in the finance industry worldwide. However, the following discussion treats risks that are relatively easy to quantify in both IBs and CBs, and also risks that attract the attention of financial practitioners and financial analysts.

### 3.4.1.1 Transaction Risk and Shari'a Principles

In terms of importance, credit risk (or default risk) is more significant than all other risks. It is the risk that an obligor will not make future interest payments or principal repayments when due (Banks 2004). Credit risk arises because promised cash flows on the primary securities held by financial institutions may not be paid in full, or in a timely fashion. Gray and Cassidy (1997) define credit risk as the risk that covers the entire spectrum of financial institutions' activities, both on and off-balance sheet. Consequently, it not only includes the obvious review of loan portfolio quality, but also balance sheet structure, amounts and types of investments and securities held, risk concentrations, and provisioning adequacy.

Credit risk simply is the risk of the borrowers' inability to repay the loans. Generally, it is the risk that the borrower will not be able to provide funds to settle transactions, usually due to bankruptcy or some other liquidity crisis. However, all deposit accounts have the potential for creating credit exposure. Palmer (1998) and Santomero (1998) point out that credit decisions associated with depository services fall into three fundamental categories<sup>35</sup>: funds availability; return items; and irrevocable payments. The exposures that result from these decisions can range from daylight overdrafts of several lines of credit to exposures that extend over several days (Ariffin, Archer & Abdul Karim 2009). In general, credit risk arises from the uncertainty of a project's stability and sustainability. Furthermore, the higher the probability of insolvency the higher the credit risk.

In other words, a major source of loss is due to the risk when borrowers are not able to comply with their obligations to return bank debt. Within financial institutions, a deterioration of the credit standing of a borrower materialises into a loss. Pastor (2002) makes a distinction between the specific risk of a particular issue and among several of the same issues, depending on the credit magnitude and character of the transaction

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<sup>35</sup> i. **Funds availability:** the decision to make deposits by cheque or electronic sources available to depositors for withdrawal, even though the bank itself may not have final liability in its own clearing account, is a credit decision. This is common practice in the banking industry and is usually driven by competitive pressures.  
 ii. **Return items:** the decision not to return cheques or to reject electronic items presented for payment, even though the customer may not have sufficient funds deposited, is a credit decision.  
 iii. **Irrevocable payments:** the decision to initiate an irrevocable payment on behalf of customers, based on expected funding in the future, is a credit decision.

(priority level guarantees). Thus, the view of banking portfolio risk and trading portfolio risk is different. In the context credit risk, conventional banking is more mature than Islamic banking in Islamic economies (Hakim, Neaime & Colton 2005). Furthermore, risk differs because of the differences in the nature of transactions, banks' roles, banks' goals, and the obligations between the institutions in both banking operations and procedures of lending have to be different (Powell et al. 2004). This difference between CBs and IBs means that assessment and treatment of credit risk may also be different. For instance, Islamic banking considers that *Gharar* (uncertainty of repayment) is a risk, and then credit or lending in cash is mainly prohibited.

Due to the asset-backed structure of *shari`a* compliant modes of lending, Islamic banks are able to reduce the impact of credit risk inherent in their financing activities. The capital structure of IBs is a combination of shareholders and investment account holders. This means that IBs are always highly concerned with allocating more resources—loans—to target corporate and retail clients. Fuad and Mohammed (1996) rejected this notion, perhaps because Islamic banking has not developed sufficiently strong credit risk assessment procedures or somehow lacks the expertise necessary to make value judgements that would allow it to draw a level of comfort commensurate with greater lending activities.

Additionally, provisions of *shari`a* which may limit the capacity of Islamic banks to enforce repayment in the event of delinquency are likely to increase the credit standards for borrowers that Islamic banks are willing to finance (Archer & Karim 2002). This problem can be mitigated by collateralising the asset involved in the transaction, similar to practice in CBs<sup>36</sup>. However, potential borrowers may not wish the asset to be collateralised. Probably the most stringent credit measure is the banks' ability to transfer borrowers' salary to their accounts. Banks are then able to deduct repayment in-settlements directly without recourse to the borrowers.

Unlike IBs, CBs are able to offer all-purpose interest-based loans. However, this type of lending arrangement may carry with it a greater credit risk since, in many instances, there may be no recourse to an underlying asset should the borrower fail to honour the loan obligations or repay the capital (Hakim & Neaime 2001). To reflect the greater credit risk, Hakim and Neaime (2001) suggest that conventional loans could be less competitively priced than Islamic alternatives. The end-users of Islamic financing arrangements may, however, feel unwilling to risk forfeiting their collateral in the event of unintentional delinquency.

The comparison above implies that the relative under-representation of Islamic financing instruments facilitates understanding of the make-up risk of the asset portfolio in IBs and may, in part, be due to demand, as well as supply-side effects of risk aversion (Hasan 2002). Broadly, the purchase price of the underlying asset effectively limits the degree of debt creation. In other words, as Laux (1990) noted, creditworthy customers will tend to prefer unsecured loans (or *murabaha* facilities) at rates that reflect their creditworthiness. A *murabaha* contract either involves: 1) the sale-repurchase agreement of a borrower-held asset (negative short sale) or 2) the lender's purchase of a tangible asset from a third party on behalf of the borrower (back-to-back sale). Thus, collateralisation is not a substitute for suitable stringent credit assessment procedures.

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<sup>36</sup> For more information see (Archer, S & Karim, RA 2002, *Islamic finance: Innovation and growth*, Euromoney Books and AAOIFI, London, UK. p.179).

### 3.4.1.2 Treasury Risk and Shari'a Principles

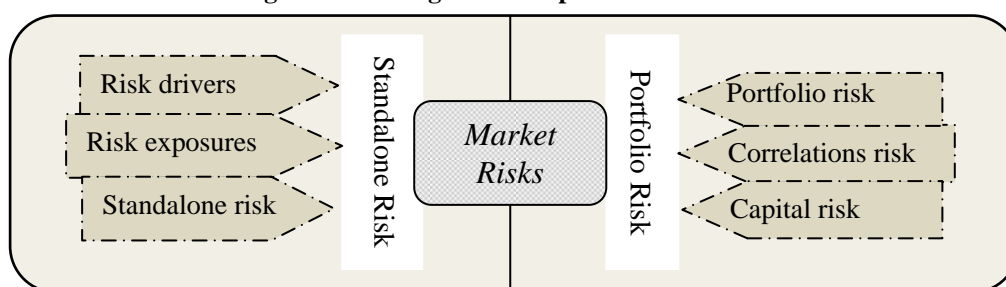
Liquidity risk may become a key factor in an assessment of a bank's portfolio. Extreme lack of liquidity sources and liquidity management inevitably results in bankruptcy, making this risk critical. Conversely, Davis and Harper (1991) and Errington (1991) indicate that important unexpected losses raise doubts with respect to the future asset/liability of the institution and its liquidity position. Adaptation of an asset-liability management (ALM) approach in CB, IB likewise considers the availability of assets/liabilities and endeavours to control the liquidation cycle. Moreover, the purpose of debt management in both banking systems is to manage possible future liquidity crises (for instance, sources of funds, asset/liability uses, and liquidity availability) so that they remain within acceptable levels of market limitations and/or the bank's conditions. Accordingly, Abraham (1988) asserts that the liquidity-risk context is confusing and it could refer to many essential issues (liquidity risk source) which appear applicable to the IB as well, such as:

1. **Inability to raise funds at normal cost:** in spite of any funding risk, this depends on the market risk exposure and the funding policy itself. This is despite negative signals being received from organisations in the market frequently seeking unexpected funds which may restrict the borrowing willingness of these organisations (Cade 1997). However, the cost of funds also impacts on the bank's credit standing if the risk exposure of the credit standing in a well-monitored fund becomes more costly. A liquidity crisis leads often to an institution's insolvency.
2. **Market liquidity risk:** the liquidity of market risk exposure relates to the availability of liquid assets/liabilities volume. Market prices fluctuations—positive or negative—become highly unstable, and sometimes counterparties are unwilling to trade with decreasingly high discount rates (Bessis 2001; Brooks 2002). However, due to the market behaviour, funding risky transactions inevitably leads to much higher cost. Thus, market liability risk exposure decreases an institution's ability to raise money at a reasonable cost.
3. **Asset/liability liquidity risk:** in terms of cash flow, asset liquidity risk is considerable in short-term funds. The source of this risk is the nature of the assets rather than the liquidity volume in the market. Jarrow and Turnbull (2000) argue that holding a sufficient fraction of liquid assets is the rationale behind a bank's regulatory rule. Calculating the liquidity ratio—capital adequacy—of banks, therefore, is considered as mandatory in deciding whether the bank considers minimum foundations of capital requirement and makes a reasonable matching between holding short-term assets and short-term liabilities in order to meet short-term obligations.

In this regard, market or asset liquidity risk remains a major issue that current techniques do not cover over the entire range of a bank's transaction practices (Bessis 2001). In fact, developing models to measure liquidity risk is not addressed fully in the finance services industry and in their instrumental applications (Ryan & Worthington 2002; Santomero 1997). In contrast to market liquidity risk, market risk refers to adverse deviations of the trading portfolio within values of the same market, or among several market values. Due to market movements during the period, institutions are often required to liquidate some assets. Wong, Cheng and Wong (2003) note that the ability to assess such adverse deviations during the period of liquidation has become a critical issue because of information asymmetry.

Market portfolio earnings—profit and loss—arise from transactions that have been made. However, the profit and loss between two dates is the variation of the market value, and any decline in value results in a market loss. Olekalns and Sibly (1992) recognised also that, as the lending period gets longer, the potential worst-loss can be higher due to market volatility—which tends to increase overall in the longer horizon of the transaction. Basically, market risk focuses on market value deviations and market parameters as the main risk drivers (Hogan & Sharpe 1988; Scott 2005). Figure 3.6 demonstrates specific market risk using the common structure followed throughout a bank for all risks. As seen from Figure 3.6 these risks are distributed in two main blocks: 1) standalone risk of individual transactions; and 2) portfolio risk.

**Figure 3.6: Recognition of Specific Market Risks**



Source: developed by the author, 2008 based on (Bessis 2001)

*Standalone risk* indicates that all market risk results from the distribution of the value variations between a current date and other dates through individual assets maturity. Consequently, the measuring of such risk is needed for the distributions of the asset returns, between now and the future—short-term horizon (Basak & Shapiro 2001; Dangl & Lehar 2004). In contrast, *portfolio risk* refers to the ‘standard portfolio problem’. This means that the opportunity to perform high level portfolio analysis is an advantage in reducing aversion risks to minimal level of risks. With such an investment program, the existence of different assets in one portfolio—portfolio diversification—eliminates a large fraction of the sum of individual risks (Campbell & Huisman 2002). However, portfolio risk needs to calculate correlation values and to use them to model the distribution of the portfolio returns. Consequently, there is a two-stage modelling process which goes from institutional risk factors to market parameters (e.g. interest rates, equity indexes, exchange rate), and moves from these risk drivers to individual market value of exposures.

However, as previously mentioned (section 3.4.1.2), it is possible to gain liquidity from tradable products (e.g. loans) or by hedging their future changes of value when they are needed. This could be an accurate method to limit market risk to the specific liquidation period. In general, Barnhill and Maxwell (2002) observed that the liquidation period depends on the types of transactions and their sizes. In the context of finance, the liquidation period has been ruled by regulators as a 10-days reference<sup>37</sup>. Consequently, pure market risks are completely different from market liquidity risk. Changes of market parameters, such as interest rates, equity indexes, and exchange rates lead to market risk (Tripe & Tozer 1998). This interaction raises important issues, such as what is the normal volatility of market parameters under a fair liquidity situation, how does it change under poorer liquidity situations, and how sensitive are prices to liquidity crises? However, asset

<sup>37</sup> Finance regulators use as reference a 10-day liquidation period and impose a multiple over banks’ internal measures of market value potential losses.

prices in emerging markets are often significantly far removed from a theoretical ‘fair value’ and liquidity is still a critical issue.

### **3.4.1.3 Business Risk and Shari'a Principles**

Business risk is defined as the risk inherent in the institution, independent of the way it is financed. Business risk generally is reflected in the variability of net operating income or net cash-flows. As mentioned in section 3.4.1, three sources of business risk might be recognised in Islamic or non-Islamic institutions. These include displaced commercial risk, withdrawal risk and solvency risk (see Figure 3.5)<sup>38</sup>. How, Abdul Karim and Verhoeven (2005) noted that business risk is a combination of these sources. They also noted that the level of business risk might be influenced by internal factors such as investment decisions, management skills and capital adequacy. Hence, in this regard, regulators in the banking and finance field gave priority to banks’ solvency risk which has been the focus of discussions in this section.

In essence, solvency risk is a major area of business risk exposure facing managers in modern institutions. The risk refers to all types of risk relating to the inability to absorb losses generated with the available capital. Bankruptcy risk results from defaulting on debt obligations and an inability to raise funds for meeting such obligations (which is different from solvency risk). Drudi and Giordano (2000) describe solvency risk as similar to the credit risk of the bank. Additionally, Fooladi, Roberts and Skinner (1997) define default risk as the probability of the event of defaults.

Further, default can be defined as follows (Rochet 1999):

1. Missing a payment obligation for a short-term or a long-term<sup>39</sup>.
2. Filing for bankruptcy restructuring imposed by lenders.
3. Breaking a covenant, triggering a cross-default for all lenders to the same entity.

Depending on the default definition above, solvency is equivalent to default as a joint outcome of all risks relative to capital accessibility (Berger & DeYoung 1996; Elsas & Krahen 2002). In this context, the capital adequacy principle, adopted by major conventional institutions and regulators for financial/business risk management, defines capital adequacy as the level of capital that allows a bank to monitor all current risks, which results in a reduction of potential losses and compliance with adequate capital levels<sup>40</sup>.

Ideally, Muljawan, Dar and Hall (2004, p. 433) indicated that ‘an Islamic bank has an equity-based capital structure, dominated by shareholders’ equity and investment deposits (investment accounts holders IAH) based on profit/loss sharing (PLS). There is no need for capital adequacy regulations if the Islamic banks are structured as pure PLS-based institutions. However, because of informational asymmetry and risk aversion by investors, there currently exists fixed claim liabilities on the Islamic banking balance sheets. This necessitates the imposition of capital adequacy requirements which aim at maintaining systemic stability by achieving two fundamental objectives:

1. Capital regulations should protect risk-averse (assumed unsophisticated) depositors, which requires a minimum equity capital cushion and an optimal assets–liabilities composition.

<sup>38</sup> Definitions of such risks have been provided in Appendix D.

<sup>39</sup> Short-term is less than 1 year, and long-term is more than 3 years, according to the accounting theory literature.

<sup>40</sup> This is according to the Basel II requirements.



2. Capital regulations should give the right incentives to shareholders to promote prudent behaviour by the banks, which requires analysis of potential behaviour by shareholders when facing financial uncertainty’.

#### **3.4.1.4 Governance Risk and Shari'a Principles**

The most important governance risk in banking institutions is operational risk. Operational risks impact on operating systems. These systems include strategies such as reporting systems, monitoring internal risk rules and internal risk procedures considered necessary to conduct information systems appropriately<sup>41</sup>. For instance, Di Renzo et al. (2007) pointed out that a specific policy such as an ‘internal auditing’ incorporates all these rules. Additionally, to ensure survival, an institution needs to protect itself against these risks. Risk-monitoring strategies and risk-controlling procedures are designed to shield the institution from those risks considered sufficiently significant to cause the institution to fail to meet its obligations.

Likewise, there are many external risk factors such as economy, market, individuals’ behaviour (society) and technology which impact on credit operations in banks. Edelstein (1975) argued that bad loans may arise because of adverse economic circumstances beyond the bank’s control, and protection against these risk problems is needed. Moreover, financial institutions are encouraged to consider the environmental impact of corporate borrowers’ actions as part of their investment decision making (Olaf 2005). For example, Coulson and Monks (1999) have provided an overview of banks’ commitment to the environment and consider the potential implications of corporate environmental performance for bank lending decisions in the UK.

Although customers usually seek finance from banks, and expect to be questioned on their environment policy and management practices as part of the lending evaluation, banks do not want to be viewed as environmental regulators or become responsible for the environmental liabilities of their borrowers (Thompson & Cowton 2004). ‘These aspects add another dimension for decision-makers in banks. Managerial decision-making on risk in organizations and, more specifically, banks, will be shaped by all three types of institutional effects<sup>42</sup>: regulatory, normative, and cognitive’ (Lane & Quack 2002, p. 4). A consideration of these factors is useful in order to understand possible changes in prevalent modes of risk behaviour. Therefore, risk assessment systems in the financial industry may have to look at operational risk from different angles.

Typically, there is a need to be able to identify, articulate, and assess operational risk on an ongoing basis. Clearly, too much operational risk can be a significant obstacle to meeting one’s business objectives. Di Renzo et al. (2007) noted that operational risk affects the ability to adapt and respond to unexpected circumstances and to make decisions in the absence of complete information. In addition, Mayland (1993) suggests there is a constant need to improve the management of, and increase the ability to anticipate, operational risk.

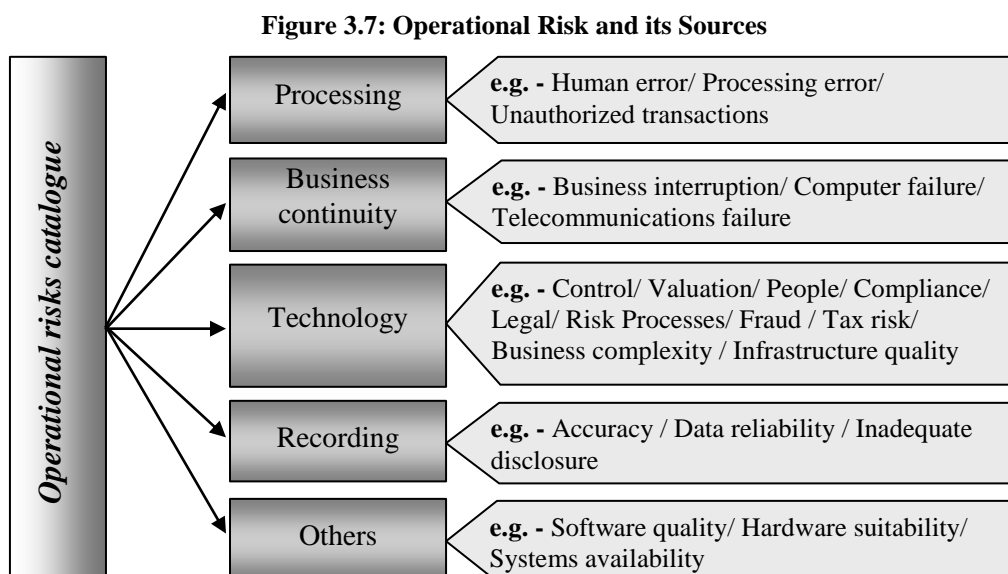
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<sup>41</sup> The new Basel Accord of January 2001 (Basel II) defines operational risk as ‘the risk of direct or indirect loss resulting from inadequate or failed internal processes, people and systems or from external events’.

<sup>42</sup>- Regulatory effects mean that decision makers address various actions taken by the institution to address the effects of risks.

- Normative effects mean that decision makers will sort acts or actions according to strong connections to typical standards or models applied in the same field.

- Cognitive effects mean that decision makers select a course of action among several alternatives.



Source: created by the author, 2008

Figure 3.7 presents a classification of operational risks. Clear definitions of the components of operational risk are still required for the proper development of best-practice operational matrices. For instance: 1) processing risk arises in part as a function of the bank's controls, strategic alliances, information systems, employee integrity, operating processes, and so on; 2) technology risk is the risk of internal and external technology becoming ineffective, unreliable, obsolete or incapable of meeting business needs (Bansal et al. 1993); 3) recording risk arises in part from financial and non-financial transactions that may be recorded inaccurately or valued inappropriately; and 4) business continuity risk covers internal and external factors that can result in business interruption or failure.

Typically, operational risk measurement addresses the likelihood and cost of adverse events. However, to some extent, a common events classification raises some practical difficulties, for example, in the data gathering processes: there are several potential sources of event frequencies which, to some extent, influence cost reduction measurement. Operation risk should be controlled in the financial industry by internal control procedures, including 'physical security, systems testing, segregation of duties, backup systems, and contingency planning. In addition, a comprehensive audit programme to assess the risk adequacy of controls and compliance with bank policies is essential' (Cornalba & Giudici 2004, p. 169).

Since most banks are third party participants in international networks, their ability to influence controls is limited. They must recognise risks to their own business operations and compensate through their own third party systems and, to the extent possible, insist upon sound operations for system continuity and integrity. Because Islamic banks are prohibited from entering into transactions based on *riba* (interest), they mobilise funds mainly on the basis of the profit-sharing form of contract (Archer, Abdel Karim & Al-Dehani 1998). This type of investment raises a set of issues concerning the contractual relations between the bank and the holders of such investment accounts. In particular, Islamic banking and finance is a new invention in the finance industry worldwide, and new relevant risks seem to be involved in their operations which do not exist in other systems.

### 3.4.2 Specific Risk Practices:

Understanding the specific risks in Islamic banking and how entrepreneurs or principals are dealing with ‘taking risk behaviour’ is essential to the sustainability of Islamic banks’ operations (Badr El-Din 2006). Under the ‘*shari`a* principle’, Kuran (2005) considers the answer to what Islamic banks essentially do,: they fund from several sources, for example, IAH (depositors) and shareholders, and use the funds to acquire assets which are expected to yield a return sufficient to cover both the cost of these funds and any operating expenses incurred. According to *shari`a*, a new generation of risk may occur such as ‘risk sharing’ and ‘risk aversion’, and IBs will subsequently need to deal with this aspect (Van Greuning, Hennie & Iqbal 2008).

#### 3.4.2.1 Interest Risk vs. Interest Free Risk

Basically, interest rate risk refers to an actual decline in earnings due to movements in interest rates. According to the context of investment theory (IT) and conventional finance theory (FT), two dimensions of investment have been considered: risk and return (Basak & Shapiro 2001). Additionally, ethics are ignored, and a conventional investor<sup>43</sup> will accept any investments that are not actually illegal. The investment may be direct or indirect. Finance context analyses these types of investment separately based on portfolio theory, to deal with; 1) unlimited liability firms with high attention of risk (investment in share or bunds); and 2) limited liability firms with little attention of risk.

In contrast to conventional investors, however, Islamic investors must consider the ethical aspects of their investment, and the types of economic activities in which they invest (Erol, Kaynak & Radi 1990). For example, Archer and Abdel Karim (2006) point out that while the insights of conventional financial theory apply to Islamic investment, the restrictions which apply to the Islamic investor make investment at IBs different from investment at CBs in several important respects:

1. In Islam an investor must pay off his debts, and his death—even as a martyr—cannot cancel these debts. Since the full repayment of debts is a duty, limited liability arrangements are unacceptable in Islamic culture.
2. A Muslim society would impose little tax upon profits. This would facilitate re-investment of profits, although there are Islamic rules about how this should be done in a partnership.
3. Overall, an Islamic investor must avoid *rib`a* in any form (increase, interest, etc.).

Islamic investors must also avoid forbidden economic activities which include producing or dealing in alcohol or drugs, unless needed for medical purposes (Segrado 2005).

Typically, the distinguishing feature of an Islamic investor lies in the definition of ‘interest’—the one used as the basis of conventional financial theory (Zaman & Movassaghi 2002). In terms of risk, the Islamic investor’s understanding is that no human being knows the future, should not worry about risk and should be ready to take investment with available returns, without demanding compensation for the risk. Similarly, a conventional investor does not know the future either, but bases his estimate of expected variance upon past data, and his expectations might often turn out to be wrong (Ahmad 1995). Thus, from an investors’ point of view Islamic rules state that the only type of loan they should use is an interest-free one.

<sup>43</sup> A term used for an investor in conventional banks.

To some extent, practical Islamic finance implies that the assets of IBs are exposed to interest rate risk where their pricing is concerned, insofar as they use conventional interest benchmarks to price their financing facilities. However, it should also be realised that the value of positions which reflect the earnings potential of assets in all periods is also sensitive to changes in interest rates since earnings potential is measured in relation to alternative investments of comparable risk and tenor (Ebrahim 1999). How, Abdul Karim and Verhoeven (2005, p. 81) add that, 'even in the absence of conventional interest rate benchmarks, as already noted, Islamic banks are potentially exposed to a form of financial return risk related to unexpected changes in the rate of inflation and hence in nominal market returns'.

In this context, Islamic practitioners argue this is an operational concern that needs to be addressed. To sum up, asset/liability management is mainly the process of preserving the net worth of an institution, and being concerned with the difference between the value of assets and the value of liabilities (Oguzsoy & Guven 1997). If, therefore, the interest rate sensitivities of assets and liabilities, as measured by their duration, are not well-matched (the net duration is not equal to zero), then an institution may be exposed to a significant degree of risk. This is especially true of highly leveraged organisations. Only if this risk is measured and its significance to the future well-being of an institution be identified.

### 3.4.2.2 Risk Sharing and Risk Aversion

Regulators need to be conscious of further risks related to IBs. The first, or so-called displaced commercial risk, arises from commercial pressure from the bank's investors<sup>44</sup> (Ahmad 1995). For example, investors in bank (X) would like to earn the highest profit available in the market, otherwise they will move their funds to bank (Y). The second, fiduciary risk, arises from Islamic banks' role, for instance 'Mudarib', and the jurisprudence concerning 'mudaraba' contracts (Al-Deehani, Karim & Murinde 1999). According to this jurisprudence, if the *mudarib* is guilty of misconduct or negligence in the fulfilment of his obligations to investors, the investors' funds cease to have the character of equity investments and become a liability. This has obvious implications for capital adequacy and, indeed, solvency.

In conventional banks, depositors have a fixed claim upon the bank's assets, according to a predetermined interest rate, plus the return of their capital (Booth, Bessler & Foote 1989). A conventional bank must, therefore, service its obligations to depositors irrespective of its actual profitability (Chapra 2007). Consequently, any uncertainty in the income streams generated by implementing risky operations and in changes in the value of the bank's assets is borne by shareholders. Islamic banks, in contrast, are structured upon the principle of risk sharing. This applies to the sources of funds and may also apply to the instruments of funds such as *mudaraba*, *musharak*, etc. (Jamshed 1999). With respect to the former, holders of profit-sharing investment accounts (which take the place of conventional interest-bearing bank deposit accounts) are essentially stockholders. Consequently, the return on their investment in the bank is uncertain since they share in the profit (asset returns net of operating expenses) generated by the bank alongside the shareholders.

Crane and Leatham's study (1993) evaluated profit and loss sharing instruments used in Islamic banking. They argued that USA financial intermediaries can use profit and loss

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<sup>44</sup> The bank's investor here is 'shareholders', not investment account holders.

sharing instruments to provide external equity capital needed to finance several investment projects. This also means that investment account holders are exposed to the risk of losing any or all their initial investment. Exposing the owners/shareholders of investment accounts to the unpredictable changes of asset return (probability) distributions has important consequences for several Islamic banks operating in economies in which depositors do not have access to conventional banking (Kahf 2002). In such economies, (for instance, Pakistan, Sudan and Iran) Islamic banks have a greater capacity than CBs to absorb negative shocks to their asset returns since generally both IAH and shareholders' funds absorb the impact of any potential losses (Kenneth 2002).

The risk-sharing arrangements on the deposit side provide another layer of protection to the bank, in addition to its book capital. Also, 'the need to provide stable and competitive return to investors, the shareholders' responsibility for negligence or misconduct (operational risk), and the more difficult access to liquidity puts pressures on Islamic banks to be more conservative' (resulting in less moral hazard and risk taking) (How, Abdul Karim & Verhoeven 2005, p. 77). Operating according to risk-sharing principles could, therefore, be expected to enhance the survival probabilities of these Islamic banks by reducing systemic risk and bringing long-term benefits to the economies in which they operate through stability in the banking industry. In such banking systems, risk management has become one of the most recent empirical challenges in terms of 'risk aversion policies assessment'.

### 3.5 Risk Assessment in Practice

#### 3.5.1 What Does 'Risk Assessment' Mean?

Risk is a concept that denotes potential negative impact on asset value that may arise from some present process or future event. Risk is also the possibility of an event occurring that will have an impact on the achievement of objectives. Assessment of risk involves the process of documenting aspects or acts, usually in measurable terms, such as knowledge, skill, attitudes, and beliefs. Therefore, the term 'risk assessment' is considered as procedures for assessing an institution's system for managing all types of risks, credit, trading, liquidity, etc. If loss is defined as a decrease in the asset value based on a single security incident, the annualised adverse changes rate in the asset value can be calculated. In this case, the risk  $R_i$  is expressed as  $R_i = p(L_i)$ , where  $p(L_i)$  indicates expected loss that will occur<sup>45</sup>. Therefore, the annualised loss expectancy is a calculation of the single loss expectancy  $p(L_i)$  multiplied by the annual rate of occurrence  $L_i$ , and individual risk expectancy can be expressed as:

$$R_i = L_i p(L_i) \quad (3.1)$$

Equation 3.1 states how much an institution estimates to lose from an asset based on the risks, threats, and vulnerabilities. However, if the risk estimate takes into account information on the number of individual risks exposed given by the sum of individual potential risks  $\sum_i L_i p(L_i)$ , it is termed a total risk  $R_{total}$ , and expected total losses per a time period can be expressed mathematically as:

<sup>45</sup> The annualised adverse changes are estimated based on the data of how often a threat would be successful in exploiting vulnerability. From this information, the annualized loss expectancy (ALE) can be calculated.

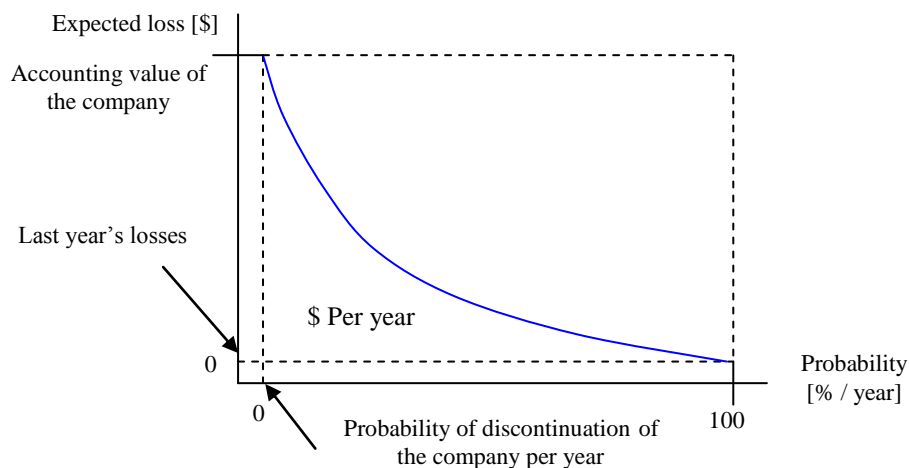
$$R_{total} = \sum_i L_i p(L_i) \quad (3.2)$$

Assessing risk means determining the quantitative value of risk related to a particular action during a certain period. Calculations of two components of risk,  $R$ , are required:

1. The importance of the potential loss  $L$ .
2. The probability  $p$  that the loss that will occur.

Then, from a financial perspective, justifying expenditures to implement counter measures to protect the asset has become possible. Nevertheless, calculations of total risks are of more use for cost/benefit analysis, however, individual risks are of more use for evaluating whether risk to individual market transactions are acceptable. Thus, measuring both the magnitude and the probability of the potential losses is part of the risk management difficulty, and risk assessment itself is considered very difficult (Van Greuning, Hennie & Brajovic 2003). Despite the uncertainty present in both activities, risk management could be simplified if a single metric could represent all of the information in the measurement. Figure 3.8 shows that measuring two quantities in which risk assessment is concerned—potential loss and probability of occurrence—can be very reasonable to measure.

**Figure 3.8: Risk Assessment Mechanisms in the Financial Markets**



Source: Vicente Aceituno 2006.

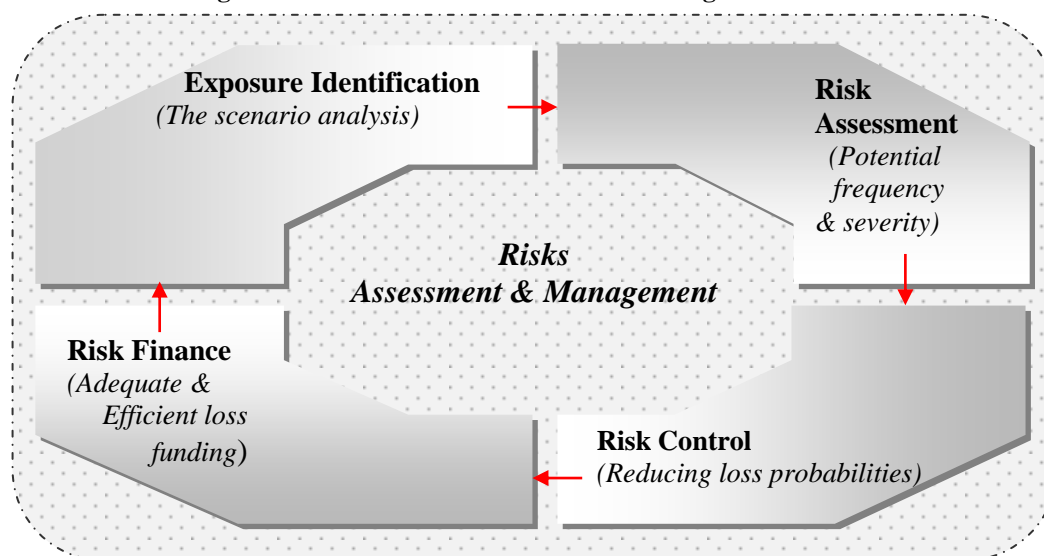
Figure 3.8 shows that expected losses in accounting value of the bank have declined gradually with the probability of discontinuation of the company per year increasing. This means, risk assessment must be treated differently from one with a large potential loss with a low probability of occurrence and another with a low potential loss and high probability of risk occurrence. Theoretically, both cases are almost similar in dealing with the potential loss. But practically, it is very difficult to manage them without adequate resources, especially at times of establishing the managing risk process.

### 3.5.1.1 Risk Assessment: A Systematic and Continuous Effort

In the risk management process, risk assessment is the most important step, and yet it may be the most difficult and complicated. The steps needed for identifying risks first, then assessing them, are considered as much more pragmatic than a selective approach. Therefore, techniques for managing risk built on the broad principles of risk management that are already deeply ingrained in banking practice. Nevertheless, non-credit corporate services often hold considerable risks to the point where participation by the credit

administration department with senior management services is necessary (Zopounidis et al. 2002).

**Figure 3.9: Administration of the Risk Management Process**



Source: developed by the author, 2008

Based on (Siddiqui 2008; Sundararajan 2005)

Figure 3.9 shows a basic model for the risk management process. This model was initially developed by Kloman and Hoffman (1974) who provide a concise overview of the risk management process. The model summarises risk management as a circle of interrelated and continuing steps as follows:

- **Exposure identification:** is a continuous discovery process where alternative scenarios are explored as the operating environment changes over time. The operating environment includes external legal, regulatory and payments system factors, customer behaviour patterns, and internal bank policies, procedures and product features. It uses ongoing (what-if) analysis to understand the dynamic of exposure creation.
- **Risk assessment:** attempts to measure the potential frequency and severity of the exposures that have been identified. It includes the continuous measurement of past and projected dollar flows associated with customers and products and the continuous evaluation of customer credit-worthiness. The process is supported with regular reports to alert management of any changes in risk assessment.
- **Risk control:** is the application of techniques to reduce the probability of loss ranging from informal control, to periodic review and to interactive control. The key component of cost-effective risk control is the business decision that balances the trade-off between the costs of increased risk control with a reduced potential for financial loss.
- **Risk finance:** is the provision of sufficient funds to meet loss situations as they occur. Funding can be accomplished by using a variety of internal and external financial resources, including insurance and risk-based pricing.

Figure (3.9) above depicts these steps. Sellers (1988) has stressed that this model is the basis of recent policies adopted in the banking industry. Kloman (1996, 2001) notes that institutions implementing this type of processes achieved advance progress in terms of

risk management. Based on this literature, the model might be applicable to the new banking services institutions, including Islamic banks.

Effective administration requires clear policies by the board of directors and senior management, designated responsibility for the function, commitment by operating officers, and periodic reports to the board. Stefanowski and Wilk (2001) indicated that financial institutions require written policies for the assessment and ongoing monitoring of payments system risk, with top management approval. Audits need to be included in the review, as well as compliance with these policies (Ramos, Jose & Santander 2000). Thus, it is most important for bankers' know how to conduct risk assessment within a practical framework.

### **3.5.1.2 Getting Started**

Administering a process to manage operating risks demands a distinctive combination of expertise. Also, an effective administrator requires a working knowledge of credit transactions (product administration, operations, and marketing). Allen et al. (1998) argued that if one individual/institution does not have the requisite knowledge, the process must ensure that needed lines of communication are established between the institutions that have expertise, as well as among the expertise within the institution itself. Accordingly, this program requires cooperation—unprecedented in many banks—between credit administrations in banks, credit business units which provide financial corporate services, and corresponding operating areas.

The discussion above highlights the necessary tools required to enable a bank to perform the initial exposure identification and risk assessment. In order to perform the risk management process well, appropriate guidance needs to be provided. It is necessary to make decisions on what risk controls are needed and to examine the need for risk-based pricing. Once the process is initiated, it will continue to evolve with exposure to the specific business needs at each bank. Thus, the objective should be two-fold, as follows<sup>46</sup>:

1. To direct senior management on whether or not there is a business need to administer a formal risk management process.
2. To integrate policy, procedures and documentation in a way that demonstrates the outline of an effective ongoing process. Each interlinking element of the process should be clear and be a useful prerequisite to the others.

### **3.5.1.3 Risk Assessment Process**

The five-step approach outlined in Figure 3.10 is used to perform initial risk assessment and management study. Banks assess risks starting with analysis of borrowers' financial base to determine their credit classes. Lenders can determine the volume of credit and the borrower's capability to comply with the repayment schedule time frame. Thereafter, banks provide an initial descriptive profile on risks that might be involved so borrower risk might be also calculated to allow lenders to make required corrective actions if required. If the initial report (profile of risk) has been supported, banks consider alternative ways that allow review of policy procedures—called flexible policy—once it is needed. Finally, the recommended policy might be conducted and, accordingly, the

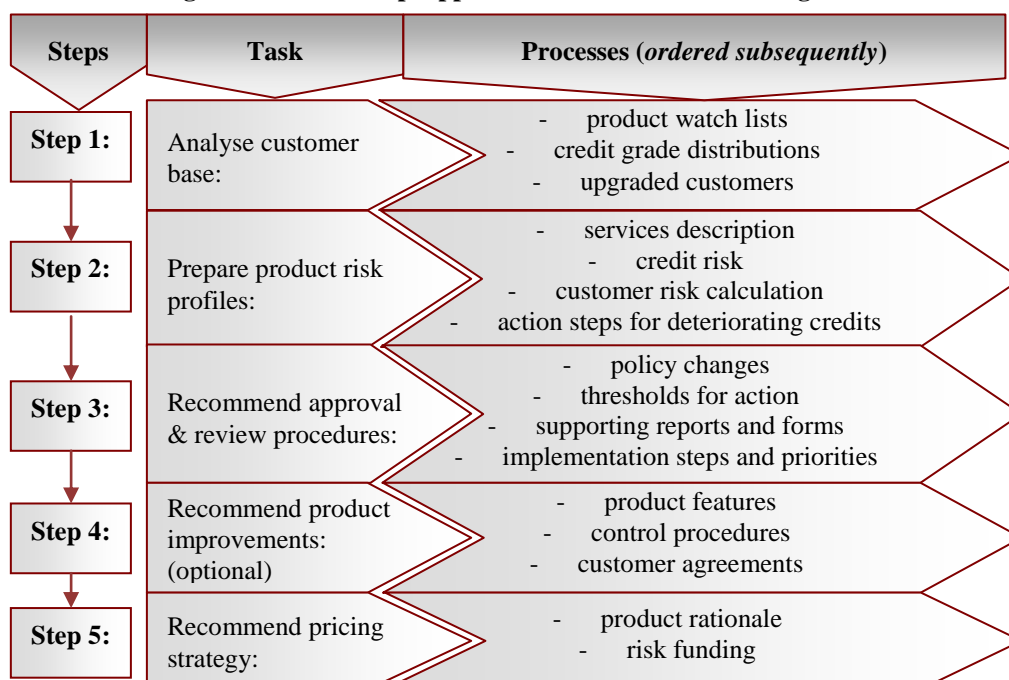
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<sup>46</sup> For more details, see Chorafas, DN 2000, *Credit derivatives and the management of risk including models for credit risk*, New York Institute of Finance, New York. and Wehrspohn, U 2005 *Credit risk evaluation: Modeling - analysis - management* Center for Risk & Evaluation, Accepted Paper Series



potential risk could be also well-controlled. In summary, the first three steps show what banks do to build their credit strategies empirically; however, the last two steps indicate what processes have been taken by the risk assessors or risk assessment units to better administrate these policies.

**Figure 3.10: Five-Step Approach Process for Risk Management**



Source: developed by the author, 2008 based on (Bol at el, 2003, Chorafas, 2000)

### 3.6 Risk Management in Islamic Project Finance

Islamic *shari`a*-based financial products imply providing scarce contractual governance services that improve the risk-return ratio facing investors in a competitive international capital market (El-Gamal 2006). An assessment of the future growth prospects for the Islamic financial products industry is considered to be important. A salient feature of Islamic project finance is that Islamic banking could be required to use its funds to acquire assets that are expected to yield a higher rate of return than lower-risk alternatives. This requirement may lie at the root of one of the most significant challenges that Islamic banks face. Thus, if ever there was a suitable time for Islamic banking to develop risk management capabilities, now is that time.

Besides the Islamic law (*shari`a*), regulatory changes on the horizon brought about by Basel Accord II will make it incumbent on Islamic banks, and their competing conventional counterparts, to develop suitable risk management capabilities (Honohan, Caprio & Vittas 2002). There are two critical steps that precede the development of a robust risk management capability:

1. Proper identification of risks.
2. Accurate measurement of such risks.

‘However, the view that IBs are in some way insulated from certain types of risk, namely, for instance, financial return risk (FRR), which is similar to interest rate risk (IRR) for CBs, has prevented even the first step from being successfully taken by many Islamic banks’ (Archer & Karim 2002, p. 167). In the case of managing project risk, an

explanation of how IBs deal with return risk is similar to managing interest rate risk in CBs, despite the fact that IBs do not directly pay or receive interest.

Project finance in Islamic finance has the same purpose and meaning as it does in conventional finance. It is for financing a project on a non-recourse basis by structuring the financing around the project's own operating cash flows and assets without additional sponsor support. Consequently, Hirschev, John and Makhija (2003) noticed that if the project does not have the ability to repay the financing, the financiers do not have recourse to another counterparty<sup>47</sup> which may be sovereign, institutional or corporate. Laeven and Mundial (1999) noted that it is not uncommon for there to be limited recourse project finance, where the arrangement between creditors and sponsors gives some recourse to the sponsors.

A focus on project finance has stemmed from more reliance on the market mechanism to guide financial activity. This, in turn, has led to greater investment in establishing and sponsoring projects (Ahmad & Hassan 2007). Hence, project finance has two significant advantages over corporate financing:

1. Increase in the availability of finance.
2. Reduction in the overall risk for major project participants; at least bringing it down to an acceptable level.

In Islamic finance, there is an emphasis on the sharing of risks and rewards and there is also a strong emphasis on financing productive endeavours. Both of these aspects are generally inherent in project financing (Jan Smolarski, Schapek & Tahir 2006). Thus, on a conceptual basis, Islamic finance should be well-suited for project financing solutions, all the more so because of the social and economic agenda inherent within it.

Islamic bankers have long been aware of the advantages of project financing. However, very little project finance on an Islamic basis has taken place (Llewellyn & Iqbal 2002). The main reasons why project finance using Islamic finance has not taken place on the scale that one might have expected are outlined as follows:

1. Assets and liquidities mismatch (liquidity risk).
2. In-house capabilities to undertake project finance (project characteristics) or lack of sources.
3. Willingness and capabilities of conventional banks to undertake project finance risk (volume).
4. Securitisation (marketing).
5. Development of project finance capabilities (regulations or requirement).
6. Reduced global income levels (rise in economic inflation rate).
7. Post-September 11, 2001 (negative target/ over-reliance).
8. Enormous demand for project financing (lack of Islamic common markets—locally or globally).

Selected techniques (Altman, Giovanna & Saunders 1998; Caouette, Narayanan & Altman 1998; Hamwi & Aylward 1999) that can be used in quantifying the risk of different Islamic contracts arrangement are discussed below. The specific techniques are *value oriented* as opposed to *earnings oriented*. The reason is that earnings techniques (for example, estimating the change in net earnings for the next 12 months, given stock earns to the current yield curve) focus on the temporal repricing characteristics of various assets and liabilities for the current period's earnings only (Ahmed 1989). On the whole,

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<sup>47</sup> Normally a stronger counter-party

such techniques ignore, for instance, the 'out-of-period' impairment to the earnings potential of assets that can occur due to unfavourable changes in the yield curve; this can lead to an understatement of the actual risk.

Perhaps the single most important contribution of this section (3.6) is the creation of awareness of the need for Islamic banks to manage their exposure to interest rate risk. Nevertheless, effective monitoring of *shari`a* compliance by an Islamic bank may involve reinforcing more remote *shari`a* supervisory board (SSB) oversight through the internal *shari`a* audit (ISA) process and by developing more knowledge and expertise within the institution. However, Anwar (2003) and Badr El Din (2006) both concluded that, to be successful, Islamic banks must have a more complete set of products that will permit active and positive balance sheet management. Just as in the way that conventional derivative products have served to make conventional banking markets more complete, IBs must introduce *shari`a complaint* risk management products to achieve the same objective.

### **3.7 Conclusion**

Managing risk in banks is extremely important because they are regularly considered as 'risk spreading' machines: institutions obtain risks and transform them in the different banking products and services. This chapter confirms banking regulation guidelines and risk assessment have become increasingly global, the expanding risk taking behaviour development in both systems (Islamic and conventional), extending scope of risk taking decisions under an *ex ante* perspective, and the issue of risk monitoring under an *ex post* perspective once risk decisions are made. Thus, this chapter provides the motivation for both banking systems to implement risk-based practices; to create balance between risks and returns from both agent and principals' points of view; and to develop competitive advantages by complying with increasingly strong regulations.

Although the overall credit assessment for project finance on an Islamic basis will tend to follow conventional banking techniques, the additional overlay is one of *shari`a* compatibility. But, an investor in both IB and CB is free to hold a diversified portfolio which could reduce exposure risks. In terms of productivity and efficiency, risk model applications and processes extend to cover many types of risks, such as credit risk, market risk, interest rate risk, liquidity risk, and operational risk. Furthermore, the future growth prospects for the Islamic financial products industry are assessed to be significant. In summary, effective risk management requires clear policies by the board of directors and senior management, designated responsibility for functions, commitment by operating officers, and periodic reports to the board. This chapter has explained why banks require written policies for the assessment of risk and ongoing monitoring of risk system within banks' administrations. Aspects that have been acknowledged in risk assessment policies and that may lead to improve the quality of lending decision-making will be the focus of the next chapter.



## CHAPTER FOUR

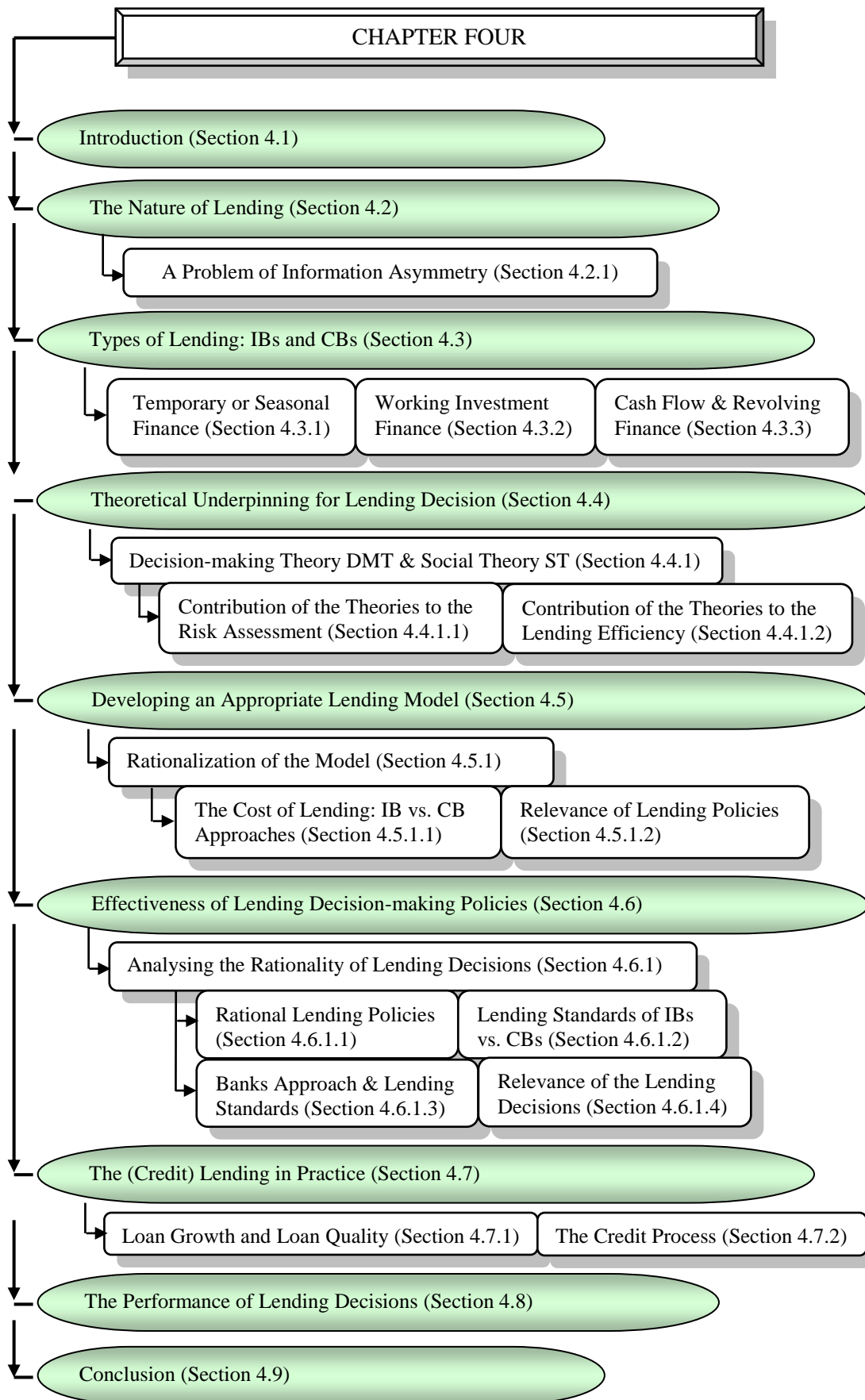
### **MAKING RATIONAL LENDING DECISIONS IN THE FINANCIAL SERVICES INDUSTRY: ISLAMIC AND CONVENTIONAL BANKS**

#### **4.1 Introduction**

‘Lending has always been a primary function of banking, and accurately assessing a borrower’s creditworthiness has always been the only method for successful lending’ (Basak & Shapiro 2001, p. 378). The aim of assessing borrowers’ creditworthiness is always the same: to ensure that the borrower will have enough cash flow to repay the loan. With many financial institutions in the ME still struggling with the consequences of poor credit decisions over the past few decades, there is a strong incentive to look to fee-based operating services to bolster earnings. Therefore, the aim of this chapter is to provide the basis of making rational lending decisions with recognition of risk assessment policies in the finance services industry. Furthermore, differences between Islamic and conventional banking in lending models, lending policies and lending processes—lending performance—are also discussed.

This chapter is developed to extend the literature provided in chapter 2 and chapter 3. Section 2 highlights the nature of lending with asymmetric information problem. Section 3 discusses types of lending in IBs and CBs. Section 4 focuses on implications of theories used in lending decision-making policies. Section 5 explains development of a rational lending decision model, focusing on the relevance of efficient policy. Section 6 provides details on the effectiveness of lending decisions in the banking industry. Section 7 and section 8 present lending processes in practice and the performance of lending decisions. Finally, section 9 provides a conclusion to the chapter. Figure 4.1 provides a visual overview of the structure of this chapter.

**Figure 4.1: Outline of Chapter 4 Interrelations**



## 4.2 The Nature of Lending

Although banking activity consists of lending financial resources to customers who are in need of financing, the exchange between the bankers and the borrowers does not concern a tangible product, but considers the borrowers' future capacity to honour the loan (Berry 1993; Ferrary 2003). '[T]he nature of this activity, therefore, implies risk-taking by financial establishments since borrowers may not honour their debts' (Abdullah 2003, p. 73). Thus, the profitability of banks depends on the quality of risk evaluation and this depends on an accurate assessment of the debtor's reliability. Banks, however, have the required expertise, experience, and customer focus to make them the preferred lender for many types of loans. Skilled administration staff in banks are well suited to this task. Berry (1993) noted that not all loans can be standardised, credit scored, and securitised (sold in marketable packages). Whilst the most commonly securitised loans are those with the most standard features (mortgages, government-guaranteed, student loan, small business loan sponsored by small business administration, credit cards, and auto loans), many other loans are more difficult to credit score and securitize, such as those that are designed to meet specific business needs or given to poor people as a part of society development commitments (e.g. benevolent loans *hibah* and good loan *gard hassan* in the Islamic lending mode) (Ahmad 2000).

### 4.2.1 A Problem of Information Asymmetry

Proprietary information generated through the process of lending can influence the structure of the banking industry in terms of an exchange relationship. In this regard, there is an information asymmetry between borrowers and lenders (Ferrary 2003; Holod & Peek 2007). Lenders seek to reduce this asymmetry via a risk evaluation process with risk evaluation methods such as those used by banks (Brown & Goetzmann 1995; Glennon & Nigro 2005). Two important questions arise that require consideration at the time of lending, namely: 1) has this risk assessment and bond management affected the relationship between borrowers and lenders? and 2) has the performance of lending operations affected banks' risk assessment?

With a growth in the number of banks competing for business, borrower-specific information becomes more disperse, as each bank becomes informed about a smaller pool of borrowers. A new perspective modifies the nature of power relationships between lenders and borrowers. As observed in section 2.4.1, asymmetric information between borrowers and lenders significantly affects the cost of lending transactions. This reduces banks' screening ability, creating inefficiency as more low-quality borrowers obtain financing. Therefore, these relationships need careful consideration by decision makers in banks.

Economists recognized that, in a variety of settings, perfect competition is precluded by asymmetric information. The fact that search and screening is costly and that information may be obtained in the course of an exchange relationship implies that new borrowers will be imperfect substitutes for old borrowers (Bell & Clemenz 2006). In the context of banks, as described in banking and financial theories, information asymmetry between the principal [borrowers] and the agent [financer] raises two aspects: adverse selection and moral hazard.

**Adverse selection**—uncertainty of the viability of the project—basically, means banks are faced with uncertainty about the creditworthiness of the borrowers (Barucci 2003). If

banks experience low net worth of the borrowers after lending, they are able to reject riskier borrowers at the time of refinancing. Potential entrants into a lending business suffer an adverse selection effect stemming from their inability to determine whether applicant borrowers are new borrowers seeking financing for their untested projects or are, in fact, borrowers who have previously been rejected by an incumbent bank and are looking elsewhere for financing.

**Moral hazard** means uncertainty regarding the reliability of the borrowers as described by Kiefer (1988), and also Scott and Dunkelberg (2003). A problem of moral hazard may arise when individuals engage in risk sharing under conditions such that their privately taken actions affect the probability of the outcome. This situation is common in insurance, labour contracts and delegation of decision making responsibility.

Accordingly, some financial intermediaries such as credit rating agencies<sup>48</sup> that assign credit ratings for issuers of certain types of debt obligations have played a significant role in demonstrating uncertainties in lending without taking into consideration the issuer's credit-worthiness (loan repayment). Credit rating agencies may also play a key role in structured financial transactions (Levich, Majnoni & Reinhart 2002). Essentially, these agencies facilitate increasing the range of investment alternatives and provide measurements of relative lending risk. This, in general, increases the efficiency of the lending decision-making and the lowering of costs for both borrowers and lenders. This, in turn, increases the total supply of assessing capital risk in the economy, leading to strong growth and more credible borrowers (Cantor & Packer 1997). A study by Hoff and Stiglitz (1997) analysed the effects of subsidies in a banking market, focusing on moral hazard rather than adverse selection. Furthermore, another study by Mailath and Nöldeke (2008) obtained similar results indicating that competition may have a negative and perverse effect on the equilibrium interest rate. In contrast, asymmetric information in IB is a driving force in a different kind of analysis.

Unlike the role of insurance in CB, IB complies with the *Takaful* role which is an Islamic insurance concept grounded in Islamic *muamalat* (banking transactions). Theoretically, *Takaful* is perceived as cooperative insurance—solidarity (Anwar 2003; bt Shahimi & Ahmad 2005). However, Islamic scholars decreed that there should be a concerted effort to implement the *Takaful* concept as the best way to resolve these needs, for instance: 1) *basis of co-operation* or helping one another; 2) *basis of responsibility* or the place of relationships and feelings of people with faith; and 3) *basis of mutual protection* or by my life, which is in God (*Allah*)'s power<sup>49</sup>. To illustrate, while some Muslims believe insurance is unnecessary, because a society should help its victims (Dhumale & Sapcanin 2003), Muslims can no longer ignore the fact that they live, trade and communicate with open global systems, and they can no longer ignore the need for banking transactions and insurance instruments (Dhumale & Sapcanin 2003; Driver, Lomonaco & Zaidi 2005). Although insurance has been practised in different ways, lending classes differ across banks as each bank has superior experience with some types of loans but not others; or have superior knowledge about some borrowers but not others. Consequently, asymmetric information might not be a problem in this case.

<sup>48</sup> It is viewed as either a series of loans with different characteristics, or a number of small loans of a similar type packaged together into a series of loans.

<sup>49</sup> IB prohibited unreasonable uncertainty in transaction contracts - *gharar* (see section 2.2.2.3.2), therefore, Islamic interpretation for the *Takaful* rule is: 'nobody will enter *Gana* - Paradise - if he does not protect his neighbour who is in distress'.



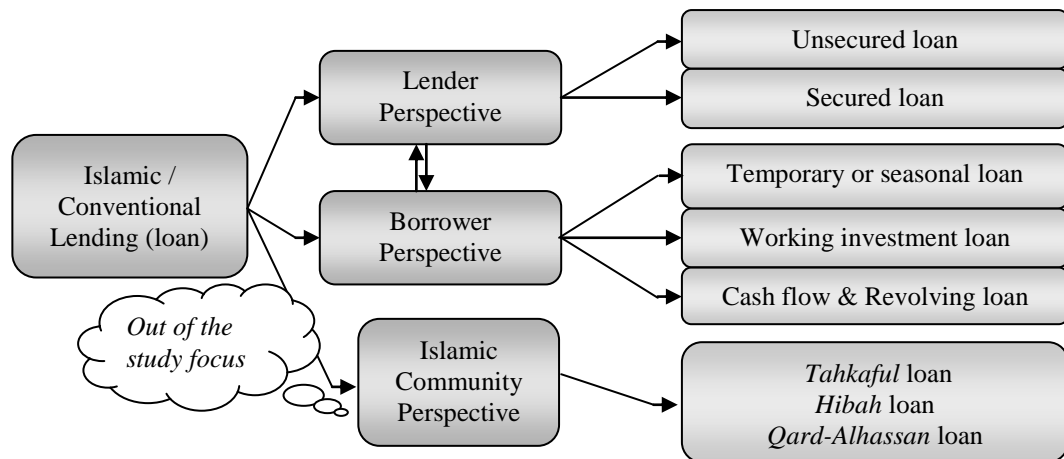
### 4.3 Types of Lending: IBs and CBs

The starting point in analysing the creditworthiness of a client is to consider the types of lending proposed. It is important to establish this before analysing the financial condition of the borrower because there are different risks involved in the different types of lending (Smith & Nau 1995). Therefore, establishing what type of lending is being proposed will define the approach to be adopted in assessing the creditworthiness of a client.

The theory of relationship lending is based on the idea that close ties between borrowers and banks may be economically beneficial. In this regard, Elsas and Krahen (2002) state ‘the empirical literature is mainly focused on assessing the consequences of relationship on loan pricing, credit availability or efficiency of deriving decisions by banks if borrowers faced financial distress’. Their argument is closely related to the idea of good and bad credit. A loan applicant will be a good or bad customer depending on his/her credit-worthiness and the terms of the loan. Elsas and Krahen (2002) found this to be the key to successful loan repayment performance.

Usually, the bank (lender) considers the loan to be of two major types: secured or unsecured. Secured loan means that debt contracts often require borrowers to pledge collateral. The incidence of secured loans is positively related to the probability of default, loan size, loan maturity and marketability of assets. It is important to note that some loans in IBs are given voluntarily as a ‘benevolent’ by banks to customers or to society members, namely *Hibah*<sup>50</sup>. Furthermore, some loans are also regarded as a token of appreciation to the borrowers and, this transaction is a true interest-free loan which is known as *Qard-hassan* (good loan). Basically, these types of loans are outside the scope of this study—which focuses solely on the project finance (see section 3.5).

Figure 4.2: Banks Lending Classification



Source: created by the author, 2008

However, from the borrowers’ perspective, lending (loan) and associated risk are primarily of three types<sup>51</sup>: temporary or seasonal finance, working investment finance, and cash flow and revolving lending. These types of lending present an interrelated

<sup>50</sup> *Hibah* is a voluntary payment made (or not made) at the bank’s discretion, and cannot be ‘guaranteed.’

<sup>51</sup> Definition of *Qard-hassan* and *Takaful* are provided in Appendix A, and for more detailed information, see: Sathye, M 2003, *Credit analysis and lending management*, John Wiley & Sons Australia, Milton., and Rhodes, T 1993, *Syndicated lending: Practice and documentation*, Euromoney Publications, London.

perspective between lenders and borrowers, and are highlighted in Figure 4.2. These types of finance are discussed further in the following section.

### 4.3.1 Temporary or Seasonal Finance

Some loans are given to meet typically seasonal requirements in business such as farming and short term services. A lender dealing with a borrower would expect an increased over-draft during a production process, such as when input is acquired and then processed into finished products (Altunbas, Fazylov & Molyneux 2002). The over-draft would be substantially reduced as finished products are sold. Temporary or seasonal lending provides finance for the build-up of assets over one season and is the conventional and Islamic form of bank-lending to business. Since, Islamic law prohibits interest and *gharar* or dubiousness in contracts, this type of finance could be mainly in the agriculture sector and is known as *muzarah* contracts (specific counterparts in *mudaraba* contracts).

However, the primary risk in this type of lending is the borrower's inability to generate liquidity through the conversion of the assets into cash due to failures in supply, manufacturing and sales. Lahiri (2002) indicates the analyst should be concerned with the liquidity of the assets being financed and management's ability to complete the asset conversion cycle. Further, Lucas et al. (2001) argue that the loan facility should be structured in such a manner that the lender can monitor the borrower's condition frequently and retain control in lending funds or renewing the facility.

Successful completion of the asset conversion cycle is vital for any lender and influences all lending decisions. Additionally, in other types of lending such as working investment finance and revolving lending, there are further considerations. Nevertheless, a borrower's successful completion of the asset conversion cycle is a pre-requisite for a good loan in both banking systems. Lown and Peristiani (1996) however, investigated the loan pricing behaviour of commercial banks, where they found strong evidence that large undercapitalised banks contributed to the credit slowdown by charging consumers a higher average interest rate than well-capitalised institutions. However, IBs attempt to protect their assets from any charges of (small or large) interest rates *rib'a*.

### 4.3.2 Working Investment Finance

Not all borrowers use the seasonal method of lending. Instead, the majority have overlapping asset conversion cycles. For such borrowers, the relatively constant levels of securities such as stock and reserved money owed to them—known as accounts receivable or adaptors—must be financed from somewhere. Hannan (1991) indicated that a borrower cannot acquire stock and sell it on credit without either receiving credit from suppliers or borrowing money. In terms of stock levels, and the amounts owed by customers, when taken together, these are usually larger than the amount a borrower's suppliers have allowed to be lent as loans (Mingo 2000). Typically, this calls for borrowing, recognized as working investment finance and, hypothetically, most borrowers require it to some degree. However, Peek and Rosengren (1998) noted that the need for such borrowing is long term, whilst working investment finance is generally supplied on a short-term, revolving basis in terms of long investment term period. At this juncture, an important point to note about the working investment requirement is that it increases with the volume of business or trade growth and stock levels.

In the case of Islamic banking, investment financing is referred to medium or long term investment including *sukuk* issuing (Islamic bonds) (El-Gamal 2007). *Sukuk* is better described as Islamic investment certificates. Wilson (2004, p. 56) has argued that ‘this distinction is as crucial as it is important, and it is stressed throughout this pioneering work that *sukuk* should not simply be regarded as a substitute for conventional interest-based securities’. Ideally, Islamic fixed-income securities are already emerging as a significant class of asset, and are as potentially important for the Muslim investor as conventional bonds are for investors generally (Tariq & Dar 2007). In addition, for non-Muslims who already own conventional bonds, the acquisition of *sukuk* introduces a new asset class into their portfolios, bringing further welcome diversity and a possible reduction in risk. What this means in practice is that IB provides assets with essential concepts such as: 1) transparency and clarity of rights and obligations; 2) income from securities must be related to the purpose for which the funding is used, and not simply comprise interest; and 3) securities should be backed by real underlying assets, rather than being simply paper derivatives.

Basically, the risks to consider here are the viability and reputation of the borrower, as well as the quality (liquidity) of the assets if the borrower goes into liquidation. The quality of the assets should be such that, if sold, the amount raised would be sufficient to repay all loans. Sathye (2003) noted that risk also arises from price or market fluctuations, when the asset value falls below the level required to satisfy the creditors. This means that banks are working under efficient markets line which generally leads to increase lending costs. Thus, facilities should be structured in a manner that enables the lender to apply control of funds on a frequent basis. Conducting medium or long-term lending—known as cash flow lending—might be an alternative option to management of funds and this will lead to financial institutions’ sustainability.

### 4.3.3 Cash Flow and Revolving Finance

This type of lending finances a client’s medium to long-term needs (5-10 years typically). Theoretically, the asset being financed by the facility, such as equipment, is usually expected to produce other assets which, when converted to cash through completion of the manufacturing or transacting process and sale, will generate sufficient funds to repay the loan (Haron & Azmi 2007; Khan & Mirakhor 1990; Shirai 2002). Nevertheless, the fixed asset itself is not expected to be converted to cash to repay the loan, which means that this type of loan is not self-liquidating.

Archer and Karim (2002) have defined revolving loan which is a source of money from which loans are made for small business development projects. Cash flow finance is similar to that of a revolving loan which is made to one person or business and, as repayments are made, funds become available for new loans to other businesses. Therefore, the fund is often established with capital that does not need to be repaid (O’Toole 1996), and borrowers tend to be involved in small projects—typically farmers and artisans who have no credit history or access to commercial bank loans. However, the main reason for this type of finance in Islamic banking is to provide the initial loans for business start-up and expansion. Often, these loans are used to fill a ‘financing gap’ in a business development project. The ultimate goal is for these entrepreneurs to become financially independent and eligible for lending loans different from banks (Archer & Karim 2002).

Hence, Slovin and Young (1990) concluded that the primary concern (risk) in this type of lending is the borrower's ability to manage asset conversion cycles over several years. Furthermore, Warapatr et al (1986), and Archer & Abdel Karim (2006) noted that reasonable forecasts of sales growth, and determining the amount of cash left over after paying all operating costs to service the debt, are important factors since the money revolves from a person or business to another person or business. In addition to the borrower's current financial condition, the analyst will examine the client's record of innovation and expansion to determine whether or not the client provides confidence for such lending. Voordeckers and Steijvers (2006) indicated that sales growth, product innovation and marketing success are general indicators of whether successful repayment is likely. Thus, the bank usually relies on establishing financial covenants and conditions (via the loan agreement) to ensure that it retains some element of control over the borrower should the financial condition deteriorate. At this point, it should be emphasised that a very large finance literature provides some theoretical evidence of such lending application practices.

Ideally, 'conventional banks perform two functions: money transfer services, including all current account operations, and money lending. The latter provides the major part of the bank's income while the former enables it to 'create' money and to lend more money than it actually possesses' (Berry 1993, p. 14). The primary concerns of the bank are the security of its capital and the ability of the borrower to pay the interest—not the end use of the borrowed funds<sup>52</sup>. In the case of Islamic banks, however, 'the end use matters because the return on their 'investment' (they do not lend) depends on how the profit/loss is achieved and computed. Determining the actual profit/loss directly attributable to the investment by the bank is still being debated. In Islamic finance, only the financing of new enterprises is recognised as amenable to *mudaraba* type financing' (Dhumale & Sapcanin 2003, p. 24). All other types of end uses must be financed by loans from conventional banks, which would recover their costs and profit from the borrowers.

The literature separates Islamic banking into four main activities: concessional financing, trade financing, participatory mechanisms and benevolent financing. Within these activities are various contractual forms that conform fully to the tenets of profit and loss sharing (Kahf 1999; Mondher & Siwar 2004 ). The more commonly used profit/loss sharing transactions PLS are *mudaraba* (partnership), *musharaka* (equity participation), and *musaqat* and *muzar'ah* (specific counterparts in Mudaraba contracts). All of these loan products appear to include a degree of uncertainty regarding the eventual returns due to the entrepreneur and to the Islamic bank. Other lending contracts used in Islamic banking include *qard hassan* (benevolent loan), *bai'mua'jjal* and *bai'salam* (sales contracts), *ijara* (leasing), *murabaha* (cost plus markup), and *jo'alah* (service charge)<sup>53</sup>.

Up to this point, although there are many types of lending which are applicable to Islamic and conventional banks, the Islamic practice shows that there are some differences in the nature of lending which are specific to Islamic banks (Kahf 1999; Pervez 1990). Consequently, the salient features that distinguishing Islamic financing are:

1. There is no interest on deposits, but capital is guaranteed.
2. Lending and investing are treated differently; loans are interest-free but carry a service charge, while investing is on a profit-and-loss-sharing (*mudaraba*) basis.

<sup>52</sup> Note: whether it was intended for establishing a new enterprise, to expand an existing one, to bridge a cash flow problem of a running concern, or to be used by a small business, by a sole-owner enterprise, or for consumption purposes, etc. was not the prime concern of the bank.

<sup>53</sup> Details in section 2.2.2

3. Value erosion of capital due to inflation is compensated.
4. The definition of ratios in which profits and losses are shared instead of fixed and pre-determined mark-up profit rates.

## **4.4 Theoretical Underpinning for Lending Decision**

There is no doubt that the empirical mechanism in developed credit markets is actually based upon some theoretical bases. These theoretical bases have been widely considered among lending decision makers in Islamic and conventional institutions. There is substantial literature related to lending decision-making in financial institutions (Allen & Peristiani 2007; Anderson 2003; Andrea & Monks 1999; Barucci 2003; Salaman 2002; Schwartz 1998; Simon 1959; Weirich 2001; Wright 1984). Although there is some debate on the relevance of the efficient markets hypothesis, there is ample evidence to suggest that if information for such lending decisions are accessible efficient markets hypothesis exists must be perfectly competitive (Christoffersen 2003; Elton 2007; Hakim & Neaime 2001; Holod & Peek 2007; Laeven & Mundial 1999). In this context, two competing theories, namely Decision-making Theory (DMT) and Social Theory (ST) are highlighted to form the theoretical basis of contemporary lending practices.

### **4.4.1 Decision-making Theory (DMT) and Social Theory (ST)**

Conceptually, Decision-making Theory (DMT) considers the problem of how real or ideal decision-makers make, or should make, decisions and how rational decisions can be reached (Jennings & Wattam 1994). Furthermore, most of decision-making theory is *normative* or *perspective*, i.e. it is concerned with identifying the best decision to take, assuming an ideal decision-maker is fully informed, able to compute with perfect accuracy, and fully rational (White 1969).

The practical application of the *perspective* approach (*how a person should make a decision*) is called decision analysis, and is aimed at finding tools and methodologies to help individuals make better decisions. The *normative* approach indicates that rational decisions often be made by creating specific hypotheses for testing against actual behaviour, whereas, the two theoretical approaches—*perspective* or *normative*—are closely linked (Cotten 1995; White 1969). Furthermore, within both theoretical approaches it is possible to relax the assumptions of perfect information and rationality in various ways and produce a series of different prescriptions or predictions about behaviour, allowing for further tests of the kind of decision-making that occurs in practice (Cotten 1995).

For modern financial administration, ensuring that decision-making is as rational as possible is extremely important. Rational decision-making enables intermediate institutions to achieve their objectives in an efficient manner and provides a means of establishing working systems of operation control. However, decision-making involves more than the choice of some preferred alternative. It also involves what can be described as a process (Gore, Murray & Richardson 1992). If the process can be improved, appropriate methods can be used and the decision itself will thus be improved (Cotten 1995).

An important subset of models of rational lending decision-making is a central concern of this research. Is that associated with decision theory? A review of a number of the models available demonstrates both: 1) the importance of understanding the methodological

stance taken; and 2) the need to relate theory to risk assessment practice. In this regard, Gore, Murray and Richardson (1992) classified decision-making theory into three models: 1) Mintzberg model; 2) Hofer and Schendel model; and 3) Higgins modern model.

The first model is based on purposeful behavior that concludes with a commitment to do something rather than merely to talk about it, and is named the *Mintzberg model* (Cotten 1995); and, next, is based on the ideas of limited rationality. This consideration (model) is a specified objective and worked with a specific application (Salaman 2002; Schwartz 1998; Weirich 2001; Wright 1984). Therefore, both considerations (models) encompass uncertainty, complexity of decision-making and provide a model for rational decision-making that takes account of features. This model can be used in a most rational way if given constraints on rationality, and excludes implementation planning from a formulated strategy (*Hofer and Schendel model*).

The third is based on the identification of information system needs which will overcome the problems of assimilation that fully rational models would have (Davis 1996). This model demonstrates objectives are required for comparing decision-making performance (including outside objectives that may account for measuring the model performance). Therefore, a gap in performance is considered in the light of forecasts. Higgins, Compeau and Huff (1999) argued most processes of using data that are imposed by the top of an institution can be easily quantified—the *Higgins modern model*. Consequently, this research uses a modern model of decision-making theory to analyse the rationality of lending decision-making with regard to credit risk factor in both conventional and Islamic banking systems.

In contrast, Social theory (ST) is interdisciplinary, drawing ideas from and contributing to such disciplines (e.g. economics). More specifically in banking and finance fields, primary justification for engaging in the selected analysis method is based on a recognition that social problems are obviously subject to considerable value-oriented interpretations (Cotten 1995). There are numerous challenges facing decision makers in CBs and IBs in the immediate future. In view of customers' satisfaction and the changing demands and diversity in Islamic society, new attitudes must be developed toward the social growth and consideration given to quality of life improvements. It is not a new idea that lending decision has considered some ethical aspects. Banks with Islamic law understand that economic ethics mostly involve making lending decisions. Initially, earlier and classical articles on making lending decisions provided concerns and responsibilities of lending decision makers (Jennings & Wattam 1994). A view of responsibility can be termed relative, which means that the decision makers accept the prevailing ethics of this current and immediate business environment.

In terms of risk taking behavior, a number of particular risk factors influence the lending decision and may act to override the quantitative answer produced by the normal computation (Zaman & Movassaghi 2001; Zhu 2003). However, the impact of qualitative risk factors on lending decisions cannot be measured with accuracy, but those factors can be very important when the decision is made. These include:

1. Social obligations (responsibilities) against customers and society.
2. Co-operation among banking institutions themselves.
3. General regulations and country ideology.
4. Society religion and customs.
5. Maintaining depositors' interests and objectives.

Since it is understandable that people do not typically behave in rational ways, there is also a related area of study which is a positive or descriptive discipline that attempts to describe what persons will actually do. Therefore, decision-making can be seen as an outcome of a mental process (cognitive process) leading to the selection of a course of action among several alternatives (Weirich 2001). Thus, every decision-making process produces a final choice.

With Social Theory, an attempt has been made to examine some of the social and religious aspects (beliefs) that face lending decision makers in finance services institutions, particularly those working within Islamic law—*shari`a*. The emphasis has been on description, not prescription. In other words, the objective is to describe an approach to manage social problems, meanwhile illustrating what decision makers have mainly done in responding to Islamic finance requirements that have been placed upon them (Abdullah 2003). This approach was conducted in favor of pursuing a normative path, which would have involved the actual avocation of specific approaches to problems of business and the larger social system and an evaluation of how well institutions have Islamically responded to social challenges (Duncan 1973).

Both Decision-making Theory and Social Theory as distinct disciplines emerged in the 20<sup>th</sup> century and were largely equated in finance literature with an attitude of critical thinking, based on rationality, logic and objectivity, and the desire for knowledge through a posteriori methods of discovery, rather than a priori methods in practices (Simon 1979). With this in mind, it is easy to link these theories to deeper seated philosophical discussions in this study. Thus, practising both theories with lending models that have been used in CBs led to a desire to develop an empirical approach more akin to the Islamic banking and Islamic finance practices.

#### **4.4.1.1 Contribution of the Theories to Risk Assessment**

The institution's choice of assessing lending risk in imperfect markets includes contracting, maturity matching and refinancing risk. This means financial institutions always aim to adopt unambiguous lending procedures to secure the quality of their lending portfolio. Conceptually, there are three fundamental issues involved in lending risk and capital adequacy: How much risk is present? What is the institution's tolerance for risk? And how much capital should be held to offset maintain that risk tolerance?

Empirically, the expected loss (EL) rate can be broken down into three elements and analysed separately for each transaction to measure that transaction's risk (Berger & DeYoung 1996). These elements are:

1. Probability of default (PD).
2. Loss, given default (LGD).
3. Exposure at default (EAD).

There are several financial models for analysing default risk, such as the Jarrow-Turnbull model, Edward Altman's Z-score model, or the structural model of default by Robert C. Merton (Westgaard & Van-der 2001). However, the term 'default' should be distinguished from the terms 'insolvency' and 'bankruptcy'. Default essentially means a debtor has not paid a debt, whereas insolvency is a legal term meaning that a debtor is unable to pay his debts and, finally, bankruptcy is a legal finding that imposes court supervision over the financial affairs of those who are insolvent or in default (Olekalns & Sibly 1992).

In case of default, the PD is then an indication of the likelihood and frequency that a loan will acquire default status. LGD measures the impact on the institution from the default. LGD is the net result of any recovery the institution has received, either through liquidation of collateral or deficiency judgments rendered from foreclosure or bankruptcy proceedings, and may be associated with quality of collateral, seniority of claims, and many guarantees associated with the loan. EAD is what the institution has at risk when the loan enters default status. EAD is usually expressed in monetary terms—e.g. US \$—and is comprised of principal outstanding, unutilised commitment, and any fees or other expenses the institution incurs in collecting the default. Finally, both PD and LGD are usually expressed in percentage terms. The relationship among PD, LGD, EAD and EL is formulated as follows (Berger & DeYoung 1996; Berry, Crum & Waring 1993):

$$EL = PD * LGD * EAD \quad (4.5)$$

Financial institutions attempt to minimise loss rates at different levels of aggregation (individual loans, portfolios of loans) and for selected baskets of loans with different profiles representing different types of borrowers and loan characteristics (Berry 1993). In this case, PD can be predicted based on the type of borrower, underwriting variables, loan size, maturity, payment frequency, and many other variables dependent on either the borrower's characteristics or external economic factors (Cowling & Westhead 1996). Furthermore, some of the simplest elements of Portfolio Theory (PT) are applicable to virtually any kind of portfolio. Therefore, 'the concept of capturing the risk tolerance of an investor by documenting how much risk is acceptable for a given return could be, and is, applied to a variety of decision analysis problems' (Berry & Robertson 2006, p. 178). Portfolio Theory, however, uses historical standard deviation as a measure of risk and returns of loans portfolio.

In terms of Decision-making Theory, logical decision-making is indeed an important part of all professions where specialists apply their knowledge in a given area to making informed decisions (Choi & Smith 2002; Rosman & Bedard 1999). At this point, several statistical tools and methods are available to organise evidence, assess risks and apply them in the decision-making process. The risk of type I and type II errors can be quantified in terms of estimated probability, cost, expected value, etc., and rational decision-making is thereby improved (Westgaard & Van-der 2001). However, when applying rationality-testing methodology, the lending decision will have a chance of reaching an erroneous condition (type I or type II). An example of the lending decision structure for deciding to lend or not to lend is presented in Table 4.1.

**Table 4.1: Lending Decision-making and Types of Error Diagnosis**

RATIONAL DESCRIPTION		ACTUAL CONDITION	
		<i>Lend(true)</i>	<i>Not lend(false)</i>
DECISION	<i>Verdict of lend</i>	True positive	False negative i.e. lending reported unsafe ( <i>type II error</i> )
	<i>Verdict of not lend</i>	False positive i.e. lending not detected ( <i>type I error</i> )	True negative

To illustrate, firstly consider specifying that a decision concerning a *verdict of lend* must be made (lend/not lend). In this case, and as shown in Table 4.1, the type I error occurs and means the verdict of lend has been made is rejected, when in fact it is true and should



not be rejected. This means that the loan application has not approval, when the verdict about the application should be approved. Type II error arises when a false verdict of lend is fail to reject (accepted) when in fact it is false and should be rejected. As noticed by Mehta (1970) and Morsman (1997), lending decisions cannot be made without considering lending policy or particular loans' characteristics.

The complements of the probability of both errors (Type I and Type II) indicate/d the power or the confidence of making lending decisions. In the case of IB, there are some lending decisions that might be subjectively made, such as social insurance decisions in Islamic communities *Takaful* (e.g. lending to poor Muslims). But for Islamic finance projects, errors in making a rational lending decision might be lower, owing to Islamic rule that has been established in transaction contracts (see section 3.6). In contrast, even though the lending decisions have been objectively made in CB, lending decision makers suffer from some errors. This means a decision can be made according to available information on each loan. Regarding the notion that DMT and ST contribute to formulate banks' efficiency frameworks empirically, this is discussed in the next section (4.4.1.2).

#### **4.4.1.2 Contribution of the Theories to Lending Efficiency**

This section provides an explanation of how these theories contribute to improve the banks' lending efficiency through making rational lending decisions. An improvement in efficiency can be defined as the extent to which a decision-making unit (DMU) can increase its outputs without increasing its inputs, or reduce its inputs without reducing its outputs (Harrington 1987). Fama (1970), and Pastor and Serrano (2006) stated that efficiency can be generally classified into three forms: 1) scale efficiency; 2) scope efficiency; and 3) x-efficiency<sup>54</sup>. In the case of lending efficiency, scale and scope efficiencies refer to the technique of costs reduction which measures the agent's success in choosing the cost minimising combination of inputs (Fama 1991). In contrast, x-efficiency measures whether banks are operating with an appropriate bundle of inputs. The x-efficiency has been the focus of recent bank efficiency studies, because it helps management to control costs of transactions and use resources to produce output.

In the finance literature, the efficient market hypothesis (EMH) asserts that markets are 'informationally efficient', or that prices on traded assets (stocks, bonds or property) already reflect all available information and, therefore, are unbiased in the sense that they reflect the collective beliefs of all investors about future prospects (Fama 1970). However, securities prices, currency rates, interest rates and dividends fluctuate, thereby creating many risks. But, when securities prices fully reflect all information, the market is efficient (Fama 1991; Matthews, Murinde & Zhao 2007).

Accordingly, there are many aspects in which lending and default risk are related to efficiency. These include information asymmetry; loans adverse selection; efficient market; funds availability; bank's communications and relationships—mostly arising from finance circumstances. For instance, some of these aspects have been analysed significantly by Berger, Rosen and Udell (2007) who found that there is a negative relationship between cost efficiency and risk in a failed bank. The reasons include:

<sup>54</sup> X-efficiency comprises technical and allocative efficiencies. Technical efficiency for a given firm is defined as the bundle of the input usage of a fully efficient firm producing the same output vector to the input usage of the firm under consideration. To be fully efficient, a firm must be both technically and allocatively efficient.

1. Inefficient banks suffer problems in controlling and assessing their internal risk factors; and
2. Bad loans may arise because of adverse economic circumstances beyond the bank's control whereby banks have to spend more resources to recover the problem loans.

In this context, a cross-country IB study by Ariff (2008) has revealed similar results that show cost efficiency in IBs appears to have steady negative impact with default risk. Pastor (2002) has also found that, typically, bad loans can appear due to two different internal causes, direct control and management risk, and indirect factors associated with bad management.

## 4.5 Developing an Appropriate Lending Model

The finance literature accurately summaries some risk management models, however, an assessment of a risky loan is clearly one of the most important topics cross-bank worldwide (Lopez & Saidenberg 2000). Examination models of internal and external risks are mainly for identifying risks and measuring their impact on capital needs, such as lending processes. For measuring lending risk, for instance, risk-based capital standards at banking institutions move from qualitative to quantitative measurements. This movement in lending risk assessment significantly contributes to lending efficiency in banks (Hyndman 1997). However, there is scope for further development in the area of risk assessment modeling, especially in the understanding of making rational lending decisions.

### 4.5.1 Rationalization of the Model

Consider a lender who extends credit for a fixed time period, say  $\tau$ , to risky loan applicants as they arrive randomly over time. Suppose that each applicant requests a \$1 loan and, those applicants arrive according to a Poisson process at rate  $\lambda$ . In addition to the uncertainty regarding the number of loan applicants, there is also uncertainty regarding the profitability of each potential loan (Megbolugbe 1993). In this regard, let  $\rho \in [-1, \infty)$  denote the risk-adjusted rate of return from lending 1 US\$ to a given applicant. For example, if  $r$  is the contractual interest rate—arrangement cost in Islamic banking—and, if  $\theta \in [-1, \infty)$  is the probability of default on both principal and interest, then  $\rho = r - \theta(1 + r)$ .

As the 'Islamic loan' is a special transaction case,  $r$  may be exogenously fixed and, therefore, the default risk becomes the sole distinguishing characteristic among applicants (Mayer 1985). In conventional transaction cases, applicants may be indistinguishable in terms of their default risk, but offer different contractual interest rates. Specifically, Jaffee and Russell (1976) and Stiglitz and Weiss (1981) have argued that higher contractual interest rates or higher arrangement costs induce applicants to undertake riskier projects so that  $\theta$  is an increasing function of  $r$ . Therefore, they assume that  $\theta$  is unobservable and increasing in  $r$ . As a result, the lender charges a common interest rate (or arrangement cost in Islamic transactions) to all applicants while recognizing that adverse selection or incentive effects may lead to declines in the expected risk-adjusted rate of return as  $r$  is

increased. Then the lender's maximum contractual interest rate yields in conventional banking or arrangement cost yields in Islamic banking are:  $\rho = \text{Max } r \geq 0[r - \theta(r)(1 + r)]$ .

Although financial services characteristics can be expected to influence the lender's procedure for assessing an applicant, sole concern is with the resulting risk-adjusted rate of return  $\rho$ . Therefore, simply assume that the lender can assess the  $\rho$  of each loan applicant and, that  $\rho$  varies across the applicant pool according to a probability density (or mass) function  $f(\cdot)$  with the corresponding distribution function  $F(\cdot)$  (Mateut, Bougheas & Mizen 2003). Then  $\lambda F(\bar{\rho})$  is the probabilistic rate of applicant arrivals whose profitability does not exceed  $\bar{\rho}$ . Thus, the Poisson process of arrivals at rate  $\rho$  describes the uncertainty in the quantity of loans demanded, whereas, the probability distribution  $f(\cdot)$  captures the uncertainty regarding the quality of loan demand (Massoud 2005).

Without these two uncertainties (quantity and quality of the loans), a bank's decision problem would be insignificant<sup>55</sup>. With these uncertainties, however, the lender's decision on each applicant should take into account not only the immediate profitability of the loan, but also the subsequent loan decisions that will have to be made with uncertainty about the future number and quality of applicants (Mateut, Bougheas & Mizen 2003). However, the risk of a particular action failing can also be given a probability—the higher the probability the greater the risk.

The analysis of likely courses of action, and the risk involved, is called risk assessment (Jennings & Wattam 1994). If a loan applicant arrives at time  $t \in [0, T]$ , thus, the lender must consider the applicant's  $\rho$ , where the cumulative loans already made  $Lt$ . This affects the lender's marginal cost of granting additional loans (Laeven & Majnoni 2005). At this point, the bank decides whether to approve or to deny the given application. A decision to lend is denoted by  $d_t = 1$ , and a negative decision by  $d_t = 0$ . Thus, after a decision at time  $t$ , total loans outstanding become  $(Lt + dt)$  and remain at this level until a decision is taken on the next applicant arrival.

#### 4.5.1.1 The Cost of Lending: IB vs. CB Approach

This study aims to establish that the methodology of measuring financial risks in banks can vary between IB and CB systems. Some banks mark risks to market, and others only recognize the cost when the default occurs—Basel II (Basel Committee 2006). The intermediary's lending cost and risk exposure depends on its mode of lending. Its exposure to loan demand uncertainty can be minimized by lending unit quantities only as needed. By synchronously lending for the same duration  $\tau$ , the intermediary operates without a cash inventory and thereby maintains a continually duration-matched balance sheet (Laeven & Majnoni 2005). Therefore, this kind of intermediary is referred to as a conventional bank, even though it sustains default risk. Islamic banking works with a similar policy which is free of cost for bank's funding and no interest charged on funds (deposits) or asset capital.

<sup>55</sup> e.g., if the lender knows that exactly  $N$  applicants will arrive over the given planning period  $[0, T]$  and, that the applicants are characterized by  $P_1, \dots, P_N$ , then the lender could simply rank the applicants according to their  $P$  and satisfy the demand of the best  $L$  applicants with  $P$ 's exceeding the bank's marginal cost of borrowing; the remaining  $(N-L)$  unprofitable applicants would then be rejected.

Alternatively, the intermediary may lend in advance of realising the loan demand and then make loans from this inventory as applicants are approved over time. By lending en bloc and lending in unit quantities, the intermediary breaks lots, thereby altering the divisibility of claims (Kopecky & VanHoose 2006). Since funds are lent at time 0 and loans are made at different times over  $[0, T]$ , the result is a continually duration-mismatched balance sheet with both cash and  $\tau$ -period loans granted exclusively with  $\tau$ -period lends. The cash inventory, however, absent in the Islamic banking mode of lending, gives rise to the risk of ending the period with excess funds. This additional exposure can be interpreted as a form of sharing risk in that unexpectedly low demand may necessitate the acceptance of a low (possibly zero) rate of return on surplus funds; similarly, an unexpectedly high demand may require additional lending at a high (possibly infinite) cost. Thus, in CBs, quantity (demand) uncertainty translates into interest rate risk even if the penalty interest rates are known with certainty.

The intermediary that sustains this added exposure is referred to as conventional banking. Some prefer to distinguish between IBs and CBs, on the basis that the former transact on behalf of clients, as, for example, a *Mudarib* (mutual fund manager), whereas the latter transact on their own accounts, as in the case of conventional loans (Kumra, Stein & Assersohn 2006; Kuran 1995). However, the more general distinction<sup>56</sup> involves risk exposure. Thus, IBs and CBs both sustain default risk, but only the latter maintains a cash inventory, implying a (duration and divisibility) mismatched balance sheet with consequent interest rate risk (Kishan & Opiela 2006).

The quality of lending decision-making may deteriorate significantly, but may not be recognized (Roy 2005). Let  $\bar{L}$  denote an upper bound on the intermediary's total lending over the planning period  $[0, T]$ . This limit may be viewed as a capacity constraint on the intermediary's scale of operation deriving either from a regulatory restriction or from the short-term fixity of capital adequacy (Saurina & Trucharte 2004). Thus, both CBs and IBs face a limit  $\bar{L}$  on the total funds lent giving rise to an opportunity cost of lending. However, conventional banking lends up to capacity at  $t=0$ , whereas Islamic banking lends in unit quantities only as loans are approved and funds are needed through time. Let  $C_A(\cdot)$  and  $C_B(\cdot)$  denote the 'cost of lending' function for CBs and IBs respectively, and assume that IBs marginal cost of lending  $[C_B(L_t + 1) - C_B(L_t)]$ , is strictly positive with no decreasing as a result of its growing default risk deriving from the debt-financed loan growth  $L_t$  over time. Although CBs lending cost may be convex increasing in the size of its funds inventory owing to the same default consideration, its lending cost is sustained before the lending process commences (Khaledi, Hosseini & Gray 2009).

Note that, the definition of the capacity constraint  $\bar{L}$ , and the lending cost functions,  $C_A(\cdot)$  and  $C_B(\cdot)$  require that the intermediary's lending be carried out within a given time interval  $[0, T]$ . The fixed planning horizon should be viewed as an analytical convenience designed to simplify the definition of costs and of risk exposure (Kakes & Sturm 2002). Without a fixed  $T$ , lending costs at any time would depend on net loans at that time, necessitating the tracking of loan repayments and an explicit inventory carrying cost would be required in order to capture the lending risk. For simplicity, it is assumed that there are no loan repayments (*i.e.*,  $\tau > T$ ) or discounting in  $[0, T]$ .

<sup>56</sup> e.g., a CB with a perfectly matched balance sheet is completely hedged and, therefore, restricts itself to the provision of search services; it behaves the same as the intermediary transacting on behalf of clients.

Finally, for consistency and ease of comparison it is assumed that the lending costs of both Islamic and conventional intermediaries are paid at the end of the planning period. Thus, CBs sustain a fixed cost  $C_A(\bar{L})$  of lending an inventory of funds at time  $t=0$  without additional lending costs as loans are made from this inventory over the time interval  $[0, T]$ , but there is a possibility of excess supply or demand. In contrast, the IBs sustain neither a fixed lending cost nor any exposure to excess supply, but they do bear a higher marginal lending cost as loans are made. A discussion on the need for lending policy is the focus of the next section.

#### 4.5.1.2 Relevance of Lending Policies

The lending process is modelled as a sequence of credit decisions taken by an intermediary facing uncertainty as to both the quality and quantity of loan demand. Both types of intermediaries (IBs/CBs) thereby sustain default risk. However, the IBs and CBs have similar loanable funds; this results in additional risk exposure which they view as a form of interest rate risk associated with duration mismatching of balance sheet-offs (Deshmukh, Greenbaum & Kanatas 1983). Reduction in the risk exposure of a financial intermediary may be simultaneously viewed from two different perspectives namely; borrowers and lenders. This means both bodies—borrower and lender—might be a main source of risk exposure and should be a point of focus in applying lending policies.

Under the credit culture and regulation concepts in Islam, the purpose of lending is to support:

1. The customer's projects plan; and
2. The poor people named 'loans for benevolent task' (see section 4.3).

According to the foremost case, Islamic financial institutions (IFIs) lend to their customers who need funds for essential plans. However, Jennings and Wattam (1994) noted that there were no fixed limits to the short-run amount of credit extended for working capital purposes, which often gave borrowers the incentive to over-borrow to stockpile inventory or use the funds for other non-productive purposes<sup>57</sup>.

Further, most regulations in banks are focused more on accounts than on risk. Ahmad and Haron (2002) and Allen and Santomero (2001) noted that both credit culture understanding and regulations are considered to be very important for banks and provide greater investor (depositors) protection. So it is difficult to develop a lending system without using a set of rules to improve lending decisions-making procedures. Since Peterson and Rajan's (1994) study of the implications of the duration of relationships and of those resulting from borrowing from single or multiple banks, there have been several studies focusing on customers' relationships with banks. A study on community bank performance in California found that longer relationships generally improve credit worthiness, but have the impact on the interest rate charged and the collateral required was inconclusive (Zimmerman 1996).

It is also important to note that duration analysis shows that the likelihood of customers substituting multiple relationships to a single one increases with the duration of the single relationship, and those customers with higher net worth and more bank debt are more

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<sup>57</sup> At the end of April 2003, the Basel Committee on banking supervision released a third consultative paper (CP3) containing a proposal for a new accord on bank capital (Basel II). The proposal defines and illustrates capital requirements, which it changes according to the riskiness of bank borrowers and have a built-in effect of any risk-sensitive prudential regulation.

likely to initiate multiple relationships (Cole 1998; Peterson & Rajan 1994; Stein 2005). In summary, the improvement in performance appears to explain the reliability of lending policy to initiate multiple relationships to protect themselves against default loans risks. In particular, a bank's strategy most likely impacts on its ability to develop multiple relationships with different customers and obtaining flexible policy to deal with default risks.

In the literature 'default mode' and 'market-to-market' are identified as the two main approaches to measuring default risks (Berry, Crum & Waring 1993). Typically, 'the default mode focuses directly on the probabilities of loan loss, with recognition of the probability default (PD) and the severity of loss given that default has occurred, whereas the market-to-market approach attempts to measure how future changes in the credit risk characteristics of a loan or a group of loans will affect the loan(s) market value, including potential losses in value' (Berry, Crum & Waring 1993, p. 12).

The above discussion highlights the point that banks mostly follow specific rules in order to reduce risk associated with lending. Therefore, lending policy is essentially significant in that:

1. It provides the bank with insurance against loan default; and
2. It ensures that borrowers put in the required effort to ensure loan repayments are made.

Basically, loans processes are used as an approach to protecting banks from exposure to risks. That is, more risky borrowers will be charged a high risk premium for a given loan, contrasting to risk sharing rule between the lender and the borrower in the case of IB.

## 4.6 Effectiveness of Lending Decision-making Policies

### 4.6.1 Analysing the Rationality of Lending Decisions

Decision analysis can be of use in two ways: 1) it can be developed into an analytical framework to enable the financial analyst to assess a bank; and 2) it can be applied by the individual to his/her own decision process from the strategic decision-making viewpoint (Jennings & Wattam 1994). One of the most important reasons for using a case model is that it provides the groundwork for a methodology for lending decision analysis. Since CBs and IBs differ in their lending cost functions, as mentioned in subsection 4.5.1.1 their rational lending decisions can be analysed within a single formulation. Let  $C(L_T)$  denote that the bank's lending cost paid at time  $T$ , where  $L_T$  denotes total loans made in  $[0, T]$ . Then for  $L_T \leq \bar{L}$ :

$$\text{The conventional banking lending cost of funds is } C(L_T) = C_A(L_T) \quad (4.1)$$

$$\text{The Islamic banking lending cost function is given by } C(L_T) = C_B(L_T) \quad (4.2)$$

By assumption of that, the cost of lending function  $C(.)$ <sup>58</sup> is not decreasing and convex. Some of the simulations are based on probabilistic models and random or seemingly random behaviour is contained. Although they have been associated specifically with those models and simulations that have financial outcomes, they can be applied in a much wider context (Newbold, Carlson & Thorne 2003). However, a lending policy is a rule  $\delta$ , that specifies an approve/deny decision on each loan on the basis of information

<sup>58</sup> Which require that the intermediary's lending be carried out within a given time interval,  $[0, T]$ .

available at the time of the applicant arrival. If an applicant offering a risk-adjusted rate of return  $\rho$  arrives at time  $t$  and, if the loans outstanding at that time are  $L_t=L$ , then  $\delta(t, L, \rho)=1$  corresponds to a loan approval, whereas  $\delta(t, L, \rho)=0$  means that the application is rejected and the capacity constraint requires  $\delta(t, \bar{L}, \rho)\equiv 0$ .

Meanwhile, let  $V(t, L, \rho)$  be the maximum expected net profit from time  $t$  until  $T$ , given that  $L$  loans have been made when an applicant with  $\rho$  arrives at time  $t$ . Thus,  $V$  is the rational value function and the bank's problem is to determine the rational lending policy  $\delta^*$  that yields  $V^{59}$ . Suppose at time  $t$ , with  $L_t=L$ , an applicant arrives with characteristic  $\rho$ . If the bank approves the application (*i.e.*,  $d=1$ ),  $\rho$  is the expected return, whereas rejection ( $d=0$ ) results in zero immediate return. In either case, cumulative loans become  $(L+d)$  after the decision and the bank then waits an exponentially distributed random time,  $\tilde{s}$ , until the arrival of the next applicant.

If the bank employs a rational policy following the next arrival, maximum expected profit from then on will be  $V(t + \tilde{s}, L + d, \tilde{\rho})$ . Therefore, the rational decision on the present applicant should maximize current return  $\rho d$ , plus the maximum expected future profit  $E[V(t + \tilde{s}, L + d, \tilde{\rho})] \equiv U(t, L + d)$  from the next applicant forward. Consequently, the bank's total maximum expected profit from the next applicant onward must satisfy, for all  $t \in [0, T]$ ,  $L < \bar{L}$  and  $\rho \in [-1, \infty)$

$$\begin{aligned} V(t, L, \rho) &= \text{Max} \{ \rho d + U(t, L + d) \} \text{ OR, more explicitly} \\ V(t, L, \rho) &= \text{Max} \{ \rho + U(t, L + 1), U(t, L) \} \end{aligned} \quad (4.3)$$

where,  $U(t, L) = \int_0^{T-t} \int_{-1}^{\infty} V(t + s, L, \rho) f(\rho) \lambda e^{-\lambda s} d\rho ds - C(L) e^{-\lambda(T-t)}$

It is, therefore, rational to approve the loan application if and, only if,

$$\{ \rho + U(t, L + 1) \geq U(t, L) \} \quad (4.4)$$

$$\text{Note, that } \rho^*(t, L) = [U(t, L) - U(t, L + 1)] \quad (4.5)$$

If the expected opportunity cost of lending to the current applicant is potentially high,  $\rho$ 's will be presented by future arrivals or by the possibly higher lending costs (for the Islamic banking). Thus, equation (4.5) is the usual profit-maximizing condition with explicit account of inter-temporal considerations and future uncertainties. The rational lending policy  $\delta^*$  can be expressed in terms of a critical rate of return (or a lending standard)  $\rho^*$ , so that it is rational to lend to the applicant if and only if the offered  $\rho$  exceeds  $\rho^*(t, L)$ . As a special case of Islamic banking, suppose the loan arrangement cost should be fixed at  $r$  from the beginning and applicants differ in their observable default risk  $\theta$ . Then,  $\rho = \bar{r} - \theta(1 + \bar{r})$  and the rational lending policy establishes a critical default risk standard  $\theta^*(t, L) = \{ \bar{r} - [U(t, L) - U(t, L + 1)] \} / (1 + \bar{r})$ . In general, loans are made only to applicants whose default risks are less than  $\theta^*(t, L)^{60}$ . After completing the

<sup>59</sup> For remainder, description of the dynamic programming functional equation is satisfied by  $V$ .

<sup>60</sup> More generally, describing the bank's decision in terms of a minimum acceptable  $\rho^*$ , to see how banks disparate loan applicants on the basis of risk-adjusted return may be mis/interpreted as 'lending rationing'.

analysis in both banking systems, the decision maker(s) is in better position to assess the risk associated with a variety of the applicants (Sincich et al. 1993; Wagner 1969).

#### 4.6.1.1 Rational Lending Policies

In order to analyse the form of the rational lending policy  $\delta^*$ , or equivalently the rational lending standards,  $\rho^*$ , the following properties of the bank's rational value functions  $V$  and  $U$  have to be proved. For expositional simplicity, results are presented in differential notation even though the functions involved may not be differentiable. Deshmukh, Greenbaum and Kanatas DGK (1983) have built their argument to approve the rationality of lending policies on two hypotheses by focusing on three main considerations.

**Hypothesis 1:** if the cost of lending function  $C(\cdot)$  is convex not decreasing, then the rational value functions  $V(t, L, \rho)$  and  $U(t, L)$  are not increasing and complementary in  $(t, L)$ , no decreasing in  $\rho$  and concave in  $L$ . That is, for all  $t \in [0, T]$ ,  $L < \bar{L}$  and,  $\rho \in [-1, \infty)$ , then;

$$\frac{\partial V(t, L, \rho)}{\partial \rho} \geq 0 \quad (\text{monotonicity in } \rho) \quad (4.6)$$

$$\frac{\partial V(t, L, \rho)}{\partial \rho} \leq 0 \quad (\text{monotonicity in } t) \quad (4.7)$$

$$\frac{\partial U(t, L)}{\partial t} \leq 0 \quad (4.8) \text{ and}$$

$$0 \leq V(t, L-1, \rho) - V(t, L, \rho) \leq V(t, L, \rho) - V(t, L+1, \rho) \quad (\text{concavity in } L) \quad (4.9)$$

$$0 \leq U(t, L-1) - U(t, L) \leq U(t, L) - U(t, L+1) \quad (4.10) \text{ and}$$

$$\frac{\partial}{\partial t} [V(t, L, \rho) - V(t, L+1, \rho)] \leq 0 \quad (\text{complementarily in } (t, L)) \quad (4.11)$$

Condition (4.6) states that total expected profits are increasing in the profitability of the current customer. The condition (4.7) indicates that the closer the end of the planning horizon, the lower is the expected profit from lending, since fewer applicant arrivals and decision opportunities remain. According to (4.8) and (4.9) the marginal opportunity cost of lending is non-negative and indicating to not decreasing in the funds already lent. Committing fewer loans by time  $t$  provides the Islamic banking with a lower cost of loans (Dhumale & Sapcanin 2003). In addition, both the CB and IB have greater flexibility in regard to future loan decisions. Hence, expected total profits from  $t$  onwards are improved. However, this marginal advantage is less pronounced for lower values of the loans already committed (Dhumale & Sapcanin 2003; Duncan 1973).

Finally, (4.10) and (4.11) indicate that the marginal advantage of reduced past lending declines as the end of the planning period approaches. Future lending opportunities depend upon the remaining time as well as the availability (or cost) of loans; as the remaining time diminishes, the marginal value of a 1US\$ not lent also diminishes. Thus, in the long-run it is better to have more time left and less loans committed, although there are diminishing benefits to having committed fewer loans and the value of uncommitted loans diminishes with the passage of time (Deshmukh, Greenbaum & Kanatas 1982).



With this interpretation, Deshmukh, Greenbaum and Kanatas (1983) expected that the bank will be more lenient in assessing loan applicants that arrive later in the planning period or when fewer loans have been made. This follows immediately from (4.9) and (4.11), which imply that the minimum acceptable rate of return,  $\rho^*(t, L)$  given by (4.5) is decreasing in  $t$  and increasing in  $L$ . The model of the rational lending policy is abridged to the first consideration as follows: the rational lending policy  $\delta^*$  is of the form

$$\delta^*(t, L, \rho) = \begin{cases} 1 & \text{if } \rho \geq \rho^*(t, L) \\ 0 & \text{otherwise} \end{cases} \quad (4.12)$$

where

$\rho^*(t, L)$  given by (4.5)

There is no increasing in  $t \in [0, T]$  and, No decreasing in  $L = \bar{L}$

#### 4.6.1.2 Lending Standards: IBs vs. CBs

Although the form of the rational lending policy (4.12) above is the same for both CB and IB, their lending standards will differ (DeGeorge 1992; Kim & Mahoney 2005). In particular, literature shows that IBs will adopt stricter lending standards and hence will lend to fewer applicants than CBs. In order to compare the lending policies of the two intermediaries, the rational value functions, lending standards and other data for IB and CB are distinguished by using superscripts  $A$  and  $B$  respectively.

**Hypothesis 2:** for all  $t \in [0, T]$ ,  $L < \bar{L}$  and,  $\rho \in [-1, \infty)$

$$[V^A(t, L, \rho) - V^A(t, L+1, \rho)] \leq [V^B(t, L, \rho) - V^B(t, L+1, \rho)] \quad (4.13)$$

And  $[U^A(t, L) - U^A(t, L+1)] \leq [U^B(t, L) - U^B(t, L+1)] \quad (4.14)$

Thus, the marginal cost of committing funds is deemed lower for Islamic banking than for conventional banking (4.12). Consequently, from equation (4.5) has also showed that the CBs will adopt a less restrictive lending policy. Thus, lending standards were recognised as a second consideration, and the difference in marginal cost of committing funds between IB and CB is presented in equation (4.14). For all  $t \in [0, T]$ ,  $L < \bar{L}$

$$\rho^{B*}(t, L) \geq \rho^{A*}(t, L) \quad (4.15)$$

To compare the volume of loans lent by CB and IB, consider an applicant arriving at time  $t$ . Since  $\rho^{B*}(t, L) \geq \rho^{A*}(t, L)$ , it seems that the IB will be more selective in lending loans than the CB. The second consideration provided both banking systems have committed the same volume of loans  $L$ , by time  $t$ . However, since the CB follows a less selective policy from the outset, more loans may have been lent by time  $t$ . Consequently, at any time  $t$ , CBs lending standards may in fact be more selective than that of IBs. However, this can happen only if the CBs have already made more loans than the IBs (Sharpe 1991; Tariq & Dar 2007). Thus, if financial intermediaries seek to reduce their lending risk exposure by switching from the conventional banking to the Islamic banking approach of operation, aggregate lending will decline. This theoretical analysis provides additional rationale to pursue the objectives of this study.

### 4.6.1.3 Banks Approach and Lending Standards

Short of switching to the IB approach of intermediation, CBs may limit their exposure by merely reducing their loanable funds inventory. Alternatively, the lending capacity of either type of intermediary may be reduced as a result of a capital loss or because of altered regulatory restrictions (Wilson 1983; Zaman & Movassaghi 2001). These changes are manifested in terms of a reduced  $\bar{L}$  increasing the cost of lending. The previous analysis permits to conclude the third consideration that a reduction in the bank's lending capacity or a reduction in the CB loans inventory results in stricter lending standards and reduced aggregate lending. Reductions in either CBs inventory or capacity or IBs capacity, result in clear increases in the marginal cost of lending (Wilson et al. 1999; Yi-Hsing, Hsu & Ching-Kai 2007). These increases in lending cost are the basis for stricter lending standards and reduced lending. Thus, exogenous capacity reductions have the same impact on lending as do CBs adaptation towards the IBs approach of operation.

### 4.6.1.4 Relevance of the Lending Decision

Despite the importance of loan default statistics for risk assessment models and credit evaluation models, most academic researchers and practitioners have a strong empirical focus. Additionally, efficiency measures, based on outputs and inputs, are usually considered a good instrument for analysing the performance of lending. However, it is necessary to consider other factors affecting good lending decisions. Pastor (2002) noted that several factors distinguished credit risk in the small and wholesale commercial loans portfolios.

As a result of transitions in the financial industry, many different problems are faced by IB and CB when making lending decisions. These may occur in several separate but interrelated areas. Jennings and Wattam (1994), Altman, Giovanna and Saunders (1998) and Gupta (2003) identified some of these problems, such as: 1) problem loans and inadequate capital; 2) the absence of a credit culture and a propensity to continue to make bad loans; 3) regulation, supervision and moral hazards; 4) deposit insurance; 5) legal systems; 6) monetary policies; and 7) payment systems. Besides these problems, there are additional issues that need to be considered when making lending decisions in IB such as: transaction should be permissible *halal*, based on mutual agreement (both parties agree) *gharar* and not based on *rib'a* (Ahmad 2000). Some of these problems, however, need to be discussed with particular attention to the banking legislations because legislations affect how banks are operating under both IB and CB.

Berry (1993) indicated that although many corporate lending decisions involve risk assessment, often the assessments are not well-documented. Often the decisions are infrequent and unique, and data on the actual outcomes of the decisions are not retained. However, commercial lending by banks offers an appropriate area for the study of lending decision-making because in this case lenders make a set of policies to facilitate the decision-making process (Cebenoyan & Strahan 2004; McNamara & Bromiley 1999). Therefore, assessing risk and analysing characteristics of such loans are almost critical practices for banks.

Conventional wisdom in banking suggests that banks should demand more collateral from riskier borrowers to reduce their risk exposure (Elsas & Krahen 2000). In contrast, good borrowers may provide more collateral indicating lower default risk (Krahen & Weber 2001). Hence, Elsas and Krahen (2000) argued that the relationship between default risk

and collateralization should be positive for observable risks, but negative for unobservable risk. Accordingly, Degryse and Cayseele (2000) commented that if collateral and asset—loan—pricing rates are substitutive devices to lower credit risk, they expected a negative relationship between collateral and the interest rates.

As most of the Islamic banks in the ME are classified as new institutions, the quality of making a lending decision in CBs is relatively higher than for IBs in these economies. Previous research has indicated that the quality of the lending system is extremely undeveloped in those countries. Furthermore, development of the banks' lending system in these countries has not been empirically investigated (Atta-Mensah & Dib 2008; De Graeve, De Jonghe & Vennet 2007). Although more studies investigated the influence of the legislative framework on making lending decisions in financial intermediaries in these countries, they have not accounted for other factors such as risk factors affecting the quality of the lending decision (Badr El-Din 2006). Furthermore, *shari'a* based lending is open to a number of risk factors and inadequate legislation has received considerable attention as primary causes of defaults.

The lack of precise methods for dealing with default risk creates a number of problems when making lending decisions. Smith (1964) noted that: 1) credit decisions were often isolated from recovery problems, whereas the feedback from recovery was essential to the development of judgement skills in approving loans to the customers; 2) decisions to tighten or ease credit conditions are risky and difficult to translate into changes in customer screening practices. Thus, developing effective lending policies is needed in order to reduce the higher default risk and moral hazard associated with lending to borrowers (Cowling & Westhead 1996).

In summary, many banks have introduced decision rules which are required for loans processes over a specified amount. Typically, the final decision must be taken at regional or head office level, which implies the use of standardized credit scoring techniques that take little account of the personal characteristics of the owner-manager (Hakenes 2004). For IB, the basis for making final lending decisions does not appear to comply with objective analysis. The following section discusses bad credit management in terms of quality and credit process.

## **4.7 The (Credit) Lending in Practices**

### **4.7.1 Loan Growth and Loan Quality**

Both CBs and IBs seek to fill the gap of credit risk (risks of default) knowledge by diversifying investments and continuation of credit portfolio to increase the efficiency of the operation (Kraft & Jankov 2005). In this case, sequences such as managing and measuring risk have to be demonstrated in banks, because it improves and maintains the stability. The 'Capital Structure Requirements' (CSR) close of the Basel II 2001 recommended that banks should have a plan to uncover their requirements by adopting suitable methods of measurement and models for quality control to protect themselves from associated operational risks, especially loss of capital value.

In the case of IB, transactions require more trust among their borrowers than CB transactions (Zaher & Hassan 2001). If many borrowers are going into business without trading experience, they are faced with further problems such as failure to repay loans, financial instability and eventual bankruptcy. Thus, financial intermediaries needs to

assess applications carefully before making the lending decisions (Rosly & Bakar 2003). Due to this expansion, banks experienced a difficult period in most economies in the past and many protective policies have been globally developed to improve lending quality, including critique of weakness of risk management rules and knowledge of adequate procedures for effective lending decision policies.

In terms of lending quality, credit data may not reflect the quality of individual assets and the likelihood of default. In addition, it is extremely difficult to assess individual asset quality using aggregate quality data such as the percentage of default rates and ‘past due’ loans (Foglia, Laviola & Marullo 1998). In this context, many clients who buy bank assets are surprised that they acquired poor asset quality, even though they conducted a due diligence review of the acquired bank prior to the purchase (Glennon & Nigro 2005).

Thus, the banks evaluate their portfolio credit risks by considering three important questions: 1) what are the expected losses in the future? 2) how much is the bank ready to tolerate in the losses or provision of loan losses? and 3) what is the historical loss rate on loan/s due to delinquencies (aggregate or individual)?<sup>61</sup> (Sullivan 1987) The response to these questions is that banks’ capability in assessing risks is not available, or dealing with losses provision sometimes is ambiguous—in addition to the fact that it is difficult to predict future loss (Kwok 2002). Therefore, historical default rates and past due loans might understate/overstate future losses, depending on the future economics and operational conditions of borrowers (financial circumstances).

A study on Thailand banks’ performance in lending has outlined many theoretical factors likely to lead to deterioration in the quality of lending (Fujiwara 2003), including:

1. ‘Increases in lending are easy to measure when compared to calculating losses in loans quality which is difficult to evaluate objectively in the short term.
2. Reforms fractured the credit supervision department, dispersing a separate group to work within each division.
3. People focused on sales [lending service] rather than credit supervision.
4. The increased lending by a division and the private benefit of a division manager are related to one another in a proportional fashion’.

Thus, it is evident that the quality in making rational lending decisions is determined by how well banks can control existing risk factors. If risk factors are well-controlled the task of performing the loan process becomes much easier; this aspect will be addressed next.

## 4.7.2 The Credit Process

As discussed previously, there are many variables surrounding lending decisions in banks (Anderson 2003). There are process that should be followed in making lending decisions in both systems—IB and CB. Also there is a need for clear policies to fill the gap relating to default risks management and helping banks to occur/achieve success in making rational lending decisions. These conclusions indicate that many defaults are classified as common or refer to general lending problems, and many others are specific and refer to banks’ lending policies (Stanton 2002). The purpose of the following discussion is to assess lending processes which are involved in a bank’s performance by evaluating the process of making lending decisions.

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<sup>61</sup>This is basically named delinquency in some finance literature, which means non-payment of debt when due, as a result of failure in or neglect of duty or obligation.

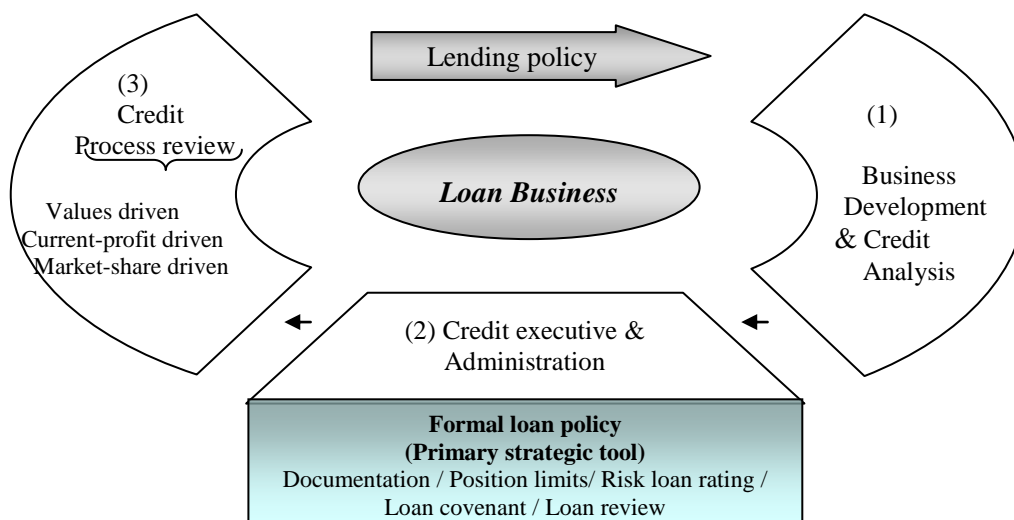
To begin, when banks grant a loan, as mentioned earlier, they take the risk that the borrower may not honour his/her debt. To reduce this uncertainty, however, banks have created instrumental evaluation methods in order to evaluate the risk more objectively (Cowling & Westhead 1996). In their efforts to improve financial efficiency, banks modify their work and their management practices so as to facilitate the emergence of a bond with lenders and to obtain accumulated social information about them. On the other hand, to reduce uncertainty, banks have created methods of evaluation that allow them to anticipate the risk of failure. Cowling and Clay (1994) proposed two approaches that are usually considered by banks seeking to reduce the risk of failure.

One is an instrumental approach that seeks to define an objective method of risk assessment. The other is a non-instrumental approach in which the subjective perception of the borrowers by the financial analyst, and the holding of specific information gathered through informal sources, are attributed to the deciding factors in loan decision-making. Nevertheless, banks sometimes evaluate loans risks by using a credit scoring method. They use historical data and statistical techniques (Mirta & Zekic-Susac 2005). Credit scoring tries to isolate the effects of various applicant characteristics in delinquencies and defaults (Saunders 1997). Consequently, credit scoring is already allowing large banks to expand into small business lending, a market in which they have tended to be less active.

Scoring is also an important step in making the securitisation of small business loans more feasible. Further, Mester (1997) notes that credit scoring has some obvious benefits that lead to its increasing use in loan evaluation; for example, greatly reduced time is needed in the loan approval process. However, while no scoring model can prevent all types of errors, Berger and DeYoung (1996) noticed that a good model should be able to accurately predict the average performance of loans made to groups or individuals as long as the model is relevant to credit quality.

The fundamental objective of commercial and customer lending is to make profitable loans with minimal risk. Hence, management should target specific industries or markets in which lending officers have expertise (Miyajima & Yafeh 2007). Further, to some extent, competing goals of loan volume and loan quality must be balanced with the bank's liquidity requirements, capital constraints, and rate of return objective (Salas & Saurina 2002). Thus, the credit process relies on each bank's systems and controls that allow management and credit officers to assess available risks and return trade-offs.

**Figure 4.3: Lending Policy Overview**



Source: created by the author, 2008

Basically, as Figure (4.3) shows the credit process has three functions:

1. Business development and credit analyses.
2. Administration and credit execution.
3. Credit process review.

Figure 4.3 shows that each function reflects requirements of the 'bank's loan policy' as written by the board of directors. A loan policy, therefore, formalises lending guidelines that employees follow to conduct bank business<sup>62</sup> (Berry, Crum & Waring 1993). Thus, lending guidelines identify preferred loan qualities and establish procedures for granting, documenting and reviewing loans. In the finance literature, the potential differences in credit activities management<sup>63</sup> are identified as follows:

1. **Value driven:** value driven focuses on credit quality with strong risk management systems and controls (Elsas 2005). Primary emphasis is on banks' soundness and stability and a consistent market presence. Thus, underwriting is conservative and significant loan concentrations are not allowed; a typical outcome is lower current profit from loans, with fewer loan losses.
2. **Current-profit driven:** current-profit driven focuses on short-term earnings (Devriese & Mitchell 2006). Primary emphasis is banks' annual profit plan; management is often attracted to high-risk and high-return borrowers; and the outcome is typically higher profit in good times, followed by lower profit in bad times when loan losses increase.
3. **Market-share driven:** market-share driven focuses on having the highest market share of loans among competitors (Joseph, Shen & Romeijn 2004). Primary emphasis is on loan volume and growth with the intent of having the largest market share. Thus, underwriting is very frequent and management accepts loan concentrations and above-average credit risk; and the outcome is that loan quality suffers over time, while profit is modest because loan growth comes from lowest market prices which refer to voidness behaviour of taking risks.

<sup>62</sup> In their periodic examinations, regulators evaluate each bank's written loan policy to see if existing loans conform to management's obligations and acceptable guidelines.

<sup>63</sup> Sometimes it is called 'credit culture understanding'.

In summary, there is a growing literature which has identified the importance of making efficient lending decisions in the finance industry by focusing on the misleading aspects of making good loans (Jennings & Wattam 1994; Kim, Hwang & Shinn 1995; McNamara & Bromiley 1999; White 1969). Section 4.7 highlights the need for corporate-efficient lending decision making, and shows how to develop a quality foundation for making lending decisions.

## 4.8 The Performance of Lending Decisions

Banks base their decisions to assign a particular rating on the criteria that define each loan. 'These are articulated as standards for a number of specific risk factors such as size, type of customers, position of the customer, the reliability of the borrower's financial statements, the quality of its management elements and transaction structure (collateral), and other miscellaneous factors' (Morgan & Ashcraft 2003, p. 92) However, the probability of default can be managed by lending performance assessment over the loan period.

Basically, Beck, Cull and Jerome (2005) defined performance as having a comprehensive meaning which should involve a number of variables of management measurement, and evaluation. Within these activities, functions such as managing, measuring, and evaluating approaches have increased dramatically during the last decade in the banking area. Also, banking institutions' performance must be considered in the commercial or Islamic banking environment (Archer & Karim 2002; Bashir 2000). Lending performance also has to be recognized in the response of gain of scale by optimum technical use of inputs to maximizing outputs. This means benefits gained from loans must be equal to or greater than the cost of holding the loans.

In terms of risk measurement, bank loan performance is measured relative to a bank's current loan stock. Loan rates are still highly significant in predicting loan performance. In the case of bad management of transaction, therefore, lending or transaction cost goes together with greater risk; this is the "*bad management hypothesis*", but theoretically transaction cost function is negatively correlated with risks management policy (Berger & Humphrey 1997). A study by Lane and Quack (2002, p. 11) showed that 'risks are not something objective—existing out there—in the business environment but are instead socially constructed by banks themselves'. Thus, regulations of such banking systems—IB or CB—are usually modelled by their circumstances with the recognition of environmental risk factors involvement.

It is apparent from the above discussion that lending risk assessment procedures and decision making structures are defining features of bank/customer interaction. But it is not the case that all banks have the same pattern of assessment in their operations; for example, the assessment methods used by Polish banks showed some differences between public banks and other types of banks (Feakins 2004). Therefore, focusing on the structure of lending decision-making and assessing whether risk factors affect decision making behaviour are banks' priorities.

Overall, lending risks assessment decisions are important for the financial institutions—e.g. financial credit institutions, financial exchange markets—involved with banks as a consequence of a high level of risk associated with wrong decisions (Simon 1979). Obtaining credit is, however, necessary for the smooth and effective operation of banks. In the process of evaluating credit risk factors, if the principal criteria involved in making

the decision are not well investigated, default in the payment of the loan may occur. Some common characteristics have been considered while assessing lending risks<sup>64</sup>. Thus, the relationship between borrowers, and the actions taken by banks at different decision-making levels, is relatively ignored (Rosman & Bedard 1999).

Overall, rational lending decisions should be based on in-depth study of several criteria. Generally, there are studies (Bessler, Wolfgang & Norsworthy 2002; Deshmukh, Greenbaum & Kanatas 1983; Stomper 2005) which noted that bankers reported some significant difficulties at both stages of the credit process: firstly, difficulties in accumulating the information to evaluate borrowers and their projects and, then, difficulties with encouraging borrowers to repay and difficulties with seizing collateral, in addition to using legal action in collecting bad debts.

## **4.9 Conclusion**

Lending is not just a matter of making the loan and waiting for payment. Loans must be monitored and closely supervised to prevent losses. Furthermore, loans are the dominant asset of most banks, generate the largest share of operating income and represent the bank's greatest risk exposure. In this case, various concentrations in lending activities—lending cultural understanding—carry different risks and returns. Also, many factors can lead to loan defaults. A firm's specific problems may arise from changing technology, labour strikes, shifts in consumer preferences, or bad management, etc.

In other words, the most commonly securitised loans are those with the most standard features: mortgages, government-guaranteed, student loans, small business loans sponsored by small business administration, credit cards, and auto loans. Many other loans are more difficult to credit score and securitize, such as those designed to meet specific business needs. However, misleading information may lead to bad decisions, resulting in default of the loan. This means there is a covariance relationship among the risk factors, making lending decisions, and performance.

To conclude, managing lending risks means managing the decision-making process for lending, since that is where risk factors are constructed and selected by banks. A loan policy, therefore, formalises lending guidelines that employees follow to conduct bank business, as well as identifying preferred loan qualities and establishing procedures for granting, documenting and reviewing loans. Obviously, because of the difficulty of incorporating these lending decisions aspects, many theoretical contributions are related to them, for example, risk management and efficiency performance. The following chapter is structured to show the empirical methodology used in this study to assess these theoretical aspects.

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<sup>64</sup> Characteristics such as: term of the loan, the purpose of the loan, type of borrowers, collateral, source of repayment, and interest rate.



## **CHAPTER FIVE**

### **METHODOLOGY OF THE STUDY**

#### **5.1 Introduction**

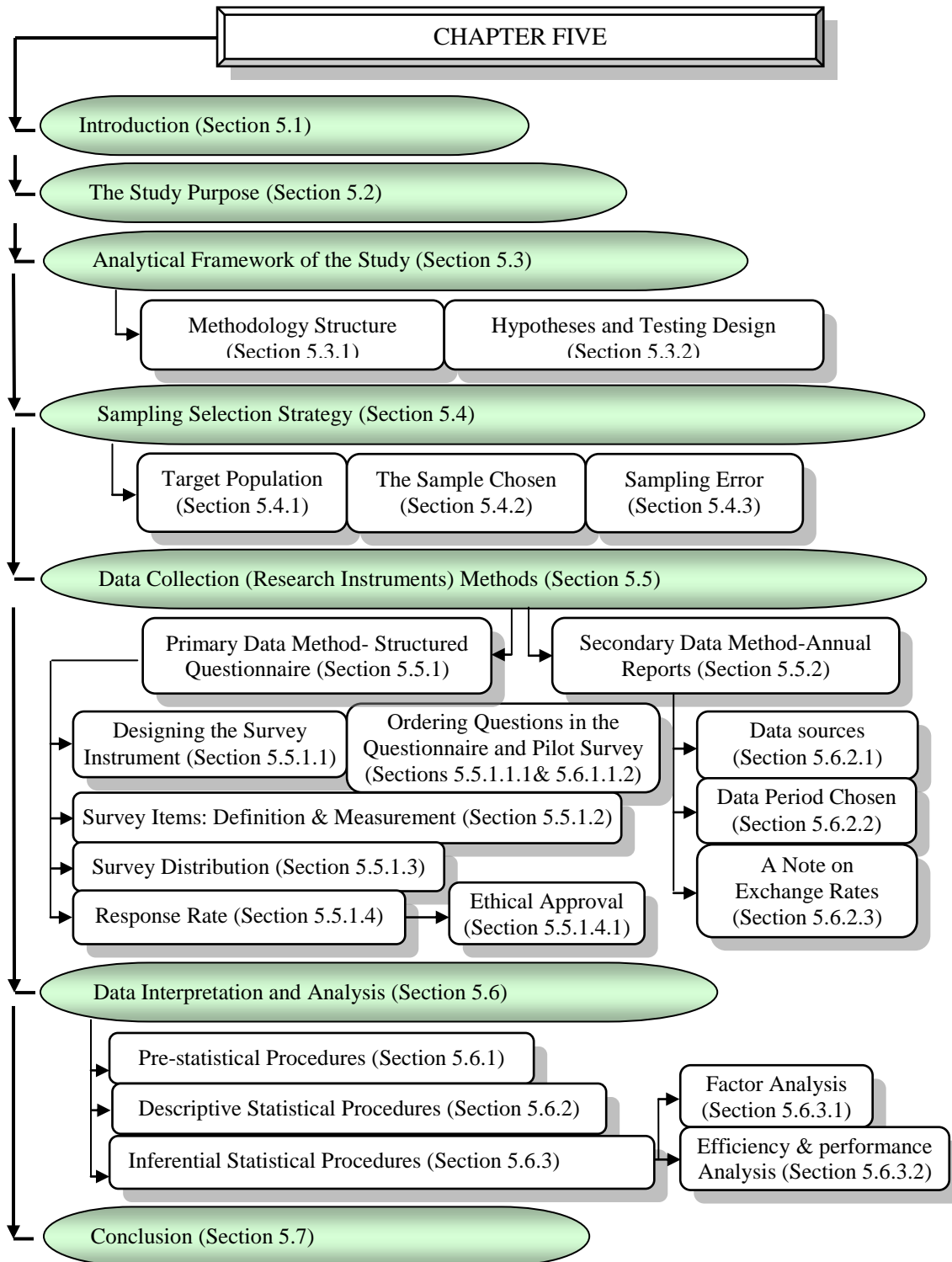
The core aims of this thesis are:

1. To examine the assessment of risk factors in IB and CB.
2. To identify what and how risk factors influence the rationality of lending decision.
3. To discover the differences of banking efficiency in lending between IB and CB systems.

In terms of lending policy, Islamic financial institutions are complex entities that have both economic and religious-cultural dimensions (Crano & Brewer 2002; McNeill & Waldman 1983). However, in order to capture such dimensions and then assess banking performance (efficiency), the study must use multiple methods to collect the data and several statistical tools to analyse the data. In particular, this study specifically uses primary and secondary data (questionnaire/annual reports), which involve different units/variables of analysis. This chapter describes the methodology that is used to compare how IB and CB deal with assessing risk factors and to determine whether or not these factors influence the rationality of lending decision-making in both IBs and CBs. The chapter describes the research design and strategy, as well as data collection methods that will be followed, to achieve the study objectives identified in chapter one.

This chapter is organised as follows. The study purpose and the analytical framework are described in sections 2 and 3 respectively Sampling selection strategy is illustrated in section 4; and section 5 provides a detailed description of the survey instruments used for collecting data. Statistical instruments applied for the interpretation and analysis of the data are covered in section 6. Finally, section 7 presents conclusions. Figure 5.1 provides a visual overview of the structure of this chapter.

**Figure 5.1: Outline of Chapter 5 Interrelations**



## 5.2 The Study Purpose

Both IBs and CBs provide products that are almost similar (e.g. loans), but they hold different policies and principles in terms of transaction instruments and contracts bases and frameworks. Conventional and Islamic finance literature provides evidence that assessing risky loans is clearly one of the most important topics in banking. But what is

absent in the literature are investigations into whether risk assessment is adequately implemented in IB. Sometimes risks may be due to different factors. Thus, the primary purpose of this study is to uncover risk factors—internal/external—which affect a bank's performance in both systems (CB and IB).

The managers' role in conventional banking is to implement decisions that maximise the profitability of their institutions and shareholders' wealth. In addition to this role, Islamic managers have to comply with rules of Islamic teaching *shari`a*. In order to achieve these aims, managers in both banking systems pursue strategies in several areas such as asset/liability management, liquidity management and capital management. A related area of strategic decision-making that carries a high potential for affecting banks' policy, value and safety is risk assessment. In general, recent changes in the banking environment (deregulation, specialisation, globalisation and conglomeration) have posed serious risk challenges for banks, but have also offered opportunities (Davis & Devinney 1997).

Theoretically, there are various ways for a well-managed bank to protect against risk. One way is through diversification (portfolio diversification, geographic diversification, etc). In addition, a bank will have to carry out appropriate asset/liability management practices and hedging strategies. However, empirically there are many bankruptcies referred to the high authority courts that relate to credit issues and numerous financial liquidation issues registered within the financial supervision sector—for example, in Libya all these issues have to be recorded in the public control and supervision sector—(Altman 2002; Berry & Robertson 2006; Checkley & Dickinson 2000; Laeven & Mundial 1999; Perotti 1993; Tunstall 2000). This study attempts to investigate the reasons behind these issues within a particular discussion of risk factors that potentially influence the rationality of lending decision-making policy in such banking systems. This focus will offer a potentially powerful tool for clarifying how different risk factors influence the rationality of lending decision in both systems (IB and CB).

Most Islamic banks in the ME are classified as new institutions and the quality of making a lending decision in CBs is relatively higher than for IBs in these economies. According to the theory of decision-making, making rational lending decisions in banking has been considered a difficult task to achieve. Major errors can typically arise in decision-making because the original question has been incorrectly formed. In particular, in lending decision making, Goodwin and Wright (2004) argue that decisions can be formulated in ways which fail to consider fundamental changes that have occurred in a credit environment. Rational lending decision-making policy must be linked with lower transaction costs. Additionally, this study attempts to identify differences in 'lending efficiency' between IB and CB systems. This focus will offer a potentially powerful tool for clarifying how risk factors assessment contributes to making rational lending decisions in both systems of IB and CB, and ultimately improve banks' overall performance.

## **5.3 The Analytical Framework of the Study**

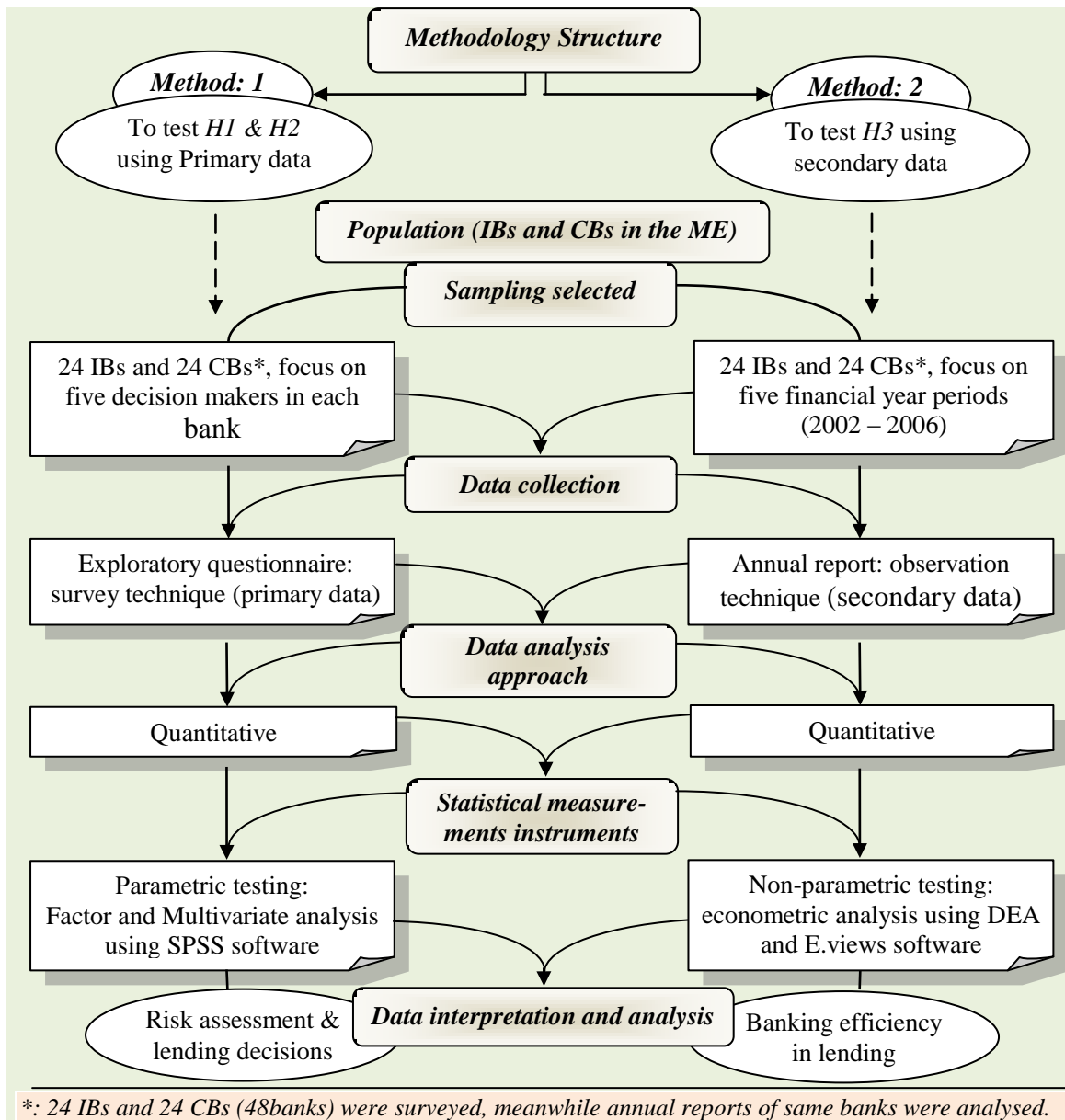
### **5.3.1 Methodology Structure—Combined Method**

The choice of research methodology depends upon the analytical depth of the research problem and the time span of the research. Some of the research methods are difficult to implement in business/social research as a consequence of a natural setting of research problems, period of study, and control of confounding variables – *if any* (Saunders, M,

Lewis & Thornhill 2006). Conversely, others, such as the survey method, can be a powerful and effective tool for collecting business and social data, especially if applied to identifying or analysing matters such as attitude, behaviour, characteristics (McNeill & Chapman 2005). For this research, data collection is performed in two ways: 1) a questionnaire survey (primary data); and 2) collection/extraction from annual reports (secondary or archival data).

Lending efficiency performance is the extent to which a banking system appears more efficient in terms of making successful lending decisions. This study has adopted a number of theories to establish a rigorous theoretical basis for the study model and framework (see sections 2.4 and 4.4). Accordingly, two methods are adopted to undertake data collection. A combination of annual reports and questionnaire surveys were used as the two main sources of data collection, as they were considered the most suitable for this research. The research method is depicted in Figure 5.3.

Figure 5.2: A Combined Approach to the Research Method and Analysis



Source: developed by the author for this study, 2008.

Given the objectives and purpose of this research, a methodology was structured with two parts:

1. Method one used primary data—an exploratory questionnaire survey—to assess the difference in risk taking behaviour and making rational lending decisions between IB and CB (*H1* and *H2*).
2. Method two utilised secondary data—annual reports—to assess the difference in efficiency performance in lending between IB and CB (*H3*).

The study adopted the pooled approach (quantitative) by emailing and handing surveys to the sample banks operating in five countries in the ME region and by combining this with data from annual reports for five years (from 2002 to 2006) for the same sample banks. In general, the approach used in this study was data triangulation through utilising some close-ended questions provided in the questionnaire, supplemented by data gathered from financial reports (Groves et al. 2009). The usage of data triangulation had the advantage of overcoming some of the potential validity problems: ‘construct validity, internal validity and external validity’ (Forza 2002; Rourke & Anderson 2004).

Combining two data sources may differentiate this study from the others. For example, similar studies by Batchelor (2005), Hassan and Bashir (2003) and Yu and Neus (2005) did not adopt multiple tools to collect the data but, rather, used a bank scope database published by the International Business Companies Association (IBCA). The reason for selecting this method—combined method—was to avoid issues relating to confidentiality or accessibility of some data that might be appropriate to describe the actual operation of IBs and CBs. A combined-method avoids implicit selectivity bias in favour of banks that may not be representative of the actual bank population operating in the ME region. Yield bias and inaccurate results in country-specific, and even cross-country specific studies that serve to obscure heterogeneity across banks, have been controlled.

### 5.3.2 Hypotheses and Testing Design

The literature survey in prior chapters provides a sound theoretical basis for designing these hypotheses. In this study, hypotheses were formulated by applying logical reasoning to findings of prior studies (Batchelor 2005; Crouhy, Galai & Mark 2000; Jacobson & Roszbach 2003). For the purpose of empirical tests, the risk assessment, the rationality of lending decision-making relationship and the efficiency of lending decision making are elaborated into seven hypotheses—grouped under three main hypotheses—as follows:

#### 5.3.2.1 First Hypothesis

The profile of risk factors (transaction risk, business risk, treasury risk, governance risk and systematic risk) in CB and IB is defined using (parametric) factor analysis and controls for the major—internal or external—risk factors. These risk factors are assessed by accounting for potential risks identified in the banking literature (Cebenoyan & Strahan 2004; Froot & Stein 1998). In Islamic and conventional banking, there are significant and different types of risk (see section 3.4). 24 risk segments are considered in this research, and they are used to explain how risk assessment has been performed in the process of rational lending decision making. Thus, principle component analysis and independent samples *t*-test are utilised to examine the first research question—*How do Conventional banks and Islamic banks determine and assess risk factors? (What factors*

are they? How are they measured? What is the relative importance of each factor in lending decisions?—and to test the hypotheses that derive from this question:

*H1a: There is no difference in factors considered in credit risk assessment and lending decision in CB and IB systems.*

*H1b: There is no difference in measurement approaches used for such risk factors in CB and IB systems.*

*H1c: There is no relationship between risk factors and default risks portfolio in CB and IB systems.*

### 5.3.2.2 Second Hypothesis

Further investigation of risk factors assessment in CBs and IBs was undertaken. The study examines whether these factors have a different impact on the rationality of lending decision making in CB vis-à-vis IB. In addition, which risk factors have significantly influenced the rationality of lending decision performance will be identified at this stage. Thus, the second hypothesis was formulated to examine the second study question—*How do the risk factors influence the rationality of lending decisions policies in CB and IB systems?*—and the hypotheses that derive from that question:

*H2a: There is no difference in factors considered in credit risk which influence the rationality of lending decision in CB and IB systems.*

*H2b: There is no difference in measurement approaches used for such risk factors that influence the rationality of lending decision in CB and IB systems.*

*H2c: There is no relationship between risk factors and default risks portfolio which influence the rationality of lending decision in CB and IB systems.*

‘Rational decision-making’ simply means a decision, which may turn out to be good or bad, made on the basis of criteria rather than in an ad hoc way<sup>65</sup>. Accordingly, the rationality of lending decision-making is considered as good/bad loans (1, 0), and measured in terms of: 1) loans allocation policy; 2) loans granted policy; and 3) risk factors measurement. Three basic regression models are formed to test *H2a*, as follows:

$$M1: \quad DM(ap)_{ij} = \alpha + \beta_1 TR_{ij} + \beta_2 BR_{ij} + \beta_3 TyR_{ij} + \beta_4 GR_{ij} + \beta_5 SR_{ij} + \varepsilon_{ij} \quad (5.1)$$

$$M2[a,b]: \quad DM(gp)_{ij} = \alpha + \beta_1 TR_{ij} + \beta_2 BR_{ij} + \beta_3 TyR_{ij} + \beta_4 GR_{ij} + \beta_5 SR_{ij} + \varepsilon_{ij} \quad (5.2)$$

$$M3: \quad DM(ra)_{ij} = \alpha + \beta_1 TR_{ij} + \beta_2 BR_{ij} + \beta_3 TyR_{ij} + \beta_4 GR_{ij} + \beta_5 SR_{ij} + \varepsilon_{ij} \quad (5.3)$$

where:

*Dependent variables:*

$DM(ap)_{ij}$ : Rational decision-making in terms of *loans allocation policy* of bank *i* and loan *j*.

$DM(gp)_{ij}$ : Rational decision-making in terms of *loans granted policy* of bank *i* and loan *j*,

with considering: a) Risk portfolio assessment, and  
b) Lending portfolio management.

$DM(ra)_{ij}$ : Rational decision-making in terms of *risk factors measurement* of bank *i* and loan *j*.

*Independent variables:*

$TR_{ij}$ : Segments of transaction risk (single name single transaction risk, products tenor plan risk, mark-up risk, foreign exchange risk, balance sheet risk, credit risk (grading risk)).

<sup>65</sup> Details see section 4.6.1, and equation 4.12.

- $BR_{ij}$ : Segments of business risk (solvency risk, displaced commercial risk, withdrawal risk, trading activity risk)
- $TyR_{ij}$ : Segments of treasury risk (hedging risk, asset and liability management risk (ALM), liquidity risk, credit skill and training risk)
- $GR_{ij}$ : Segments of governance risk (business environment risk, transparency risk, legal risk, operational risk, event, natural disaster risk, fiduciary risk)
- $SR_{ij}$ : Segments of systematic risk (shift in regulation (regulatory risk), technology/systems exposure, payment/settlement risk, institutional risk, and fraud / compliance risk)
- $\beta_i$ : Variables' coefficients
- $\alpha$  and  $\varepsilon_{ij}$ : Constant and unpredictable variances in the model (residuals)

The first model  $M1$  is developed to examine risk factors which may influence the rationality of lending decision-making in terms of 'considered issues in loan allocation procedures'. The rationality of lending decision-making  $DM(ap)_{ij}$  as a dependent variable and five risk factors considered as independent variables may explain the rationality of lending decision-making in terms of rational policies of lending policies in IB and CB. This model allows the determination of what risk factors may significantly influence the rationality of lending policies in both IB and CB.

The second model is modelled into two phases,  $M2a$  and  $M2b$ . In terms of 'loan authorisation policy', the first phase explains policies of making rational lending decisions by focusing on issues that can be considered in risk portfolio assessment, and the second model examines factors influencing the rationality in lending decisions and considers issues which can be referred to lending portfolio management. The model allows the determination of what risk factors can significantly influence the rationality of lending decisions in terms of rational policies of granted loans in IB and CB, taking into account: *a*) risk portfolio assessment ( $M2a$ ); and *b*) lending portfolio management ( $M2b$ ).

The third model  $M3$  explains the importance of measuring risk factors. If measuring risks contributes to improvements in lending decision-making policies, the rationality of lending decision-making can be dependent upon how and when those risks are measured. Therefore, this model explains how this function—risks measurement—affects the rationality of lending decision, and what risk factors need to be considered in IB and CB.

The study also examines the matter of risk assessment according to the objective of risk measurement approaches. The main objective describes whether conventional and Islamic banks apply appropriate approaches to measuring risk. The study obtains three common models (internal rating or scoring model, value and risk model, asset pricing and beta model) which are commonly used to perform risk measurements in the banking industry (Basel Committee 2006; Bessis 2001; Fowler 2002; Van Greuning, Hennie & Brajovic 2003). To examine whether models of risk measurements and the rationality of lending decision making relationship is an important element, three regression models ( $M4$ ,  $M5[a, b]$  and  $M6$ ) are expressed to test  $H2b$ , as follows:

$$M4: \quad DM(ap)_{ij} = \alpha + \beta_1 AP / S_{ij} + \beta_2 VaR_{ij} + \beta_3 AP / B_{ij} + \varepsilon_{ij} \quad (5.4)$$

$$M5[a,b]: \quad DM(gp)_{ij} = \alpha + \beta_1 AP / S_{ij} + \beta_2 VaR_{ij} + \beta_3 AP / B_{ij} + \varepsilon_{ij} \quad (5.5)$$

$$M6: \quad DM(ra)_{ij} = \alpha + \beta_1 AP / S_{ij} + \beta_2 VaR_{ij} + \beta_3 AP / B_{ij} + \varepsilon_{ij} \quad (5.6)$$

where:

*Dependent variables:*

$DM(ap)_{ij}$ : Rational decision-making in terms of *loans allocation policy* of bank  $i$  and loan  $j$ .

$DM(gp)_{ij}$ : Rational decision-making in terms of *loans granted policy* of bank  $i$  and loan  $j$ ,  
with considering: a) Risk portfolio assessment, and  
b) Lending portfolio management.

$DM(ra)_{ij}$ : Rational decision-making in terms of *risk factors measurement* of bank  $i$  and loan  $j$ .

*Independent variables:*

$AP/S_{ij}$ : Areas of internal rating or scoring model applications (transaction risk, business risk, treasury risk, governance risk and systematic risk).

$Var_{ij}$ : Areas of value and risk model applications (transaction risk, business risk, treasury risk, governance risk and systematic risk)

$AP/B_{ij}$ : Areas of asset pricing and beta model application (transaction risk, business risk, treasury risk, governance risk and systematic risk)

$\beta_i$ : Variables' coefficients

$\alpha$  and  $\varepsilon_{ij}$ : Constant and unpredictable variances in the model (residuals)

The relationship between risk factors which appear to have an actual influence on lending decision-making policy and the quality of lending decision making is examined. This is the test of  $H2c$ . For this stage, only significant items (risk factors) in  $M1$ ,  $M2a$ ,  $M2b$  and  $M3$  are examined in order to determine whether the relationship between these types of risk and the rationality of lending decision elements is significant. The examination of the (linear) relationship between risk factors and lending decision variables is tested by using 'Pearson correlation-2-tailed' technique to explain direction of correlation (positive /negative) and the significance relations among them.

Overall, these hypotheses ( $H1$  and  $H2$ ) are tested with data collected from a survey.  $H2a$  test outcomes and  $H2b$  test outcomes are treated as inputs data to perform tests of the  $H2c$ . In general, analysis of the hypotheses is performed in three main steps using principal component analysis (PCA), Pearson correlation coefficients, independent samples  $t$ -test and regression (details of which are provided in section 6.4.3).

### 5.3.2.3 Third Hypothesis

The third research question—*Is there a difference in credit department efficiency performance between the two banking groups?*—is a logical final step in the analysis. A hypothesis has been constructed to examine whether there are significant differences between CB and IB systems in efficiency performance in the lending field. The sound assessment of risks increases the opportunity of making rational lending decisions and will contribute to an improvement of banking efficiency, thus the subsidiary hypothesis is written in testable forms as follows:

$H3$ : *There is no difference in efficiency performance in the credit field between CB and IB systems.*

This hypothesis will be tested with data collected from the questionnaire and annual reports data. To test this hypothesis, three input variables (total deposits, operation costs and interest/non-interest expenditure) and six output variables (profitability ratios (ROE/ROA), revenues, loans/ advances, risk weighted assets and annual average increase in total assets) have been specified to develop a specific model for this study (details in



section 7.4.3). Analysis of the hypothesis is performed in two main steps using DEA and *Tobit* regression. For simplicity, examination and discussion of this hypothesis is provided in a separate chapter (Chapter 7).

## 5.4 Sampling Selection Strategy

### 5.4.1 Target Population

A sample is a selection from a wider population from which it is hoped the results found in the sample can be generalised (McNeill & Chapman 2005). However, selecting a sample which might produce suitable data by applying an appropriate instrument is an additional challenge. The first step in the sampling process is to define the survey population. This might be the entire population of the banking industry in a particular country or region, but it is more likely to be a sub-set of that population. For this study, the target population is two different banking systems: CB and IB in the ME region. Consequently, the banks' population was selected using the following criteria:

1. An experienced credit activity for a long period of time (at least 5 years to satisfy the analysis requirement).
2. It has provided different types of lending activities (transactions).
3. It has, as a minimum, credit and risk consideration centres.
4. Potentially, varying sized banks in terms of 'the total assets'.
5. Countries located in ME and selected based on 'per capita' index measurement—they are same or almost similar level of economy growth.

Many surveys are concerned not with the population as a whole, but with small groups within it. Thereby, the study moves from defining the survey population to sampling it, and drawing upon a variety of theoretical concepts required for sampling design (Davies & Kempnich 1994). Thus, to assess the hypothesised relationships outlined in section 5.3.2 above, an initial sample was drawn from the banking industry operating in the ME region, as shown in Appendix E. This is the focus of the next discussion.

### 5.4.2 The Sample Chosen

Firstly, to identify the participants—banks—to be investigated, the internet provided the basis of selection, as well as websites for those banks that could be easily accessed. The banks are selected randomly from the database of identified population of Islamic and non-Islamic financial institutions. However, as a result of the researcher contacting some banks asking for their participation in this research, the banks nominated a person as their best representative who could also provide additional information useful to the study.

Two focus groups of banks—IBs and CBs—were formed for participation in this survey. According to Neuman (2006), the sample size is determined by the size of population and statistically acceptable if it at least consists of 20% from the whole population. Thereby, it is suggested that for the moderately large population of CBs operating in the ME, a sampling of 20% of the main banks consisting of 96 CBs distributed in different parts of Libya, Bahrain, Qatar, United Arab Emirates and Jordan is representative. A sampling of at least 24 banks—25%—should be permissible<sup>66</sup>. However, the number of Islamic banks is very low, with approximately 240 IBs around the world and their capital portfolio is a

<sup>66</sup> Sample size % : - Conventional banks: (24/96) % = 25 %,                      - Islamic banks: (24/32) % = 75%  
- Total sample size: (48/128) % = 37.5%

combination of many Islamic economies' contributions—only 32 IBs operating in ME region (Nick 2005). The participation of the largest/medium/small 24 Islamic banks—75%—from Bahrain, Qatar, United Arab Emirates and Jordan should be suitable for gathering enough data by using existing contents observation and questionnaire survey<sup>67</sup>.

Overall, then, the study sample consisted of 48 banks operating in the ME region; that is, 24 Islamic banks and 24 conventional banks. These banks are chosen randomly from the IB and CB ME region populations respectively, and it is assumed that the documentation of these banks has ample data suitable to accommodate robust statistical analysis. With no expected deviations among banks' capacity—homogeneity—within the banking industry, the 48 banks in the sample were selected by utilising the same sampling criteria (such as selecting the sample and sampling error).

### 5.4.3 Sampling Error

A random sample tends to be representative of the whole population (Zikmund 2003). Cooper and Schindler (1998), and Dillman, Sinclair and Clark (1993) expressed the view that researchers conducting surveys should take necessary steps to minimise four potential sources of error: sampling error, non-coverage error, non-response error, and measurement error<sup>68</sup>. Groves (2005) argues that sampling error is the degree to which the selected sample does not represent the general population and is caused by exclusion of certain members of the population from the sample. Thereby, he suggested increasing the sample size to decrease sampling error when random sampling is used. This study encompassed banks operating in five countries located in the ME region. Therefore, according to Groves (2005), sampling error should be minimised in this study because: 1) The sample of IB and CB are selected randomly; and 2) A normality assumption of the data distribution will be statistically verified.

## 5.5 Data Collection (Research Instruments) Methods

### 5.5.1 Primary Data Method—Structured Questionnaire

Based on prior research in the finance field, particularly explanatory and descriptive studies (Ahmad & Haron 2002; Bashir 2000; Bourke 1987; Carling & Lundberg 2002; Elsas 2005; Kumra, Stein & Assersohn 2006), a questionnaire was designed to collect the empirical data. A pilot study was undertaken to ensure that there were no problems associated in completing the survey instrument. Further discussion on this instrument is presented below.

#### 5.5.1.1 Designing the Survey Instrument

Though items in this study's questionnaire were mostly adopted from prior research, particular attention was given to content validity, reliability and formatting of the items in order to minimise the chance of misleading and inaccurate recording of response. Further emphasis was given to the original items and the items that were used in most studies. From the extant literature on IB and CB, economies' financial systems, and social

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<sup>67</sup> Otherwise, in terms of reliability and accuracy, involvement of more than the selected banks may be necessary in order to achieve the minimum participation requirement for this study.

<sup>68</sup> Further information about these errors is provided in many sources, e.g. Groves, RM 2005, *Survey Errors and Survey Costs*, Wiley-Interscience, New York.

research, Zikmund (2003), Seale (2004) and Leedy and Ormrod (2005) noted that most descriptive and explanatory studies had used a questionnaire to collect information from participants. Therefore, for this study, instructions were provided on the front page of the questionnaire, as well as in a covering letter, explaining the study purpose, participants' rights, and who should participate. The questionnaire consisted of five parts: participants' characteristics, risk assessment, loan portfolio, rationalising lending decision-making and demographic questions respectively. The final draft of the questionnaire applied is presented in Appendix F.

#### **5.5.1.1.1 Ordering Questions in the Questionnaire**

The order in which questions are asked can affect the response rate, as well as the overall data collection activity and the occurrence of adjusting answers to succeeding questions based on the answer of the previous questions (Bradburn, Sudman & Wansink 2004). According to Brace (2004) choosing the first question in a questionnaire is also more important than any other items, since it influences the destiny of the questionnaire—either to the mail box, or to the garbage bin. Therefore, success in understanding and answering the first question motivates respondents to continue. In this study, the questionnaire was designed with consideration of these issues; it included an easy, short question first. Bank representatives were asked to answer the questions from their perspective within the organisation. Typically, such surveys have received poor response rates due to the lack of connectedness between the objectives of the survey and the understanding of respondents (Cavana, Sekaran & Delahaye 2001).

#### **5.5.1.1.2 Pilot Survey (Pre-testing)**

Prior to primary testing of the survey, it was considered essential to validate the survey instrument through pre-testing in order to identify any ambiguous questions, problems in understanding the questions, threatening or embarrassing questions, or suggestions, if any, for revision of the questionnaire (Bolton 1993; Van Teijlingen & Hundley 2001). In other words, to ensure that *Likert* and *Stapel* scales of measurements were adopted and developed appropriately to the study context and objectives, pre-testing was considered essential. Accordingly, 18 banking experts, academic staff in an accounting and finance school, and fellow Masters/PhD research students were selected for the survey instrument's examination. The draft questionnaire, along with the covering letter, was distributed to each participant. Further, each respondent was timed so that the time requirement for answering the questionnaire was estimated. Respondents were then interviewed to identify issues relating to the survey instrument. Appendix H provides a summary of changes made after the pilot survey. The table in Appendix H, shows the pilot study of the questionnaire elicited valuable comments from respondents.

#### **5.5.1.2 Survey Items: Definition and Measurement**

This section explains the measurement of the study instruments, and describes the variables used in the study. As indicated above, the study instruments—the study constructs which existed in the survey—are divided into five (5) parts, each part addressing items of measurements used in this study, namely: 1) bank characteristics data; 2) risk factors—assessment and measurement; 3) lending portfolio—management and control; 4) rationalisation of lending decision-making; and 5) information about the participants (demographic data). These parts are described as follows:

## 1. Bank Characteristics Data

Previous research identified different types of items which can be measured (Coleman et al. 2002; Saunders & Cornett 2006; Terry, Hunt & Hutcheson 2000). Accordingly, the descriptive statistics are exhibited in Table 5.1. It is seen from Table 5.1 that banks were varied in terms of: status, size, obligation and innovations. These are statistically tested in order to uncover differences between IBs and CBs characteristics.

**Table 5.1: Classification of Bank Characteristics**

Conventional Banks			Islamic Banks		
<i>Feature</i>	<i>Frequency</i>	<i>Percent</i>	<i>Feature</i>	<i>Frequency</i>	<i>Percent</i>
<b>Bank Status (Classification) - multiple choice ( yes, frequency and percent)</b>					
Conventional	86	100.0	Conventional	00	0.00
Local	19	22.1	Local	9	12.3
Islamic	00	0.00	Islamic	73	100.0
Private	6	7.0	Private	10	13.7
International	14	16.3	International	6	8.2
Commercial	86	100.0	Commercial	00	0.00
Public	13	15.1	Public	5	6.8
<b>Conventional</b>	<b>38</b>	<b>44.2</b>	<b>Islamic</b>	<b>46</b>	<b>63.0</b>
<b>Conventional + Other</b>	<b>48</b>	<b>55.8</b>	<b>Islamic + Other</b>	<b>27</b>	<b>37.0</b>
<b>Bank Size - multiple choice ( yes, frequency and percent)</b>					
Less than 200 million US \$	9	10.5	Less than 200 million US \$	8	11.0
200-490 million US \$	25	29.1	200-490 million US \$	24	32.9
500-749 million US \$	39	45.3	500-749 million US \$	34	46.6
750 million US \$ and over	13	15.1	750 million US \$ and over	7	9.6
<b>Bank Activity - multiple choice ( yes, frequency and percent)</b>					
Loans granting	85	98.8	Loans granting	72	98.6
Deposits accepting	84	97.7	Deposits accepting	72	98.6
Retirement products	50	58.1	Retirement products	51	69.9
Insurance securities	77	89.5	Insurance securities	58	79.5
Investment banking	82	95.3	Investment banking	73	100.0
Others	8	9.3	Others	15	20.5
<b>Bank Obligation - multiple choice ( yes, frequency and percent)</b>					
Religious affiliation	86	0.00	Religious affiliation	72	98.6
Customer satisfaction	80	93.0	Customer satisfaction	71	97.3
Securing clients' assets	83	96.5	Securing clients' assets	71	97.3
Corporate governance	83	96.5	Corporate governance	71	97.3
Financial development (shari`a)	86	0.00	Financial development (shari`a)	72	98.6

In order to highlight unapproved loan applications, descriptive statistics on lending portfolios in both banking groups are exhibited in Table 5.2. These statistics show that the mean of unsuccessful loans in CBs and IBs (8.46 and 7.50 lending applications respectively) are small compared with the mean of successful lending applications (44.85 and 37.22 lending applications respectively), and the mean of unapproved applications (63.65 and 56.29 lending applications respectively).

Table 5.2: Descriptive Statistics on Lending Portfolio Activity

Feature	Conventional Banks			Islamic banks		
	Mean	Median	Std. Dev	Mean	Median	Std. Dev
No. of successful loans	44.85	40.00	15.367	37.22	35.00	13.261
No. of unsuccessful loans	8.46	8.34	5.089	7.50	6.00	4.787
<i>No of Applications Approved</i>	<i>53.33</i>	<i>50.00</i>	<i>18.951</i>	<i>44.77</i>	<i>42.00</i>	<i>16.480</i>
<i>No. of applications unapproved</i>	<i>63.65</i>	<i>60.40</i>	<i>17.317</i>	<i>56.29</i>	<i>55.00</i>	<i>18.469</i>

\*Note: These statistics indicate the number of lending applications that have been requested yearly over the sample.

## 2. Risk Factors: Assessment and Measurement

In order to provide an accurate answer to part of the research problem, the survey was designed to collect data about the risk factors that might influence banks' performance. This data was then used to test *H1a* and *H1b* (details in section 5.3.2.1). Santomero (1997), Jimenez and Saurina (2003) and Morgan and Ashcraft (2003) reported some risks that were related to specific activities and it can be presented as follows: transaction risks, business risks, treasury risks, governance risks and systemic risks. In reality, before assessing the risks, it is necessary to understand the classifications and the characteristics of such risks and to measure these types of risks. The relative sub-classes of such risks and risks' feasibility items are highlighted to explain how banks deal with risks and how they manage and measure it, and the relevant descriptive statistics are presented in Appendix G.

## 3. Lending Portfolio: Management and Control

The second major focus of the research problem investigates whether there are significant relationships between risks and lending portfolio performance in the banking industry. Analysis in this part shows that risks portfolio and lending portfolio performance are significantly correlated, with 77.9 % of the CB respondents with a median of 2.00 are chosen 'agree' and 'completely agree' options. This implies that risks and the lending portfolio are correlated. In contrast, responses of 'agree' and 'completely agree' to the survey item that risks and the lending portfolio are correlated are chosen by 85% of IB respondents with a median of 1.00.

The descriptive statistics on lending portfolio performance in CBs and IBs are presented in appendix G. In general, in terms of portfolio diversity, analysis shows that Islamic and conventional banks have held lending portfolios which are differently structured. Abdalla (1997) reports that IB instruments are extremely different from CB ones; therefore, controlling transaction processes might be different as well. Furthermore, this research seeks to uncover the similarities and differences between IBs and CBs in lending policy. Therefore, this research has investigated banking policies used to demonstrate the structure of lending portfolios. Descriptive indicators about relevant items used in this part are presented in Appendix G. In addition to the risks items highlighted in point 2, these items are added to test *H1c*.

## 4. Rationality of Lending Decision-making

The third part of the research problem investigates credit policies applied to these banks, with a particular focus on the efficiency of making rational lending decisions. The term

‘rationality’ is not a physical thing that can be touched (quantity) but, rather, an intangible thing (quality). It means the feasibility of risks that may impact the efficiency of lending decision-making might be challenged by both IB and CB systems (Jericevic 2002; Kraft & Tirtiroglu 1998; Laeven & Mundial 1999; Pastor 2002). Even though the data collected in this phase covers policies in efficient lending decision-making, credit culture, lending standards, lending policies and controlling/managing risks were also matters of concern (in terms of allocated and granted loans considerations and models used for risk measurement). Appendix G provides descriptive statistics on the items used for measuring the rationality of lending decision-making. Thus, the study measurements in this part were used to test *H2a*, *H2b*, and *H2c* and details are provided in section 5.3.2.2.

### 5. Information about the Participant (Demographic Data)

This part includes characteristics of the respondent—information such as age, education level, experience in job. A review of the literature in the relevant field shows that similar demographic variables have been used by different researchers. What is significant to the findings is respondents who regularly/often participation in making lending decisions are 72% in CB and 81% in IB. Descriptive statistics of respondents are provided in Table 5.3.

**Table 5.3: The Respondent’s Description**

Conventional Banks			Islamic Banks		
Feature	Frequency	Percent	Feature	Frequency	Percent
<b>Participants’ age</b>					
Less than 30	4	4.7	Less than 30	1	1.4
30-44	49	57.0	30-44	40	54.8
45-59	31	36.0	45-59	30	41.1
60 and over	2	2.3	60 and over	2	2.7
<b>Participants’ qualification level</b>					
Primary School	1	1.2	Primary School	–	–
Secondary School	1	1.2	Secondary School	4	5.5
Associate Degree	14	16.3	Associate Degree	9	12.3
Undergraduate Degree	45	52.3	Undergraduate Degree	40	54.8
Postgraduate Degree	25	29.1	Postgraduate Degree	20	27.4
<b>Experience in banking and finance</b>					
Less than 5 years	8	9.3	Less than 5	4	5.5
5-9	40	46.5	5-9	42	57.5
10-14	30	34.9	10-14	24	32.9
More than 14	8	9.3	More than 14	3	4.1
<b>Participation in decision-making</b>					
Regularly Invited	28	32.6	Regularly Invited	26	35.6
Often	34	39.5	Often	33	45.2
Seldom	15	17.4	Seldom	14	19.2
Never Invited	9	10.5	Never Invited	–	–

#### 5.5.1.3 Survey Distribution

This research was undertaken with a maximum distribution of 240 survey booklets among the sample—IB and CB—in five countries, with five survey booklets to be distributed to

each bank [(24 IBs + 24 CBs) x 5 = 240]. Likewise, the survey focused on five decision-makers within the organisation who were classified in the survey instrument as follows:

1. Executive manager.
2. Property board member (for CB), or Islamic board member (for IB).
3. Risk management manager.
4. Credit department manager.
5. Treasurer/financial department manager.

Further, for this research, an email survey was conducted as a result of travelling limitations which restricted the researcher from entering several countries where some participants were located. Therefore, due to an inability to deliver the survey personally, approximately 130 survey booklets were emailed—five (5) booklets for such banks. Taking into consideration the time limitation for conducting the study, it was assumed the data obtained using this distribution technique to be acceptable for statistical testing. Table 5.7 presents the statistics of the survey distribution and the banks' sample.

**Table 5.4: Distribution of the Banks' Sample and the Survey**

The Country	Population		Banks' sample		Distributed surveys		
	IBs	CBs	IBs	CBs	By email	By hand	Total
<i>Libya</i>	None	19	-	7	-	35	35
<i>Bahrain</i>	13	19	11	5	80	-	80
<i>Qatar</i>	6	6	4	2	30	-	30
<i>United Arab Emirates</i>	9	33	6	5	-	55	55
<i>Jordan</i>	4	19	3	5	20	20	40
<i>Total</i>	32	96	24	24	130	110	240

#### 5.5.1.4 Response Rate

From the first round questionnaires distributed to the 240 participants (five participants in each bank), a total of 159 surveys were returned with mostly completed information. Of the 240 surveys distributed, manually handled and online responses were received within two months. Of these responses, 70 were from the survey distributed manually with a response rate of (63.63%)<sup>69</sup>. At this point, as potential participants expressed a preference for participating in the study by using an email survey rather than a postal survey, a total of 92 were returned online with a response rate of (70.76%)<sup>70</sup>; 89 were returned after completion, and three (3) surveys were returned blank. Thus, three (3) surveys (0.018%)<sup>71</sup> have been excluded from analysis of the total surveys returned. The response rate from the first round survey was an acceptable (66.25%)<sup>72</sup>; according to Dillman, Sinclair and Clark (1993) a response rate of at least 20% was deemed usable.

##### 5.5.1.4.1 Ethical Clearance Approval

The main purpose of research ethics is to protect interviewers and respondents from harm or adverse consequences that may result from the research activities (Hays, Murphy & Sinclair 2003). Since this study sought to collect data from individuals/institutions, prior

<sup>69</sup> Handling survey response rate:  $70/110 = 63.63\%$

<sup>70</sup> Online survey response rate:  $92/130 = 70.76\%$

<sup>71</sup> Blank survey response:  $3/162 = 0.018\%$

<sup>72</sup> - Response rate of CBs:  $(86/120)\% = 71.66\%$       - Response rate of IBs:  $(73/120)\% = 60.83\%$   
- Total response rate of CBs and IBs:  $(159/240)\% = 66.25\%$

approval was required from the University of Southern Queensland Ethics Committee. An application—along with both versions (English and Arabic) of the questionnaire—was forwarded for ethical clearance approval. Approval for conducting the survey was received from the Postgraduate Students and Research Ethics Officer, reference number (H07STU710)<sup>73</sup>.

## 5.5.2 Secondary Data Method—Annual Reports

Sometimes, a researcher can use data from previous studies as the basis for new research (Best 1999). Cowton (1998) explains that secondary data might be official statistics (statistics collected by agencies and governments), such as a full survey conducted on the whole population. These statistics are most readily available to researchers. For example, trade unions will usually have statistical data about the industries in which their members are working. Developments in data storing techniques, and improvements in preparing secondary data methods and saving data have considerably assisted researchers to access archived data much more easily.

Typically, studies with similar purposes have found that content observation is a key to obtaining good survey results (Zikmund 2003). Furthermore, an annual report survey—secondary data—particularly focuses on specific aspects of behaviour. However, this behaviour is considered quantitative in some way (Leedy & Ormrod 2005). According to sub-question.3 of this study and theoretical constructs used, the texts (financial reports) that will be examined need to be carefully identified. Additionally, specifying units of analysis followed by data collection technique must be considered in the former stage of developing research ideas. Therefore, the study adopts this strategy as a principal target for collecting the secondary data used for the analysis in this part.

### 5.5.2.1 Data Sources

Secondary sources are basically sources of data that have been collected by others, and not specifically for the research question at hand (Best 1999; McNeill & Chapman 2005). Nevertheless, McNeill and Chapman (2005) have outlined many sources of secondary data that include government and regulatory agencies documents, public reports of companies, items in the press and other media, published academic research, and internal documents produced by organisations. Likewise, research methods such as contents analysis—annual reports—used in dealing with secondary data are often more easily amenable to replication and to validity and reliability checks than some methods used to collect primary data in business settings (Cooper & Schindler 1998). Further, Harris (2001) suggests that the use of secondary data—*particularly the data obtained from financial statements*—forces the researcher to think more closely about the theoretical aims and substantive issues of the study. Secondary data can also be used to provide ‘triangulation’, increasing the credibility of research findings using primary data (Cowton 1998).

Therefore, to ensure reliability, consistency, and comparability of the results, the data were obtained from individual CBs’ and IBs’ annual reports, published in accordance with General Accounting Acceptance Principles (GAAP)<sup>74</sup>, in addition to other financial

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<sup>73</sup> A copy of the ethical clearance approval is provided in Appendix I.

<sup>74</sup> ME countries are still suffering from the adoption of a national uniform set of accounting standards; they follow the international financial accounting standards, and the international standards of auditing.



information (public/private) published by the local markets in these countries (Libya, Qatar, Bahrain, United Arab Emirates and Jordan).

### 5.5.2.2 Data Period Chosen

As mentioned above, the sample used for this study comprises 24 IBs and 24 CBs that operate in the ME region. The study covers the time period between 2002 and 2006 in order to capture rapid changes within the ME banking industry that might have occurred in both IBs and CBs systems, in particular changes that occurred in the capital adequacy requirement or lending policy following the onset of the economic crisis in the ME region. Typically, this crisis hit Islamic economies after September 11, 2001 and led to deterioration in financial institutions due to a decrease in international investment in Islamic economies. It is anticipated that selecting these five financial year-periods particularly will improve the interpretation of the research findings significantly once the data have been analysed.

### 5.5.2.3 A Note on Exchange Rates

In this study, because of the diversity of banks' location and the differences in currency power/name in the selected countries sample, currencies of these countries have been converted into USA dollars to obtain comparable data sets for the research. Basically, justifications of data are made to avoid systematic bias produced by random errors of measurement or by misspecification in the model underlying the analysis. For this study, uniformity in the use of different currencies is essential for comparative matters and for reliability as well, as Table 5.5 suggests.

**Table 5.5: Equivalence of Exchange Rate for the Sample**

	<i>Country</i>	<i>Currency Name</i>	<i>Exchange Rate (\$ US)*</i>
<b>1</b>	Libya	<i>Libyan Dinars</i>	1.139
<b>2</b>	Qatar	<i>Qatar Rials</i>	0.275
<b>3</b>	Bahrain	<i>Bahraini Dinars</i>	2.656
<b>4</b>	United Arab Emirates	<i>UAE Dirham</i>	0.272
<b>5</b>	Jordan	<i>Jordanian Dinars</i>	1.411

*\*The \$US exchange rates have been estimated over the data period of time (1999–2006) according to (<http://www.ozforex.com.au>) database by using a weighted average.*

There is another reason relating to treatment and consistency over the entire period of data coverage. The annual reports for the sample banks have been surveyed, and the way in which these reports have been prepared has also been considered. This study is committed to analysing annual reports data in order to ensure that conclusions drawn from primary data are as unbiased as possible. It also seeks to develop a single manner to evaluate the data. Generally, the following accounting standards, as well as aspects mostly focused on by external auditors, have been considered in this research:

1. Interest revenue and expenses are calculated according to the monetary accrual principle. The received and paid commissions (or *Zakat* in IB) are also recorded in this segment—revenue and expenses—in the income report.
2. Depreciation of fixed assets is disclosed with their total cost value. Payments are also calculated on the basis of the straight line method according to taxation law; therefore, this segment—depreciation—has been carefully estimated.

3. In terms of loans volume, loans were calculated as annual figures or values (loans volume), to assure the reliability of statistical analysis.
4. All investments are recorded in the sample banks at their cost values.
5. All foreign exchanges transactions are converted into US dollars according to the exchange rate in force as published by the central banks in surveyed countries: Libya, Qatar, Bahrain, United Arab Emirates and Jordan.

Overall, according to Newbold, Carlson and Thorne (2003), the difficulties of using data without estimation might be: 1) location and authority for its release; 2) insufficient documentation; 3) inappropriate aggregation; and 4) delays and refusals to data requests. By focusing on the contribution of sufficient documentation, issues also arise regarding the reliability of standards used by documentation staff, that is, of those who prepare the annual reports. Spathis, Doumpos and Zopounidis (2002) have argued that most financial boards were required to publish large amounts of information that technically comply with generally accepted concepts/principles, whereas most researchers require a narrower focus to ensure data accuracy. Additionally, offering guidelines for describing information interchange formats in advance seems highly useful for technical processing with providing a uniform checklist glossary for the data use. Thus, it becomes essential to build sets of data files which contain the lowest level of data collecting errors.

Although many business studies will not use the data collected by content analysis to construct precise conclusions, a number of steps can be taken 'to provide evidence that systematic and spurious errors occur infrequently' (Janis 1965, p. 81) in (Harris 2001, p. 194). An explicit procedure for content analysis, like other research instruments, is said to have validity of measurement in what it purports to measure; and has reliability if it gives the same result consistently. To conclude, the technique used in this study was data triangulation through utilising some close-ended questions provided in the questionnaire, supplemented by data gathered from financial reports. This study therefore generates a framework to triangulate data that helps to draw reliable conclusions and improves the study validities (*construct, internal and external*).

## **5.6 Data Interpretation and Analysis**

Statistical instruments have been used to test the study hypotheses and make a statement about the statistical validity of the results (Newbold, Carlson & Thorne 2003). Both parametric and non-parametric mathematical programming approaches use all the information contained in the data. Sheskin (2004) argued that the parametric approach required the imposition of a specific functional form (e.g. regression equation), while a non-parametric approach does not require any assumption about the functional form. According to the nature of the study questions and its purpose, the information obtained from two different groups of banks (24 IBs and 24 CBs), was analysed using two statistical instruments:

1. Parametric statistical technique: this technique has been used to analyse primary data collected by using a questionnaire survey.
2. Non-parametric/econometric statistical technique: secondary data used in this study have been analysed using econometric technique.

In brief, statistical procedures—parametric and non-parametric—that have been utilised to analyse the data are highlighted as follows.

### 5.6.1 Pre-statistical Procedures

Because some questionnaires were distributed online (emailed), and some annual report data were directly uploaded, the information can be downloaded directly into a database sheet once it has been submitted. This produces some advantages, such as reduced time cost and coding error. It also automates the coding process, improves efficiency and removes the possibility of human coding error. The researcher also made efforts to check errors which might be involved by ensuring that data were transformed correctly to the spreadsheets, and by performing a random check of five percent of the entered surveys (Laeven & Majnoni 2005; Leedy & Ormrod 2005).

### 5.6.2 Descriptive Statistical Procedures

The study has used descriptive statistical procedures to present a picture of the specific details of assumed relationships. During the descriptive statistics process, outliers—abnormality—that could influence the analysis and interpretation of the results were investigated (Davis 2000). If identified, profiles on each outlier observation were generated. The reason for this was to see if outliers for individual variables may impact on the overall research model; the outliers was retained until sufficient evidence was found to prove that it did not provide an accurate representation of the target population. In addition, each statistical user makes assumptions about the nature of the data, such as its normality, homoscedasticity, and linearity (Anderson, Sweeney & Williams 2005). Therefore, if a normal distribution is not observed, data transformation needs to be carried out, if possible, because the assumption is a prerequisite for the parametric inferential statistical technique used in this study. Further, assumptions on sampling adequacy and reliability for establishing factor analysis have been investigated. In this context, a normality test was performed by observing normal probability plots and histograms or, to be more accurate, the skewness and kurtosis value was obtained.

### 5.6.3 Inferential Statistical Procedures

#### 5.6.3.1 Factor Analysis (FA)

This study has two major constructs: risk factors assessment and the rationality of lending decisions. Both constructs are multidimensional and they include multi-variables that incorporate multiple items of assessment for each variable. Therefore, multivariate analysis (MA) has been used for this study in accordance with Levine et al (2005), who stated that MA is more appropriate for assessing the direction and strength of relationships between independent and dependent variables. To accomplish factor analysis, a principal component (PC) technique was used to analyse the significance of relationships among independent and dependent variables (Newbold, Carlson & Thorne 2003). Consequently, the factor scores derived from the PC were used as input values for the multiple regression analysis (MR). The MR model was applied to measure the association between the study variables which are measured by interval scales. In this part, analysis has been taken to test the main hypotheses *H1* (*H1a*, *H1b* and *H1c*) and *H2* (*H2a*, *H2b* and *H2c*).

#### 5.6.3.2 Efficiency & Performance Analysis (EPA)

Finally, in order to measure a gain efficiency scale for each decision making unit (DMU) relative to the other DMUs in the sample banks and test the hypothesis *H3*, the data

envelopment analysis (DEA) technique has been used (details in Appendix O). As mentioned, data envelopment analysis (DEA) is used to analyse banking performance (frontier efficiency) and the quality of lending decision-making<sup>75</sup>. The orientation of DEA on deriving the best-practice frontier and optimising returns to scale of decision making units (gain efficiency scale) affords new ways of organising and analysing data and can result in new managerial and theoretical insights. ‘Regression models require the dependent variable to be observed on a continuous and unrestricted scale’ (Vogelvang 2005, p. 126). It is quite common, however, for this condition to be violated, resulting in a non-continuous or a limited dependent variable (Manual 2002; Vogelvang 2005). Manual (2002, p. 405) considered that ‘[a]n analyst will distinguish between three types of these variables: 1) qualitative (observed on a discrete or ordinal scale); 2) censored or truncated, and 3) integer valued’.

Once the efficiency scores have been estimated using DEA, the statistical technique of non-linear *Tobit* econometric modelling is used to represent relevant factors in the decision process and, further, determine to what extent each factor affects the outcome<sup>76</sup>. To perform this analysis, E-View’s econometric software has been utilised. At this stage, the hypothesis 3—*H3*—of the study can be tested. Using this model yielded a number of advantages regarding the estimation technique for maximum likelihood (ML) binary *Tobit* model, as well as descriptive statistics/information on the number of iterations required for convergence, and estimation of the coefficient covariance matrix, mean and standard deviation of the dependent variable, standard error of the regression and sum of the squared residuals (Papke & Wooldridge 1996).

## 5.7 Conclusion

This chapter highlights the main purposes of the study and outlines the appropriate approach that has been conducted to achieve the hypothesised objectives and to answer the research questions by testing relative hypotheses. This chapter explains the data collection strategy. The study conducted two focus groups as a sample of research within IBs and CBs operating in the ME region; and the use of the survey technique, including annual reports observation to collect data, provided a good basis for triangulation data analysis. This chapter describes aspects that should be considered to ensure occurrence of different types of validities. For this study, to some degree, several applications concerning validity were established to ensure that the meanings of the constructs in this study are correctly captured, for instance: 1) the draft questionnaire was pre-tested in order to improve face and content validities; 2) principal component factor analysis was performed in order to ensure construct validity; and 3) appropriate statistical analysis by employing three software packages SPSS, DEA and E.View’s, in order to draw valid statistical conclusions. To conclude, once the constructs, their relationships and their boundary conditions were articulated, the propositions that specify the relationships among the constructs were translated into hypotheses and related empirical indicators (empirical level). These aspects will be covered in the following chapters.

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<sup>75</sup> About 240 decision-making units in conventional banks and 240 decision-making units in Islamic banks were considered in this study.

<sup>76</sup> Estimation models for several qualitative and limited dependent variable models have been discussed in Manual (2002) by using E.Views, which provides estimation routines for binary or ordered (*Probit*, *Logit*, and *Gompit*), censored or truncated (*Tobit*, etc.), and integer valued (count data) model. For further explanation see, Johnston, J 1997, *Econometric methods*, McGraw-Hill, New York..

## CHAPTER SIX

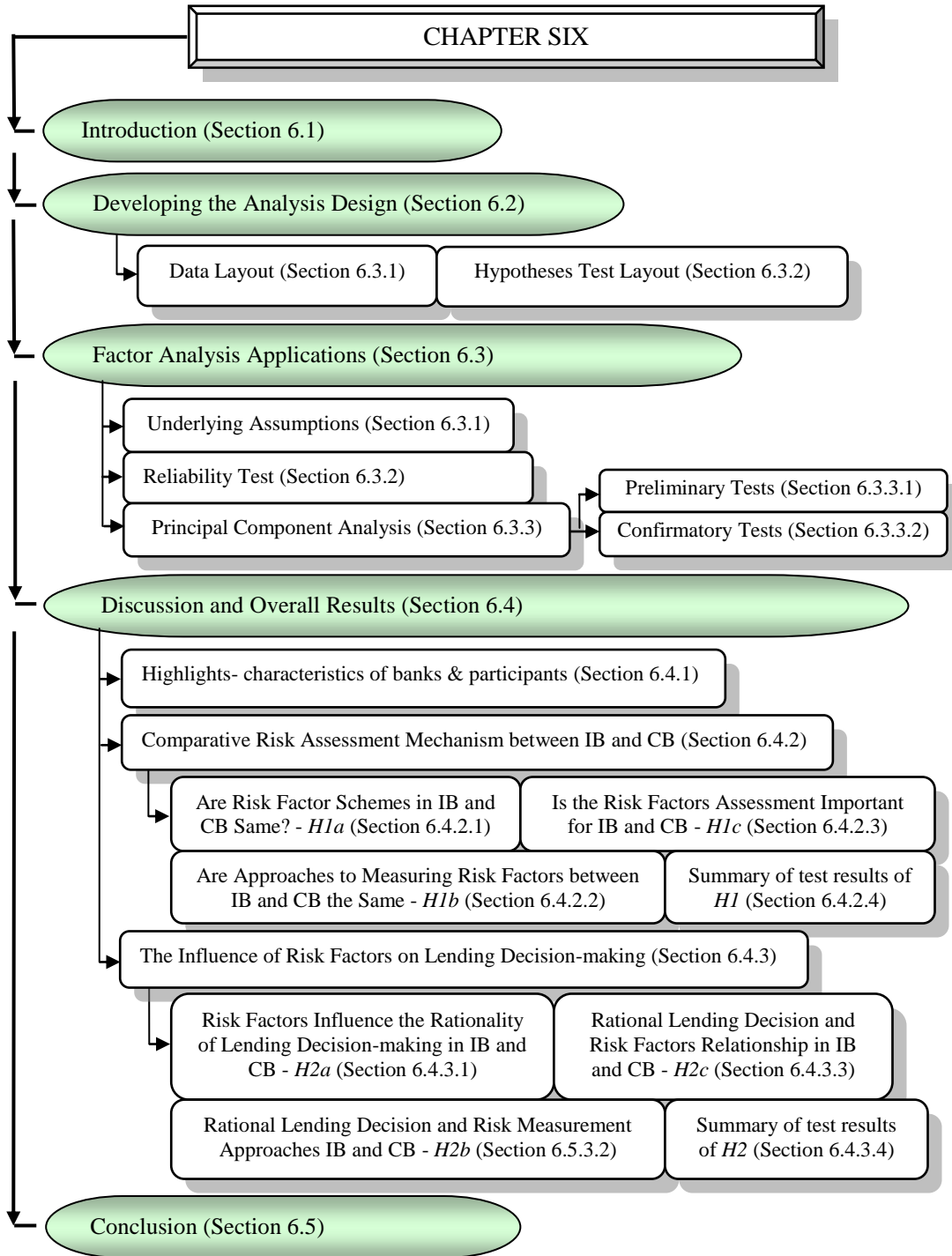
### **INVESTIGATIONS OF THE RISK ASSESSMENT AND LENDING MANAGEMENT RELATIONSHIP: COMPARATIVE INTERPRETATIONS AND RESULTS**

#### **6.1 Introduction**

This chapter presents quantitative results of analysis undertaken on data gathered via a survey questionnaire. Two research hypotheses that relate to the assessment of risk factors and their relationship with the lending portfolio performance in two different banking systems—CBs and IBs—are tested. The chapter also includes further discussion on the relative importance of evaluating such factors in relation to the lending portfolio. Therefore, the aim of this chapter is to present findings and discussion focusing on how IBs and CBs are different in terms of risk factors assessment—risk taking behaviour—and how these factors influence the rationality of lending decision making. To enhance the analysis, several procedures which might be a focus for similar future studies have been adopted in this study. Thereby, assumptions of the statistical instruments used in this study, such as normality and reliability, were carefully assessed.

The chapter is divided into five sections as follows: the introductory section is followed by section 2 which provides information regarding the research design and analysis. Section 3 outlines the factor analysis model for evaluating the assumptions, assessing the reliability, and determining the principal component factors which were conducted to analyse the study variables. This is followed by section 4 which discusses the findings and provides detailed conclusions for test hypotheses *H1* (*H1a*, *H1b* & *H1c*) and *H2* (*H2a*, *H2b* & *H2c*). Finally, section 5 concludes the chapter with an overall assessment of the results. Figure 6.1 depicts a detailed outline of Chapter 6.

**Figure 6.1: Outline of Chapter 6 and Interrelations**



## 6.2 Developing the Analysis Design

### 6.2.1 Data Layout

The CB’s data was analysed and compared with data obtained from IBs, thereby, all CBs were combined into one group of data to represent the CB system in the ME region. Further, a similar structure was employed on the IB system and the analysis procedures were the same as those above. The purpose of this arrangement was to make the circumstance of comparing these banking systems similar in the five geographical

locations<sup>77</sup>. Accordingly, the study examines whether policies and roles of lending decision-making used in IBs and CBs are different and the possible relationship between these policies and risk factors assessment. However, for the purpose of this study, the comparative information—primary data—of default risks portfolio and management/measurement approaches are obtained by a questionnaire survey originally prepared in English, with Arabic language supplements.

Although economic models are often based on continuous response and explanatory variables, both categorical and numerical data are used in empirical economic research. In recent years, econometric literature has focused on the development of limited dependent (e.g. categorical) variable models (Cummins & Gullone 2000; Dunn & Va 1992; Weng 2004). These models address a wide range of economic and empirical issues such as selection bias and unobserved population heterogeneity. In this context, Weng (2004) has stated that most empirical research on the effects of response categories on the reliability of Likert-type rating scales has focused on internal consistency reliability. In conducting empirical policy research, economists focus on model specification issues. These include variables that need to be measured by survey or secondary data sources to estimate categorical and numerical parameters and test hypotheses about policy effects.

A very common question is whether it is legitimate to use Likert scale data in parametric statistical procedures that require interval data, such as linear regression and factor analysis. Running a regression by using Likert scale is somewhat controversial. Some statisticians have commented that ordered categories applied to parametric statistical regression is invalid, and only non-parametric instruments should be used (Jamieson 2004). In contrast, while technically the Likert scale item is ordered, using it in parametric test is valid if assumptions about using the technique are met (Lozano, García-Cueto & Muñiz 2008; Lubke & Muthén 2004). Ideally, it is not a question of the right and wrong way to analyse data from Likert scale items: the question is more directed to answering the research questions meaningfully. Statistical procedures that meaningfully answer the research questions, maintain the richness of data, and are not subject to scaling debates should be the methods of choice in analysing Likert scale items.

Consequently, the following aspects have to be considered when regression has been taken:

- Understand the difference between Likert scale type item and a Likert scale.
- Proceed with caution. (Sufficient justification)
- Five items of scale or more must be treated with an underlying concept that the scale be continuous (normality, equal variance of residual, etc. should be met).
- Run equivalent non-parametric test when possible; if the same result is achieved, conclusions can be confidently reported.

## 6.2.2 Hypotheses Test Layout

In this study, the sampling distribution of the *t*-test can be approximated by the normal distribution when both ( $n_1 = \text{CB}$ ) and ( $n_2 = \text{IB}$ ) are large. Since the number of samples in this study— $n_1 = 86$  and  $n_2 = 73$ —meets this condition, the standard normal probability distribution table can be used for testing the hypotheses. The hypotheses testing procedure for examining whether the risk factors assessment (management/measurement/control) and their effects on making rational lending decisions (*H1a*, *H1b*,

<sup>77</sup> All CBs and IBs which contributed to this study are located in five Middle Eastern countries, namely, Libya, Jordan, Bahrain, Qatar and United Arab Emirates (more details are available in section 5.6.2.2).

*H2a* and *H2b*) of two groups of banks from different banking system is alike or different is presented as:

Null hypothesis  $H_0: \mu_1 = \mu_2$

Alternative hypothesis  $H_1: \mu_1 \neq \mu_2$

where

$\alpha = 0.01$  or  $0.05$  level of significance for testing these hypotheses, and along a certain degree of freedom (*df*).

Null hypothesis assumes that there is no difference between the two systems, which means the CB and IB populations have the same means in such risk factors. An alternative hypothesis, on the other hand, assumes there is a difference between groups, which means the population has different means of such risk factors. Using a two-tailed test, the acceptance region of the 't statistic value' is determined at the 0.01 or 0.05 level of significance. If 'P-value' is noticed within the acceptance level of significant, the samples are assumed normally distributed. When t-test 'calculated value' lies outside the acceptance region; the null hypothesis of no difference is rejected.

However, testing the *H1c* and *H2c* is demonstrated by using correlation coefficient technique to examine the relationship between risk factors and default risk portfolio or lending portfolio policy. At this point, the study measures the relevant factors<sup>78</sup> in the expectation that it will show a positive/negative association. Despite this strategy, it does not yield the strong evidence for causation that true experiment would yield; however, an association would at least be consistent with the researcher's view that risks factors assessment associated positively/negatively with lending portfolio policy, and might be different in CBs and IBs.

Accordingly, the Pearson correlation is a measure of a supposed linear relationship between such risk factors and lending portfolio policy. But, the supposition of linearity must always be confirmed by inspection of the scatter plots (Newbold, Carlson & Thorne 2003; Ruppert 2004). Therefore, by definition, the value of *r* can vary only within the range from -1 to +1, inclusive ( $-1 \leq r \leq +1$ ). Thus, to test the null hypothesis of (*H1c* and *H2c*) that if the correlation equal to zero is made with the statistic  $t < 0.01$  and  $< 0.05$ , the hypothesis of no relationship is accepted. However, if *H0* is not true, one can say nothing whatsoever about the relationship between the two variables.

## 6.3 Factor Analysis Applications

### 6.3.1 Underlying Assumptions

Discussion here focuses on the important statistical problem of making inferences about a population, based on results from a sample. However, by using the central limit theorem researchers have a rationale for applying the statistical analysis to a wide range of applications in different fields (Newbold, Carlson & Thorne 2003). As indicated by Newbold, Carlson and Thorne (2003), the inferences about the population might be considered as means, proportions and variances. This study seeks high-quality results from which analysis has been conducted. Thus, the evaluation of the sample's assumptions is important for many reasons, including:

<sup>78</sup> To meet the study objectives that the relationship between such risk factors and lending portfolio factors have been examined independently. As well as the examinations, factors were extracted by PCA.



1. It avoids potential significant effects which may be relative to the sample size, sample distribution and correlation among the study variables.
2. It mitigates a potential bias in the results towards those banks that performed best in assessment of risks or displayed significantly less engagement to the risk assessment.
3. It satisfies the postulates of the statistical techniques used in this study for data analysis such as normality, linearity and homoscedasticity and reliability.

### 6.3.1.1 Normality

The assumption of normality is a prerequisite for many inferential statistical techniques. According to Levine et al. (2005), there are a number of different ways to explore this assumption graphically, for instance, shape of histogram, stem-and-leaf plot, box plot, etc., and to provide information about the variable and frequency of cases' distribution, and the distribution of scores (i.e. a number of cases that fall into a particular interval). Therefore, to determine whether a distribution is normal, the median value should be positioned in the centre of the shape or the cases should fall more or less in a straight line in the case of normal probability plots. In this study, normality tests indicated that the majority of study variables were normally distributed.

More often, distributions are skewed and display varying degrees of kurtosis. However, when skewness and kurtosis are extreme, transformation of the variable is an option (Myers & Well 2003). Transformation of variables—called computing in SPSS—is used to obtain composite scores for items in one scale. In this study, few variables are transformed to be normally distributed, and missing values also have been computed to avoid the problem of missing observations. Therefore, all missing values replaced with estimates were computed with a common method—the mean of the item distribution<sup>79</sup>.

### 6.3.1.2 Linearity and Homoscedasticity

Newbold, Carlson and Thorne (2003) defined linearity, and advocated that the relationship between the two variables must be linear. Homoscedasticity typically means the variability in scores for one variable is roughly the same as all values of the other variable. Coakes and Steed (2005) argued that homoscedasticity is concerned with how the scores cluster uniformly on the regression line. However, when statistically considered, linearity and homoscedasticity describe the relationships between variables. Because the tendency to inconsistency cluster around the regression line is not marked in this study analysis, the researcher is able to say that the assumption of linearity and homoscedasticity are not violated<sup>80</sup>.

## 6.3.2 Reliability Test

Reliability can be assessed by a number of different coefficients. However, one of the most commonly used is Cronbach's Alpha, which is based on the average correlation of

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<sup>79</sup> There are several methods to compute missing values or observations; see, Raaijmakers, QAW 1999, 'Effectiveness of different missing data treatments in surveys with Likert-type data: Introducing the relative mean substitution approach', *Educational and Psychological Measurement*, vol. 59, no. 5, p. 725.

<sup>80</sup> This correlation may be performed between dichotomous or categorical variables (Phi coefficient) or between a continuous and a categorical variable (Point-biserial correlation). The second case is concerned in this study. For more information see, Coakes, SJ & Steed, LG 2003, *SPSS analysis without anguish: Version 13.0 for windows*, John Wiley, Sydney. Page 64)

items within a test if the items are standardised<sup>81</sup> (Rourke & Anderson 2004). Cronbach's Alpha is typically employed in this study because it can be interpreted as a correlation coefficient, plus it ranges in value from 0 to 1. Thus, a reliability test for the study variables is performed in following three areas.

### 6.3.2.1 Risk Portfolio Variables

Literature in this field showed that a higher Cronbach's Alpha coefficient indicates higher reliability statistically (Kinneer & Gray 2008). According to Table 6.1, Cronbach's Alpha coefficient output shows that the correlation among the items in such risk portfolio variables was significantly correlated with range 0.63, 0.59 as lowest coefficients, and 0.87, 0.91 as highest coefficients in both CB and IB samples respectively. This means that the overall measurement of the items scale indicates the reliability level of the data after removing items that showed the lowest correlation coefficient. Thus, deletion of these items is a technique that has been used for improving the overall reliability coefficient in this study.

In contrast, examining the characteristics of a scale requires considering each item individually—the overall scale and the relationship between the individual items and the overall scale.

**Table 6.1: Risk Portfolio Variables**

Variables	Conventional Banks				Islamic banks			
	Reliability Statistics		Scale Statistics		Reliability Statistics		Scale Statistics	
	N of Items	Cronbach's Alpha	Mean	Std. Deviation	N of Items	Cronbach's Alpha	Mean	Std. Deviation
<b>A. Risks Portfolio</b>								
Risks Profile	5	.78	17.68	3.839	5	.80	17.64	4.228
Transaction Risks	5	.70	10.50	3.112	5	.73	10.47	2.938
Business Risks	4	.76	7.03	2.505	3	.74	5.17	1.730
Treasury Risks	4	.77	6.31	2.490	3	.59	4.39	1.356
Governance Risks	6	.64	11.00	3.152	3	.65	5.01	1.774
Systematic Risks	4	.83	7.95	2.740	4	.76	7.66	2.193
Risk Visibility	5	.83	12.15	3.860	5	.91	12.72	4.456
IR&S Model	4	.63	8.98	2.876	3	.74	6.78	2.564
VaR Model	5	.70	11.54	2.776	4	.70	8.36	1.877
AP&B Model	4	.87	10.94	3.805	4	.80	10.51	3.276
Risk Models in Practice	5	.84	5.43	1.101	5	.91	5.48	1.251

Note: IR&S: Internal rats and Scoring Model. VaR: Value at Risk Model. AP&B: Asset Pricing and Beta Model

### 6.3.2.2 Lending Portfolio Variables

An examination of the lending portfolio items in Table 6.2 indicates that the reliability coefficient of overall scale is mostly above the acceptable level (Cronbach's Alpha 0.50).

<sup>81</sup> A researcher should consider that if the items is not standardised, Cronbach's Alpha is based on the average covariance among the items

**Table 6.2: Lending Portfolio Variables**

Variables	Conventional Banks				Islamic banks			
	Reliability Statistics		Scale Statistics		Reliability Statistics		Scale Statistics	
	N of Items	Cronbach's Alpha	Mean	Std. Deviation	N of Items	Cronbach's Alpha	Mean	Std. Deviation
<b>B. Lending Portfolio</b>								
Portfolio Diversification	4	.58	8.05	2.283	3	.52	6.33	2.019
Lending Profile	6	.48	21.98	4.975	4	.86	18.16	5.993
Portfolio Management	6	.70	23.85	3.859	5	.61	20.60	3.039
Portfolio Quality Control	6	.77	10.22	2.821	5	.52	9.33	2.254

However, the reliability coefficient of lending profile items in the CB sample was 0.48, which, although lower than 0.50, still shows significant correlation. In contrast, the overall reliability coefficient for the same variable was significantly higher in the IB sample, 0.86, with consistency of four items only. In general, those alpha coefficients were significant enough to support the reliability test.

### 6.3.2.3 Rational Decision-making Variables

As noted from Table 6.3, the number of items varies between both samples and that indicates the items to be excluded in seeking improvement in the model. Typically, Table 6.3 indicates that the overall reliability coefficient of rationalising decision making variables were mostly above the acceptable level in both samples, except for lending decision when considering lending portfolio characteristics and, at almost 0.47, is substantially lower than 0.50 (acceptable level) but still considerably correlated. Thus, inspection of the Cronbach's Alpha coefficient column reveals that deletion of some items increase the reliability margin in both samples.

**Table 6.3: Rational Decision-making Variables**

Variables	Conventional Banks				Islamic banks			
	Reliability Statistics		Scale Statistics		Reliability Statistics		Scale Statistics	
	N of Items	Cronbach's Alpha	Mean	Std. Deviation	N of Items	Cronbach's Alpha	Mean	Std. Deviation
<b>C. Rational Decision Masking</b>								
Loan Allocation	9	.79	16.23	4.388	12	.73	23.51	5.676
Consider Risks Portfolio*	8	.85	32.75	4.707	5	.61	21.29	2.234
Consider Lending Portfolio	5	.57	11.71	2.456	3	.47	6.72	1.960
Decision Makers Focus	4	.78	7.82	2.780	6	.77	12.20	3.594

## 6.3.3 Principal Component Analysis

### 6.3.3.1 Preliminary Tests

This analysis determines the appropriateness of the factor analytic mode. Therefore, 'the Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy are both tests that can be used to determine the factorability of the matrix as a whole. Accordingly, if the Bartlett's Test of sphericity is large and significant, and if the Kaiser-Meyer-Olkin measure is greater than 0.50, then factorability is assumed' (Field

2005, p. 561). Additionally, Field (2005) indicates that the anti-image correlation matrix can also be used to assess the sampling adequacy of each variable<sup>82</sup>. Factor analysis preliminary test is performed by considering variables relevant to three areas: risk portfolio, lending portfolio and rational decision making. This test is presented as follows:

### 6.3.3.1.1 Risks Portfolio

It can be seen from Table 6.4 that the Bartlett's test of sphericity for such variables in both samples is significant and the Kaiser-Meyer-Olkin measure of sampling adequacy is mostly arranged above the acceptable level 0.50, and this indicates the sampling accuracy for factoring models. In contrast, the KMO test also shows that variables such as internal rating model (IR&S model) 0.49, and value at risk model (VaR model) 0.46 in the CB sample were under the acceptable level of sampling adequacy, which indicates the sample's unwillingness to present a good factoring model for these variables. However, in terms of validity, Cronbach's Alpha coefficients of these variables were highly correlated (0.628 and 0.703 respectively). In this regard, risks portfolio variables in both IB and CB samples are adequate for applying parametric tests such as factor analysis, and adequate results might be expected.

**Table 6.4: Risk Portfolio Factors Accuracy**

Variables	Conventional Banks				Islamic Banks			
	Sampling Adequacy	Bartlett's Test of Sphericity			Sampling Adequacy	Bartlett's Test of Sphericity		
		Approx. Chi-Square	df	Sig.		Approx. Chi-Square	df	Sig.
<b>A. Risks Portfolio</b>								
Risks Profile	.79	149.62	10.00	.000	.70	139.08	10.00	.000
Transaction Risks	.75	95.49	15.00	.000	.75	117.32	10.00	.000
Business Risks	.66	74.92	6.00	.000	.64	62.17	6.00	.000
Treasury Risks	.73	84.96	6.00	.000	.53	35.96	6.00	.000
Governance Risks	.54	89.58	15.00	.000	.52	93.48	15.00	.000
Systematic Risks	.73	143.35	10.00	.000	.67	37.06	10.00	.000
Risk Visibility	.71	141.46	6.00	.000	.73	281.11	10.00	.000
IR&S Model	.49	63.02	6.00	.000	.67	57.20	3.00	.000
VaR Model	.46	45.91	10.00	.000	.54	40.99	6.00	.000
AP&B Model	.76	180.06	6.00	.000	.65	98.55	6.00	.000
Risk Models in Prectice	.65	315.85	10.00	.000	.70	414.94	10.00	.000

*Note:* IR&S: Internal rats and Scoring Model. VaR: Value at Risk Model. AP&B: Asset Pricing and Beta Model. Kaiser-Meyer-Olkin (KMO) used to test the sampling adequacy which statistically at least must be equal or more than 0.50.

### 6.3.3.1.2 Lending Portfolio

Table 6.5 indicates that the factoring model is fairly appropriate for lending portfolio variables. However, in the IB sample, by considering the portfolio quality control variable of 0.47, factoring analysis seems fairly adequate to account for all items used for

<sup>82</sup> The measures of sampling adequacy are displayed on the diagonal of the anti-image correlation matrix. Therefore, variables with a measure of sampling accuracy that fall below the acceptable level (0.50) should be excluded from the analysis.

measuring lending portfolio risks. Table 6.5 also indicates that coefficients of the Bartlett's test of sphericity appeared highly significant for the different variables.

**Table 6.5: Lending Portfolio Factors Accuracy**

Variables	Conventional Banks				Islamic Banks			
	Sampling Adequacy	Bartlett's Test of Sphericity			Sampling Adequacy	Bartlett's Test of Sphericity		
		Approx. Chi-Square	df	Sig.		Approx. Chi-Square	df	Sig.
<b>B. Lending Portfolio</b>								
Portfolio Diversification	.54	19.38	3.00	.000	.55	12.45	3.00	.006
Lending Profile	.53	39.60	15.00	.001	.54	46.30	10.00	.000
Portfolio Management	.76	94.34	15.00	.000	.53	56.35	15.00	.000
Portfolio Quality Control	.70	138.08	28.00	.000	.47	39.70	15.00	.001

*Kaiser-Meyer-Olkin (KMO) used to test the sampling adequacy which statistically at least must be equal or more than 0.50.*

### 6.3.3.1.3 Rational Decision-making

Table 6.6 indicates that KMO coefficients of the rational decision-making variables were mostly high correlated, and above 0.50. In addition, Table 6.6 shows the coefficient of the lending authorisation with considering lending portfolio issues was smallest at 0.48, but still significant. However, the Bartlett's test of sphericity coefficient was significant and followed a similar pattern in both CB and IB samples. Thus, this means these coefficients were significant enough to support the sampling adequacy. In brief, all variables used in this study have been tested to explore their validity in terms of conducting component factor analysis. Therefore, the above discussion indicates that the sampling adequacy for nearly all variables in both banks' samples has been assumed, and it is appropriate to proceed with factor analysis.

**Table 6.6: Rational Decision-making Factors Accuracy**

Variables	Conventional Banks				Islamic Banks			
	Sampling Adequacy	Bartlett's Test of Sphericity			Sampling Adequacy	Bartlett's Test of Sphericity		
		Approx. Chi-Square	df	Sig.		Approx. Chi-Square	df	Sig.
<b>C. Rational Decision Making</b>								
Loan Allocation	.73	177.57	36.00	.000	.59	195.74	66.00	.000
Consider Risks Portfolio*	.76	161.26	21.00	.000	.50	48.00	21.00	.001
Consider Lending Portfolio	.48	64.04	36.00	.003	.54	20.96	15.00	.138
Decision Makers Focus	.75	76.75	6.00	.000	.73	115.62	15.00	.000

*Kaiser-Meyer-Olkin (KMO) used to test the sampling adequacy which statistically at least must be equal or more than 0.50.*

### 6.3.3.2 Confirmatory Tests

To complete testing processes of the factor model, a technical transformation from exploratory to confirmatory analysis was conducted. Factor analysis is assumed to represent an underlying or latent variable, in terms of which correlations in 'R-matrix are accounted for', both mathematically and theoretically (Coakes & Steed 2003; Field 2005). The number of factors, therefore, to be interpreted largely depends on the underlying purpose of the analysis. This means variables with low squared multiple correlation with all other variables, and low correlations with important factors—outliers

among the variables—were removed from this study analysis. In this study, the purpose was to make the pattern of loadings easier to interpret risk portfolio variables, therefore, the factors are rotated to maximise the loadings of the variables on some of the factors, reduce them on others, and to achieve a simple structure in general. Consequently, the most common method of rotation is *varimax*, which maintains independence among the mathematical factors (Coakes & Steed 2005).

### 6.3.3.2.1 Profile of Risk Portfolio Factors

Table 6.7 discusses the number of factors that have been extracted with use of principal component method. The table shows also the underlying variables that will be used for further explanations in this study. As seen from Table 6.7, the pattern of loading the variables varies within both CB and IB samples. Therefore, some differences have been noted in terms of number of factors and the name of these factors. For example, transaction risk classification was loaded into two factors in CB, whilst it was loaded into one factor in IB. Thus, as literature in the finance field suggests (Bashir 2000; Cowling & Clay 1994; Crook, Edelman & Thomas 2007), there are some difficulties in risk assessment, but the factor technique offers reasonable pattern and has been utilised into this analysis which made the interpretation less difficult.

**Table 6.7: Risk Portfolio Factors Extracted**

Variables	Conventional Banks		Islamic Banks	
	N of factors	Factor's Name	N of factors	Factor's Name
Risk Profile	1	Internal & External Risks	1	Internal & External Risks
Transaction Risks	2	Applicable TR Less-applicable TR	1	Applicable TR
Business Risks	1	Applicable BR	1	Applicable BR
Treasury Risks	1	Applicable TyR	1	Applicable TyR
Governance Risks	2	Applicable GR Less-applicable GR	2	Applicable GR Less-applicable GR
Systematic Risks	1	Applicable SR	1	Applicable SR
Risks Visibility	1	Internal & External Risk Visibility	1	Internal & External Risk Visibility
IR&S Model	2	Appropriate IR&S Model Less-appropriate IR&S Model	1	Appropriate IR&S Model
VaR Model	2	Appropriate VaR Model Less-appropriate VaR Model	1	Appropriate VaR Model
AP&B Model	1	Appropriate IR&S model	1	Appropriate IR&S Model
Risk Models in Practice	2	Available Special Model Unavailable Special Model	1	Available Special Model

**Note:** TR: Transaction Risks. GR: Governance Risks. TyR: treasury Risks. SR: Systematic Risks. IR&S: Internal rats and Scoring Model. VaR: Value at Risk Model. AP&B: Asset Pricing and Beta Model. Extraction method: principal component analysis. Components of each factor are presented in Appendix J.

### 6.3.3.2.2 Profile of Lending Portfolio Factors

Table 6.8 presents the lending portfolio factors that have been extracted in such variables. As indicated in this table, new factors—loading factors—in CBs and IBs become easier

to interpret, taking the study design and objectives into account. Studies by Dhumale and Sapcanin (2003), El-Hawary, Grais and Iqbal (2004), Elsas (2005), and Glennon and Nigro (2005) assisted the researcher to elaborate the extracted factors. Thus, in terms of validity, the interpretation of lending portfolio factors will be principally supported with relevant context and literature, and matched to the wide applications in the finance field.

**Table 6.8: Lending Portfolio Factors Extracted**

Variables	Conventional Banks		Islamic Banks	
	N of factors	Factor's Name	N of factors	Factor's Name
Portfolio Diversification	1	Portfolio Diversification	1	Portfolio Diversification
Lending Profile	2	Direct Lend Indirect Lend	2	Direct Lend Indirect Lend
Portfolio Management	1	Lending Productivity & Performance	2	Lending Productivity Lending Performance
Portfolio Quality Control	2	Lending Efficiency Capital Adequacy	2	Lending Efficiency Capital Adequacy

**Note:** Extraction method: principal component analysis.  
Components of such factor are presented in Appendix J.

### 6.3.3.2.3 Profile of Rational Decision-making Factors

Table 6.9 indicates that the rational decision making variables in CB sample have been differently extracted and loaded from the IB sample. However, factor analysis usage offered some similarities of loading rationalising decision making factors which, in turn, made the discussion much clearer and relevant to interpreting these factors.

**Table 6.9: Rational Decision-making Factors Extracted**

Variables	Conventional Banks		Islamic Banks	
	N of factors	Factor's Name	N of factors	Factor's Name
Loan Allocation	3	Characters Considerations External Considerations Internal Considerations	4	Characters Considerations External Considerations Internal Considerations Religious Affiliation
Consider Risks Portfolio	2	Information Asymmetry Risk Exposure Control	3	Information Asymmetry Risk Exposure Control Lending discipline
Consider Lending Portfolio	4	Borrowers Considerations Shareholders & Investors Considerations Lenders Considerations Location Consideration	2	Lenders Considerations <i>Shari`a</i> Considerations
Decision Makers Focus	1	Lending Decision-makers Focus	1	Lending Decision-makers Focus

**Note:** Extraction method: principal component analysis.  
Components of such factor are presented in Appendix J.

## 6.4 Discussion and Overall Results

### 6.4.1 Highlights of Banks' and Participants' Characteristics

Tests across the sample were undertaken to identify significant differences between the two independent samples. Specifically, the t-test was used to test association in two-way contingency data (Newbold, Carlson & Thorne 2003). Pearson correlation coefficient was used to measure association between the variables in this study. Table 6.10 shows whether the characteristics of the respondents of the two groups vary in the corresponding survey. Therefore, the two banking groups were found to be similar in terms of respondents' age ( $p = 0.336 > 0.05$ ,  $t = -0.964$ ), education ( $p = 0.819 > 0.05$ ,  $t = -0.230$ ), and period of experiences ( $p = 0.456 > 0.05$ ,  $t = -0.748$ ) in the finance field.

**Table 6.10: Respondent Characteristics**

feature	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Participants Age	.003	.958	.964	157	.336	.09	.095
Participants Qualification Level	.029	.866	-.230	157	.819	-.03	.125
Job Experience	4.210	.042	-.748	157	.456	-.09	.115
Decision-making Participation	2.726	.101	-1.622	157	.107	-.22	.137

Note: The equality of variance between the means of two samples not assumed if F value is significant ( $< 0.05$ ), and it is assumed if F value is not significant ( $> 0.05$ ).

At this point, it appeared that, irrespective of the banking system, the respondents' responses are fairly similar, suggesting that any potential differences are not likely to be due to respondent characteristics. The respondents from both CBs and IBs indicated that they have a similar pattern of involvement in decision-making in their institutions. From Table 6.10 it can be seen that the test results showed an insignificant difference between both banking systems in terms of decision-making participation ( $p = 0.107 > 0.05$ ,  $t = -1.622$ ).

**Table 6.11: Banking Lending Activities**

feature	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
No of Successful Loans	3.042	.083	-3.324	157	.001	-7.64	2.298
No of Unsuccessful Loans	.315	.576	-1.218	157	.225	-.96	.788
No of Applications Approved (Good + Poor Loans)	2.742	.100	-3.011	157	.003	-8.56	2.842
No of Applications Unapproved	.352	.554	-2.591	157	.010	-7.36	2.841

Note: The equality of variance between the means of two samples not assumed if F value is significant ( $< 0.05$ ), and it is assumed if F value is not significant ( $> 0.05$ ).

Table 6.11 indicates that the number of loan applications approved by both CBs and IBs—good loans and bad loans—are significantly different ( $p = 0.003 < 0.01$ ,  $t = -3.324$ ). Also,



there is a considerable difference between these banking systems in terms of unapproved loan applications ( $p=0.010<0.05$ ,  $t = -2.591$ ). However, the number of applications approved and classified with 'bad loans' is almost similar. This suggests that the Islamic banking and conventional banking systems work with different capacity and mostly refers to the system obligations and boundaries of their activities (Zaman & Movassaghi 2002) This finding is supported by Zaher and Hassan (2001) who found that there has been large-scale growth in Islamic finance and banking in Muslim countries and around the world during the last twenty years. However, a complete Islamic financial system, with its identifiable instruments and markets, is still very much at an early stage of evolution. In addition, many problems and challenges relating to Islamic instruments, financial markets, and regulations need be addressed and resolved.

Typically, Table 6.12 shows that there were some significance differences between IBs and CBs in terms of banks' obligations, especially in *shari`a* compliant banks ( $p=0.000<0.01$ ,  $t =54.610$ ) and social and financial development in the way of *shari`a* teaching ( $p=0.000<0.01$ ,  $t =54.610$ ) aspects. Therefore, El-Gamal (2006) believes that regulations and prohibitions of interest payments (*rib`a*) impose some additional restrictions on the IBs—non-interest-based—which, in turn, affects their lending performance.

**Table 6.12: Banks' Obligations**

feather	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Religious affiliation	.054	.817	54.610	157	.000	.97	.018
Customer needs & satisfaction	6.181	.014	1.258	146.686	.210	.04	.034
securing clients' assets	.288	.592	.268	157	.789	.01	.028
Corporate governance	.288	.592	.268	157	.789	.01	.028
Social & financial development in the way of shari`a teaching	.054	.817	54.610	157	.000	.98	.018

Note: The equality of variance between the means of two samples not assumed if *F* value is significant ( $<0.05$ ), and it is assumed if *F* value is not significant ( $>0.05$ ).

Table 6.13 compares the size of IBs and CBs and shows that no significant difference exists between both banking systems ( $p=0.443>0.01$ ,  $t=0.769$ ). Therefore, the size of IBs is relatively similar to the size of CBs in terms of total assets. Likewise, this result is consistent with findings of a study in Iran and Pakistan by Khan and Mirakhor (1990) which showed that more than 45% of the financial industry institutions in these countries have attempted to establish Islamic finance institutions side-by-side with traditional institutions.

**Table 6.13: Banking Size**

feather	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Banks Size' total assets	.122	.727	-.769	157	.443	-.10	.134

Note: The equality of variance between the means of two samples not assumed if *F* value is significant ( $<0.05$ ), and it is assumed if *F* value is not significant ( $>0.05$ ).

However, in terms of competition, (Casu, Girardone & Molyneux 2006) found that banks reformed themselves in order to be competitive in global activities or services. With the compression of both banking systems, they also found the growth rate of IBs has outpaced the CBs in Islamic countries. Accordingly, this study's results reveal that no considerable difference was found in the proportion of unsuccessful granted loans between IB and CB systems ( $p = 0.223 > 0.05$ ,  $t = -1.218$ )—see Table 6.11.

Table 6.14 tests the reference of activities that have been conducted by both banking systems. Therefore, activities such as investment banking ( $p = 0.045 < 0.05$ ,  $t = 2.036$ ) and some other activities<sup>83</sup> ( $p = 0.050 < 0.50$ ,  $t = 1.970$ ) seem to be considerably different, which explains the variety of banking transaction instruments and the pattern of dealing with them in such banking systems. Furthermore, Table 6.14 also highlights that in recent times both IBs and CBs have similarly experienced substantially different activities. These findings are consistent with Archer and Karim (2002) who found that there is notable convergence of Islamic finance to conventional positions, both in business and academia. The results also support the findings of Wilson et al. (1999), who examined the 'current' position of financing by various sectors in the UK, and refers to the variations between CBs and IBs and the banks' size and experiences, but not the volume of activities that have been conducted.

**Table 6.14: Banks' Activities**

feature	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Loans granting	.054	.817	-.116	157	.908	-.00	.018
Deposits accepting	.775	.380	.439	157	.661	.01	.022
Retirement products	8.967	.003	1.541	155	.125	.12	.076
Insurance securities	13.079	.000	-1.737	132	.085	-.11	.058
Investment banking	15.544	.000	2.036	85	.045	.05	.022
Others	17.257	.000	1.970	128	.050	.11	.057

Note: The equality of variance between the means of two samples not assumed if  $F$  value is significant ( $< 0.05$ ), and it is assumed if  $F$  value is not significant ( $> 0.05$ ).

In terms of banking category, Table 6.15 documents the models of banking systems the banks have engaged in (e.g. local/international or public/private). Of major note from this table is the required adoption by both banking systems of the universal banking model. However, the trend towards universality has been explained by Casu, Girardone and Molyneux (2006, p. 53) as follows:

1. To extend the scope of economies by additionally offering cross-selling opportunities for the banks.
2. To meet banks' obligations as a result of converting into 'full services' financial institutions.
3. To minimise risks exposure (risk diversification).

Table 6.15 highlights that the public banks category is somewhat different ( $p = 0.093 < 0.10$ ,  $t = -1.689$ ). The ideology behind this is that, mostly, IBs operate with an additional body such as a *shari`a* board and, therefore, their organisational structure cannot be fully corporate—as is the case in non-Islamic microfinance institutions.

<sup>83</sup> For example, IBs provide indirect loans for social reasons such as commodities transaction—*Mukayadah*—and engagement of finance insurance securities ( $p = 0.085 < 0.10$ ,  $t = -1.737$ )

**Table 6.15: Banks' Categories**

feather	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Local	11.184	.001	-1.644	156	.102	-.10	.059
Private	8.121	.005	1.371	130	.173	.07	.049
International	10.007	.002	-1.565	154	.120	-.08	.051
Public	11.673	.001	-1.689	152	.093	-.08	.049

Note: The equality of variance between the means of two samples not assumed if *F* value is significant (<0.05), and it is assumed if *F* value is not significant (>0.05).

As mentioned previously in section 6.2.2, the hypotheses 1 and 2 for this research are discussed in light of the survey findings. Hypotheses 1 and 2—*H1* (*H1a*, *H1b* and *H1c*) and *H2* (*H2a*, *H2b* and *H2c*)—are tested and discussed in the following two main parts. Each part is outlined in a sense of the first and second research questions, and provides analysis of the three sub-hypothesis using independent samples *t*-test, Pearson correlation coefficients and regression. The independent samples *t*-test was used to test the differentiation among the risk factors between both CB and IB systems. Pearson correlation coefficients and regression were used to indicate risk factors and rational lending decision relationships. The analysis has been provided as follows.

## 6.4.2 Comparative Risk Assessment Mechanism between IB and CB

### 6.4.2.1 Are Risk Factor Schemes in IB and CB the Same? (*H1a*)

Table 6.16 shows percentages of applicable rate of credit (grading) risk; products tenor plan risk; mark-up risk; foreign exchange risk; balance sheet risk; and single name/single transaction risk to transaction risks factor in CBs and IBs. In general, the respondents from CBs and IBs have mostly followed the same pattern to appoint, following risks applicability in terms of transaction risks factor.

**Table 6.16: Percentage of Transaction Risks Classification**

feather		Very Applicable %	Applicable %	Neutral %	Inapplicable %	Very Inapplicable %
Credit risk ( grading risk)	CB	70.9	24.4	2.3	2.3	0.00
	IB	54.8	35.6	9.6	0.00	0.00
Products tenor plan risk	CB	33.7	33.7	24.4	7.0	1.2
	IB	20.5	52.1	19.2	8.2	0.00
Mark-up risk	CB	38.4	41.9	15.1	4.7	0.00
	IB	37.0	56.2	6.8	0.00	0.00
Foreign exchange risk	CB	58.1	27.9	9.3	2.3	2.3
	IB	43.8	46.6	9.6	0.00	0.00
Balance sheet risk	CB	24.4	37.2	31.4	4.7	2.3
	IB	21.9	46.6	26.0	5.5	0.00
Single name single transaction risk	CB	17.4	22.1	36.0	18.6	5.8
	IB	17.8	16.4	34.2	26.0	5.5

As can be seen, the respondents from the CBs have indicated that credit risk is very applicable at 70.9%, contrasting to IB participants who believe that foreign exchange risk is very applicable at 58.1%. Additionally, Table 6.16 shows also that the majority of respondents' choices appeared in the range of very applicable and applicable in both banking systems. However, single name and single transaction risk seems moderate—neutral—in IB respondents' view.

Table 6.17 shows that trading activity risk; displaced commercial risk; withdrawal risk; and solvency risk are mostly applicable to the business risks factor in both banking systems. It seems also the applicable rate of these risks to business risks factor is a common factor. In contrast, very few participants from CBs have indicated these risks are not applicable to the business risks factor. This means 2.3%, consisting of the minority choice and it is neglected in the discussion.

**Table 6.17: Percentage of Business Risks Classification**

feather		Very Applicable %	Applicable %	Neutral %	Inapplicable %	Very Inapplicable %
Trading activity risk	CB	36.0	47.7	12.8	3.5	0.00
	IB	31.5	56.2	12.3	0.00	0.00
Displaced commercial risk	CB	43.0	37.2	18.6	1.2	0.00
	IB	31.5	53.4	15.1	0.00	0.00
Withdrawal risk	CB	45.3	39.5	7.0	5.8	2.3
	IB	43.8	46.6	9.6	0.00	0.00
Solvency risk	CB	47.7	41.9	3.5	7.0	0.00
	IB	42.5	50.7	6.8	0.00	0.00

Table 6.18 contains the percentages of governance risks classification held by the respondents from both CB and IB systems. Typically, participants from both banking systems indicated that event, natural disaster risk and business environment risk are less applicable to the governance risks factor than transparency risk, legal risk, operational risk and fiduciary risk. However, a small number of participants—mostly from CBs rather than IBs—regarded these risks as inapplicable to this risk factor.

**Table 6.18: Percentage of Governance Risks Classification**

feather		Very Applicable %	Applicable %	Neutral %	Inapplicable %	Very Inapplicable %
Fiduciary risk	CB	48.8	33.7	16.3	1.2	0.00
	IB	39.7	38.4	21.9	0.00	0.00
Transparency risk	CB	53.5	31.4	11.6	3.5	0.00
	IB	46.6	42.5	11.0	0.00	0.00
Legal risk	CB	67.4	20.9	9.3	2.3	0.00
	IB	58.9	31.5	9.6	0.00	0.00
Operational risk	CB	52.3	30.2	15.1	2.3	0.00
	IB	50.7	39.7	9.6	0.00	0.00
Event, natural disaster risk	CB	26.7	33.7	31.4	8.1	0.00
	IB	13.7	37.0	35.6	13.7	0.00
Business environment risk	CB	31.4	32.6	26.7	4.6	4.7
	IB	19.2	46.6	27.4	6.8	0.00

However, Table 6.19 demonstrates that credit skill and training risk, asset/liability management (ALM) risk, liquidity and hedging risk were regarded as highly applicable to treasury risks factor by participants from both CB and IB systems, thereby that aspect of liquidity risk is almost the highest in both systems (67.4% in CB and 65.8% in IB). Accordingly, Table 6.19 shows also negligible choices in inapplicable and very inapplicable columns.

**Table 6.19: Percentage of Treasury Risks Classification**

feather		Very Applicable %	Applicable %	Neutral %	Inapplicable %	Very Inapplicable %
Credit skill and training risk	CB	46.5	36.0	11.6	4.7	1.2
	IB	39.7	50.7	9.6	0.00	0.00
Asset & liability management risk (ALM)	CB	65.1	26.7	4.7	2.3	1.2
	IB	65.8	34.2	0.00	0.00	0.00
Liquidity risk	CB	67.4	24.4	4.7	1.2	2.3
	IB	65.8	27.4	6.8	0.00	0.00
Hedging risk	CB	46.5	33.7	14.0	5.8	0.00
	IB	52.1	38.4	9.6	0.00	0.00

Table 6.20 shows that the respondents from CBs and IB believe shifts in regulation (regulatory) risk, technology/systems exposure risk, payment/settlement risk, institutional risk and fraud/compliance risk were mostly applicable to systemic risk factors. However, a possible reason for moderating institutional risk in IBs, 35.6%, is that the IB system still operates without an organisational body to take the responsibility for act regulations that might be necessary to this industry. A study by Kuran (2004) found that Muslim rulers made no attempt to supply a corporate form of organization themselves, because they saw no commercial or financial benefits and the findings by these researchers support this study. Therefore, the absence of Islamic reserve banks, unlike conventional reserve banks, results in a lack of awareness by IBs about this risk.

**Table 6.20: Percentage of Systemic Risks Classification**

feather		Very Applicable %	Applicable %	Neutral %	Inapplicable %	Very Inapplicable %
Fraud/ compliance risk	CB	38.4	43.0	15.1	3.5	0.00
	IB	23.3	34.2	8.2	11.0	23.3
Technology/systems exposure	CB	34.9	44.2	18.6	2.3	0.00
	IB	20.5	35.6	28.8	15.1	0.00
Payment/settlement risk	CB	27.9	45.3	23.3	3.5	0.00
	IB	19.2	34.2	21.9	24.7	0.00
Institutional risk	CB	30.2	44.2	22.1	3.5	0.00
	IB	17.8	37.0	35.6	9.6	0.00
Shift in regulation (regulatory risk )	CB	30.2	46.5	12.8	9.3	1.2
	IB	20.5	50.7	13.7	15.1	0.00

As discussed above, risks are classified differently in CB and IB systems. In other words, the conclusion of the variance of risk factor components between CB and IB is that it may be somewhat acceptable. However, even the participants from CB and IB systems attempt to indicate the rate of risks applicability to specific risks factors, and their capability in considering and identifying these factors.

Table 6.21 shows the percentages of CB and IB capability in evaluating such risks factors. In general, Table 6.21 shows that all risks factors are difficult to evaluate, and very difficult in both CB and IB systems. In fact, these results are consistent with a study by Greuning and Brajovic (2003) which strongly indicated that evaluating risks is a contemporary challenge in the entire banking industry. Transaction, business, treasury, governance and systemic risks are used here as a risks factors index to examine whether CBs and IBs deal with risks similarly.

**Table 6.21: Percentage of Internal/External Risks Evaluation**

feather		Very Easy %	Easy %	Neutral %	Difficult %	Very Difficult %
Transaction Risks Factor	CB	7.0	17.4	33.7	18.6	23.3
	IB	13.7	16.4	24.7	21.9	23.3
Business Risks Factor	CB	1.2	8.1	20.9	44.2	25.6
	IB	1.4	9.6	23.3	38.4	27.4
Treasury Risks Factor	CB	1.2	9.3	26.7	43.0	19.8
	IB	0.00	9.6	21.9	46.6	21.9
Governance Risks Factor	CB	0.00	8.1	36.0	34.9	20.9
	IB	0.00	13.7	31.5	34.2	20.5
Systemic Risks Factor	CB	8.1	17.4	36.0	23.3	15.1
	IB	4.1	15.1	35.6	19.2	26.0

Table 6.22 reports on the results of the parametric test for the means of risks factors assessment in CBs and IBs. Independent sample *t*-test results show no significant differences among means for conventional and Islamic banking systems across all risks factors index.

**Table 6.22: T-test for Risk Factors Evaluation**

feather	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	Df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Transaction Risks Evaluation	1.401	.238	-.445	157	.657	-.49	.31
Business Risks Evaluation	.682	.410	-.264	157	.792	-.34	.26
Treasury Risks Evaluation	.480	.489	.680	157	.497	-.19	.39
Governance Risks Evaluation	.697	.405	-.470	157	.639	-.36	.22
Systemic Risks Evaluation	.521	.472	1.539	157	.126	-.07991	.64

Note: The equality of variance between the means of two samples not assumed if *F* value is significant ( $<0.05$ ), and it is assumed if *F* value is not significant ( $>0.05$ ).

As shown in Table 6.22, the *p* values under 0.01 and 0.05 significant levels obtained for all risks factors are not significant, which means the equality of variance between the means of such risk factors has been assumed. As indicated in Table 6.22 (2-tailed), *t*-test values show no evidence that banks with Islamic law perform differently to banks without Islamic law in terms of risks factors assessment. Here the null hypothesis—*H1a*—

—for all factors **cannot be rejected**. Thus, for CB and IB systems, there is no difference in performing risk factors assessment.

Many studies have considered the trend and importance of evaluation risks in different banking areas (Gardner 1997; How, Abdul Karim & Verhoeven 2005; Lehar 2005; Simpson, Evans & De Mello 2002; Uyemura & Van Deventer 1993), but no study has examined the variance evaluation trends between CB and IB systems. Furthermore, for instance, Froot and Stein (1998) found that at bank-level risk management considerations should be a factor in the pricing of those risks that cannot be easily hedged—which means banks attempt to maximise a well-founded concern with risk management.

#### 6.4.2.2 Are Approaches to Measuring Risk Factors between IB and CB the Same? (H1b)

The risks measures were computed in order to determine and examine risks in banks. CB and IB systems engage in different approaches to measure risks. Consequently, banks have developed different risks models and approaches to quantify and measure risk (Jacobson & Roszbach 2003; Lehar 2005; Roy 2005; Saunders & Allen 2002; Thomas 2000; Van Greuning & Brajovic 2003). In this study, three commonly recognised risks models are used in the banking industry (both CB and IB systems) to investigate banks' capability for handling such risk factors, namely:

1. Internal rating and scoring model.
2. Value and risk model.
3. Beta and assets pricing model.

While these models are commonly referred to in the literature, the tracking error and computing difficulty are also considered, which increases the banks' capability to discover risks and determine their exposure on activities. Therefore, Table 6.23 demonstrates that participants from both CBs and IBs consider an internal rating and scoring model as very appropriate to measure transaction risk factor—55.8% and 39.7% respectively. From CB respondents, 41.9% give the model high appropriate value to measure business risks factor; atypical, 38.4% of IB respondents consider this model to be appropriate. Table 6.23 also shows that the model is almost moderate in measuring treasury risks factors (CB=31.4%, IB=43.8%) and governance risks factors (CB=36.0%, IB=31.5%) in both banking systems.

**Table 6.23: Percentage of Internal Rating / Scoring Model Application**

feather		Very	Appropriate	Uncertain	Inappropriate	Very
		Appropriate	%	%	%	Inappropriate
Transaction Risks	CB	55.8	25.6	14.0	4.7	0.00
	IB	39.7	23.3	13.7	17.8	5.5
Business Risks	CB	41.9	29.1	24.4	4.7	0.00
	IB	26.0	38.4	31.5	4.1	0.00
Treasury Risks	CB	12.8	37.2	31.4	15.1	3.5
	IB	8.2	41.1	43.8	6.8	0.00
Governance Risks	CB	15.1	25.6	36.0	16.3	7.0
	IB	13.7	19.2	31.5	15.1	20.5
Systemic Risks	CB	9.3	7.0	22.1	36.0	25.6
	IB	21.9	16.4	20.5	27.4	13.7

However, according to respondents in both CB and IB systems, this model may not be suitable to measure systemic risks factor. CB and IB participants followed the same pattern in terms of suitability of applying value and risks—VaR—model to measure the majority of risks factors. Table 6.24 shows that the VaR model is appropriate to measure transaction and business risks factors: 54.7%, and 57.0% in IB and CB respectively. Similarly, 46.6% of the IB participants indicate the appropriateness of the VaR model to measure transaction and business risks factors. Furthermore, for the CB and IB systems, participants indicate that the VaR model is also appropriate for measuring treasury risk factor (64.0%, 56.2%) and governance risks factor (54.7%, 63.0%). For the systematic risks factors, 36.0% of the CB participants consider the VaR model somewhat inappropriate, in contrast to 53.4% of IB participants who confirm the model's suitability.

**Table 6.24: Percentage of VaR Model Application**

feather		Very Appropriate %	Appropriate %	Uncertain %	Inappropriate %	Very Inappropriate %
Transaction Risks	CB	15.1	54.7	26.7	2.3	1.2
	IB	13.7	46.6	13.7	15.1	11.0
Business Risks	CB	23.3	57.0	18.6	1.2	0.00
	IB	21.9	46.6	13.7	17.8	0.00
Treasury Risks	CB	10.5	64.0	22.1	1.2	2.3
	IB	6.8	56.2	16.4	20.5	0.00
Governance Risks	CB	12.8	54.7	26.7	2.3	3.5
	IB	8.2	63.0	26.0	2.7	0.00
Systemic Risks	CB	7.0	30.2	36.0	15.1	11.6
	IB	8.2	53.4	26.0	12.3	0.00

Table 6.25 shows that using a beta/assets pricing model has been moderated by both CB and IB participants to measure transaction (40.7%, 41.1%), business (46.5%, 46.6%) and treasury (40.7%, 35.6%) risks factors. Implementation of these results indicates developing a beta model and assets pricing model is required to assess risk factors and consolidated risk management techniques.

**Table 6.25: Percentage of Beta & Assets Pricing Model Application**

feather		Very Appropriate %	Appropriate %	Uncertain %	Inappropriate %	Very Inappropriate %
Transaction Risks	CB	14.0	15.1	40.7	22.1	8.1
	IB	9.6	31.5	41.1	17.8	0.00
Business Risks	CB	14.0	15.1	46.5	16.3	8.1
	IB	8.2	30.1	46.6	15.1	0.00
Treasury Risks	CB	11.6	20.9	40.7	17.4	9.3
	IB	12.3	35.6	35.6	16.4	0.00
Governance Risks	CB	23.3	43.0	25.6	3.5	4.7
	IB	24.7	43.8	23.3	8.2	0.00
Systemic Risks	CB	68.6	22.1	2.3	2.3	4.7
	IB	47.9	31.5	20.5	0.00	0.00

Nevertheless, Table 6.25 exhibits that the respondents from both banking systems consider the model is an appropriate one to measure governance risks factors



(CB=43.0%, IB=43.8%) and is highly appropriate for measuring systematic risks factor (CB=68.6%, IB=47.7%). In terms of risks factor assessment, however, both CB and IB systems were rigorously investigated as to whether they apply specific models to measure such risks factors or not.

Table 6.26 exhibits that neither banks with Islamic compliance nor banks without Islamic compliance have applied specific models to measure such articulated risk factors. Even though a small number of the participants selected 'yes', they did not specify which models have been actually used. However, the result is consistent with the findings of Cumming and Hirtle (2005) who reported that, in recent years, financial institutions and their supervisors have placed increased emphasis on the importance of measuring and managing risk on a firm-wide basis as a coordinated process.

**Table 6.26: Percentage of Specific Risks Model Applied**

feather		Yes %	No %
Specific Models Applied for Transaction Risks Measurement	CB	11.6	88.4
	IB	11.0	89.0
Specific Models Applied for Business Risks Measurement	CB	11.6	88.4
	IB	9.6	90.4
Specific Models Applied for Treasury Risks Measurement	CB	4.7	95.3
	IB	9.6	90.4
Specific Models Applied for Governance Risks Measurement	CB	7.0	93.0
	IB	9.6	90.4
Specific Models Applied for Systemic Risks Measurement	CB	12.8	87.2
	IB	11.0	89.0

Therefore, the above discussion indicates that banks are often following a similar pattern in terms of their approach to measuring risk factors. Table 6.27 exhibits the results of *t*-test for measuring risk factors approaches that have been extensively used in CB and IB systems. Principally, no significant difference is found between Islamic-based banks and non Islamic-based banks on the subjects of transaction, business, treasury, governance and systematic risk factors (*p* values are > 0.05 significant level in such risk factors).

**Table 6.27: T-test for Approaches to Measuring Risk Factors**

feather	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	Df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
<b>Specific Models Actually Applied for Measuring</b>							
Transaction Risks	.070	.792	-.132	157	.895	-.11	.09
Business Risks	.685	.409	-.412	157	.681	-.12	.08
Treasury Risks	6.115	.014	1.189	128	.237	-.033	.13
Governance Risks	1.425	.234	.596	157	.552	-.06	.11
Systemic Risks	.501	.480	-.353	157	.725	-.12	.08

Note: The equality of variance between the means of two samples not assumed if *F* value is significant (<0.05), and it is assumed if *F* value is not significant (>0.05).

Thus, the results displayed in Table 6.27 support hypothesis *H1b* and confirm that the incentive of quantifying risk models designed by researchers and practitioners in the finance fields for the agent principals is beneficial to control risk exposure. Therefore, the hypotheses that there is no difference in approaches to risk factors measurement between IB and CB—*H1b*—cannot be rejected.

Although the benefits of this type of risk measurement are widely acknowledged, few—if any—financial firms have fully-developed systems in place today, suggesting that significant obstacles have led them to measure risks in a more segmented fashion. This finding is consistent with the results of a study by Cebenoyan and Strahan (2004) which found that banks that improve their ability to measure risks may operate with greater leverage and may lend more of their assets to risky borrowers.

#### 6.4.2.3 Is Risk Factors Assessment Important for IB and CB? (*H1c*)

Pyle (1997) concluded that recent financial disasters in financial and non-financial organisations and in governmental agencies point to the need for various forms of risk measurement. Further, Lehar (2005) found that banks and other financial institutions need to meet forthcoming regulatory requirements for risk measurement and capital. Typically, all these findings harmonise with the study objectives. However, the set of these risk factors—internal and external—are used here to examine the degree of risk visibility in CB and IB systems. Accordingly, the response to whether CB and IB systems are able to recognise the risk factors that may frequently involve every single act indicates the banks' considerations towards managing and controlling these risk factors.

Table 6.28, therefore, exhibits that CBs and IBs often are able to determine the different types of risk factors.

**Table 6.28: Percentage of Internal/External Risks Visibility**

feather		Always %	Often %	Occasionally %	Rarely %	Never %
Transaction Risks	CB	14.0	38.4	27.9	12.8	7.0
	IB	15.1	24.7	30.1	24.7	5.5
Business Risks	CB	7.0	38.4	37.2	11.6	5.8
	IB	12.3	30.1	28.8	24.7	4.1
Treasury Risks	CB	7.0	46.5	31.4	10.5	4.7
	IB	8.2	35.6	38.4	17.8	0.00
Governance Risks	CB	12.8	41.9	33.7	4.7	7.0
	IB	17.8	35.6	31.5	15.1	0.00
Systemic Risks	CB	32.6	32.6	20.9	10.5	3.5
	IB	26.0	31.5	30.1	12.3	0.00

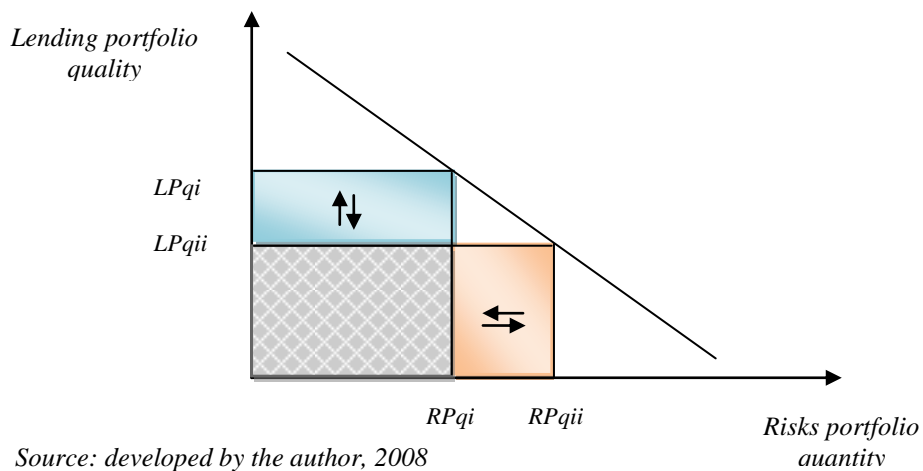
The study survey asked respondents from both CB and IB systems to indicate the relationship between risk factors quality and lending portfolio quality. In the CB system, the results of Table 6.29 show that 77.9% of the respondents consider the relationship between risk factors and lending portfolio is strongly negative and negative (50.0% + 27.9%); conversely, 84.9% of the respondents from the IB system reported that the relationship is strongly negative and negative (46.6% + 38.3%). Certainly, these results may not be similarly applicable for all types of risk factors, but provide general magnitude of the relationship in both banking systems.

**Table 6.29: Percentage of Credit Portfolio Quality and Risks Portfolio Relationship**

feature		Strongly positive %	Positive %	Neutral %	Negative %	Strongly negative %
The Relationship Between Lending Portfolio & Risk Factors Portfolio	CB	0.00	3.5	18.6	27.9	50.0
	IB	0.00	0.00	15.1	38.3	46.6

Generally, there is no universally accepted criterion for establishing the magnitude of a risk factors value necessary to identify the quality of a lending portfolio. However, the quality of lending portfolio—quality control—should be administrated as much as the quantity risks factors. Bansal et al. (1991) investigated how changes in the evaluation strategies supporting these tasks have led to improvements in the control of risks and in the design of products which involve risk factors. Therefore, the theoretical relationship between risk quantity and portfolio quality is depicted in Figure 6.2.

**Figure 6.2: Theoretical Relationship between Risk Quantity and Portfolio Quality**



The following discussion attempts to focus narrowly on the relationship of such risk factors within the lending portfolio quality. Specifically, Table 6.30 shows the summary of the Pearson correlation coefficients which were used to test the linear relations between such risk factors (transaction; business; treasury; governance; and systemic) and the factors of lending portfolio quality that include: 1) lending portfolio diversification; 2) lending types-secured/direct loan; 3) lending types-unsecured/indirect loan; 4) managing risks of lending portfolio-productivity and performance; 5) measuring risks of lending portfolio efficiency; and 6) measuring risks of lending portfolio capital adequacy. The correlation coefficients matrices summarised in Table 6.30 are fully presented in Appendix K.

**Firstly: Transaction Risk Factor**

Table 6.30 exhibits correlation coefficients matrices. Accordingly, the results of correlation coefficient  $r$  show that transaction risk factor in the CB system has been significantly and positively correlated with unsecured loan factor ( $p = 0.007 < 0.01$ ,  $r = -0.288$ ), and fairly positively correlated with lending productivity and performance factor ( $r = 0.158$ ). In contrast, the IB system is different from the CB system, Table 6.30 shows the transaction risk factor and lending portfolio diversification relationship which was somewhat lower and negative ( $r = -0.119$ ), however, there is a significant negative relationship between this risk factor and measuring capital adequacy factor ( $p = 0.011 < 0.05$ ,  $r = -0.298$ ).

**Table 6.30: Summary of Pearson Correlation Coefficients Test - CB & IB**

RP / LP	CB					IB				
	TR	BR	TyR	GR	SR	TR	BR	TyR	GR	SR
LPD	.068	-.139	-.032	.156	.069	-.119	-.139	-.168	-.115	-.102
DLT	-.087	.216***	.154	.213**	.146	.068	.216***	.082	.143	.146
ILT	.288*	.276**	.040	-.076	.070	.097	.276**	.217***	.192	.133
LPerM						.041	.040	.013	-.133	-.118
LProM	.158	.040	.206***	.235**	-.153	-.083	-.137	-.130	-.106	-.239**
LPE	-.031	-.137	-.041	.227**	.237**	.012	-.009	.031	-.009	.112
CA	-.039	-.051	.018	.150	.055	-.298**	-.051	-.038	-.142	.011

**Note:** PC analysis was mainly used to identify underlying factors which, in turn, was the basis for this analysis step. Managing risks of lending portfolio in CB system has been loaded in one factor.

- TR: Transaction Risks. BR: Business Risks. TyR: Treasury Risks. GR: Governance Risks SR: Systemic Risks Factor.
- LPD: Lending Portfolio Diversification Factor. DLT: Lending Types Factor (Direct loan). ILT: Lending Types Factor (Indirect loan). LPerM: Managing Risks of Lending Portfolio Factor (Lending performance). LProM: Managing Risks of Lending Portfolio Factor (Lending productivity). CA: Measuring Risks of Lending Portfolio Factor (Capital Adequacy). LPE: Measuring Risks of Lending Portfolio Factor (lending efficiency).

\*. Correlation is significant at the 0. 01 level (2-tailed), n: CB=86 and IB=73.

\*\* . Correlation is significant at the 0. 05 level (2-tailed), n: CB=86 and IB=73.

\*\*\*. Correlation is significant at the 0. 10 level (2-tailed), n: CB=86 and IB=73.

### **Secondly: Business Risk Factor**

From Table 6.30 it can be seen that only lending productivity and performance management factor correlated significantly and positively with business risk factor in the CB system ( $p = 0.011 < 0.05$ ,  $r = 0.272$ ); conversely, the IB system coefficients present a significant and positive relationship between business risk factor and unsecured loan factor ( $p = 0.018 < 0.05$ ,  $r = 0.267$ ). Furthermore, in the CB system, and as Table 6.30 shows, lending portfolio diversification, secured loan and unsecured loan factors somewhat positively correlated with business risk factor ( $r = 0.183$ ,  $0.205$  and  $0.152$  respectively). In the IB system, however, the business risk factor fairly correlates negatively with lending portfolio diversification and lending productivity factors ( $r = -0.139$  and  $0.1370$  respectively), and fairly correlates positively with the direct loan factor ( $r = 0.216$ ).

### **Thirdly: Treasury Risk Factor**

Table 6.30 also indicates that there is no significant relationship ( $p > 0.05$ ) between treasury risk factor and the lending portfolio quality factor correlation in both banking systems. Typically, in the CB system, secured loan factor, as well as lending productivity and performance factor, positively correlated with the treasury risk factor. Within the IB system, however, indirect loan factor positively correlated with treasury risk factor ( $r = 0.217$ ). Nevertheless, as Table 6.30 indicates, there exists a somewhat negative correlation between this risk factor and lending portfolio diversification factor ( $r = -0.168$ ) and lending productivity factor ( $r = -0.130$ ).

### **Fourthly: Governance Risk Factor**

In regard to this aspect, the relationship between governance risk factor and the quality of lending portfolio factors seems similar in both CB and IB systems, where the correlation

is fairly significant with almost all lending portfolio factors. Therefore, in the CB system, the governance risk factor correlated significantly with secured loan factor ( $p = 0.049 < 0.05$ ,  $r = 0.213$ ), lending productivity and performance factor ( $p = 0.030 < 0.05$ ,  $r = 0.235$ ), and pending efficiency factor ( $p = 0.036 < 0.05$ ,  $r = 0.227$ ). However, lower correlations appeared between this risk factor and capital adequacy factor ( $r = 0.150$ ), and lending portfolio diversification factor ( $r = 0.156$ ). In contrast, the governance risk factor fairly correlated with almost all lending portfolio quality factors in the IB system. This risk factor correlates with lending portfolio diversification factor negatively ( $r = -0.115$ ); direct loan factor positively ( $r = 0.143$ ); indirect loan factor positively ( $r = 0.192$ ); lending performance factor negatively ( $r = -0.133$ ); lending productivity factor negatively ( $r = -0.106$ ); and capital adequacy factor negatively ( $r = -0.142$ ).

### **Finally: Systemic Risk Factor**

From Table 6.30, it can be seen that within the CB system there is a considerable positive relationship between systemic risk factor and lending efficiency measurement factor ( $p = 0.028 < 0.05$ ,  $r = 0.237$ ), and this risk factor fairly correlated with secured loan factor ( $r = 0.146$ ), and lending productivity and performance factor ( $r = -0.153$ ). In contrast, in the IB system, systemic risk factor significantly and negatively correlated with lending productivity factor ( $p = 0.042 < 0.05$ ,  $r = -0.239$ ). Further, a lower negative correlation is found between the systemic risk factor and lending portfolio diversification factor ( $r = -0.102$ ), and lending performance factor ( $r = -0.118$ ); contrasting to direct and indirect lending factors which have been positively correlated to this risk factor ( $r = 0.146$  and  $r = 0.133$ ) respectively.

Overall, the results showed the correlation coefficient at all the significant levels of 0.01, 0.05 and 0.10. However, the conclusions are drawn from test of significant levels of 0.01 and 0.05 only. Discussion above asserts that there are both somewhat positive/negative relationships between risk factors and the quality of lending portfolio factors. These results are consistent with Bansal et al.'s (1991) finding that in both banking systems—CB and IB—regulators are actively formulating strategies to control risk factors, thereby suggesting that although new technologies create significant opportunities to improve global and departmental risk management, the cost function for risk management strategies should be considered. These results also are consistent with the findings of many other researchers who have used the relationship techniques to examine the relations of different orientation in their studies (Abdullah 2003; Batchelor 2005; Jericevic 2002; Podder 2005). Thus, for the CB and IB systems, the results contradict the expectation stated in the null hypothesis—*H1c*—no relationship between risks factors and lending portfolio quality factors, and ***H1c cannot be accepted.***

**Table 6.31: T-test for Lending Portfolio and Risk Factors Portfolio Relationship**

feather	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Lending Portfolio & Risk factors Portfolio Relationship	1.204	.274	-.106	157	.916	-.25	.23

Note: The equality of variance between the means of two samples not assumed if *F* value is significant ( $< 0.05$ ), and it is assumed if *F* value is not significant ( $> 0.05$ ).

To this end, an additional contribution from this study is defining whether CB and IB systems vary in terms of recognising the relationship between risks and lending portfolio factors. Table 6.31 of *t*-test examines this difference, and the results show no evidence that CB and IB systems are different when considering the relationship between these two factors ( $p = .916 > 0.05$ ,  $r = -0.106$ ).

#### 6.4.2.4 Summary of H1 - Test Results

The above analysis of hypothesis 1 (*H1a*, *H1b* and *H1c*) indicates those counterparts of Islamic and non-Islamic banking systems operating in the ME region are more efficient in risks factors assessment. Further, the CB and IB systems are fairly equal in their approach, and there is evidence that all risk factors implicitly affect the quality of lending portfolio performance. In part, the study has analysed CB and IB systems independently, and then compared them. Accordingly, the results of testing the *H1* indicate that differentiation between both banking groups was somewhat significant. Finally, the test results are summarised and shown in Table 6.32.

**Table 6.32: Test Results for the Hypothesis-1**

Feature	Content of the Hypotheses	Test results
<i>H1a</i>	<i>There is no difference in factors considered in credit risk assessment and lending decision in CB and IB systems.</i>	<b>Supported</b>
<i>H1b</i>	<i>There is no difference in measurement approaches used for such risk factors in CB and IB systems.</i>	<b>Supported</b>
<i>H1c</i>	<i>There is no relationship between risk factors and default risks portfolio in CB and IB systems.</i>	<b>Unsupported</b>

#### 6.4.3 The Influence of Risk Factors on Lending Decision-making

The association between risk factors and the rationality of lending decision-making is measured using linear regression models. Separate pooled regressions are conducted on each of the three models mentioned in section 6.2 above. A positive/negative response coefficient is expected according to previous risk and lending portfolio studies (Allen, DeLong & Saunders 2004; Andrea & Monks 1999; Bessis 2001), as well as determinants of lending portfolio returns and the lending structure studies (Armstrong & Ashworth 2000; Bashir 1983; Berry 1993; Cardozo & Smith Jr 1983).

In general, underlying factors identified by factor analysis (Principal Component PC) were mainly used as the basis for the following analysis steps. As noted earlier, the examination of these three regression models are performed to test the second hypothesis of the study and discussed in two significance levels ‘\*\*\*’ 5% and ‘\*\*\*\*’ 1%, and the discussions are presented as follows.

##### 6.4.3.1 Risk Factors Influence the Rationality of Lending Decision-making in IB and CB - H2a

Generally, rational decision making for allocating loans is affected by risk factors assessment and the rational lending decision cannot be economically performed without considering different types of risk factors. Model *MI* indicates that rational lending decision making for allocating a loan can be performed by considering: loan characters CC; religious affiliations RA; and bank’s external and internal circumstances EC & IC.

Table 6.33: M1: Consideration Issues in Loans Allocation Policy

feather	IB				CB		
	CC	EC	IC	RA	CC	EC	IC
TR: 1	.168	.601	.398	1.124	.957	<b>2.105**</b>	-1.766*
TR: 2	-	-	-	-	-.678	.211	-.945
BR	.947	.482	1.045	.682	-.545	1.331	.979
TyR	-.278	-.599	-.987	-.684	.198	-.838	<b>3.364***</b>
GR: 1	.558	-.296	-.641	-2.171*	.886	.113	.661
GR: 2	-.337	-1.487	1.654	1.668	<b>-2.499**</b>	-1.381	1.894*
GR: 3	1.436	.330	.034	-.748	-	-	-
SR	.667	-.920	-1.773*	-.757	1.311	-1.511	.849
<b>F-value</b>	1.467	.613	1.373	1.885*	1.769	1.884*	5.646***
<b>R square</b>	.136	.062	.129	.169	.137	.145	.336
<b>Residual</b>	62.178	67.543	62.728	59.853	73.352	72.706	56.415

CC: loan's characters. RA: religious affiliations. EC& IC: external & internal circumstances. TR: 1 & 2 highly & low applicable transaction risks. BR: applicable business risks. TyR: applicable treasury risks. GR: 1, 2 & 3 high, medium & low applicable governance risks. SR: applicable systematic risks.

**Note:** \* indicates significance under 0.1 confidence level, \*\* indicates significance under 0.05 confidence level, and \*\*\* indicates significance under 0.01 confidence level. Only '\*\*' and '\*\*\*' are discussed.

For the CB, out of the seven entries of risk factors<sup>84</sup>, transaction risk.1 (TR:1) influences the rationality of lending decision making with a significant relation to banks' external circumstances ( $t = 2.105 < 0.05$ ) as shown in Table 6.33; while banks' internal circumstances are significantly related to treasury risk (TyR) ( $t = 3.364 < 0.01$ ). The rationality of lending decision making is influenced by governance risk.2 (GR:2) because their relation with loan characters (CC) is significant ( $t = -2.499 < 0.05$ ). In contrast, in IB, Table 6.33 shows that there are no risk factors which significantly influence the rationality of landing decision making in terms of allocative loans policy.

Table 6.34: M2a: Loan Authorisation Policy (risk portfolio consideration issues)

feather	IB			CB	
	IA	REC	LD	IA	REC
TR: 1	.150	-1.145	.029	-.474	<b>-2.581**</b>
TR: 2	-	-	-	.285	-.718
BR	-.999	-.403	-.795	.723	.585
TyR	.383	.010	.838	<b>-2.895***</b>	-1.863*
GR: 1	-.645	.224	.796	.084	-.683
GR: 2	<b>-2.294**</b>	1.630	-.187	-.023	<b>2.397**</b>
GR: 3	-1.634	<b>-2.156**</b>	-1.063	-	-
SR	1.729*	.985	-.636	-.128	-.617
<b>F-value</b>	1.760	1.417	.604	1.779	4.077***
<b>R square</b>	.159	.132	.061	.138	.268
<b>Residual</b>	60.528	62.466	67.606	73.298	62.230

IA: information asymmetry. REC: risk exposure control. LD: lending disciplines. TR: 1 & 2 highly & low applicable transaction risks. BR: applicable business risks. TyR: applicable treasury risks. GR: 1, 2 & 3 high, medium & low applicable governance risks. SR: applicable systematic risks.

**Note:** \* indicates significance under 0.1 confidence level, \*\* indicates significance under 0.05 confidence level, and \*\*\* indicates significance under 0.01 confidence level. Only '\*\*' and '\*\*\*' are discussed.

In terms of making rational decisions in authorising loans stage (model *M2a*), some variables are referred to risk portfolios management (such as: information asymmetry

<sup>84</sup> There are some different types of risk loaded under such risk factors that are used in this analysis by utilising principal component technique. For more details see Appendix L.

(IA); risk exposure control (REC); and lending disciplines (LD) and have to be considered—as shown in Table 6.34. Table 6.34 shows that the rational decision of authorising loans in IB is influenced by governance risk.2 (GR:2) and governance risk.3 (GR:3)  $t = -2.294 < 0.05$  and  $t = -2.156 < 0.05$  respectively, which are significantly related to information asymmetry and risk exposure control respectively.

Table 6.34, also shows that the rational lending decision-making in the CB system appears affected by treasury risk (TyR) which is significantly related to information asymmetry factor ( $t = -2.895 < 0.01$ ), as well as being affected by transaction risk.1 (TR:1) ( $t = -2.581 < 0.05$ ) and governance risk.2 (GR:2) ( $t = 2.397 < 0.05$ )—which are significantly correlated with risk exposure control. Furthermore, rational lending decision in authorising loans stage can be performed by considering factors related to lending portfolio (model *M2b*), such as: lenders characteristics (LeC); *shari`a* compliance (SC); borrowers characteristics (BC); shareholders and investors (S&IC); and location of both borrowers and lenders (LoC).

Table 6.35 shows that the rationality of lending decision making in the IB system is influenced by governance risk.2 (GR:2) which is significantly related to *shari`a* compliance ( $t = -2.110 < 0.05$ ), and governance risk.3 (GR:3), in turn, is also significantly related to lenders' characteristics ( $t = -3.303 < 0.01$ ). However, the policy of making rational lending decisions in CB is influenced by governance risk.2 (GR:2) which is significantly correlated with lenders' characteristics ( $t = 2.410 < 0.05$ ), and location characteristics of borrowers and lenders ( $t = 2.419 < 0.05$ ). Also, governance risk.1 (GR:1) is significantly related to shareholders and investors ( $t = 2.128 < 0.05$ ). Systematic risk influences the rationality of lending decision in both IB and CB systems. In IB, it is significantly related to the lenders' characteristics ( $t = 1.956 < 0.05$ ), whilst in CB it is significantly related to shareholders' and investors' considerations ( $t = -2.495 < 0.05$ ).

**Table 6.35: M2b: Loan Authorisation Policy (lending portfolio consideration issues)**

feather	IB		CB			
	LeC	SC	BC	S&IC	LeC	LoC
TR: 1	1.093	1.130	-1.179	-.489	.908	-.943
TR: 2	-	-	-1.725*	1.076	-.330	-.888
BR	-.120	-.387	1.402	-1.465	-1.139	-.696
TyR	.480	-.740	.546	-.745	.594	-.718
GR: 1	-.852	-1.186	.754	<b>2.128**</b>	.247	.202
GR: 2	.451	<b>-2.110**</b>	1.773*	-1.345	<b>2.410**</b>	<b>2.419**</b>
GR: 3	<b>-3.303***</b>	-1.398	-	-	-	-
SR	<b>1.956**</b>	1.681*	-.085	<b>-2.495**</b>	-1.404	-1.142
<b>F-value</b>	1.925*	1.687	1.223	3.512***	1.817*	2.295**
<b>R square</b>	.172	.154	.099	.240	.140	.171
<b>Residual</b>	59.638	60.933	76.592	64.628	73.084	70.484

LeC: lender's characteristics. SC: *shari`a* compliance. BC: borrower's characteristics. S&IC: shareholders & investors characteristics. LoC: location characteristics. TR: 1 & 2 highly & low applicable transaction risks. BR: applicable business risks. TyR: applicable treasury risks. GR: 1, 2 & 3 high, medium & low applicable governance risks. SR: applicable systematic risks.

**Note:** \* indicates significance under 0.1 confidence level, \*\* indicates significance under 0.05 confidence level, and \*\*\* indicates significance under 0.01 confidence level. Only '\*\*' and '\*\*\*' are discussed.

Table 6.36 shows that making rational lending decisions whilst considering risk factors measurements (model *M3*) is significantly impacted by treasury risk (TyR) ( $t = 2.391 < 0.05$ ) in CB, while performing rational lending decisions in IB is significantly impacted by governance risk.1 (GR:1) ( $t = 2.207 < 0.05$ ).



**Table 6.36: M3: Consideration Issues in DM and Measurement of Risk Factors**

feather	IB	CB
	D/R	D/R
TR: 1	-.468	.342
TR: 2	-	.074
BR	-.427	-1.362
TyR	-.501	<b>2.391**</b>
GR: 1	<b>2.207**</b>	1.349
GR: 2	.189	-.751
GR: 3	1.324	-
SR	.254	.208
<b>F-value</b>	1.303	1.858*
<b>R square</b>	.123	.143
<b>Residual</b>	63.142	72.850

D/R: making lending decision whilst considering risk factors measurements. TR: 1 & 2 highly & low applicable transaction risks. BR: applicable business risks. TyR: applicable treasury risks. GR: 1, 2 & 3 high, medium & low applicable governance risks. SR: applicable systematic risks.

**Note:** \* indicates significance under 0.1 confidence level, \*\* indicates significance under 0.05 confidence level, and \*\*\* indicates significance under 0.01 confidence level. Only ‘\*\*’ and ‘\*\*\*’ are discussed.

To this end, loan allocations and authorisation are not mitigated policies. These policies comprise different aspects that have to be considered by lending decision makers. Through the analysis in *M1*, *M2a* and *M2b*, issues which might be affecting the rationality of lending decisions policies have been examined. For the IB and CB, the summary of results from these models suggest that risk factors influencing the rationality of lending decisions are somewhat varied in these banking systems. Thus, tests provide evidence that risk factors influence the rationality of lending decision and they are different between IB and CB, and ***H2a* cannot be rejected**.

#### **6.4.3.2 Rational Lending Decision and Risk Measurement Approaches in IB and CB - *H2b***

A large number of risk measurement models/approaches are performed to meet the variation in risk factors in the financial and banking industry. Among them, three common approaches, namely, internal rate or scoring model IR/S, value and risk model VaR, and asset pricing and beta model AP/B are widely used in banking institutions<sup>85</sup> (Cebenoyan & Strahan 2004; Claessens & Embrechts 2003). These models were examined to explain whether they influence the rationality of lending decision making in IB and CB differently in terms of loans allocation stage and loans authorisation stage. The same dependent variables of making rational lending decisions that was used in *M1*, *M2a*, *M2b* and *M3* above are also regressed to IR/S:1 and IR/S:2; VaR:1 and VaR:2; and AP/B models of measuring risk factors. These are formulated as *M4*, *M5[a, b]* and *M6* regression model (see section 6.2.3 above).

For IB, Table 6.37 shows that the use of value and risk.1 (VaR:1) model of measuring risk factors influence the rationality of lending decisions at the loan allocation stage (model *M4*), which is significantly correlated with banks’ external circumstances ( $t = 2.269 < 0.05$ ). There is also a significant relationship between banks’ internal circumstances and the use of internal rate or scoring.1 (IR/S:1) model of measuring risk factors ( $t = 4.341 < 0.01$ ) and the use of asset pricing and beta (AP/B) model of measuring

<sup>85</sup> Principal component factor analysis has been applied and indicates that the use of these models to measure risk factors are varied from risk factor to other and also varied from one banking system to another.

risk factors ( $t = 2.813 < 0.01$ ), which indicates these models have influenced the rationality of lending decisions significantly. In contrast to IB, the use of internal rate or scoring.1 (IR/S:2) model of measuring risk factors in CB, and value and risk.2 (VaR:2) model of measuring risk factors influence lending decisions, and they are significant with the loan's characteristics variable  $t = -2.540 < 0.05$  and  $4.282 < 0.01$  respectively. However, the use of value and risk.1 (VaR:1) model of measuring risk factors in CB is significant with banks' internal circumstances.

**Table 6.37: M4: Consideration Issues in Loans Allocation Policy**

feather	IB				CB		
	CC	EC	IC	RA	CC	EC	IC
IR/S: 1	1.361	-.098	<b>4.341***</b>	-.966	-.081	1.623	.689
IR/S: 2	-	-	-	-	<b>-2.540**</b>	1.421	-.834
VaR: 1	.607	<b>2.269**</b>	1.219	2.759	1.625	-.238	<b>2.628**</b>
VaR: 2	.775	.298	-1.246	.089*	<b>4.282***</b>	1.628	.177
AP/B	-.548	-.053	<b>2.813***</b>	-.091*	1.389	.117	-1.134
<b>F-value</b>	.977	1.382	5.348***	2.520**	5.285***	2.337**	2.375**
<b>R square</b>	.054	.075	.239	.129	.248	.127	.129
<b>Residual</b>	68.085	66.586	54.770	62.706	63.896	74.167	74.014

CC: loan's characters. RA: religious affiliations. EC& IC: external & internal circumstances. IR/S: 1&2 highly appropriate & loss appropriate internal rates & scoring model. VaR: 1&2 highly appropriate & loss appropriate value at risk model. AP/B highly appropriate & loss appropriate asset pricing and beta model. **Note:** \* indicates significance under 0.1 confidence level, \*\* indicates significance under 0.05 confidence level, and \*\*\* indicates significance under 0.01 confidence level. Only '\*\*\*' and '\*\*\*' are discussed.

Table 6.38 shows that loans authorisation policy (model *M5a, b*) in IB is seemingly not affected by the use of risk measurement approaches, which are not significantly related with recognition of information asymmetry, risk exposure control and lending disciplines. However, in CB, the use of internal rate or scoring.1 (IR/S:1) model of measuring risk factors and value and risk.2 (VaR:2) model of measuring risk factors are significantly related with information asymmetry variable at the loan authorisation stage. This indicates that the optimality of lending decisions has been influenced by these two models.

**Table 6.38: M5a: Loan Authorisation Policy (risk portfolio consideration issues)**

feather	IB			CB	
	IA	REC	LD	IA	REC
IR/S: 1	-.484	.893	.771	<b>-2.748***</b>	-1.250
IR/S: 2	-	-	-	1.760*	1.969*
VaR: 1	1.209	-1.152	-.879	.441	-.412
VaR: 2	.567	-.659	-.055	<b>-2.576**</b>	1.025
AP/B	-.491	1.374	1.132	-1.830*	-.666
<b>F-value</b>	.555	.941	.604	4.276***	1.669
<b>R square</b>	.032	.052	.034	.211	.094
<b>Residual</b>	69.722	68.223	69.531	67.076	76.970

IA: information asymmetry. REC: risk exposure control. LD: lending disciplines. IR/S: 1&2 highly appropriate & loss appropriate internal rates & scoring model. VaR: 1&2 highly appropriate & loss appropriate value at risk model. AP/B highly appropriate & loss appropriate asset pricing and beta model. **Note:** \* indicates significance under 0.1 confidence level, \*\* indicates significance under 0.05 confidence level, and \*\*\* indicates significance under 0.01 confidence level. Only '\*\*\*' and '\*\*\*' are discussed.

With a recognition of *shari`a* compliance variable in Table 6.39, statistics suggest that loan authorisation policy in IB is influenced by the use of value and risk.1 (VaR:1) model

of measuring risk factors ( $t = -1.948 < 0.05$ ), value and risk.2 (VaR:2) model of measuring risk factors ( $t = -3.046 < 0.01$ ) and asset pricing and beta (AP/B) model of measuring risk factors ( $t = 3.340 < 0.01$ ).

**Table 6.39: M5b: Loan Authorisation Policy (lending portfolio consideration issues)**

feather	IB		CB			
	LeC	SC	BC	S&IC	LeC	LoC
IR/S: 1	.282	.557	-1.311	-1.588	-.433	<b>-2.312**</b>
IR/S: 2	-	-	-.589	<b>2.234**</b>	-1.861*	-.436
VaR: 1	1.268	<b>-1.948**</b>	<b>2.758***</b>	-1.367	1.001	-.002
VaR: 2	.300	<b>-3.046***</b>	1.566	.635	.707	.056
AP/B	-.444	<b>3.340***</b>	<b>2.088**</b>	1.969*	-.577	.995
<b>F-value</b>	.477	5.372***	4.019***	4.160***	.927	1.945*
<b>R square</b>	.027	.240	.201	.206	.055	.108
<b>Residual</b>	70.035	54.711	67.937	67.461	80.347	75.788

LeC: lender's characteristics. SC: *shari`a* compliance. BC: borrower's characteristics. S&IC: shareholders & investors characteristics. LoC: location characteristics. IR/S: 1&2 highly appropriate & loss appropriate internal rates & scoring model. VaR: 1&2 highly appropriate & loss appropriate value at risk model. AP/B highly appropriate & loss appropriate asset pricing and beta model.

**Note:** \* indicates significance under 0.1 confidence level, \*\* indicates significance under 0.05 confidence level, and \*\*\* indicates significance under 0.01 confidence level. Only '\*\*' and '\*\*\*' are discussed.

In contrast, loan authorisation policy in CB is influenced by the use of internal rate or scoring.1 (IR/S:1) model of measuring risk factors which is significantly correlated to borrowers' and lenders' location ( $t = -2.312 < 0.05$ ), but the use of internal rate or scoring.2 (IR/S:2) model of measuring risk factors is significantly associated with shareholders' and investors' considerations ( $t = 2.234 < 0.05$ ). Furthermore, the use of value and risk.1 (VaR:1) model in CB of measuring risk factors and asset pricing and beta (AP/B) model of measuring risk factors are influencing authorisation policies and significantly correlated with borrowers' consideration  $t = 2.758 < 0.01$  and  $t = 2.088 < 0.05$  respectively.

**Table 6.40: M6: Consideration Issues in DM and Measurement of Risk Factors**

feather	IB	CB
	D/R	D/R
IR/S: 1	<b>2.120**</b>	.585
IR/S: 2	-	.373
VaR: 1	1.038	<b>2.282**</b>
VaR: 2	-1.504	<b>2.618**</b>
AP/B	-1.246	<b>-3.810***</b>
<b>F-value</b>	2.718**	6.128***
<b>R square</b>	.138	.277
<b>Residual</b>	62.075	61.461

D/R: making lending decision whilst considering risk factors measurements. IR/S: 1&2 highly appropriate & loss appropriate internal rates & scoring model. VaR: 1&2 highly appropriate & loss appropriate value at risk model. AP/B highly appropriate & loss appropriate asset pricing and beta model.

**Note:** \* indicates significance under 0.1 confidence level, \*\* indicates significance under 0.05 confidence level, and \*\*\* indicates significance under 0.01 confidence level. Only '\*\*' and '\*\*\*' are discussed.

Discussion above focuses on whether the use of different approaches to measure different risk factors influence the rationality of lending decision making (models *M4* and *M5a,b*). At this point, the rationality of lending decision making was regressed with the importance of measuring risk factors as formulated in model *M6*. Consequently, Table 6.40 shows that IB has given high consideration to the importance of using internal rate

or scoring.1 (IR/S:1) model ( $t = 2.120 < 0.05$ ) of measuring risk factors. However, in CB, high importance was given to value and risk.1 (VaR:1), value and risk.2 (VaR:2) and asset pricing and beta (AP/B) models of measuring risk factors  $t = 2.282 < 0.05$ ,  $t = 2.618 < 0.01$ ,  $t = -3.810 < 0.01$  respectively. Not surprisingly, results in this part are consistent with the results from *M1*, *M2a*, *M2b* and *M3* above.

The previous three regression models *M4*, *M5[a, b]*, and *M6* mainly examined the relationships between the rationality of lending decision variables and models/approaches of risk measurement. High attention was given to the loading of principal component analysis for risk measurement models in IB and CB. By the use of these components of risk measurement models, results from two different sets—IB and CB—suggest that IB use different models to measure different types of risk similar to CB, but they did not follow the same pattern. Also, the rationality of lending decisions is impacted by some models usage being different to that used in CB. Overall, findings from this examination provide evidence that null *H2b* cannot be rejected, **and it is accepted.**

#### **6.4.3.3 Rational Lending Decision and Risk Factors Relationship in IB and CB - H2c**

The discussion above highlights the risk factors that influence the rationality of lending decision making at the allocation and authorisation stages. These factors vary between IB and CB and have been described in detail in Appendix M. To examine relationships between these risk factors and the rationality of lending decision making, Pearson correlation test ( $r$ ) was conducted. At the beginning, the researcher assumes that all relationships between all the rationality of lending decision making, and these risk factors can be significant and similar in both IB and CB systems. Now, despite the fact the rationality of lending decision making in each banking system has been influenced by different risk factors, the correlation between them is not clearly formed. Correlation matrixes for all risk factors which had marked significant relationships with the rationality of lending decision making are provided in Appendix N.

Table 6.41 provides a summary of the risk factor relationships that have been marked as influencing the rationality of lending decision making in IB and CB separately. For CB, the relationship between transaction risk.1 (TR:1) factor is highly correlated with risk exposure control REC only, and negatively significant ( $r = -.376 < 0.01$ ). However, treasury risk (TyR) factor is positively significantly correlated with banks' internal considerations (IC) ( $r = .520 < 0.01$ ) and the importance of measuring risk (D/R) ( $r = .321 < 0.01$ ), while negatively significantly correlated with information asymmetry IA ( $r = -.353 < 0.01$ ). Governance risk.2 (GR:2) factor is negatively significantly correlated with loan's characters CC ( $r = -.217 < 0.05$ ), and positively significantly correlated with lenders' consideration LeC ( $r = .268 < 0.05$ ). Finally, systematic risk (SR) factor is negatively significantly correlated with shareholders and investors S&IC ( $r = -.361 < 0.01$ ).

In contrast to CB, for IB the relationship of governance risk.2 (GR:2) factor between information asymmetry IA and *shari`a* compliance SC is a significant and negative  $r = -.283 < 0.05$  and  $r = -.256 < 0.05$  respectively. However, governance risk.3 (GR:3) factor is negatively significantly correlated with risk exposure control REC and with lenders' considerations LeC  $r = -.243 < 0.05$  and  $r = -.285 < 0.05$  respectively. Overall, results suggest that even though risk factors are influenced, the rationality of lending decision is somewhat not significantly correlated with the rationality variables.



## 6.5 Conclusion

In summary, the analysis was undertaken using primary data for two different samples of CB and IB. This chapter provides the description of an assessment of the risk factors and their relationship with the lending portfolio performance. Furthermore, the analysis in this chapter determines what risk factors influence the rationality of lending decisions and whether they differ between IB and CB. To this extent, all variables considered in this study seem reliable, due to the Cronbach's Alpha, which is based on the average correlation items within the reliability test. Thereby, the test indicates that the overall scale measurement after removing items that signed lowest correlation coefficient support the reliability of the data and the Bartlett's test of sphericity is large and significant ( $>0.05$ ) for most variables, and then the factorability is assumed. Accordingly, factor analysis presented some underlying or latent variables used for this study in both CB and IB systems. Typically, to make the pattern of loadings easier to interpret risk and lending portfolio variables, the factors are rotated to maximise the loadings of the variables on some of the factors and reduce them on others to achieve a simple structure in general.

Independent samples t-test and Pearson correlation statistical instruments are used to examine the hypothesis 1. The results provide evidence that hypotheses *H1a* and *H1b* can be supported; conversely *H1c*, which lacks statistical support is thus rejected. In addition, linear regression by formulating the rationality of lending decision making policies as dependent variables and profile of risk factors as independent variables is conducted for each of the banking system separately. The results as presented in *M1*, *M2[a, b]* and *M3*, indicate that some positive/negative response coefficients are significant which suggests that, to some extent, there is a relationship between risk factors assessment and rationality of lending decision making in IB and CB. In order to achieve the entire analysis, a further investigation into rationalising lending decisions—efficiency—will be the focus of Chapter 7.

## CHAPTER SEVEN

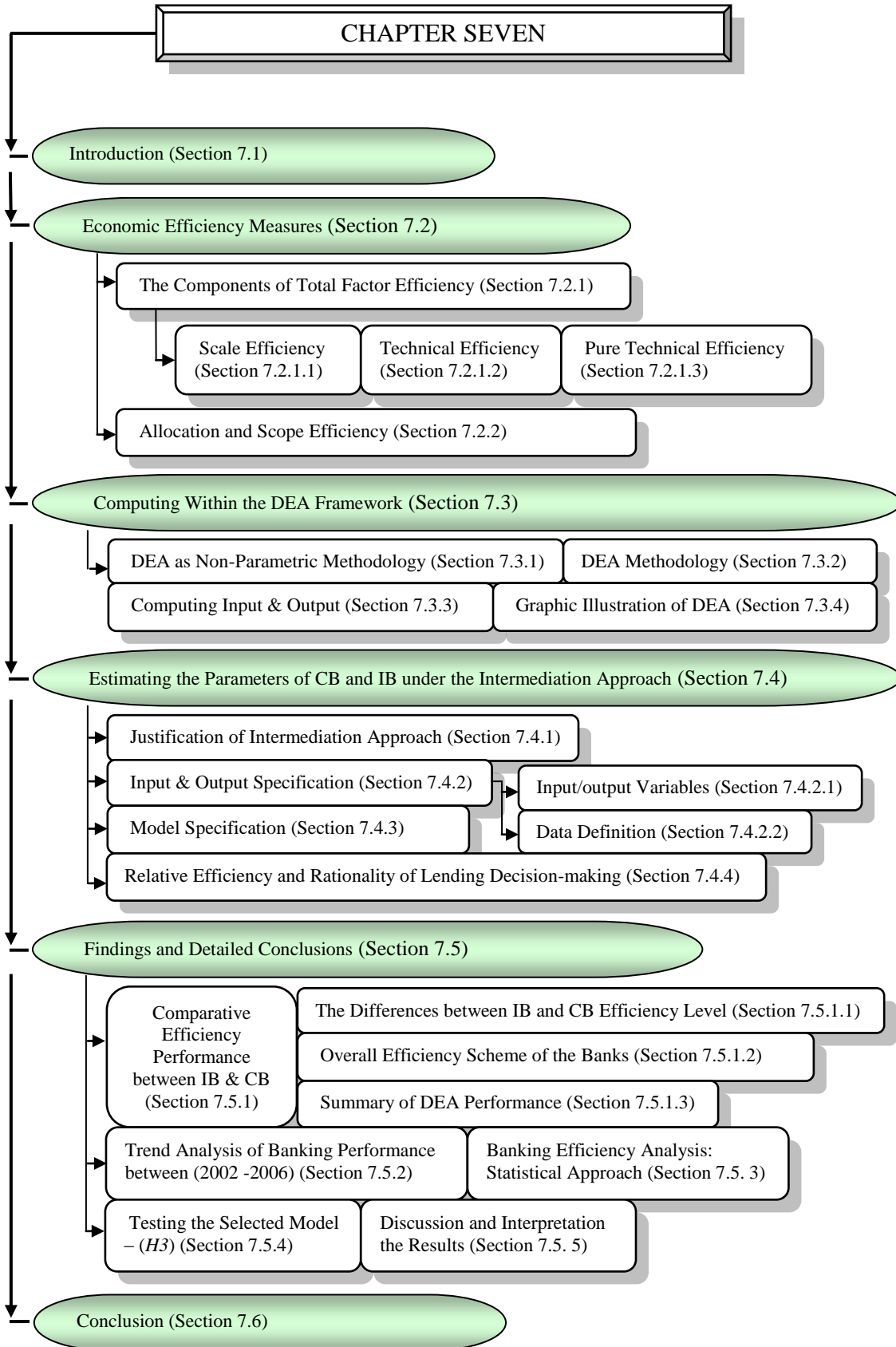
### **ENSURING THE RATIONALITY LEVELS OF LENDING DECISION MAKING: COMPARATIVE INTERPRETATIONS AND RESULTS**

#### **7.1 Introduction**

Typically, literature explains that decision-making in banks consists of rational combinations of different securities in terms of their weightings into portfolios that minimise portfolio risk for each level of expected portfolio return, typically known as an *efficient frontier* (Cooper, Seiford & Tone 2000). When referring to this concise statement, perceptions of those financial instruments and the financial environment affects the banks' performance and, in an IB system, might not be ideal. However, the aim of this chapter is to provide potential evidence in relation to the rationality of lending decision making by adopting an efficiency model. The findings reported in this chapter also attempt to bridge the gap between Islamic and non-Islamic financial circles by extending bankers' knowledge. Therefore, through utilising bank level data, the study examines the efficiency indicators of CBs and IBs in the Middle East during the period 2001-2006. Additionally, an analysis of the results will subsequently present the probable similarities and differences between these two diverse banking systems.

This chapter is organised as follows. Section 2 explains the relationship between economic efficiency measures and rationality of lending decision making. It outlines the components of total efficiency, and allocative and a scope efficiency. Following this, section 3 provides a computing framework within data envelopment analysis DEA. The parameters of CB and IB systems under intermediation approach are outlined in section 4, while section 5 discusses the findings and detailed conclusions. Finally, section 6 provides a summary of the chapter. Figure 7.1 provides a detailed outline of Chapter 7.

**Figure 7.1: Outline of Chapter 7 Interrelations**





## 7.2 Economic Efficiency Measures

All business operations/processes involve transformation-adding value and changes to materials and turning them into goods and services that customers want. materials, energy and machines; and outputs consisting of finished products, services, customer satisfaction and other outcomes (Amirteimoori & Shafiei 2006; Berger & Humphrey 1997). Since the production technology of the fully efficiency firm in a banking industry is not known, it must be estimated from observations in practice. Of the available methods in the efficiency literature, in this study, the optimisation of the performance of each production unit—gain of bank scale—non-parametric approach has been conducted. Hence, to measure the efficiency of Islamic banks and conventional banks, data envelopment analysis (DEA) has been employed which allows to estimate and report returns to scale for all banks according to various size measures.

Consequently, of this analysis three objectives could be achieved by this analysis, and that are:

1. To investigate the overall (economic), technical and pure technical, and scale efficiencies of Islamic banks and compare it with the conventional banks from the Middle East region;
2. To investigate whether Islamic banks and conventional banks are different in terms of efficiency performance; and
3. To investigate factors may impact banking efficiency and factors contribute to optimisation of banks performance.

In banks, managers are often interested in evaluating how efficiently various processes operate with respect to multiple inputs and outputs. Strategically, since banks should have sufficient resources to bear losses incurred from bad loans or from other similar adversity, they should also have generated sufficient performance for their equity to increase in value in order to attract new shareholders (Casu, Girardone & Molyneux 2004; Derban, Binner & Mullineux 2005). However, eliminating or improving inefficient operations decreases the cost of inputs and increases productivity. Typically, performance evaluation and benchmarking mode help business operations/processes to become more productive. Aly et al. (1990) assert that performance evaluation positively forces any business unit to constantly evolve and improve in order to survive and prosper in a business environment facing global competition. At this point, it is important to initiate efficiency literature by highlighting components of total factor economic efficiency follows by how these efficiencies can be allocated and computed.

### 7.2.1 The Components of Total Factor Economic Efficiency

Single-measure based gap analysis is often used as a fundamental method in performance evaluation and benchmarking. However, the use of a single measure ignores any interactions, substitutions or tradeoffs among various performance measures. Färe, Grosskopf and Li (1992) argued that each business operation or process has specific performance measures with tradeoffs. In order to comprehend these tasks within computing overall efficiency, it is necessary to understand the related efficiency components. Thus, three efficiency components under productivity changes in CB and IB systems have been considered in scale, technical and pure technical efficiencies.

### **7.2.1.1 Scale Efficiency**

By making the efficiency measurement more sophisticated, the range of topics it can explore is increased—particularly in increasing the decomposition of the technical efficiency score into components resulting from the scale operations or efficiency; surplus inputs which cannot be disposed of; and a residual or pure technical efficiency. The concept of scale efficiency was first introduced by Farrell (1957)—a concept which can be simply defined as the relationship between a bank's per unit average production cost, and volume. Thus, a bank is considered to have economies of scale when the increase in outputs is accompanied by a lower unit cost of production. Accordingly, the attention shifts from the average practice performance of banks to benchmarking of individual banks against best practice bank performance and becomes a focus of this efficiency.

Scale efficiency has been defined by Ray (2004, p. 35) as 'the extent to which an organisation can take advantage of returns to scale by altering its size towards optimal scale—which is defined as the region in which there are constant returns to scale [CRS] in the relationship between outputs and inputs'. Therefore, return to scale exhibits the relationship between output and input, and these returns can be constant, increasing, or decreasing, depending on whether output increases in proportion to more than or less than input respectively. Similarly, this applies in the case of multiple inputs and outputs, which means here that outputs change when there is an equi-proportionate change in all inputs.

### **7.2.1.2 Technical Efficiency**

Conversion of physical inputs such as labour services and raw materials or semi-finished foods into outputs is known as a technical operation. However, technical efficiency is determined by the difference between the observed ratios of compound operations achieved by best practice. Zhu (2003) explains that technical efficiency can be expressed as the potential to increase quantities of outputs from given quantities of inputs, or the potential to reduce the quantities of inputs used in producing given quantities of outputs.

Studies in the banking and finance field have attempted to examine the x-efficiency, which was popularised by Leibenstein (1966), and refers to deviations from the cost-efficiency frontier that depict the lowest production cost for a given level of output (Casu, Girardone & Molyneux 2004; Cooper, Seiford & Tone 2005; Greene 2008). Conversely, scale and scope efficiency focuses on collective bank performance; x-efficiency relates to individual bank differences in efficiency. X-efficiency stems from technical efficiency which gauges the degree of friction in the production process, and 'allocative efficiency' measures the levels of various inputs. Thus, these two are neither scale nor scope dependent and, thus, x -efficiency is a measure of how well management is aligning technology, human resources management and other resources to produce a given level of output (Avkiran 2000).

### **7.2.1.3 Pure Technical Efficiency**

Since the CB and IB systems were burdened by default risks or portfolios of bad loans from the policy of a decision making, they might be expected to be inefficient and unprofitable. Both banking systems should rapidly overtake the single-measure based gap analysis which is often used as a fundamental method in performance evaluation (Chen 2005). In general, literature on banking efficiency distinguishes economic efficiency pure-technical and allocative efficiency. Consequently, the ability to assess efficiency in banking systems is a focus of performance measurement. However, Berger and

Humphrey (1992) argue that this type of measurement is considerably affected by the size of operations (scale efficiency) and by managerial practices (non-scale technical efficiency). In other words, while efficiency has been a major consideration by the banks, pure technical efficiency has occurred where there is not an over-employment (inadequate use) of inputs to produce given outputs.

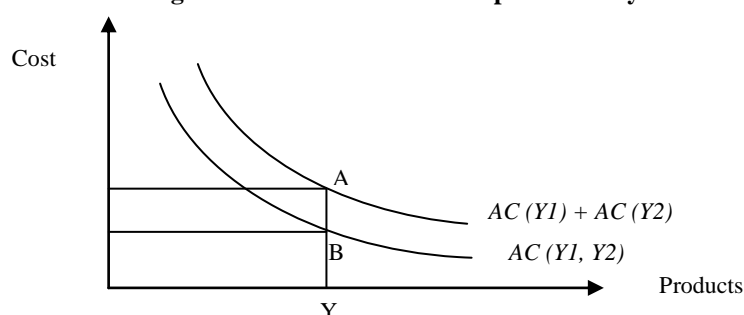
## 7.2.2 Allocation and Scope Efficiency

The topic of efficiency has attracted a growing focus from researchers, with findings suggesting that the average bank has levels of efficiency that considerably outweigh inefficiency deriving from scale and scope sources. Spurring this interest, however, is the existence of different approaches to efficiency measurement and a significant difference in the degree of efficiency being reported. Thus, in terms of the superior management of resources, the research literature has narrowed this to cover the two well-known economic concepts of technical and allocative efficiency.

Related literature has examined the structure of debt contract terms, focusing on corporate governance structure and how transaction cost economies, agency problems, asymmetric information and credit quality affect the corporation's contract terms (see: Charnes, Cooper & Rhodes 1979; Leibenstein 1966; Sengupta 1995; Zhu 2003). In relation to bank loan contract terms, researchers have also considered the effect of the strength of borrowers' relationships—principal agency problem—in the setting of these terms (see: Aly et al. 1990; Hakim, Neaime & Colton 2005; Huang & Wang 2001; Rosly & Bakar 2003). With rational lending decision making characteristics such as monitoring capability, lending reputation, capital efficiency and adequacy influencing the scale and scope of efficiency reaction to the bank loan instruments, it is not surprising that empirical studies of the determinants of approving loans have generally neglected lender characteristics.

Several studies of lending performance in CBs and IBs have controlled for bank size, and a study by Batchelor (2005) investigated how changes in banking systems affect the banking performance in general. Batchelor's (2005) study findings are consistent with the 'allocative efficiency' concept which occurs when a better mix of inputs would produce the same output at lower cost. Generally, pure technical efficiency model measures the relative low performance of banks' decision making units on the basis of the observed operating practices in a set of sample banks. If the use of both the input and the output are high gain of the efficiency scale, the banks are considered efficient. In turn, the efficiency of making rational lending decisions in these banks sets can be evaluated under the different types of efficiencies.

**Figure 7.2: Bank Cost and Scope Efficiency**



Source: (Huang & Wang 2004)

Economies of scope exist when joint production of two or more products is less costly than the combined cost of production of these products by specialist banks. Scope efficiency is illustrated in Figure 7.2 in a manner of analysis similar to that used to demonstrate scale efficiency (Huang & Wang 2004). From Figure 7.2 it can be seen that the combined average cost of producing outputs  $y_1$  and  $y_2$  separately is given by  $AC(y_1) + AC(y_2)$ , which is greater than the average cost of joint plant production  $AC(y_1, y_2)$ . The degree of cost saving from joint production is given by  $AB/AY$ .

The basis for economies of scope lies in the potential to use common production facilities for multiple products. A simple historical example of economies of scope occurred in Australia for many years with major banks operating legally separate trading and savings banks jointly by means of common staff and branch facilities until the distinction was formally removed in 1989 (Anderson, Sweeney & Williams 2005; Mertens & Urga 2001). On an individual product basis, facilities and staff expertise involved in operating foreign exchange payments would be expected to facilitate the provision of trade finance and hedge products to manage foreign exchange risk as a consequence of the difficulty in accessing services. However, currently, the ability to service many products by alternative means such as computerised telecommunication systems is challenging the role of the traditional product delivery using new common electronic inputs.

In this study, interestingly, the success of some specialised banking systems, such as Islamic finance institutions, suggests that there may be some banking niche products that are not well suited to joint production with other system products<sup>86</sup> and, hence, economies of scope may not be present across the full spectrum of banking products.

## 7.3 Computing Within the DEA Framework

### 7.3.1 DEA as Non-Parametric Methodology

‘The literature distinguishes two main approaches in measuring banking efficiency: parametric and non-parametric, in which the specification of a production cost function is required in both approaches’ (Charnes 1994, p. 56). ‘The parametric approach engages in the specification and econometric estimation of a statistical or parametric function, while the non-parametric method offers a linear boundary by enveloping the experimental data point, known as data envelopment analysis–DEA’ (Charnes 1994, p. 59). Thus, DEA uses mathematical programming to implicitly estimate the tradeoffs inherent in the empirical efficient frontier.

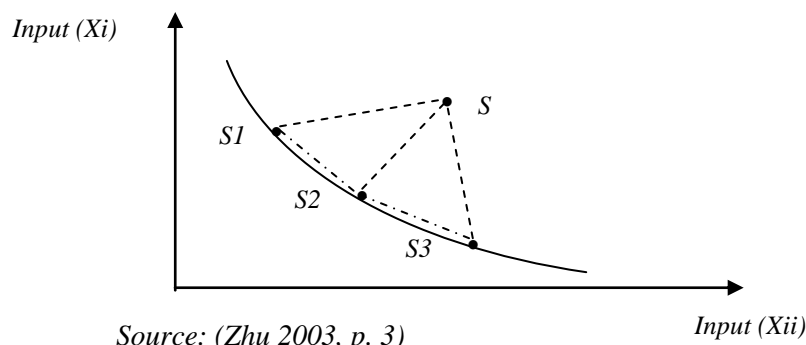
DEA methodology has been extensively used in the banking literature. As reported less recently by Fukuyama (1995) and, more recently, by Cooper, Seiford and Tone (2000), DEA is a linear programming technique for examining how a particular decision making unit (*DMU*) or bank in this study operates relative to the other banks in the sample. The technique creates a frontier set by efficient banks and compares it with inefficient banks to produce efficiency scores. Furthermore, such decision making units are assessed between 0 and 1 scores; with a completely efficient bank having an efficient score of 1 (Farrell 1957). In DEA, the most efficient bank (with score of 1) does not necessarily generate the maximum level of output from the given inputs. Rather, this bank generates the best practice level of output among other banks in the sample.

<sup>86</sup> For example, point of view of *shari`a* board against some transactions which may be prohibited in such banks and not in others—which is known in Islamic literature as *fatwa*.

### 7.3.2 DEA Methodology

Data envelopment analysis (DEA) has proven to be an efficient tool in identifying such an empirical frontier and in evaluating relative efficiency (Färe 1975; Zhu 2003). Figure 7.3 illustrates alternative supply chain operations  $S1$ ,  $S2$ ,  $S3$  and  $S$  and the efficient frontier or tradeoffs curve determined by them. A supply chain whose performance or (strategy) is on the efficient frontier is non-dominated (efficient) in the sense that no alternate supply chain performance is strictly better in both input and output. Consequently, through performance evaluation, the efficient frontier that represents the best practice is identified, and an efficient strategy (e.g. point  $S$ ) can be improved (moved to the efficient frontier) with suggested directions for improvement (to  $S1$ ,  $S2$ ,  $S3$  or other points along the frontier).

Figure 7.3: Alternative Supply Chain Illustration



Unfortunately, information that can be used to estimate the efficient frontier is not necessarily available (Brown 2001). Therefore, without prior information on the tradeoffs, the functional forms cannot be specified. Empirically, the efficient frontier estimate is based upon observations on one business operation/process over time, or similar business operations at a specific time period (Steering Committee for the Review of Commonwealth/State Service Provision 1997).

Throughout the study, the researcher uses decision making units ( $DMUs$ ) to represent business operations or processes. Each  $DMU$  has a set of input/s and output/s representing multiple performance measures. Consider a set of  $n$  observations on the  $DMUs$ . Each observation,  $DMU_j$  ( $j=1,2,\dots,n$ ), uses  $m$  inputs  $x_{ij}$  ( $i=1,2,\dots,m$ ) to produce  $s$  outputs  $y_{ij}$  ( $r=1,2,\dots,s$ ). The empirical efficient frontier or best practice frontier is determined by these  $n$  observations. To ensure developing a piecewise linear approximation to the efficient frontier and the area dominated by the frontier, two characters should be considered (Farrell 1957):

**Property1: Convexity:**  $\sum_{j=1}^n \lambda_j x_{ij}$  ( $i = 1,2,\dots,m$ ) and  $\sum_{j=1}^n \lambda_j y_{rj}$  ( $r = 1,2,\dots,s$ ) are possible inputs and outputs achievable by the  $DMU_j$ , where  $\lambda_j$  ( $j = 1,2,\dots,n$ ) are nonnegative scalars such that  $\sum_{j=1}^n \lambda_j = 1$ .

**Property2: Inefficiency:** the same  $y_{ij}$  can be obtained by using frontier input-oriented model, where for instance, the same outputs can be produced by using more inputs; and the same  $y_{ij}$  can be used to obtain output-oriented model, where e.g., the same inputs can be used to produce less outputs.

Consider Figure 7.3 above, where total supply chain input and supply chain output represent two inputs. Applying *property1* to *S1*, *S2* and *S3* yields the piecewise linear approximation to the curve shown in the same figure (Figure 7.3). Applying both *property1* and *property2* expands the segments of *S1*, *S2* and *S3* into the area dominated by the curve.

### 7.3.3 Computing Input and Output

Two alternative approaches are available in the DEA technique to estimate the efficient frontier characterised by *property1*, namely, input-oriented, and output oriented (Brown 2001; Cooper, Seiford & Tone 2000; Zhu 2003). For *n* DMUs in industries, all of the sample input/s and output/s are characterised by *m* and *s* respectively, and the efficiency of each bank is computed as an input-oriented or output-oriented model.

Table 7.1: Summary of Envelopment Models

Frontier	Input-oriented Model	Output-oriented Model
	$mix\theta - \varepsilon(\sum_{i=1}^m s_i^- + \sum_{r=1}^s s_r^+)$	$max\phi - \varepsilon(\sum_{i=1}^m s_i^- + \sum_{r=1}^s s_r^+)$
	Subject to:	Subject to:
CCR_CRS	$\sum_{j=1}^n \lambda_j x_{ij} + s_i^- = \theta x_{i0} \quad i = 1, 2, \dots, m$	$\sum_{j=1}^n \lambda_j x_{ij} + s_i^- = \theta x_{i0} \quad i = 1, 2, \dots, m$
	$\sum_{j=1}^n \lambda_j y_{rj} - s_r^+ = y_{r0} \quad r = 1, 2, \dots, s$	$\sum_{j=1}^n \lambda_j y_{rj} - s_r^+ = \phi y_{r0} \quad r = 1, 2, \dots, s$
	$\lambda_j \geq 0 \quad j = 1, 2, \dots, n$	$\lambda_j \geq 0 \quad j = 1, 2, \dots, n$
BCC_VRS	Add $\sum_{j=1}^n \lambda_j = 1$	
NIRS	Add $\sum_{j=1}^n \lambda_j \leq 1$	
NDRS	Add $\sum_{j=1}^n \lambda_j \geq 1$	
Efficient	$\hat{x}_{i0} = \theta^* x_{i0} - s_i^{-*} \quad i = 1, 2, \dots, m$	$\hat{x}_{i0} = x_{i0} - s_i^{-*} \quad i = 1, 2, \dots, m$
Target	$\hat{y}_{r0} = y_{r0} + s_r^{+*} \quad r = 1, 2, \dots, s$	$\hat{y}_{r0} = \phi y_{r0} + s_r^{+*} \quad r = 1, 2, \dots, s$

Source: (Zhu 2003)

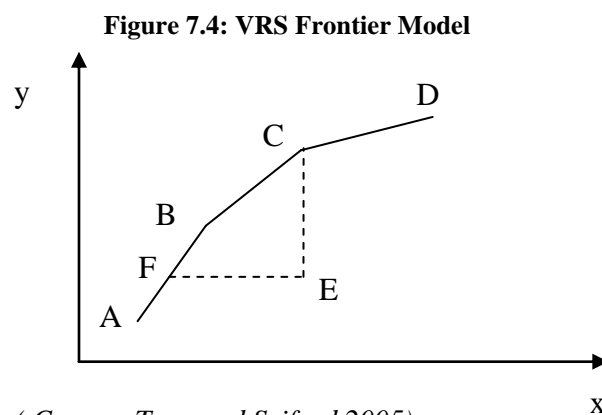
A summary presentation for the two envelopment models orientation is depicted in Table 7.1, whilst a mathematical derivation of these methodologies is explained in Appendix O part A and part B. (For a detailed review of the literature on frontier methodologies see (Brown 2001; Cooper, Seiford & Tone 2000; Farrell 1957; Kalirajan & Shand 1999; Mester 1987; Zhu 2003)

### 7.3.4 Graphical Illustration of DEA

The original Charnes, Cooper and Rhodes (1978) model (called CCR model), and Banker, Charnes and Cooper's (1984) model (called BCC model) are the two basic models of DEA most commonly used in empirical studies. Appendix O shows the frontier BCC

model determined by model 7.5 and 7.6 which exhibits variable returns to scale (VRS). The models (7.5 and 7.6) are practised as input-oriented VRS envelopment model and output-oriented VRS envelopment model respectively. The BCC model uses (VRS) for identifying the envelopment surface and, thus, the VRS model is graphically depicted (see Appendix O, 3a).

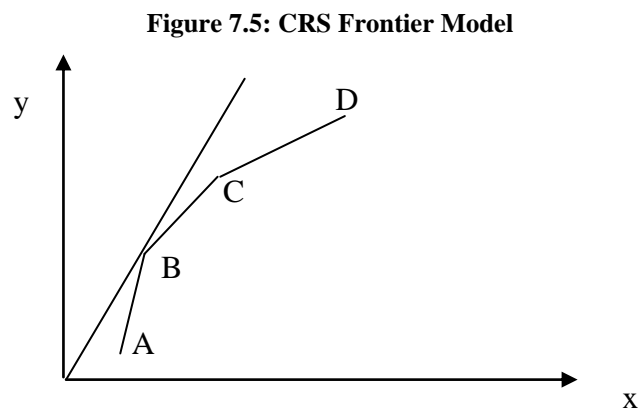
Figure 7.4 depicts, for example, five *DMUs* (A, B, C, D and E) with one input ( $x$ ) and one output ( $y$ ). The VRS frontier consists of *DMUs* A, B, C and D. AB exhibits increasing returns to scale (IRS), B exhibits constant returns to scale (CRS), and BC and CD exhibit decreasing returns to scale (DRS). Based on the VRS input-oriented model as shown in Appendix O, *DMU* E is inefficient and is compared to F (a convex combination of A and B) on the VRS frontier. In this case, it should reduce its input to F, or F is the efficient target for E. On the other hand, if the output-oriented model is considered, E is compared to C by increasing output.



Source : (Cooper, Tone and Seiford 2005)

However, the following envelopment is a different DEA model (called CCR model) which is considered in various studies (Aly et al. 1990; Cooper, Seiford & Tone 2000; Fukuyama & Weber 2002; Jablonsky 2007). Contrary to the BCC model, the CCR model uses an optimisation method of mathematical programming to generalise the single output/input technical measure to the multiple output/input case. It is based on constant return to scale (CRS) when enveloping the actual data to determine the shape of the production frontier.

Consequently, based on this constant return to scale (CRS) frontier—presented in model 7.5 and 7.6 in Appendix O: 1 and 2—only B is efficient. This is exhibited in Figure 7.5.



Source: (Cooper, Tone and Seiford 2000)

Accordingly, the constraint on  $\sum_{j=1}^n \lambda_j$  actually determines the return to scale (RTS) type of an efficient frontier. If the equality of one  $\sum_{j=1}^n \lambda_j = 1$  has been removed from the models 7.5 and 7.6, the constant return to scale (CRS) envelopment model is obtained where the frontier exhibits constant return to scale (CRS)<sup>87</sup>. Therefore, referring to Appendix O 3b, which depicts this technique graphically, if  $\sum_{j=1}^n \lambda_j = 1$  is replaced with  $\sum_{j=1}^n \lambda_j \leq 1$ , a non-increasing returns to scale (NIRS) envelopment model has occurred. In contrast, if  $\sum_{j=1}^n \lambda_j = 1$  is replaced with  $\sum_{j=1}^n \lambda_j \geq 1$ , non-decreasing returns to scale (NDRS) envelopment model will occur. Consequently, the interpretation under this model is if  $\theta^* = 1$  or  $\phi^*$ , then the *DMU* under evaluation is a frontier point, (e.g., there is no other *DMU* operating more efficiently than this *DMU*). Otherwise, if  $\theta^* < 1$  or  $\phi^* > 1$ , then the *DMU* under evaluation is inefficient (e.g., this *DMU* can either increase its outputs level or decrease input levels).

## 7.4 Estimating the Parameters under the Intermediation Approach

### 7.4.1 Justification of Intermediation Approach

There are different approaches for recognising banks' output/inputs. Leong, Dollery and Coelli (2003)—cited in (Seelanatha 2007)—identified production, intermediation and assets as three main approaches. However, Favero and Papi (1995) previously identified five approaches for the input/output specification in the banking industry under two groups: the production, intermediation and assets approaches which directly linked to operation functions of bank; and user cost and value-added approaches which indirectly linked to banks' operational functions. Notably, researchers have selected different variables even though they used identical approaches. Ray (2005) and Färe (1975) asserted that these variables highlighted both the technical and economic views of financial institutions. In a technical sense, output is a set of financial services to depositors and borrowers.

Consider the production approach which treats banks as producers of services by use of labour and capital to generate deposits and loans (Altman 1980; Li 2005). Contrary to this approach, the intermediation approach regards deposits as an input which is used for producing the other banking outputs. Therefore, the intermediation approach is based on the assumption that the main role of banks is to arrange a meeting place for the savers and borrowers to perform a transformation function. Because of the main characteristics of IBs and CBs, they are often claimed to be joint stock firms within which shares are easily tradable. Favero and Papi (1995, p. 388) indicated that the intermediation approach is 'most appropriate for banks where most activities consist of turning large deposits and funds purchased from other financial institutions into loans and financial investments'.

<sup>87</sup> For detailed information see, Appendix O: 1 and 2



For this study, the intermediation approach has been adopted as a consequence of its advantages over other approaches, namely:

1. The intermediation approach is more inclusive of total costs<sup>88</sup> (Huang & Wang 2001).
2. Since the deposits are used for making loans and investments with other inputs, they should be considered as inputs (Altman 1980).
3. By giving a value to the banking system ideology, the inference of the intermediation approach is much more suited to the potential agency problem

## 7.4.2 Input and Output Specification

Despite many studies applying either the intermediation and/or production approaches, some have sought alternative ways of identifying input and output. Studies that use DEA to model financial intermediaries show a wide variety of input and output specifications. As stated above, there is no general agreement about the components of banking inputs and outputs. However, in order to comprehend these tasks within DEA, it is significant to understand the related variables.

### 7.4.2.1 Input and Output variables

A survey of the relative literature shows the input and output variables widely used in financial institutions (Aly et al. 1990; Athanassopoulos 1998; Banker, Charnes & Cooper 1984; Berger & Humphrey 1992; Cooper, Seiford & Zhu 2004; Cummins & Weiss 2000; Elyasiani & Mehdiian 1995; Fukuyama 1995; Greene 2008; Kalirajan & Shand 1999). These variables are summarised in Figure 7.6 and Figure 7.7 respectively.

**Figure 7.6: Input Variables Used in Previous Studies in the Banking Field**

<b>Input Variables</b>	<b>Bank specific</b>	Branch size, number of computer terminals, number of banks, number of computers/office, and space/teller hours
	<b>Borrowed funds</b>	Borrowed money, and purchased funds
	<b>Capital</b>	Capital/equity and financial capital/net profits
	<b>Deposits</b>	Call, savings and demand deposits, funds from customers, retail and wholesale deposits, short term deposits, small de-nomination time deposits
	<b>Non-interest expenses</b>	Operating expenses, depreciation, non-establishment/establishment expenses, general costs, non-interest expenses, other expenses, and total cost)
	<b>Interest expenses</b>	Interest expenditure and interest spread
	<b>Fixed assets</b>	Fixed assets /net fixed assets, physical/net physical capital, net worth
	<b>Labour</b>	Clerical staff, labour salary average, labour: number / hours, managerial personnel, no. of staff, number of tellers, and personnel cost
	<b>Problem loans</b>	Credit loss cost, loan loss provisions, and problem loans
	<b>Others</b>	Banking funds, net funds from other banks, economic status of the area, income from non-banking sources, investments, loanable funds, market size, and environmental variables

<sup>88</sup> Expenses constitute a substantial portion of a bank's total costs and their exclusion may distort the empirical results.

**Figure 7.7: Output Variables Used in Previous Studies in the Banking Field**

<b>Output Variables</b>	<b>Bank specific</b>	Number of: business accounts, branches, employees, Service: hours, variety, Interest spread, and Transaction volume
	<b>Capital</b>	Net worth
	<b>Deposits</b>	Total deposits: value/number, New accounts (time savings, certificates of deposits), Core deposits, Customer deposits, Deposit withdrawals, Commercial accounts, Current accounts: value/number, Deposit not at call, Time and saving deposits. and Transaction deposits
	<b>Investments</b>	Earning assets, Investment/Investment securities/Bonds/Other, Liquid assets, other productive assets, and Securities
	<b>Loans &amp; advances</b>	Loans and advances/Net loan, Number of loans, loan maturity, Commercial / industry loans, Personal loans/Housing loans, Real estate loans, Non-housing loans, Interbank loans, Loans to other banks, Small loans/other loans, and No. credit applications
	<b>Non-traditional activity</b>	Non-traditional activity, Risk adjusted off-balance sheet activities, Risk-weighted assets, and Travellers' cheques
	<b>Revenue</b>	Income: banking /non-banking, Interest or Non-interest income: gross/net /average, Operating income/ other earnings, Revenues/ Net profits, Net commission income/fee-based income/ foreign currency
	<b>Other</b>	Annual average increase in total assets, Bills discounted, Borrowing, and interbank assets/ liabilities

#### 7.4.2.2 Data Definition

The sample data set represented 48 banks operating in the Middle East region (Libya, Bahrain, Qatar, United Arab Emirates and Jordan), that is, 24 Islamic banks and 24 conventional banks<sup>89</sup>. In addition, this study included banks that use different types of transactions such as aggregate and collateral loans. This period can be considered as the most active time period in the Middle East banking industry. During this period, crises hit Islamic economies after September 11, 2001 which led to a deterioration in financial institutions and a decrease in the international demand for investment in Islamic economies.

Since the currencies of the sample countries are different, for the purposes of this analysis, currencies are denoted in US dollars. This conversion facilitated the use of comparable data for analytical purposes. The use of unified data sets avoided the systematic bias produced by errors of measurement. In order to assess the impact of data heterogeneity on efficiency estimates, the research uses panel data from conventional banks and Islamic banks to examine the sensitivity of DEA estimated mean efficiency scores amongst banks—decision making units—and sample size. In order to assess the impact of heterogeneity in size on efficiency estimates, a two-stage process is undertaken:

- Each sample is stratified into more homogeneous sub-groups for DEA estimation presented in this study; and
- The whole sample and all sub-groups are regressed separately to explain variables impacting on the efficiency of lending decisions in both systems. This process is presented in section 7.6.3.

<sup>89</sup> Descriptive data for these banks were fully explained in chapter five (Section 5.5.2).

### 7.4.3 Model Specification and Scope

The process of developing a final model of service transaction/production is often interactive, with different combinations of inputs and outputs, and sometimes measures of inputs and output are trialled before a final model is reached (Berger & DeYoung 1996). This ensures the most appropriate measures for this study, that inputs and outputs are utilised in the assessment of relative efficiency, and also allows the sensitivity of the model to different specifications to be tested. Thus, several variables of efficiency were derived under CB and IB models and have been considered herein, as set out in Table 7.2.

**Table 7.2: Preferred Model Specification for CB and IB System**

INPUTS		OUTPUTS	
<i>CB system</i>	<i>IB system</i>	<i>CB system</i>	<i>IB system</i>
➤ Total deposits	➤ Total deposits	➤ (ROE) & (ROA).	➤ (ROE) & (ROA).
➤ Operation costs	➤ Operation costs	➤ Revenues; (Pre-tax returns + interest income )	➤ Revenues; (Pre-tax returns + non-interest income)
➤ Interest expenditure	➤ Non-interest expenditure	➤ Loans (investment): loans & advances	➤ Loans (investment): loans & advances
		➤ Risk weighted assets*	➤ Risk weighted assets*
		➤ Annual average increase in total assets	➤ Annual average increase in total assets

Return on Equity (ROE) = net income/shareholder equity.

Return on Assets (ROA) = net operation income/total assets.

\*Capital to Risk (weighted) Assets Ratio (CRAR) = Capital/Risk.

Where: Risk weighted Assets ratio respective national regulator's minimum total capital requirement. Cash & Government bonds have a 0% risk weighting, mortgage loan have a 50% risk weighting and others loans have a 100% risk weighting.

Both conventional banking and Islamic banking systems attempt to ensure that their lending decisions are made within a rational policy framework. The focus in this study is to examine whether they are different in terms of maximising the efficiency of lending activities (maximising banks' outputs). To examine this question, the output needs to reflect the rational strategy of lending decision-making. In this study, the rational strategy of lending decision-making is measured by the quantity of successful loans across all transaction categories quantified by risk weighted price (*called risk weighted assets*).

The inclusion of other income, non-interest income and risk factors' assessment in the analysis is particularly important, as Islamic banks have been very creative in avoiding interest rate products creating the movement from conventional financial intermediation into off-balance sheet and fee income-generating business (Amirteimoori & Shafiei 2006; Zaman & Movassaghi 2001). As a result, concentrating completely on earning assets would be insufficient to capture the overall output of the Islamic banking industry. Furthermore, the total loans of Islamic banks in the sample consist of mostly Islamic transactions. In the case of conventional banks, charging of interest and giving interest on deposits to the customers is permitted in the transaction policy.

Unfortunately, the provision of different products will, however, affect operational costs of the financial institutions (Yu & Neus 2005). For example, the average size of the bad loans provision of transaction account versus the fixed deposit account will affect operating costs. The type of credit will be a function in the loan value and value securitisation, and requires additional monitoring. Table 7.3 shows the types of data used to construct the DEA model. A detailed descriptive definition of each item is given in Appendix P.

Table 7.3: Detailed Definition (Data 2002-2006)

Inputs	Units
➤ Total deposits ( <i>for both</i> )	Monetary US \$
➤ Operation costs ( <i>for both</i> )	Monetary US \$
➤ Interest expenditure ( <i>for CB</i> )	Monetary US \$
➤ Non-interest expenditure ( <i>for IB</i> )	Monetary US \$
Outputs	Units
<i>Traditional activities:</i>	
➤ Profitability ratios: return on equity (ROE)* and return on assets (ROA)*.	Percentage %
➤ Revenues; (Pre-tax returns + interest income ) ( <i>for CB</i> )	Monetary US \$
➤ Revenues; (Pre-tax returns + non-interest income) ( <i>for IB</i> )	Monetary US \$
➤ Loans (investment): loans & advances ( <i>for both</i> )	Monetary US \$
<i>Non-traditional activities:</i>	
➤ Risk weighted assets ( <i>for both</i> )	Percentage %
➤ Annual average increase in total assets ( <i>for both</i> )	Percentage %

The data supplied by conventional banks and Islamic banks for returns on the lending portfolio performance over the period 2002 to 2006, included information on:

- The input used to provide outputs (monetary values).
- Profitability and liquidity rates are treated as percentages (%) to such *DMUs*
- Assets grouped into good and bad credits.

In this study, the frontier is estimated using the output-oriented model outlined in section 7.3. However, the effect of the input/output set is addressed by using two models. Model-1 has total deposits, operation costs and interest/non-interest expenditure inputs. Outputs are included profitability ratios ROE and ROA; revenues (pre-tax returns plus interest—income) or, for IB, pre-tax returns plus non-interest income and loans (investment); loans and advances (traditional banks' activities). However, Model-2 is less aggregated: the inputs are total deposits, operation costs and interest/non-interest expenditures, but two more outputs are specified as non-traditional banks activities; risk weighted assets (CAR) and annual average increase in total assets.

#### 7.4.4 Relative Efficiency to Rational Lending Decision-making

A large number of studies have examined how the financial industry has some reaction—positive/negative—against the variety of policy issues or new regulations that are introduced by institutions' regulators (Ahmad & Haron 2002; Alessi 1983; Beck, Cull & Jerome 2005). Particularly in the lending field, uncertainty in decision-making dominates these policies (Coulson & Monks 1999). Since the behaviour of the financial services industry directly influences the performance of overall economic activities, the diversity of banking systems also has some impact on the financial industry itself. In this sense, regulators generally attempt to introduce more productive policies for maximising overall production/services operations and effective performance.

At this point, the outcomes of implemented policies or specific regulations must be evaluated to identify the most productive policy for rationalising decision making processes. Therefore, the success or otherwise of such transactions upon the variables of input/s that have been processed for lending decision making needs to be established. Hence, this particular issue is popular in efficiency studies relating to deregulation, risk

factors assessment, effective lending decision making policies, and ownership structure of the banks—all of which have been included for analysis in this study.

As mentioned previously, prior DEA studies provide useful managerial information on improving performance, particularly in the efficiency of making lending decisions (Huang & Wang 2001). However, the ability of DEA to model multiple-input and multiple-output relationships without prior underlying concerns, for example, bank failure prediction (Berger & DeYoung 1996), market prices (Seelanatha 2007), or corporate governance (Suleiman 2000), resulted in the methodology for this study being designed to measure the relative efficiency where parametric data are not available.

## **7.5 Empirical Findings**

This section will detail the results and answer the third principal research question of the relative efficiency level of CBs and IBs as found within the sample used to construct the grand frontier. An output oriented envelopment analysis model is dedicated to the assessment of whether CB or IB operations were more efficient, based on a comparison of average efficiency measures between the CB and IB systems. In addition, it presents an analysis of results on whether CBs outperformed IBs over the study period (2002-2006).

### **7.5.1 Comparative Analysis for Efficiencies between IB and CB**

#### **7.5.1.1 The Differences between IB and CB Efficiency Levels**

The key research objective in this chapter is to investigate the empirical evidence relating to efficiency of lending decision making in terms of ‘credit performance’ between Islamic banking and conventional banking systems, benchmarked to efficient banks operating in the ME. Therefore, the evidence will be examined using financial statements data, which enable the decomposition of efficiency into technical efficiency TE, pure technical efficiency PTE, and scale efficiency SE. Detailed efficiency scores are provided in Appendix Q. The sample is decomposed into three main groups; large, medium and small banking size<sup>90</sup>. These efficiencies are compared in three categories of IB as well as CB: small Islamic and conventional banks (SIB & SCB); medium Islamic and conventional banks (MIB & MCB); large Islamic and conventional banks (LIB & LCB)

##### **7.5.1.1.1 Small IB vs. Small CB**

The presentation of data is begun by considering the TE results for small conventional and Islamic banks during five years (2002-2006). With reference to Figure 7.8, it is noted that throughout 2002-2006, small conventional banks (SCB) were the most efficient banks on average relative to increasing returns to scale (IRS) in the study. Within 2003, small conventional banks (SCB) were almost as efficient 0.94, and followed closely by small Islamic banks (SIB) at 0.90. There was, however, a considerable gap between the most efficient small conventional banks (SCB) and increasing returns to scale (IRS) in 2004 with an average score of 0.94 and 0.85 respectively.

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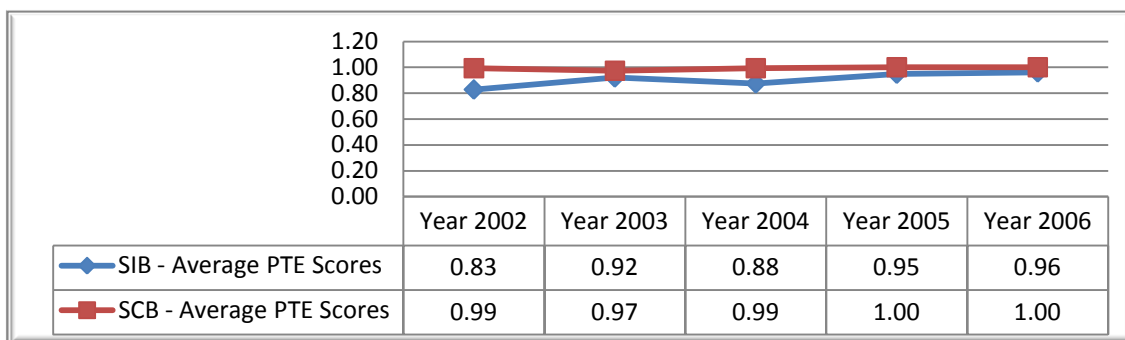
<sup>90</sup> Previous studies classified financial institutions according to regional indexes which were based on regional financial market indicators. Following Elyasiani and Mehdian (1995), this study adopts the absolute gross total asset as an index for categorising banks in both banking groups. ‘Large size’ is defined as those banks that have total assets larger than a billion US\$; and ‘small size’ that have total assets lower than 400 million US\$.

**Figure 7.8: TE (CRS) for SIB & SCB Categories (by period)**



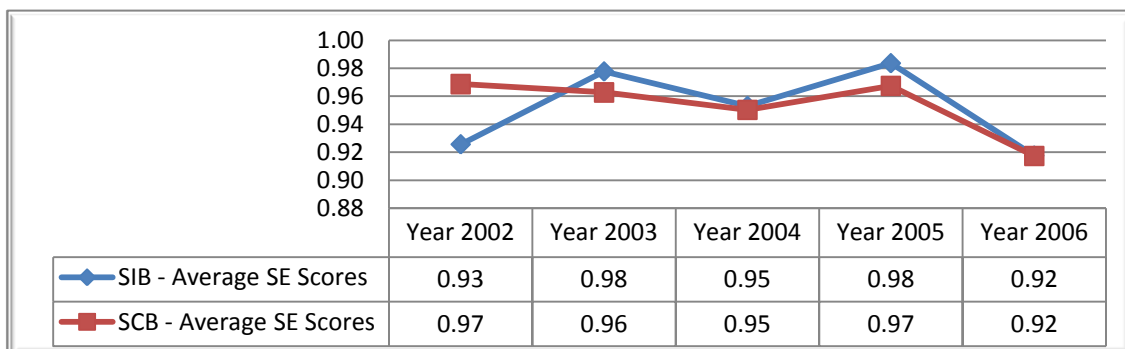
In terms of pure technical efficiency, Figure 7.9 indicates that variable returns to scale of small conventional banks (SCB) and small Islamic banks (SIB) have followed the same pattern of variable returns to scale over the examination period on average, and that small conventional banks (SCB) were more successful in allocating their inputs. As seen also from Figure 7.9, small conventional banks (SCB) were technically more appropriate in allocating their resources, and were operating efficiently during 2005 and 2006 (PTE =1.00).

**Figure 7.9: PTE (VRS) for SIB & SCB Categories (by period)**



Technically, Figure 7.10 shows that small Islamic banks (SIB) had a lower efficiency (0.92) than small conventional banks (SCB) efficiency (0.97) in terms of scale efficiency in 2002. Nevertheless, small Islamic banks' (SIB) efficiency value ranges fluctuated over time from 2003-2006, and seemed to outpace small conventional banks (SCB). However, due to the concurrent rise in the coefficient of variation of annual efficiency means, banks' efficiency scores became volatile over time. This indicates that banks' performances were diverging, but standard-practice banks, especially small and less efficient banks, generally managed to catch up with the best practice banks.

**Figure 7.10: SE (CRS/VRS) for SIB & SCB Categories (by period)**



**7.5.1.1.2 Medium IB vs. Medium CB**

Figure 7.11 depicts that both banking groups (Islamic and Conventional) with medium size did not boast very high levels of technical efficiency on average: medium Islamic banks (MIB) on average reported output level deterioration by 0.88 to 0.76 without increasing the level of input. Furthermore, although medium conventional banks (MCB) are shown to be the most efficient, their performance over the analytical periods was nevertheless inconsistent, as shown by their average coefficient of variation of 0.89 in 2003 to 0.85 in 2006. In contrast, the medium Islamic banks (MIB) technical efficiency scores increased slightly during 2005 to 0.91 and during 2006 to 0.96.

**Figure 7.11: TE (CRS) for MIB & MCB Categories (by period)**

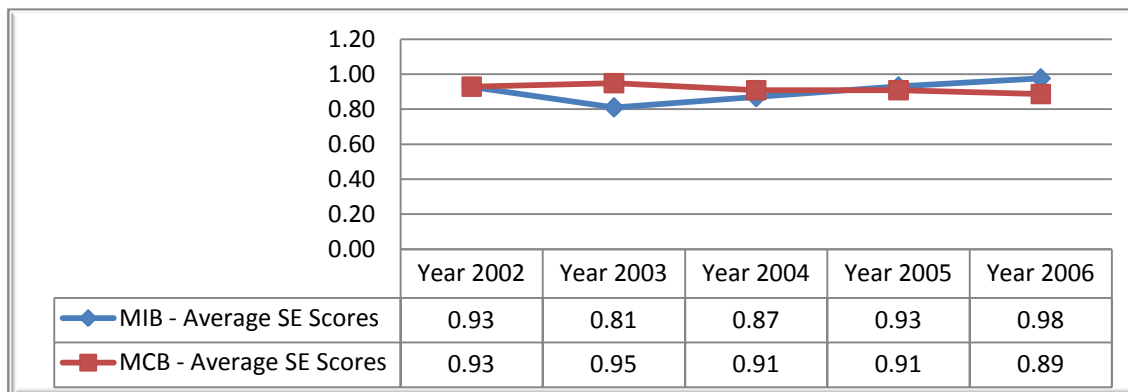


However, by contrasting TE with PTE, Figure 7.12 shows the measure of variation is small compared to all other banks' categories in terms of allocative efficiency. Medium conventional banks (MCB), in fact, had the most consistent performance according to variable returns to scale scores over the analytical period; medium Islamic banks (MIB), however, reported a better performance than medium conventional banks (MCB) in 2006 with scores of 0.98 and 0.96 respectively.

**Figure 7.12: PTE (VRS) for MIB & MCB Categories (by period)**



In terms of scale efficiency, Figure 7.13 depicts medium conventional banks (MCB) as performing much the same as medium Islamic banks (MIB) on average. Medium Islamic banks (MIB) started with a better performance (0.93), whereas for the duration of the following analytical periods 2003 and 2004, it was the least efficient with an average of only 0.81 and 0.87 respectively. There were slight increases in 2005 and 2006 with averages of 0.93 and 0.98 respectively. As also shown in Figure 7.13, both banking categories have experienced continuous decline on average over the time period.

**Figure 7.13: SE (CRS/VRS) for MIB & MCB Categories**

Overall, this finding indicates that efficiency differences across the sample data appear to be mainly determined by many factors, including default risk portfolio risks and lending decision making. Studies by Berger and DeYoung (1996), Mertens and Urga (2001), and Abdullah (2003) support the finding that problem loans precede reductions in measured efficiency; that efficiency precedes reductions in problem loans; and that reductions in capital at thinly capitalised banks precede increases in problem loans. Hence, efficiency may be an important indicator of future problem loans and problem banks.

### 7.5.1.1.3 Large IB vs. Large CB

Figure 7.14 reveals that large Islamic banks (LIB) technically were operating more efficiently than large conventional banks (LCB) during the period 2002-2006, with average scores of 0.93, 0.86, 0.83, 0.91, and 0.83 respectively. Both banking categories were mostly operating with decreasing returns to scale (DRS), although large conventional banks (LCB) managed to attain a fairly high score of 0.73 in 2002. However, mostly large Islamic banks (LIB) operations achieved the highest level of constant return to scales throughout 2002-2006. Hence, only a few banks managed to attain increasing returns to scale (IRS) consistently through to 2006.

**Figure 7.14: TE (CRS) for LIB & LCB Categories**

Figure 7.15 shows that there is considerably less efficiency variation between large Islamic banks (LIB) and large conventional banks (LCB) categories on a year to year basis, except that large Islamic banks (LIB) appear significantly efficient (0.94) in 2003. Likewise, large conventional banks (LCB) and large Islamic banks (LIB) were attaining quite high performance, which indicates that large conventional banks (LCB) and large Islamic banks (LIB) were quite heterogeneous even within the same banking group.



Overall, the results suggest that both large conventional banks (LCB) and large Islamic banks (LIB) suffered slight inefficiencies in operations after the Gulf War crisis.

Figure 7.15: PTE (VRS) for LIB & LCB Categories

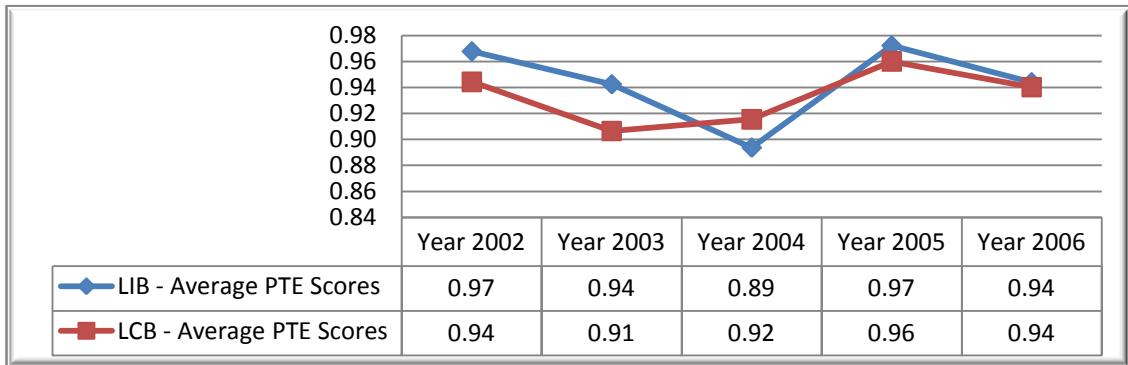


Figure 7.16 highlights the scale efficiency scores for large Islamic banks (LIB) and large conventional banks (LCB) over the analytical period. Again, large Islamic banks (LIB) show higher performance than large conventional banks (LCB) over the time period (from 2002 to 2006) in terms of scale size efficiency. This indicates that large Islamic banks (LIB) have a greater ability to gain scale economies arising from the optimal/ideal scale size than large conventional banks (LCB), which experienced lower response to scale economies changes.

Figure 7.16: SE (CRS/VRS) for LIB & LCB Categories (by period)



Similar to technical efficiency of these large banks (see Figure 7.14), the range of scale size changes was almost constant over all analytical periods, whilst revealing a gradually declining pattern. However, the results were inclusive and it cannot be concluded that banks are converging in terms of SE.

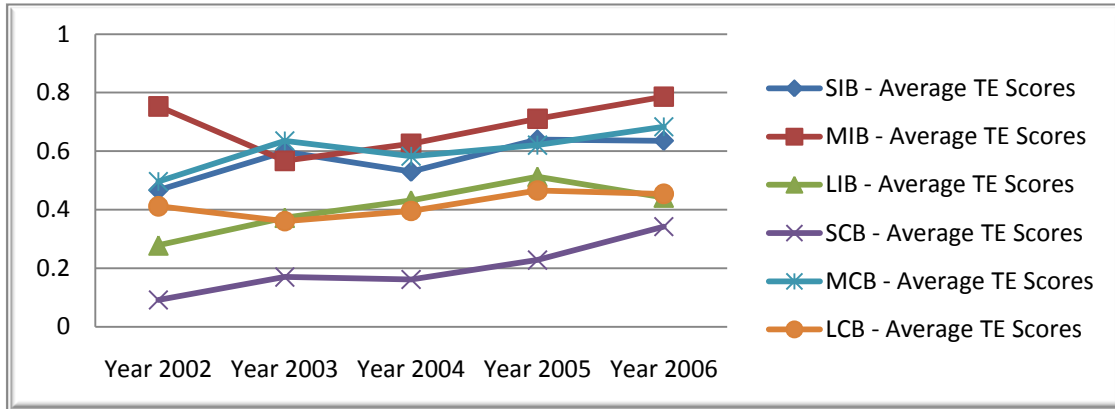
### 7.5.1.2 Overall Efficiency Scheme of the Banks

This section illustrates how TE, PTE and SE can be monitored on average within overall IB and CB systems. Figure 7.17 shows the relative TE scores—on average—of six banking categories: small Islamic banks (SIB), small conventional banks (SCB), medium Islamic banks (MIB), medium conventional banks (MCB), large Islamic banks (LIB) and large conventional banks (LCB).

As seen from Figure 7.17, medium Islamic banks (MIB) were mostly dominant in terms of technical efficiency in the 2002 and 2006 periods with average scores of 0.75 and 0.79 respectively. Medium conventional banks (MCB), typically, were seen to operate with the

best technical efficiency scale in 2003 with average scores 0.64. However, small conventional banks (SCB) show the lowest scores of efficiency (0.09) among all banking sizes, in contrast to the small Islamic banks (SIB) which performed better than large Islamic banks (LIB) and large conventional banks (LCB) overall in the analytical period.

Figure 7.17: TE (CRS) for All CB & IB Categories



Decomposing technical efficiency into pure technical efficiency and scale efficiency allows an insight into the source of inefficiencies. It also helps determine whether banks have been operating at optimal, increasing or decreasing returns to scale. Hence, the variable returns to scale represent pure technical efficiency, that is, an implication of a measure of efficiency without scale size efficiency.

Figure 7.18: PTE (VRS) for All CB & IB Categories

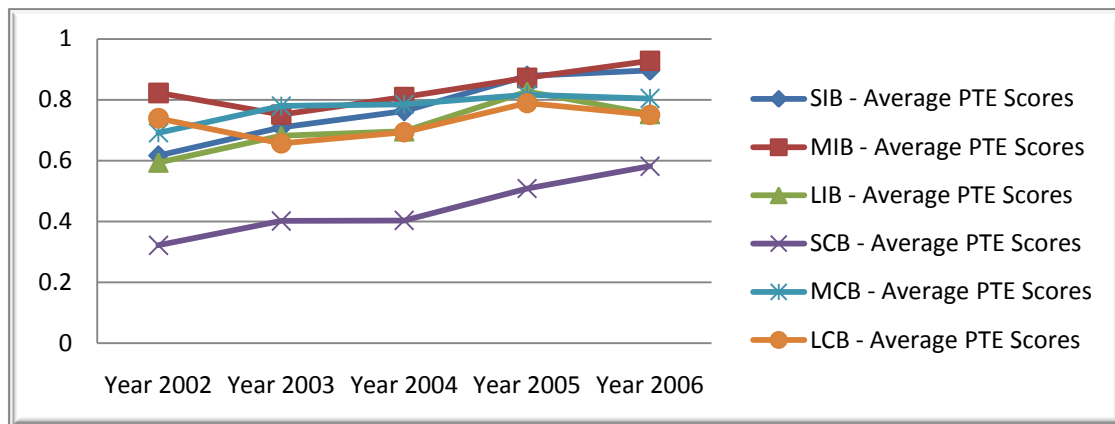
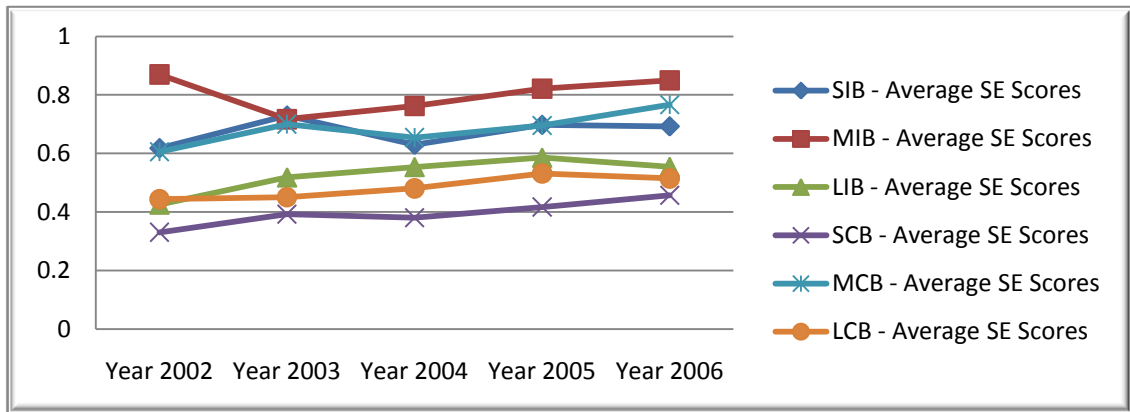


Figure 7.18, therefore, shows the nature of PTE among the banks' categories, and highlights the fact that medium Islamic banks (MIB) operate with the best scale size, realising average PTE of 0.82, 0.81 and 0.93 in 2002, 2004 and 2006 respectively, followed by medium conventional banks (MCB) with 0.78 in 2003 and small Islamic banks (SIB) with 0.88 in 2005. Even though LIB and large conventional banks (LCB) showed slightly different scale efficiencies in 2002 (0.59, 0.74 respectively), they were, however, not far behind and followed a similar pattern in the overall analytical periods. In contrast, a similarity was also apparent in measures of PTE variability for small conventional banks (SCB)—which appears consistent with TE once scale size has been considered.

Nevertheless, the impact of scale size on relative efficiency was also assessed. Figure 7.19 exhibits that medium Islamic banks (MIB) recorded the highest performance (0.87)

in 2002 in terms of SE, followed by small Islamic banks (SIB) (0.62) on average. Figure 7.19 shows also that small conventional banks (SCB) were the most heterogeneous in terms of SE performance and when analysed across time both large and small conventional banks (LCB & SCB) had the most varied scale efficiency scores among banks' size. On the other hand, the nature of scale returns for all bank categories indicate that some banks are operating at decreasing returns to scale, while others are at optimal returns to scale or increasing returns to scale, which means that a rise in inputs will lead to a proportionate rise in outputs.

Figure 7.19: SE (CRS/VRS) for All CB & IB Categories

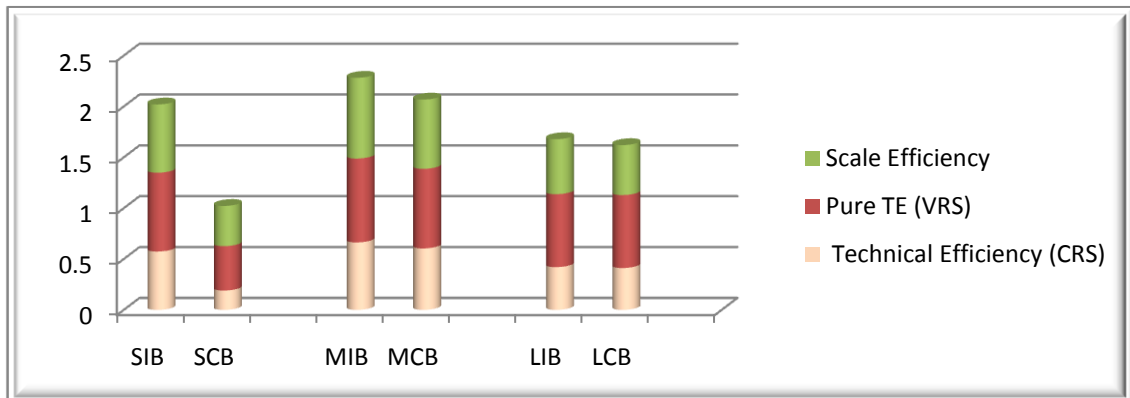


As noted from analysis of banks' scale size, decreasing returns to scale (DRS) dominated CB and, in large conventional banks (LCB), decreasing returns to scale DRS were most prevalent. However, increasing returns to scale (IRS) were reported in both small conventional banks (SCB) and small Islamic banks (SIB), but large Islamic banks (LIB) seemed to have exhausted these to the optimum level. Medium conventional banks (MCB), on the other hand, were operating with better scale sizes with fair shares in both increasing returns to scale (IRS) and decreasing returns to scale (DRS).

7.5.1.3 Summary of DEA Performance

On balance, the incentive of maximising the optimality of banking services provided was considered to be the most appropriate driver of productivity gains. Therefore, the principal results reported in these sections were derived by imposing the assumption of constant returns to scale (CRS) and variable returns to scale (VRS) on each of the models outlined above.

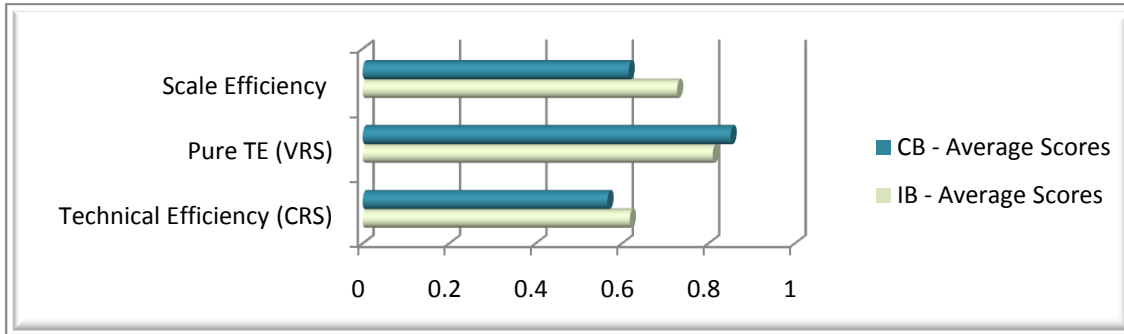
Figure 7.20: Efficiencies Coefficient for All CB & IB Categories



Note: efficiencies results were observed over a window of three years time.

To conclude, Figure 7.20 depicts the average of three efficiencies scales; 1) technical efficiency scores; 2) pure technical efficiency scores and; 3) scale efficiency scores for all banks categories, and indicates which banks' size is calculated by the model to be on the efficient (best practice) frontier—those with a score of 1—and which are calculated to be less efficient relative to banks on the frontier. (See Appendix O for more information.)

**Figure 7.21: Efficiencies Coefficient for IB & CB Systems**



*Note: efficiencies results were observed over a window of three years time.*

Furthermore, Figure 7.21 exhibits that the overall TE of Islamic banks on average was 0.62, which was higher than the conventional banks with an average of 0.57. This result indicates that the Islamic banking system was somewhat more efficient than the conventional banking system—on average—in terms of rational decision making for resources usage. In contrast, in terms of PTE, the conventional banking system shows better resource allocation than the Islamic banking system, on average, with scores of 0.85 and 0.81 respectively. Finally, in terms of SE, Figure 7.21 shows that the Islamic banking system ranks higher on scale performance (with an average of 0.73) than the conventional banking system (average of 0.62) within the sample under analysis.

## 7.5.2 Trend Analysis of Banking Performance between 2001-2006

### 7.5.2.1 Trend Analysis of TE

**Figure 7.22: TE (CRS) for IB & CB Categories (by period)**



*Note: efficiencies results were observed over a window of three years time.*

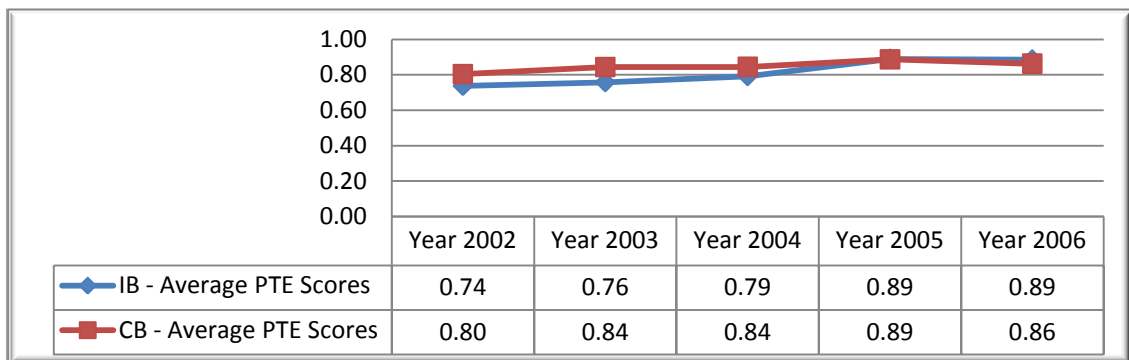
Figure 7.22 charts the trends for the annual DEA technical efficiency TE scores for both banking systems, CB and IB, over the study period. It shows that both banking systems suffered increased inefficiency between 2002 and 2004 with averages of 0.57 to 0.56 in the conventional system and 0.60 to 0.58 in the Islamic system, before a slight recovery in 2005 in both CB and IB systems (0.59 and 0.69 respectively) with the banks becoming more efficient again. Although the efficiency trends for IB and CB were very similar, IB

experienced better technical efficiency over the study period. In brief, efficiency trends for both banking systems continued to decline in early 2003 and throughout 2004, and later improved during 2005—even as both banking systems charted a different course.

### 7.5.2.2 Trend Analysis of PTE

The variable returns to scale for CB and IB over the study period are exhibited in Figure 7.23. For both banking systems' operations, PTE scores revealed the most inefficient levels occurred in the first three periods. This general performance deterioration was largely due to a deep contraction in PTE (allocation of sources), especially in CB, indicating that banks were somehow oversized and overstaffed and more vulnerable to the effects of the crisis in the Middle East. The narrowing range and slight improvements in efficiency in 2005 and 2006 also suggests that banks of both systems were becoming more homogeneous in terms of PTE levels, as the less efficient banks managed to catch up with the best banks. The efficiency recovery, however, was largely attributed to sharp improvement in PTE among both CB and IB operations alike, as Figure 7.23 suggests.

Figure 7.23: PTE (VRS) for IB & CB Categories (by period)



Note: efficiencies results were observed over a window of three years time.

### 7.5.2.3 Trend Analysis of SE

A further extension in analysing the efficiency trends is SE. SE allows specifically benchmarking all differences in the operating environment. During 2003 and throughout 2004, decreasing returns to scale (DRS) were prevalent among CB and IB systems. Since the higher gap—SE value—was recorded twice in 2003 and 2005, as depicted in Figure 7.24, it highlights once again that banks' performance was not only deteriorating, but deviating from each other as well. Figure 7.24 reveals that the highest variation was attributed to both CB and IB.

Figure 7.24: SE (CRS/VRS) for IB & CB Categories (by period)



Note: efficiencies results were observed over a window of three years time.

Thus, banks' systems were quite heterogeneous in terms of their performance. Perhaps this, in turn, is linked to common trigger factors and common organisational and financial market structures.

### **7.5.3 Banking Efficiency Analysis: Statistical Approach**

To investigate factors that may influence the estimated efficiency and productivity gain, many different techniques have been applied in prior studies, for instance, multivariate analysis, the longitudinal graphical approach and other non-parametric approaches such as DEA itself (Seelanatha 2007; Thanassoulis, Boussofiane & Dyson 1996). Among these approaches, multivariate analysis is the most important technique and is widely used in similar studies. This approach considers DEA-estimated efficiency scores as dependent variables and a range of other factors as explanatory variables. This approach has many advantages over other approaches, the most important one being it offers multivariate regression analysis (Levine et al. 2005).

#### **7.5.3.1 Determinants of Banking Efficiency and Model Specification**

It must be noted that the sample of 48 banking units represents the enlarged sample that includes conventional commercial banks and Islamic banks regardless of transaction instruments scope and market/economic environment. The DEA is initially applied with this sample—universal and separately—to project common grand frontiers to enable the derivation of TE indices and banks' trends. This approach provides the simplest and most direct way of comparing efficiency levels of all banking units relative to one another as a group, and all banking units in such systems together as different groups.

However, this approach is not by any means the most accurate and desirable. (Avkiran 2000) explains that one major limitation of generating TE scores using large samples is that one needs to estimate that all decision making units (*DMUs*) share the same efficiency frontier. However, this estimation may be too far-fetched if decision making units within a sample operate within a different ideology are subjected to different regulatory environments, are of different asset size, or differ by skill and transaction instruments type. In such circumstances, efficiency differences are likely to prevail and it can be difficult to attribute this to either differences in characteristics or actual operations on an equal footing (Avkiran 2000).

'Previous empirical studies present mixed evidence of factors affecting the estimated efficiency scores of banks. However, methodological different as well as differences in regulatory and economic environments, have greatly influenced the outcome of these studies. Thus, the comparison of these results with other research needs careful analysis' (Seelanatha 2007, p. 142). The quotation indicates that previous studies produced dissimilar evidence on factors affecting bank's performance (Ahmad 1995; Berger & DeYoung 1996; Casu, Girardone & Molyneux 2004; Charnes, Cooper & Rhodes 1979; Cummins & Gullone 2000; Warapatr et al. 1986; Zaman & Movassaghi 2001). Nonetheless, the main implication found in these studies is that the relationships among efficiency, productivity and other factors are inconsistent.

In terms of Specification of the Model, despite other research in the same area selecting different combinations of variables according to the objectives of their analysis, this study gives a greater weight to the regulatory and reactionary factors by addressing lending policy matters, banking activities and loan problem particularly. However, for the general

assessment of efficiency, similar studies have selected variables from the sample environment that may assist in identifying efficiency determinants. Worthington and Dollery (2002) asserted that the examination of factors such as agency problem, regulator and institutional structure, risk management, size and technology in a study aims to identify appropriate DEA-estimated scores.

In general, variables used in this model were divided into five main groups, namely, banking management system; banking environment; banking skill; banking size; and banking system. Broadly, variables under these groups can be presented in three main areas; 1) microeconomic factors; 2) macroeconomic factors; and 3) non-economic factors (Seelanatha 2007). However, some of these variables have limited influence over a particular industry, segments such as input utilisation, and the institution system and management style. On the other hand, the rest of the variables in the banking models are exogenous factors such as market share prices, market interest rate and market volatility, which may not be controlled through managerial decision. Thus, variables were presented in this model as a bank's determinants may influence the improvement in efficiency gain of financial institutions operating in ME.

Since many researchers have often focused on the assets side of the balance sheet for financial analysis purposes, this study uses absolute size based on gross total assets. This is one of the best proxies available on financial intermediation size (Boyd & Runkle 1993). Since a bank's size and activity are one of the main construct measures of banks' performance, the model of efficiency of such banking systems is as follows:

$$\begin{aligned} \xi_{CB,IB} = & \alpha + \beta_i x_{(SA)i,t} + \beta_i x_{(IE)i,t} + \beta_i x_{(BSk)i,t} \\ & + \beta_i \log x_{(L,M \& S)i,t} + \beta_i x_{(0,1)i,t} + \varepsilon_{i,t} \end{aligned} \quad (7.1)$$

Where;

- $\xi_{CB,IB}$  = Technical efficiency of Islamic and conventional banking systems.
- SA* = Banking management system applied variable which is represented by transaction volume, specialisation in financial services provision, services range and affiliation to the network.
- IE* = Industry environment variable which is represented by corporate governance, profitability and liquidity of the bank, transformation scope and location.
- BSk* = Banking skill variable which is represented by lending portfolio structure, capital adequacy, risk assessment, decision making policy and staff productivity.
- BSi* = Bank's size which is considered as a proxy variable and is presented by volume of total assets: large, medium and small.
- BSy* = Banking system differentiation variable which is considered as a dummy variable and is represented by Islamic banking system=0; conventional banking system=1.

Testing banks' efficiencies may need control of efficiency by a bank's size, defined as the natural logarithm of the bank's total assets, and which may serve as proxy of performance for both conventional banking and Islamic banking systems. A similar Australian study by the Steering Committee for the Review of Commonwealth/State Service Provision (1997) utilised the unit's size as a proxy, arguing that input availability and expected differences in operating structure and size (output) are practical issues encountered in applying DEA.

Having considered the previous studies, this study uses the multivariate regression analysis approach to examine the factors defined above, and examines their influences on

banking performance. The empirical model used is taken from the literature which investigates the explanatory variables of efficiency of *DMUs*. Most studies that used a similar technique have conducted two-stage procedures to regress the point estimation of efficiency with a number of explanatory variables. This is performed, firstly; by an estimation of efficiency scores based on DEA model (analysis in sections 7.5.1 and 7.5.2 above), then estimated efficiency scores are regressed with rang of explanatory variables which will be analysed in this part.

### 7.5.4 Testing the Selected Model - (H3)

Descriptive statistics for the dependent variables and independent variables used in the regression model are presented in Table 7.4. The average of estimated technical efficiency score for banks classified according to the banking size—large, small and medium—is 0.89. This score is slightly higher than the estimated technical efficiency score when the same banks were considered without classification, or classified according to the banking system (0.56 and 0.68 respectively). These figures confirm that the size of banks possibly affects the banks' efficiency and then overall performance.

**Table 7.4: Descriptive Statistics of Bank-Specific Variables (\$ million)**

Feature	Mean	Median	Std. Dev.
Technical Efficiency - Overall	0.57	0.59	0.38
Technical Efficiency – by System	0.68	0.92	0.36
Technical Efficiency – by Categories	0.89	1.00	0.22
Bank Size (total assets)	\$3533.470	\$1227.791	\$7737.614
Affiliation to the Network (contribution to the society)	40.43%	14.56%	69.73%
Services Range (number of branches)	31.7	27	21.65
Profitability (return to assets)	2.84%	2.00%	3.88%
Liquidity (liquid assets/total assets)	0.57%	0.21%	1.76%
Location- Economy Power (per capita)	33.32%	33.90%	23.96%
Lending Structure (total loans / total assets)	0.14%	0.05%	0.28%
Capital Structure (total equity / total liabilities)	0.60%	0.19%	1.47%
Decision Making Policy (total loans approved)	\$688.47	\$58.40	\$1421.03
Risk Assessment (default loans)	12.77%	8.12%	13.82%
Staff Salary (Productivity)	\$28.69	\$12.96	\$40.96

**Note:** descriptive statistics summarise panel data, and the means, medians and standard deviations are calculated for all observations throughout the period of study (from 2002 to 2006)

The results of the mean, median and standard deviation of each variable in Table 7.4 show no outliers among the explanatory variables which may affect the estimated regression coefficients. In relation to banks' size, the median of total assets value is \$ 1227.791 million on average—these data include very small banks (\$ 17.803 million), as well as large banks (\$ 6927.617 million). Furthermore, the mean of the banking affiliation to the network is 40.43% which is measured by the proportion of each bank's contribution to the community. Moreover, the average of the proportion of total equity on total liabilities is 59.5%—an indication of the capital structure of banks. Nevertheless, the test indicated that total loans approved during the study period was \$ 688.47 million on average—among them 12.77% are classified as default loans. For the period of study, the median of bank branches is almost 27 branches on average (with range of 2 branches the lowest; to 86 branches the highest)—an indication of the volume of banks' services range.



Appendix R presents the correlation matrix of the dependent and independent variables. Coefficients of the correlation show that there are no independent variables utilised in the model with a high coefficient of correlation (i.e. more than 0.6), except banking categories variable which shows few high coefficients with other variables. This suggests that there is no evidence of multicollinearity<sup>91</sup> among variables used in this model which may affect results of the test. Furthermore, test of homogeneity of variance, the Levene's test for equality of variance between groups in this model, reveals that the result is significant ( $p < 0.05$ ). This suggests that variances for the each group are not equal and, therefore, violates the assumptions of homogeneity of variance.

#### 7.5.4.1 Confirmatory Analysis

Table 7.5 presents statistics of a fitted *Tobit* regression equation. As can be seen from Table 7.5,  $R^2$  values were fairly highly estimated in three sets of regression: 1) estimated overall technical efficiency scores TE\_O; 2) estimated technical efficiency scores by banking system TE\_S; and 3) estimated technical efficiency scores by banking categories TE\_C. This indicates that all regressions were able to explain the influence of the variables on estimated technical efficiency scores by 30%, 38% and 32% respectively. The estimated Jarque-Bera test of normality for the TE\_O and TE\_S provides sufficient evidence to support the assumption that residuals of the regression estimates are fairly normally distributed (6.96 and 8.05 respectively). However, recorded Jarque-Bera test for the TE\_C shows that residuals of the regression may not be normally distributed (144.59).

7Table 7.5: Statistics of a Fitted Regression Equations

TOBIT Regression (ML - Censored Normal)			
Explanatory variables	TE_O	TE_S	TE_C
R-squared	0.30	0.38	0.32
Adjusted R-squared	0.27	0.35	0.27
Mean dependent var	0.57	0.68	0.89
S.D. dependent var	0.38	0.36	0.22
Jarque-Bera	6.96	8.05	144.59

Table 7.6 presents *Tobit* regression results, and the following discussion considers the implication of the findings of three regressions based on the various constructs employed in the model, as specified in section 7.5.4.

#### ***Firstly: Bank Size***

As noted above, the controlling role of bank size observed in this study will apply for the Islamic and non-Islamic banking systems. The *Tobit* regression is performed to confirm the hypothesis that large size banks operate more efficiently than small or medium size banks. Consequently, the independent variable (bank size) is treated as a control variable—normal logarithm of total assets—in order to investigate whether the size influences banking efficiency or not. Table 7.6 shows that for the total assets owned there is a statistically positive significant relationship with estimated TE\_O scores ( $z = 10.11$ ,  $p < 0.01$ ) and TE\_S scores ( $z = 4.795$ ,  $p < 0.01$ ) on average. However, the same variable reveals a statistically negatively significant relationship with estimated TE\_C scores ( $z = -4.265$ ,  $p < 0.01$ ). Thus, it is important to observe that different size of identities have different implications for the efficiency of financial institutions in the finance industry.

<sup>91</sup> The assumption is that the samples are obtained from populations of equal variances meaning that the variability of score for each group technical efficiency scorer is similar.

**Table 7.6: Tobit Regression Results**

<i>TOBIT Regression (ML - Censored Normal)</i>			
<i>Explanatory variables</i>	TE_O <i>z-Statistic</i>	TE_S <i>z-Statistic</i>	TE_C <i>z-Statistic</i>
Banking Size	10.11*	4.795*	-04.265*
Services Range	-2.118**	-5.616*	-1.347
Affiliation to Network	-0.716	-1.240	-0.362
Profitability	0.106	0.481	2.116**
Liquidity	3.225*	2.899*	2.569**
Location-Economy Power	-3.386*	-5.472*	-3.068*
Lending Structure	8.000*	4.276*	1.079
Capital Structure	-0.615	-0.601	-1.540
Risk Assessment	4.992*	1.783***	0.582
Decision Making Policy	-3.159*	-2.888*	-1.993**
Staff Salary (Productivity)	-1.613	-1.965**	-0.168
IB - (BSY, TOT, SISP, COB, TS)		6.988*	
CB - (BSY, TOT, SISP, COB, TS)		5.800*	
SIB - (BSY, BCAT, TOT, SISP, COB, TS)			16.08*
MIB - (BSY, BCAT, TOT, SISP, COB, TS)			13.34*
LIB - (BSY, BCAT, TOT, SISP, COB, TS)			12.00*
SCB - (BSY, BCAT, TOT, SISP, COB, TS)			14.45*
MCB - (BSY, BCAT, TOT, SISP, COB, TS)			12.02*
LCB - (BSY, BCAT, TOT, SISP, COB, TS)			10.26*

**Note:** [ \* indicates significant coefficients under 0.01 confidence level, \*\* indicates significant coefficients under 0.05 confidence level, \*\*\* indicates significant coefficients under 0.10 confidence level].

Five explanatory dummy variables are used in the model [BSY: Banking System (IB & CB), BCAT: Banking Categories (SIB, MIB, LIB, SCB, MCB & LCB), TOT: Technique of Transactions, SISP: Specialisation in Services Provision, COB: Composition of the Board, TS: Transformation Scope]

### **Secondly: Bank system Applied**

The explanatory variable, bank system applied, is numerical: the subject is characterised by banking services range and affiliation to the network. These variables were regressed with TE\_O, TE\_S and TE\_C. Based on the nature of these variables, *Tobit* regression was performed and the result is provided in the Table 7.6. Services range, which is represented by the number of bank branches, has a statistically negatively significant relationship with only estimated TE\_O scores ( $z = -2.118$ ,  $p < 0.05$ ) and TE\_S scores ( $z = -5.616$ ,  $p < 0.01$ ). This means that the range of bank services at the categorical level (large, medium and small) may not significantly affect banks' technical efficiency. Nevertheless, the model reveals that there is no statistically significant relationship between banks' affiliation to the network and estimated banking technical efficiency scores for all regression sets.

### **Thirdly: Bank Environment**

The explanatory variable—the bank environment—is based on three numerical variables: bank profitability, bank liability and bank location. The result, presented in Table 7.6, reveals that only TE\_C has a statistically positive significant relationship with banks' profitability. Additionally, bank liquidity has a statistically positive significant relationship with all sets of the regression (TE\_O:  $z = 3.22$ ,  $p < 0.01$ ), (TE\_S:  $z = 2.899$ ,  $p < 0.01$ ) and (TE\_C:  $z = 2.569$ ,  $p < 0.05$ ). Furthermore, the results of TE\_O, TE\_S and

TE\_C regressions, shown in Table 7.6, reveal that estimated banking technical efficiency scores are statistically significantly affected by the location of the bank ( $z = -3.886, -5.472$  and  $-3.068, p < 0.01$  respectively). The results for this study are not unexpected given the geographical location of the banks sample. This is consistent with results of a study by Carling and Lundberg (2002) which reports that banking circumstances include economy power that may have a potential influence on bank stability and bank lending.

#### **Fourthly: Banks' Skills**

The independent variable is also numerical: the banks' skill is associated with lending structure, capital structure, risk assessment, decision making policy and staff productivity. Based on the nature of the variables, a *Tobit* regression was performed and the results are shown in Table 7.6. In terms of capital structure, the result shows that capital structure does not influence operating technical efficiency of both IB and CB, even when the size of these banks is controlled. However, the result shows that lending structure has a statistically positive significant relationship with only estimated TE\_O and TE\_S scores ( $z = 8.00$  and  $4.276, P < 0.01$  respectively). This means that lending structure is not necessarily related to the size (i.e. small, medium or large) of banks.

Throughout differentiating the sample of banks to Islamic and non-Islamic, the result reveals that staff productivity has a statistically negative significant relationship with estimated banking efficiency scores ( $z = -1.965, p < 0.05$ ). Table 7.6 also shows that decision making policy has a statistically negative significant relationship with banking technical efficiency over the three sets of regression (TE\_O:  $z = -3.159, p < 0.01$ ), (TE\_S:  $z = -2.888, p < 0.01$ ) and (TE\_C:  $z = -1.993, p < 0.05$ ). Finally, this study evaluates whether differences in assessing risk factors in Islamic and conventional banking, as suggested by the analyses in chapter six (section 6.5.1), lead to differences in banking performance. As noted, the result reveals that risk assessment has a statistically positive significant relationship with TE\_O ( $z = 4.992, p < 0.01$ ), and TE\_S ( $z = 1.783, p < 0.10$ ), however, this response does not provide evidence for an association with TE\_C ( $z = -1.993, p < 0.05$ ).

#### **Finally: Dummy Variables**

Variables representing banking system: Islamic banking and conventional banking (IB & CB), banking categories: small, medium and large Islamic and conventional banks (SIB, MIB, LIB, SCB, MCB & LCB), technique of transactions (TOT), specialisation in services provision (SISP), composition of the board (COB) and transformation scope (TS) are regressed as explanatory variables. Therefore, regression results relating to dummy explanatory variables are also estimated. The estimated coefficients of these variables represent the line of both Islamic and conventional banking systems which indicate there is a statistically positive significant relationship with estimated technical efficiency scores over all sets of the regression. Technically, these results provide statistical evidence that Islamic banking operations and the management of their resources are more efficient than conventional banking on average, especially when the estimated technical efficiency scores were discriminated by banking system or banking categories.

Overall, the regression model explained approximately TE\_O: 38%, TE\_S: 36% and TE\_C: 22% of the variances. Although for some variables the signs of coefficient correlation for the regression model are contradictory (i.e. bank size, staff productivity), research findings indicate support of previous results on DEA analysis. Differences in the result might be attributable to the characteristics of the bank groups used in this study,

since the IB performance indicator utilises non-interest income in comparison to interest income in CB.

In response to the last research question, *is there a difference in credit department efficiency performance between CB and IB systems?*, the study hypothesised that efficiency performance in the credit field between CB and IB systems is similar. The main finding of this study regarding this aspect is that portfolio risk assessment is a key factor in determining rational decision making and efficient credit-structure relationships. Throughout the study period, 2002-2006, the results discussed above reflect that the IB system varied from the CB system in terms of efficiency of lending decision making in general. While the DEA analysis and *Tobit* regression analysis for the determinants of estimated technical efficiency scores both revealed statistically and economically significant differences in efficiency performance in credit field between CB and IB systems, the results indicate that there is no statistical evidence to accept the predicted similarity that was addressed as —null hypothesis-3, thus, the null hypothesis **cannot be supported**. The result of test hypothesis\_3 has shown in Table 7.6.

**Table 7.7: Summary of Results of Test Hypothesis-3**

Feature	Content of the Hypotheses	Test results
<i>H3</i>	<i>There is no difference in efficiency performance in the credit field between CB and IB systems</i>	<b>Unsupported</b>

### 7.5.5 Discussion and Interpretation the Results

The empirical findings, thus, are consistent with the models presented by (Bloomfield 1973; Chapra & Ahmed 2002; DeGeorge 1992; Grossman & Hart 1983). Their results show that religion is not necessarily the overriding factor leading to a public embracement of Islamic banking but, rather, circumstances where there is the expectation of higher returns on deposits or better terms than might be available from the conventional banks. In fact, the religious and moral appeal of Islamic banking did very little to contribute to the growth of Islamic banking transactions in the ME economies prior to the 1980s (Zaher & Hassan 2001). This argument is significant considering that Islamic banking in the ME has relied heavily on public awareness among its majority Muslim population about the unlawfulness of interest to mobilise deposits since the 1970s, when the first IB was established.

Hughes (1999) maintains that the most critical factors in sustaining growth in Islamic banking are: 1) the ability to provide modern banking facilities, supported by the latest technological advancements and; 2) the ability to offer rates of return comparable to those received by depositors in CB. It is apparent in the results, at least during the years between 2002 and 2006, that the second factor appears to be dominant. According to IB in the ME, experience appeared to deviate from the religious underpinnings claimed by IB proponents that require the business community to place first emphasis on contribution towards and growth of the institution over individual economic profits.

The result is that currently the demand and supply for Islamic deposits and transactions far outstrips the supply of suitable financing/asset aspects of IB. Some of the major factors that contributed to this imbalance can be explained by the unique risks inherent in IB that have been discussed at length in chapter three. In contrast, there was a significant

contraction in interest income and increase in interest expenses in CB operations that led to a sharp decline in efficiencies, with the decline in interest income attributed to: 1) rising competition (Hakim & Neaime 2001); 2) negative loan growth (Zaman & Movassaghi 2001); and 3) higher loan loss provisions (Wilson 1999).

The results show also that IBs meanwhile enjoyed rapid asset and deposit expansion in 2003 as a result of spill-over effects from the improving economy. In the following years, IBs also recorded impressive profitability and efficiency increases, largely due to higher financing income and lower financing loss provision expenses as financing write-backs and recoveries increased. Further, since IBs benefited from a financial crisis (due to global restriction on Muslim deposits), the years 2005 and 2006 marked the rise of Islamic banking performance in general, and this finding is consistent with study results by Bashir (2000).

The IB system eventually progressed to record the highest PTE and SE scores. Furthermore, IBs tend to operate at a more efficient size, with the majority of them attaining optimal return to scale. Nevertheless, all IBs experienced technical regress on average. Thus, IBs were superior in improving managerial efficiency and realising scale economies, but they were not as innovative as the CBs. Within IBs, there was a noted difference in efficiency and productivity performance among banks' categories (large, medium and small size). The aftermath of the financial crisis left many vulnerable to scale inefficiencies in the face of the rising costs of banks transactions, staff and overheads in the maintenance of overextended networks of branches—a finding which is consistent with that of Leong, Dollery and Coelli (2003). At the same time, Rosly and Bakar (2003) reported that the financial crisis prompted the banks to take correctional measures that saw mergers between banks and reintegration with financial companies that provide similar products and services.

The large conventional banks (LCB), on the other hand, were becoming more reliant on non-financing income from free-based activities to generate profitable returns due to their greater access and participation in international money markets as a result of their wide international presence, and the existing supporting framework afforded by their CB operations. This distinctive feature sets the large conventional banks (LCB) apart from other CB sizes as is shown in Figures 7.17, 7.18 and 7.19, where it is apparent that although both financing and non-financing income increased at faster rates beyond 2000, non-financing income increases dominated financing income growth which is consistent with results by bt Shahimi and Ahmad (2005) who found that financing structure and loan loss provision affects net income margin positively.

In general, it must be noted that throughout the study period, Islamic banking was not only constrained by the financing difficulties that Islamic banking often faces due to the heightened risks arising from asset/liability mismatches unique to Islamic banking, but was also subjected to a greater degree of political pressures in their operations. A study conducted by Batchelor (2005) on the cross-system banks productivity measures in Malaysia revealed that the Islamic banking operations had over 80% of *Murabaha* investments dedicated towards larger term (over 5year) investments, as compared to other Islamic banking operations in the ME. This finding suggests that IBs in the ME region—much like other IBs elsewhere in Muslim countries—may have undertaken government's priorities due to:

1. The assistance extended by government in the Islamisation of financial transactions system; and

2. The principal requirement of Islamic banks to support community-enhancing programs.

These constraints often result in investment decisions that run contrary to economic profit interests and limit IBs in allocating resources to other more profitable but less morally optimal projects. At the same time, however, one cannot conclude that the interests of depositors are not taken care of since in Islamic banking, 'shareholders activism' places the advancement of social interests first. Therefore, the results of this study are quite consistent with those reported by Favero and Papi (1995) and Fohlin (2000) wherein their findings suggested that although IBs were the most efficient in terms of decision making performance, another factor holds true to some extent within the IB context. As the results show, the medium Islamic banks (MIB) always outperformed the large Islamic banks (LIB) due to their ability to operate with better scale size.

The comparative SE results also correspond well to the findings of Mester (1987), in which the author found that regional banks with substantially smaller bank size than the major trading banks tended to operate with increasing returns to scale (IRS), whilst the major trading banks operated at decreasing returns to scale (DRS). Nevertheless, the period throughout 2000 and 2001 was one of the most challenging for the Islamic banking system. The early 1990s (and up until 2000) was a period of high profitability and easy credit extension that prevailed. However, the onset of the Gulf War crisis in 2002 following a prolonged period of depreciation was followed by a devaluation of the regional currencies and a number of another currencies (Abdullah 2003). In addition, the period also marked the beginning of an industry-wide regulatory consideration process where the financial restriction program was directed to control deposits and securities of Islamic banks around the world (Kahf 1999).

## **7.6 Conclusion**

This chapter demonstrates that DEA is an excellent tool of measurement for improving the productivity of a service business. Therefore, by its ability to model multiple-input and multiple-output relationships, studies that use DEA provide useful managerial information on improving the performance. By respecting this study's results in this chapter, the Islamic banking system, even the large or small ones, have not as yet proved to be the expected formidable competitor. At the same time, the growth and experience of the Islamic banking system has allowed it to operate closer to efficient scales and with comparable or even better levels of managerial efficiency than conventional banks.

To sum up, banks that have greater monitoring incentive and capabilities, higher risk, and greater controlling over borrowers, operate at higher yield efficiency and are well prepared for the challenges of the future. Thus, banks with lower monitoring of these factors actually attain lower performance. The following chapter, Chapter 8, provides an overall conclusion to the study, along with policy implications and recommendations for further research.

## **CHAPTER EIGHT**

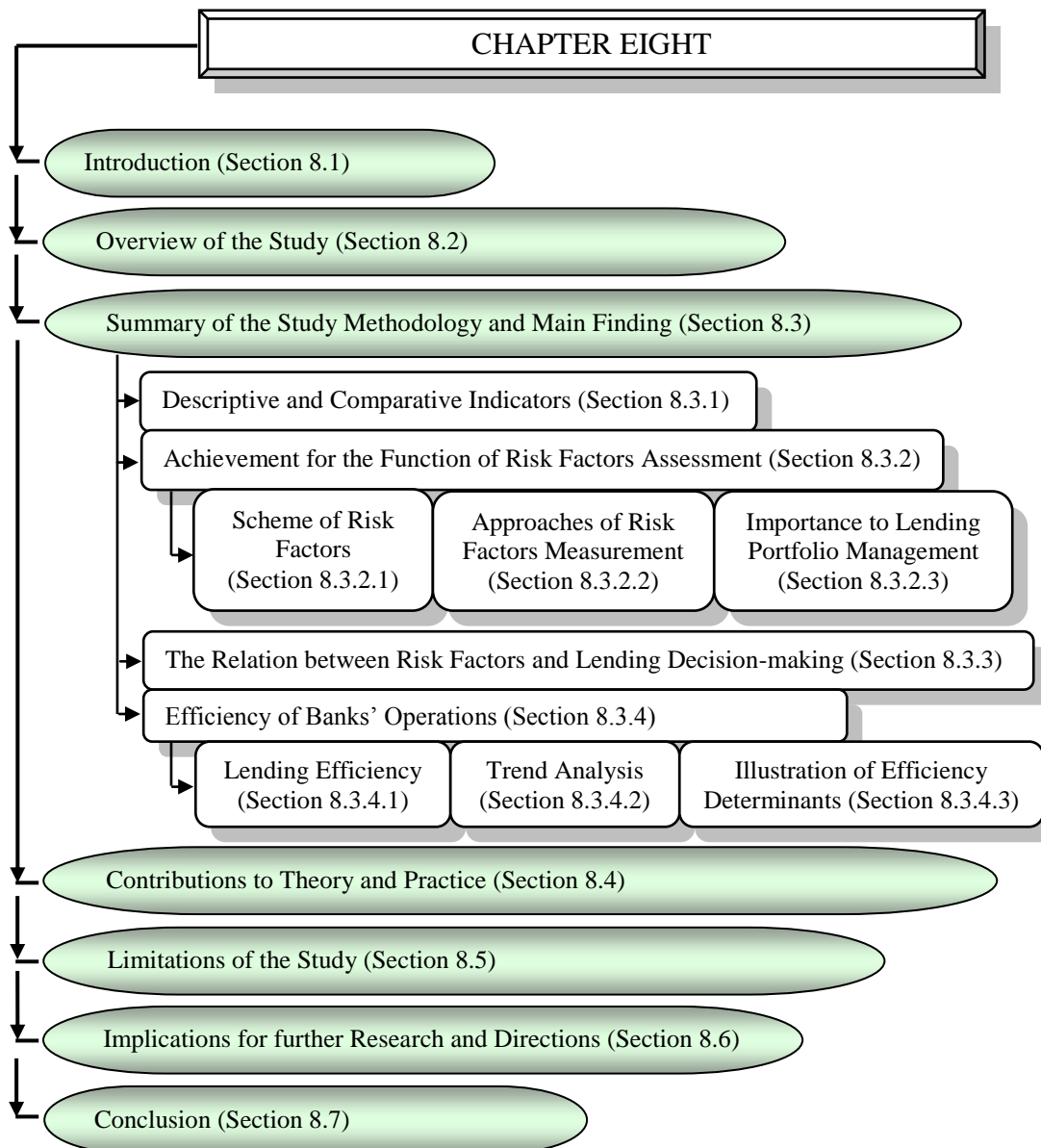
### **CONCLUSION, POLICY IMPLICATIONS AND RECOMMENDATIONS**

#### **8.1 Introduction**

Recorded relationships of risk factors and the rationality of lending decision making reveal that achieving a trade-off between risk and products quality is a pre-condition for having high technical efficiency in Islamic or conventional intermediation. Mainly, this study aimed to explore whether the risk factors are differently assessed between CB and IB, and whether these risk factors influence the rationality of lending decision-making. Furthermore, this study provides a comparison between banking systems, and highlights banks' efficiency scales in making rational lending decisions specifically. This chapter relates to the theoretical significance and field application according to the findings stated in the previous chapters and, presents recommendations for future research and field application.

This chapter contains seven sections, including the introductory section above. An overview of the key aspects relevant to CB and IB is presented in Section 2. Section 3 contains a summary relating to the conclusions comprising the major findings obtained from theoretical research and tests, together with the significance of the research results. Section 4 contains contributions to theory and practice. Section 5 provides limitations of the study. Policy implications and recommendations for further research are provided in section 6. Finally, a conclusion to this chapter is provided in section 7. Figure 8.1 provides a visual overview of the structure of this chapter.

Figure 8.1: Outline of Chapter 8 Interrelations



## 8.2 Overview of the Study

The role of banks under the financial intermediation concept is to bridge the gap between the needs of lenders and borrowers by performing a transformation function. Banks' pool funds from surplus units—depositors—to provide loans to deficit units—borrowers—to enable the latter to undertake the use of the funds for either consumption or investment purposes. In return, the deficit units or borrowers compensate both the bank and the saver in the form of interest. This contractual design forms the basis of CB that has a record of almost 300 years of history (Archer & Karim 2002). The interest-based debt contracts have been able to effectively solve problems of moral hazard and adverse selection in the bank-borrower relationship, but at times they have fallen short. This happens in terms of the depositor-bank relationship as depositors often rely on bank shareholders to monitor banks for them when they delegate both agency problems and costs to the banks that act as their agents (Lewis & Algaoud 2001). This form of financial intermediation, nevertheless, has been able to generate acceptable risk and returns to all parties.



IB counterparts represent a new form of financial intermediation that is fast gaining popularity worldwide. Unlike CB, IB counterparts prohibit the charging and giving of interest and the practice of amassing wealth through speculative economic transactions that entail excessive risk. Instead, IB counterparts strive for economic justice and emphasize societal and community welfare development above the earning of economic profits. In short, the essence of IB counterparts is a dual partnership between the Islamic bank and its depositors, and between the Islamic bank and its investment clients to manage the depositors' financial resources towards productive uses. Rather than earning returns in the form of interest, both the Islamic bank and depositors, instead, share in the profits or loss in a particular project with the investors or entrepreneurs. Profit and loss sharing (PLS) arrangements in investment financing, therefore, form the key theoretical framework for IB counterparts.

The forces of financial deregulation, consolidation, technological advances and financial innovation, however, are rapidly transforming the role of financial intermediaries, including banks, by increasing competition among them. Financial intermediaries often respond to these forces of change by engaging in financial innovation, a process where new financial solutions provide better investment opportunities, returns and risk management, thus helping to maintain their competitive positions. As a result, new financial instruments, or even new financial systems, are being introduced at increasing rates to serve the role of financial intermediation as financial innovation is assisted by advancements in technology, finance theory and the liberalisation of financial regulations.

Nevertheless, the rejection of interest-based mechanisms exposes Islamic banking to heightened risks arising from (1) the nature of equity-like funding, (2) moral hazards, (3) adverse selection and (4) the lack of risk hedging and liquidity instruments that are based on PLS arrangements. To aggravate problems further, the fundamental differences inherent in Islamic banking could potentially result in friction and misunderstanding with regulatory bodies and other external agencies that Islamic banks need to deal with, as they often treat banks as authorized interest-based depository financial institutions: the regulations of many central banks to protect depositors in non-Muslim countries are in contradiction with the concept of PLS deposits of Islamic banks. Furthermore, conventional accounting standards are often inadequate for the provision of accurate disclosures of financial reporting to stakeholders.

Collective evidence has shown that multinational banks and organisations have been more adept in operating IB than fully-fledged Islamic banks from Muslim countries. As a result, Islamic banking has experienced astounding growth rates over the past two decades compared to CB. IB counterparts hold great potential, especially in Muslim countries where the revival of IB is fast taking place as CB slowly gives way after being the principal financial intermediary since the colonial period. Furthermore, there has been much support and interest shown by non-Muslim depositors, investors and organisations.

Eventually, the distinctive nature and challenges presented by IB counterparts call into question the sustainability of growth of the sector and its ability to compete against CB as an alternative banking mode, despite its impressive record so far. After all, the growth rates of Islamic banking are rather crude measures to gauge the competitiveness of IB with regard to CB. This is compounded by the fact that a cross-banking system performance assessment and analysis between IB and CB has never been widely researched before. Nevertheless, a credible cross-system bank performance would yield valuable insights to all participants in the financial intermediation process (including

regulators) whose decisions would have significant bearing on the eventual success or demise of IB as a viable alternative financial system to CB. The next section provides a summary of the findings of this study.

### **8.3 Summary of the Study Methodology and Main Findings**

The profile of CB and IB systems above depicts the significance of conducting a comparative research between IB and CB. This study fundamentally shows that despite the fact that many aspects within Islamic counterparts deviate significantly from those of their conventional counterparts, Islamic banking is nevertheless performing the same role of financial intermediation function as CB. This argument then forms the basis for a comparative cross-system bank in general, and methodologies or approaches of performance risks assessment in particular, between IB and CB. Subsequently, the methodology is applied to banks originated in the Middle East region. Two different types of data<sup>92</sup>, along with two different analysis techniques<sup>93</sup>, have been used to drive a comparable set between IB and CB.

The information obtained from 48 banks (including IBs and CBs) by using questionnaire method and data gathered from five financial periods were methodologically analysed using three analytical softwares, parametric statistical techniques such as SPSS software, non-parametric techniques such as E.Views econometric software, and DEA-Solver performance software. In brief, the study conducted factor analysis, and factor scores derived from the principal component (PC) were used as input values for the Multiple Regression (MR) analysis. Then, MR was carried out to measure the association between the project variables which were then measured by interval scales. Also, this study used non-linear *Tobit* econometric model to find what factors are relevant to the decision-making process and, further, how much each factor affects the outcome. Finally, Data Envelopment Analysis was used to analyse the decision performance (efficiency and quality).

With credible banking models ‘Islamic and conventional’ to hand, the study proceeded to perform a comparative bank performance in terms of risk assessment and lending decision making policies. Without doubt, a fully-fledged banking system enables one to make the comparison of bank behaviour and bank performance between IB and CB more effectively and accurately than in a dual banking system and a mixed financial system. Therefore, the methodology was applied to the sample of fully-fledged banks—Islamic/conventional—operating in Libya, Bahrain, Qatar, Jordan and United Arab Emirates in the Middle East region. At this stage, it is very important to report that the principal objective of IB is two-fold: profit maximisation, as well as welfare *falah* maximisation—corporate wealth maximisation. This study investigated this aspect and clearly found that, unlike CB which only focuses on economic objectives, IB considers

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<sup>92</sup> First, primary data were collected by using the questionnaire method, and second, secondary data were collected from annual reports for the period from 2002 to 2006.

<sup>93</sup> First, a parametric method where Multivariate analysis (MA) and factoring Analysis (Principal component analysis method) techniques were used to analyse the primary data related to the risk factors assessment and their relation with the optimality of lending decision-making tests. Second, a non-parametric method where Data Envelopment Analysis (DEA) technique was used to analyse the secondary data related to the efficiency tests.

the benefit of the whole society as well as the other priorities of the Islamic community through the prohibition of injustice and the payment of *rib`a* (interest).

### 8.3.1 Descriptive and Comparative Indicators

This study investigated banks' and respondents' characteristics in both banking systems. Thereby, results suggested a similarity in terms of participants' characteristics between CB and IB systems (age, education level, experience in job and participation in lending decision making), which means that any potential differences are not likely to be due to the respondents. In terms of banks' characteristics, results showed some differences in the lending capacity in each banking system and their obligations. In this regard, even though the number of loan applications approved by both IB and CB are significantly different, the number of applications approved and classified as a 'good loan' is almost similar. Banks' obligations and status are varied; however, no considerable difference was found in the range of banking activities and banks' size.

In primary tests to determine the appropriate factor analysis model and the reliability level of overall scale measurement, results show that both banking samples are significantly adequate and reliable, and can be used to determine the factorability of the matrix as a whole. Basically, factor analysis is assumed to represent underlying or latent variables in terms of which correlations in R-matrix are counted both mathematically and theoretically. The number of factors, therefore, to be interpreted largely depends on the underlying purpose of the analysis. This study confirmed the factor structure of the scale (low/high) that can be used for further explanations. In relation to this aspect, the study also confirmed that factor analysis revealed some differences in terms of the number of risk factors extraction and loading factors' name between CB and IB groups. What follows is a presentation of the results and findings of the study according to the presentation of research questions and the thesis organisation.

### 8.3.2 Achievement for the Function of Risk Assessment in CB and IB

In reference to research sub-question 1 on a comparison of an achievement of risk factors assessment function between CB and IB, the principal findings of the study in this phase are indicated below in terms of the following:

#### 8.3.2.1 Scheme of Risk Factors

Results show that risks in the CB system are classified differently from those in the IB system, and the variance was somewhat acceptable and sometimes considerable. Moreover, having considered the principal component analysis, results reveal that both CB and IB follow different patterns to indicate the rate of applicability of latent or underlying risks to the specific risk factors (transaction risk, business risk, treasury risk, governance risk and systematic risk).

For the CB and IB, results also suggest that both banking systems are somewhat different in terms of risk factors visibility, but risk feasibility is almost similar. Thus, in relation to this segment, the study provided some evidence that CB and IB have different capabilities in considering and identifying these risk factors.

### **8.3.2.2 Approaches to Risk Factor Measurement**

There are many approaches to measure different risk factors that have been used in the finance industry. Among them, three approaches—internal rating and scoring model, value at risk model, and beta or asset pricing model—are commonly applied in both IB and CB. This study investigated the appropriateness of using these approaches to measure risk factors which might be faced in these systems, and the results reveal no evidence to indicate that CB performs differently to IB in terms of risk factors measurement.

Nevertheless, the results clearly indicate that neither banks with Islamic compliance, nor banks with non-Islamic compliance, have applied specific models to measure such articulated risk factors. Thus, CB and IB are similar in terms of risk measurement, but vary in terms of conducting risk measurement approaches.

### **8.3.2.3 Importance for Lending Portfolio Management**

As the tests assert, IB and CB are able to recognise risks that may frequently involve every single act and indicates the banks' consideration towards managing and controlling risk factors. The results ultimately indicate that there is a considerable relationship between assessment of risk factors and management of lending portfolio, although this conclusion is not similarly applicable for all types of risk factors. Thus, results provide the general magnitude of the relationship in both systems: IB and CB.

Basically, the quality of lending portfolio should be properly assessed and administrated as much as the quantity of risk factors. In this regard, the results asserted that both positive and negative correlations exist between risk factors and the quality of lending portfolio.

### **8.3.3 The Relation between Risk Factors and Lending Decision-Making in CB and IB**

In relation to research sub-question 2 on a comparison of risk factors which influence the rationality of lending decision making between CB and IB, in general, the results revealed that the rationality of lending decision making can be influenced by different risk factors; and the influence level can be different from bank to bank in one system, and from system to system in the industry. The principal findings of the study in this phase can be summarised as follows:

1. In an allocative loans stage, results reveal that some risk factors can significantly influence the rationality of lending decision-making in the CB system. This is in contrast to IB, where there is evidence that risk factors have no influence on the rationality of lending decision-making.
2. In an authorisation stage, results assert that the rationality of lending decision making is, in the main, less influenced by risk factors. However, these risk factors which are applicable to the CB system and influence the rationality of lending decision making are mostly different from the IB system.
3. Making a lending decision with consideration of risk measurement approaches: results also reveal that approaches of measuring risk factors may influence the rationality of lending decision-making significantly in both banking systems.

4. Finally, results suggest that even though the rationality of lending decision-making in such banking systems has been affected similarly by different risk factors, the correlations among them are inconsistent and not clearly formed.

### **8.3.4 Efficiency of Banks' Operations - CB vs. IB**

With regard to the comparative efficiency of lending decision making between CB and IB, in research sub-question 3, conclusions are made according to average efficiencies scores observed over a window of three years. The results of technical efficiency (TE), pure technical efficiency (PTE) and scale efficiency (SE) for all banks' categories (small, medium and large sizes) in both banking systems are compared and presented as two main aspects as follows:

#### **8.3.4.1 Lending Efficiency**

1. In terms of constant returns to scale model, results revealed that medium Islamic banks (MIB) were mostly dominant in terms of technical efficiency during the testing period, followed by small Islamic banks (SIB) on average. These two banks' categories—*MIB* and *SIB*—reported better performance amongst all other categories overall in the analytical period.
2. With decomposing constant returns to scale model into variable returns to scale model to allow an insight into the sources of efficiency, results suggested that even though IB was operating more efficiently than CB, CB performed better in terms of allocative resources on average.
3. Results showed that IB was better on scale performance on average than CB. In this regard, decreasing returns to scale (DRS) were dominant in CB, and increasing returns to scale (IRS) were reported in both small conventional and Islamic banks (SCB & SIB); while medium conventional and Islamic banks (MCB & MIB) operate with quite optimum scale size with share in both DRS and IRS.

#### **8.3.4.2 Trend Analysis**

1. Results revealed that CB and IB performed similarly and followed the same pattern in terms of technical efficiency, which continued to decline throughout 2003 and 2004. Later, during 2005, results showed slight improvement, even though both banking systems charted a different course.
2. Considering size of scale, results suggested that the most inefficient levels occurred in the period 2002–2004. In general, these inefficiencies were due to allocation of resources, especially in banks which were experiencing some difficulties—such as being oversized and overstaffed.
3. Results asserted that both IB and CB were quite heterogeneous in their performance and results reported a wider gap between them overall in the analytical period.

### 8.3.4.3 Illustration of Efficiency Determinants

DEA is initially applied with the study samples—universal and separately—to project common grand frontiers to enable the derivation of TE indices that banks' efficiency trends. This approach provides the simplest and most direct way of comparing efficiency levels of all banking units (see sections 7.6.1 and 7.6.2); however, it is not by any means the most accurate and desirable. A comment should be made here that one major limitation of generating TE scores using different samples is that one needs to estimate on the basis that all banking units share the same common technology or frontier. However, this estimation may be too far-fetched if banking units within a sample are operating with different ideology, are subjected to different banking environments and are of different asset size, or differ by skill and transaction instruments type. In such a circumstance, efficiency differences are likely to prevail and it can be difficult to attribute this to differences in characteristics, or actual operations, on an equal footing.

The study investigated the reasons behind fluctuating performance of lending decision-making throughout determinants of banks' efficiency, and the results are as follows:

#### ***Banks' size:***

The result suggests that controlling size of banks may possibly lead to an increase in banking performance, but may produce a value loss as discriminated by banking categories. The regression model for determinants of technical efficiency provides evidence for a statistical significant relationship between banking size and banking efficiency.

#### ***Bank's system applied:***

The study model for determinants of technical efficiency provides evidence for a statistical negative significant relationship between banking efficiency and their services range, while the model failed to provide statistical significant evidence for technical efficiency and affiliation to the network relationship.

#### ***Banks' environment:***

The study model for determinants of technical efficiency provides evidence for a statistical positive significant relationship between banking efficiency and banking liquidity and negative significant relationship with a bank's location or a bank's work environment. However, the model is quite able to provide evidence that banking profitability and banking efficiency are significantly correlated.

#### ***Banks' skills:***

The result in this construct reveals that decision making policy is a dominant variable among all sets of the regression, which provides evidence for a statistical negative significant relationship between decision making policies and technical efficiency. In addition, the relationship of banking technical efficiency with lending structure, risk assessment and staff productivity demonstrated significant differences between Islamic and non-Islamic systems. In other words, the results significantly distinguish the differences in Islamic and non-Islamic systems. Despite this, the model failed to provide statistical evidence for a significant relationship between banking efficiency and capital structure.

The results of testing the hypotheses of this study are summarised in the form of statistical decisions as follows:

<i>Feature</i>	<i>Content of the Study Hypotheses</i>	<i>Test Results</i>
<b>H1:</b>	<b>H1a</b> There is no difference in factors considered in credit risk assessment and lending decision in CB and IB systems.	<b>Supported</b>
	<b>H1b</b> There is no difference in measurement approaches used for such risk factors in CB and IB systems.	<b>Supported</b>
	<b>H1c</b> There is no relationship between risk factors and default risks portfolio in CB and IB systems.	<b>Unsupported</b>
<b>H2:</b>	<b>H2a</b> There is no difference in factors considered in credit risk which influence the rationality of lending decision in CB and IB systems.	<b>Supported</b>
	<b>H2b</b> There is no difference in measurement approaches used for such risk factors that influence the rationality of lending decision in CB and IB systems.	<b>Supported</b>
	<b>H2c</b> There is no relationship between risk factors and default risks portfolio which influence the rationality of lending decision in CB and IB systems.	<b>Unsupported</b>
<b>H3:</b>	There is no difference in efficiency performance in the credit field between CB and IB systems	<b>Unsupported</b>

## **8.4 Contributions to Theory and Practice**

While the investigative effort in this thesis suggests further studies, it does make distinct contributions to theory and practice. In the areas of risk taking behaviour—risk factors assessment—and the effect of assessing these factors on the rationality of lending decision making, the thesis contributes to practitioners' knowledge and the literature in the following ways:

### **Contribution to the Theory**

Information obtained from the related literature has resulted in the theories and model adopted for the study making the researcher's suppositions the very best that they can be. Accordingly, referring to the research questions and research objectives, and the use of a combination of three theories and the model of lending decision-making to test the conceptual framework of this study, has resulted in ultimate benefits to this study and to finance knowledge in general.

A number of factors that influence the rationality of lending decision-making are important to take into account when a decision is being made. Moreover, no general studies highlight all the potential risks that may affect the lending decision-making process, or determine their influence on the rationality of lending policy. Therefore, this study contributes to the literature on finance in general, and on the banking industry in particular.

### **Contribution to Practice**

In general, much of the literature points to risk taking behaviour as being homogenous throughout both the Islamic banking and the conventional banking systems. However, this

study aimed to evaluate how Islamic and conventional banking systems manage the different risk factors and recognise the lending and risks relationship. This study offers an insight into the function of risk factors assessment similarities and differences between the two banking systems, which in the past have been treated as one financial industry in the literature when investigating reasons behind increased lending defaults.

The literature survey indicated there is no evidence of a study which has tested or applied the risk factors which influence lending decisions significantly. This study compared the performance of two different banking systems, CB and IB, and has clarified that the ability to manage and control risk factors which influence the rationality of lending decision making can vary from one banking system to the other, notwithstanding the differences in risk factors, policies of lending portfolio management and banks' efficiency in making rational lending decisions. Thus, via the aspects that have been considered, the study contributes to the theory on the similarities and differences between these two banking systems—CB and IB—to bankers and practitioners.

A prime focus of the research has been to differentiate which banking system is considered a greater risk in their operations and decision-making on lending; and whether these banks are capable of better control when formulating and implementing lending decisions. These aspects added empirical depth and dimension for the researcher of this study, and will contribute to expanding knowledge on lending credit. This study covers Islamic countries in the ME region and attempts to fill the gap in this specific knowledge. It also introduces a model which employs factors expected to have an influence on the performance of lending decisions and supporting evaluation of lending decisions in both systems.

Despite developments in Islamic banking, a number of challenges and obstacles still remain for banking institutions in Islamic countries. Therefore, this study has helped to clarify which system has the ability to better manage, measure, and control risk factors that may affect lending decisions. Moreover, the research will contribute to an increased understanding of dominating risk factors in both CB and IB systems.

Finally, this study draws attention to the effect of risk factors on lending policies and the rationality of lending decision making, regardless of how powerfully it may be established. Ultimately, lending policies or strategies are not stable or fixed, but may be changed and affected by their circumstances or environments. Thus, to lending decision makers in the banking industry, this study offers effective establishment of evaluation and control risk factors and an understanding of the reasons behind the fluctuation in levels of making lending decisions.

## **8.5 Limitations of the Study**

Despite the proportion of the research samples to the study population being quite high, the number of banks in each sample is still small. This allowed the researcher to collect 87 data booklets from the CB sample and 76 data booklets from the IB sample, which is often considered unsuitable for using some statistical analysis. The results obtained in this study, therefore, may be confounded by the fact that the number of banks in the sample was simply too small to allow for suitable conclusions that can be appropriately generalised—to meet the external validity—on Islamic and conventional banks operating in Middle East region, and then on banking institutions worldwide. Hence, the larger number of banks' sample, if applied to this study, would better be able to reveal any



noticeable behaviour or trends. The results are to be interpreted with an understanding of the context of this study.

In terms of the determinants of using linear regression to predict the response variables based on the value of explanatory variables, or to predict the relationship between dependent and independent variables, it is important to consider the relevant range of the independent variable(s) in making predictions. This range includes all values from the smallest to the largest used to develop the model. In this study, the results of the regression models used to predict the relationship of risk factors with the rationality of lending decision making may be influenced by the use of limit values which have been given as five Likert scale values. Hence, the use of absolute values with a relevant range can provide better prediction of the model. Thus, for interpretations in this part of the study it was assumed that values are quite representative within the relevant range.

## **8.6 Implication for Further Research and Directions**

It would be unwise to say that the IB system completely provides an alternative real-model to the CB system, but a risk assessment model and approaches of risk management have been developed and demonstrated in the study that provide a possible way of solving lending decision problems, especially under uncertainties and irregular risk factor circumstances. Given the use of a combination of Transaction Cost Theory (TCT), Agency Theory (AT), Decision Making Theory (DMT) and rational lending decision-making model (DGK), rational lending decision-making can be performed by considering different objective functions and policy constraints. A great deal of research has focused on quantitative analysis models for corporate default problems, yet only a minority of researchers has developed models concerning the qualitative and irregular factors of the problem. However, these qualitative and irregular factors in the lending decision-making process are always inconsistent.

Assessing different risk factors and determining their effect on the rationality of lending decision-making has provided new research direction for both the concepts and methodologies used to formulate and solve default problems. Performing functions of assessment of these risk factors and rational lending decision-making at the corporate and comparative project level can be solved. However, a number of problems remain to be solved in future research, namely:

1. In the study, the relationships between risk factors and rational lending decision making were always reasonably and simply defined; however, in reality, the decision-making process needs more analysis for complicated—quantitative/qualitative—risk factors to support critical lending decision-making. These factors should be generated and obtained in the form of a database or historical resources. Most decisions have time limits and, thus, rapid and rational decision-making policy needs simple and well-defined risk taking behaviour for support. The behaviour of such risk factors should be defined prior to the process of making lending decisions. Further research work should focus on the development of effective risk factors assessment, or at least the most frequently used qualitative and irregular factors.
2. Under the lending policy, the default problem is usually transformed into a crisp problem, followed by the establishment of an inventory of lending problems such as availability of liquidity and a bank's capital sustainability. This

transitional issue of credit problems could reduce the efficiency and rationality of lending decision-making policies. Moreover, the calculation in the lending decision model is complicated and the decision itself is always carried out with time limits. More research and development of methods used to assess internal/external factors that influence the rationality of lending decision making is urgently required.

3. Since the decision makers' decisions on credits are subjective, the qualitative and irregular factors involved in the decision are the performance of the decision maker in accordance with his/her experience, knowledge, and priority with respect to the decision itself. Different decision makers may have different perspectives on the same decision, and the differences can sometimes be quite explicit. More research effort should be put into the development of a knowledge-base and practical-base of the qualitative and irregular factors.
4. The assessment of risk factors is one of the most important functions in any institution, especially in multi-based funds structure institutions such as Islamic banking. A balance on returns and risk rate within the Islamic policies of a transactional activity is essential. The profit and loss sharing principle (PLS) reflects the ability of an institution to perform best management of their financial transactions, and regulatory and Islamic supervisory boards can also affect future transactions considerably. Future research should focus on these two areas as determinant factors in making rational lending decisions.

## **8.7 Conclusion**

The strategy of assessing risk factors and making rational decisions is critical for every institution in every industry, and even more critical for financial institutions in terms of making lending decisions (employing rational lending policy). The institutions must take into account all relevant factors for making short-term and long-term decisions. In the case of IB and CB, during a period of deregulation/economic recession as a result of the global financial crisis, both banking systems were influenced by some risks that led them to focus on all potential risks that might occur in lending activities.

This thesis attempts to enhance our understanding of how IB and CB systems assess risk factors, and to determine what risk factors influence the rationality of lending decision making, in addition to comparing the efficiency of such banking systems. Thus, the results of this thesis provide theoretical and practical guidelines and contributions to risk factors assessment and efficiency measurement for banks operating with ideologically different views. The results also indicate that while an assessment of risk factors may necessitate a focus on financial institutions alone, banks, strategically, cannot rely on assessing quantified risk factors without considering the effect of these factors on their lending decision processes.

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## APPENDICES

### APPENDIX A: Glossary and Arabic Terms

- Amana** (Demand deposits): Deposits held at the bank for safekeeping purpose. They are guaranteed in capital value, and earn no return.
- Bay mu'ajal** (Pre-delivery, deferred payment): The seller can sell a product on the basis of a deferred payment, in instalments or in a lump sum. The price of the product is agreed upon between the buyer and the seller at the time of the sale, and cannot include any charges for deferring payment.
- Bay salam** (Pre-payment, deferred delivery): The buyer pays the seller the full negotiated price of a product that the seller promises to deliver at a future date.
- Fiqh** (Islamic jurisprudence): *It* refers to Islamic jurisprudence that covers all aspects of life: religious, political, social and economic. *Fiqh* is mainly based on interpretations of the *Qur'an* and *Sunna* (sayings and deeds of the prophet).
- Ijara** (Lease, lease purchase): A party leases a particular product for a specific sum and a specific time period. In the case of a lease purchase, each payment includes a portion that goes toward the final purchase and transfer of ownership of the product.
- Istisna** (Deferred payment, deferred delivery): A manufacturer (contractor) agrees to produce (build) and to deliver a certain good (or premise) at a given price on a given date in the future. The price does not have to be paid in advance (in contrast to *bay salam*). It may be paid in instalments or part may be paid in advance while the balance to be paid later on based is the preferences of the parties.
- Ju'ala** (Service charge): A party pays another a specified amount of money as a fee for rendering a specific service in accordance with the terms of the contract stipulated between the two parties. This mode usually applies to transactions such as consultations & professional services, fund placements and trust services.
- Kifala** It is a pledge given to a creditor that the debtor will pay the debt, fine or liability. A third party becomes surety for the payment of the debt if unpaid by the person originally liable.
- Mudaraba** (Trustee finance contract): *Rabb -ul- mal* (capital's owner) provides the entire capital needed to finance a project while the entrepreneur offers his labour and expertise. Profits are shared between them at a certain fixed ratio, whereas financial losses are exclusively borne by *rabb -ul- mal*. The liability of the entrepreneur is limited only to his time and effort.
- Murabaha** (Mark-up financing): The seller informs the buyer of his cost of acquiring or producing a specified product. The profit margin is then negotiated between them. The total cost is usually paid in instalments.

**Musharaka** (Equity participation): The bank enters into an equity partnership agreement with one or more partners to jointly finance an investment project. Profits (and losses) are shared strictly in relation to the respective capital contributions.

**Qard Hassan** (Beneficence loans): These are zero – return loans that the *Qur'an* encourages Muslims to make to the needy. Banks are allowed to charge borrowers a service fee to cover the administrative expenses of handling the loan. The fee should not be related to the loan amount or maturity.

**Shari`a** (Islamic Law): The Islamic Law extracted from the *Qur'an* and *Sunna* (sayings & deeds of the Prophet)

**Wikala:** An agency contract which may include in its terms a fee for the agent. The same contract can also be used to give a power of attorney to someone to represent another's interests.

**Zakat:** Religious tax to be deducted from wealth to be paid to the needy.

*Source: El-Hawary, Grais & Iqbal 2004, pp. 45-6 (Annix I), and  
2007, pp. 775-6 (Annix I)*

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**Takaful:** Arabic name for insurance based on *Shari`a* rules. An Islamic Insurance is a collective protection scheme. It literally means solidarity. *Takaful* reflects solidarity and is akin to mutual insurance. The permissibility of *Takaful* is supported by the *Sunnah* as; *hadith 1*) 'the seal of the prophets (Muhammad) said: whosoever removes a worldly hardship from a believer, Allah will remove from him one of the hardships of the day of the judgment. Whosoever alleviates from one, Allah will alleviate his lot in this world and the next' (narrated by Abu-huraira); *hadith 2*) 'the seal of the prophets (Muhammad) told a Bedwin Arab who left his camel untied trusting to the will of Allah said: Tie the camel first and then leave it to Allah' (narrated by Anas Bin-malik). (*Developed by the author, 2009 based on Archer and Ahmed (2002, 2003).*)

**Concessionary Financing:** Special credit lines from the bank should be done with the objective of such lends to provide credit to small business or to self-employed entrepreneurs (to who suffer with weak financial situation). It should be allowed to float bonds with government security, mobilise deposits and lend at lowest rates. Since they will pay higher rates for loans obtain through informal channels. (*Developed by the author, 2009.*)

**Rational decision making model** is a process for making logically sound decisions. It is the process of realizing a problem, establishing and evaluating planning criteria, create alternatives, implementing alternatives, and monitoring progress of the alternatives which is known 'rational planning model'. This multi-step model aims to be logical and follow the orderly path from problem identification through solution.

**Rational lending decision-making** means the process of adjusting one's trading system in an attempt to make it more effective. These adjustments include changing the number of periods used in moving averages, changing the number of indicators used, or simply taking away what does not work

**Funds availability:** it means the decision to make deposits by cheque or electronic sources available to depositors for withdrawal, even though the bank itself may not have final viability in its own clearing account, is a credit decision. This is common practice in the banking industry and is usually driven by competitive pressures.

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**Return items:** it means the decision not to return cheques or to reject electronic items presented for payment, even though the customer may not have sufficient funds deposited, is a credit decision.

**Irrevocable payments:** the decision to initiate an irrevocable payment on behalf of customers, based on expected funding in the future, is a credit decision.

**Case-based** means the decision to lend a new loan is based on the processes of similar past loans, while the term of **class-based** means the decision to lend is based on the recorded character sheet or policy recorded in an advance

**Moral hazard** means the prospect that a party insulated from risk may behave differently from the way it would behave if it were fully exposed to the risk. It is related to information asymmetry, and arises because an institution does not bear the full consequences of its actions, and therefore has a tendency to act less carefully than it, otherwise would leaving another party to bear some responsibility for the consequences of these actions. A special case of moral hazard is called a principal-agent problem.

[http://en.wikipedia.org/wiki/Moral\\_hazard](http://en.wikipedia.org/wiki/Moral_hazard))

**Opportunism** is a term forms an important rationale for transaction cost economics. It is interpreted in different ways. In this relation, means the practice of abandoning in reality some important empirical principles that were previously held, in the process of trying to increase one's economical power and influence.

<http://en.wikipedia.org/wiki/Opportunism>)

## APPENDIX B: Some Studies and Models used Relating to the Credit Field

Author(s)	The Scope	Focus of the study and analysis	Function of model
Bessler and Norsworthy (2003)	Measure performance Banking production	Useful in resolving some of the ambiguities in the classification and measurement of outputs and inputs in particular, in sorting out the stock and flow dimensions of deposits, and in capturing their widely differing effect on bank operation and performance	This model encompasses explicit treatment of several aspects of risk and maturity and risk transformation activities of the bank
Banks (1993)	Risk assessment ( VaR )	Used to help forecast trends and developments in important macro prudential indicators of financial stability.	Analysis of financial stability
Stomper (2005)	Industry specific credit risk Lending to industries	Correlation between this risk of lending and the recovery rate, default rate, interest rate of bank loans.	The model highlights that interest rate of bank loans depend not only on borrower-specific, but also on the aggregate volume of bank's lending to the industries of their borrowers.
Carling and Landbery (2002)	Risk management Distance and location	Analyze geographical proximity between borrowing firms and lending bank, matter in credit risk management	Empirical assessment of the church tour principle CTP model
Deshmukh, Greenbaum and Kanatas (1983)	Lending policy Funding risks	Focusing on uncertain demand in both quantity and quality. The rational sequential lending policy is shown to involve setting credit standards that become stricter with the length of the intermediary's planning horizon and the volume of loans outstanding	Comparing the rational lending decision in different banking institutions system that differ in their risk exposure
Jacobson and Roszbach (2003)	Lending policy Credit scoring	Individual default risk estimates are used to compose value- at-risk measure of risk. The model offered comparison with current practice, risk becomes more transparent, create future provision of losses	To calculate portfolio risk apply VaR before lending policy
Berger, Frame and Miller (2005)	Financial risk	Used scoring and behavior technique to forecast financial risk of lending to consumers. And points out degree of success in forecasting financial risk	This technique helps organizations decide whether or not to grant credit to customers who apply to them.
Dimakos and Aas (2003)	Integrated risk modeling	The approach respect improves upon conventional practice, and also the total economic capital required protecting financial institutions	Now approach takes into account the correlation between risk types

		against possible losses.	
Fabi, Laviola and Reedtz (2004)	Lending decisions	Lending decisions and the use of new Basel capital accord to measure probability default	Internal ratings-based used to measure probability default
Rochafeller and Uryasev (2000)	More consistent measure of risk	Used to rationalizing a portfolio of instruments to reduce risk is presented and tested on application also suitable for use by investment company, mutual funds and business that evaluate risks	This model focuses on minimizing conditional value at risk CVaR rather than minimizing value at risk VaR
Berger and DeYoung (1996)	Cost efficiency	Used to test the relationship among low quality, cost efficiency, bank capital precedes reductions in problem loans.	Analyze the relationship between loan lending efficiency in commercial banks.
Koford and Tschoel (1999)	Lending decision improvement	Focus on information asymmetry	To solve problems related to bank lending
Elsinger et al (2003)	Risk associated loan	Used to evaluate the effect of auditor attestation and tolerance for ambiguity on commercial banks	To evaluate commercial loans especially lending decisions

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## APPENDIX C: Bank Definitions

**Bank and Non-bank Bank:** a non-bank bank is an institution that provides most of the services of a bank but is not a member of the state reserve system and does not have a charter from a state banking agency. A non-bank bank may offer credit cards, consumer and commercial loans, savings accounts, and accounts with services similar to bank checking accounts but avoids government regulation; such businesses may be able to be more innovative and profitable than traditional government-regulated banks.

**Commercial/Conventional Banks (CB):** Commercial Banks: A state bank or National Bank which is owned by stockholders, which accepts demand deposits, grants commercial and industrial loans, and performs other banking services for the public. The term commercial bank is synonymous with Full Service Bank. Such bank offers the public most, if not all, of the services traditionally expected of banking institutions. Services typically found in full service banks include consumer credit, mortgage financing, commercial lending, trust services, and corporate agency services, such as funds transfer and securities registration. The term of commercial is used mainly for a normal bank to distinguish it from an investment bank.

**Investment Banks (InvB):** underwrite (guarantee the sale of) stock and bond issues, trade for their own accounts, make markets and advise corporations on capital markets activities, such as mergers and acquisitions. Other services include underwriting, acting as an intermediary between an issuer of securities and the investing public, facilitating mergers and other corporate reorganizations, and also acting as a broker for institutional clients.

**Merchant Banks (MB):** these were traditionally banks which engaged in trade financing. The modern definition, however, refers to banks which provide capital to firms in the form of shares, rather than loans. Unlike venture capital firms, they tend not to invest in new companies.

**Islamic Banks (IB):** these adhere to the concepts of Islamic law. Islamic banking revolves around several well-established concepts which are based on Islamic canons. Since the concept of interest is forbidden in Islam, all banking activities must avoid interest. Instead of interest, the bank earns profit (mark-up) and fees on financing facilities that it extends to the customers. Also, deposit makers—holders—earn a share of the bank's profit as opposed to a predetermined intersegment.

**Ethical Banks (EB):** these prioritize the transparency of all operations and make only what they consider to be socially-responsible investments.

**Savings Bank (SB):** depository financial institutions that primarily accept consumer deposits and makes home mortgage loans. Its focus is on retail banking: payments, savings products, credits and insurances for individuals or small and medium-sized enterprises. They also differ from commercial banks in their broadly decentralised distribution network, providing local and regional outreach, and by their socially responsible approach to business and society.

**Mutual Savings Bank (MSB):** a state chartered non-stock savings institution that accepts deposits from individuals and makes residential mortgage loans. Management is by a board of trustees. These savings institutions offer checking and other transaction account services, and may also originate consumer loans, commercial loans, and commercial mortgages, and invest in limited amounts of corporate bonds and corporate stock. State banking departments are the primary regulators of mutual savings institutions

**Agent Bank (AB):** a bank named by members of a multi-bank lending syndicate to protect the interests of the participating banks in administering a loan to a foreign or domestic borrower. Its role is similar to a bond trustee. It is responsible for notifying other banks of advances or drawdowns by the borrower and changes in interest rates. Also, such a bank participates in the credit card program of another bank, by issuing credit cards and acting as a merchant

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depository, but does not finance the card receivables. Most financial institutions participating in bank card programs are agents rather than principal issuers.

**Agreement Corporation (AC):** this is a state chartered corporation engaged in international banking (IntB). These banking offices agree to limit their activities, under Federal Reserve Board regulations, to those permitted by Edge Act Corporations but have more liberal capital guidelines. Agreement corporations are chartered to conduct international operations through domestic offices, thereby allowing local firms access to international markets through local banks.

**Associate Bank (AssB):** this is a member of a corporation or joint project providing common benefits. Examples include banks that are members in a clearing house association and those affiliated with a bank card system such as Visa or MasterCard International. Typically, associations have different classes of membership, depending on equity ownership, and other factors.

**Bridge Bank (BB):** this is a bank organized to assume the deposits and secured liabilities of an insolvent bank. For instance, the Federal Deposit Insurance Corporation was given authority to charter these temporary banks with competitive equality banks.

**Cooperative Bank (CoopB):** this is a member-owned organization, similar to a mutual Savings and loan association, which makes loans and pays interest on pooled deposits. For example, banks for cooperatives in the Farm Credit System, and state chartered savings associations.

**Correspondent Bank (CorrB)** this is a bank that holds deposits for other banks and performs services, such as check clearing. The deposit balance is a form of payment for services. Many community banks clear checks drawn on out-of-town banks through reserve accounts at a larger bank. Correspondent banks also buy participations in loans exceeding the legal lending limit of a smaller bank, called the respondent, and give these banks access to financial markets, such as the foreign exchange market or financial futures market, that are ordinarily beyond the reach of smaller financial institutions.

**Country Bank (ConB):** a bank whose main office is outside a city. Country banks do not receive overnight credit on checks cleared in the reserve system, and generally have lower reserve Requirements than reserve city banks which are located in major cities.

**Independent Bank (IndB):** a locally owned and operated commercial bank. It derives its sources of funds from, and it lends money to, the community where it operates, and is not affiliated with a multibank holding company. Also it may be called community bank.

**Industrial Bank (InduB):** this is a state chartered finance company that makes consumer and commercial loans and accepts time deposits and interest-paying negotiable order of Withdrawal accounts. Industrial banks, once found in sixteen states, are today chartered in just five states, mostly in the western United States. The term has its roots in the early-20th-century finance companies that originated loans to industrial workers; back then, most commercial banks did not offer consumer loans. Also, such banks are often called industrial loan banks or industrial loan companies.

**Interstate Banking (Inter-sB):** that is banking expansion across state lines through bank holding company acquisitions. Interstate expansion of commercial banking companies began in the mid-1980s when state legislatures enacted laws permitting holding company acquisitions on a reciprocal basis with other states.

**Money Centre Bank (MCB):** this is a bank in one of the major financial centres of the world, such as New York, London, Paris, and Tokyo. These banks play a major national and international economic role because they are large lenders, depositories, and buyers of money market instruments and securities as well as large lenders to international governments and corporations.

**National Bank (NB):** this is a commercial bank chartered by the comptroller of the currency, an agency of the country (treasury department). A national bank is supervised by the comptroller and is a member bank in the countryside reserve system.

**Retail and Wholesale Banking (R&WB):** wholesale banking consists of banking services offered to corporations with sound financial statements, and institutional customers, such as pension funds

and government agencies. Services include lending, cash management, commercial mortgages, working capital loans, leasing, trust services and loan building societies. On the other hand, retail banking consists of group of financial services offered to the general public. It includes instalment loans, residential mortgages, equity credit loans, deposit services, and individual retirement accounts. In contrast with wholesale banking or corporate banking, retail banking is a high volume business with many service providers competing for market share.

**Offshore Banks (Off-sB):** these are banks located in jurisdictions with low taxation and regulation. Many offshore banks are essentially private banks.

**Relationship Banking (Rel-shipB):** this is a concept in financial services marketing whereby an account officer or customer service representative tries to meet all of a consumer's needs, to the extent permitted by regulation. Relationship banking is an attempt to advance the sales culture in bank marketing beyond order taking to a more pro-active form of direct selling. Instead of selling financial services one at a time, an account officer attempts to gain an understanding of the consumer's needs and offer services that fulfil those needs. Commercial banks and other financial institutions have attempted to apply the concept of relationship banking through Personal Banker and Private Banking programs.

**State /Central Bank (S/CenB):** this is a corporation chartered by a state or a country to engage in commercial banking, and subject to supervision under banking laws in the chartering state. State or central banks differ from national banks which are chartered and supervised by the comptroller of the currency. State banks have access to provide services, such as check collection, currency and coin delivery.

**Universal and Unit (limit) Banking (Uni&UB):** this banking system has several branches distributed in several countries and provides several financial services. This type of bank is more commonly known as a financial services company which engages in several activities. For example, commercial banks make loans, underwrite corporate debt, and also take equity positions in corporate securities. It permits better use of customer information and allows banks to sell more services under one roof as a financial supermarket. In contrast, unit or limit banking is a banking system in several states that prohibits branching, or operation of more than one full-service banking office.

**Private banking (PB):** is a term for banking, investment and other financial services provided by banks to private individuals, disposing of sizable assets. The term 'private' refers to the customer service being rendered on a more personal basis than in mass-market retail banking, usually via dedicated bank advisers. This high-level form of private banking is often referred to as high net wealth management.

**Community Development Banks (CDB):** regulated banks that provide financial services and credit to underserved markets or populations.

**Postal Savings Banks (PSB):** savings banks associated with national postal systems.

**Mortgage Banker or Broker (MB/Bro):** a bank when services mortgage loans for a fee, collect-ing principal and interest payments plus real estate taxes.

*Sources: definitions have been developed by the author, 2009 based on the electronic Banking dictionary).*

See suggested websites:

<a href="http://www.allbusiness.com/glossaries/bank/4952184-1.html">http://www.allbusiness.com/glossaries/bank/4952184-1.html</a>	<a href="http://bank.askdefine.com/">http://bank.askdefine.com/</a>
<a href="http://uk.100links.com/s3/generic/bank_loans/google">http://uk.100links.com/s3/generic/bank_loans/google</a>	<a href="http://articles.gourt.com/en/Bank">http://articles.gourt.com/en/Bank</a>
<a href="http://www.askaword.com/search.jsp?q=bank&amp;d=ss&amp;libs=">http://www.askaword.com/search.jsp?q=bank&amp;d=ss&amp;libs=</a>	<a href="http://obks.com/">http://obks.com/</a>
<a href="http://www.newworldencyclopedia.org/entry/Bank">http://www.newworldencyclopedia.org/entry/Bank</a>	<a href="http://tripatlas.com/Bank">http://tripatlas.com/Bank</a>
<a href="http://schools-wikipedia.org/wp/b/Bank.htm">http://schools-wikipedia.org/wp/b/Bank.htm</a>	<a href="http://finance.indiabizclub.com/info/bank">http://finance.indiabizclub.com/info/bank</a>
<a href="http://www.myoffshoreaccounts.com/english/DeltaQuest_of_fshore-banks-banking-services">http://www.myoffshoreaccounts.com/english/DeltaQuest_of_fshore-banks-banking-services</a>	<a href="http://www.answers.com/topic/agent-bank-2">http://www.answers.com/topic/agent-bank-2</a>



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## APPENDIX D: Risk Definitions

### 1. TRANSACTION RISKS

- a. **Credit risk** is failure of counterparty to meet his or her obligations in a timely way and on the agreed terms of the contract. The bank faces counter-party risks in the various forms of contracts: such as, *bay mua'jal*, *mudaraba*, *musharaka*, *murabaha*. These forms of contracts face the risk that the bank does not honour requests for withdrawals at face value. Also, these forms face the risk that the bank does not honour requests for withdrawals at market value.
- b. **Market risk** is the risk associated with change in the market value of held assets.
- c. **Mark-up risk** is risk of divergence between the *murabaha* contract mark-up and the market benchmark rate. The bank may incur losses if the benchmark rate changes adversely.
- d. **Foreign Exchange risk** is the risk of the impact of exchange rate movements on assets denominated in foreign currency. This exposes the bank to risks associated with their deferred-trading transactions. Business risk results from competitive pressures from existing counterparts.

### 2. BUSINESS RISKS

- a. **Displaced Commercial risk** is the risk of divergence between assets' performance and expectations for returns on liabilities. Displaced commercial risk may adversely affect the value of the bank's capital. Return on equity goes down Shareholders are exposed to the risk of not receiving their share of the bank's profit Investment depositors may have to forgo receiving their *mudarib* share.
- b. **Withdrawal risk** owns when the bank is exposed to the risk of withdrawal of deposits Withdrawal risk exposes the bank to liquidity problems and erosion of its franchise value.
- c. **Solvency risk** is the risk of a bank having insufficient capital to continue operations. Solvency risk may expose the bank to loss of its reputation. Solvency risk exposes the different stakeholders to counter – party risks.

### 3. TREASURY RISKS

- a. **Asset & Liability Management (ALM) risk** is a balance sheet mismatch risk resulting from the difference in terms and conditions of a bank's portfolio on its asset & liability sides. This may adversely affect the bank's capital.
- b. **Liquidity risk** is the risk of a bank's inability to access liquid funds to meet its obligations. The bank is exposed to risk of failure to honour requests for withdrawals from its depositors. The latter face the risk of not being able to access their deposits as needed.
- c. **Hedging risk** is the risk of failure to mitigate & manage the different types of risks. This increases the bank's overall risk exposure.

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#### 4. **GOVERNANCE RISKS**

- a. **Operational risk** is the risk of the failure of internal processes related to people or systems. The bank incurs losses due to occurrence of that risk; hence, it may fail to meet its obligations towards the different stakeholders. This risk adversely affects return on equity. This risk adversely affects return on assets
- b. **Fiduciary risk** is the risk of facing legal recourse action when the bank breaches its fiduciary responsibility towards depositors and shareholders. In the other word, potential losses that come from reputation legal recourse may lead to charging the bank a penalty or compensation. This may lead to withdrawal of deposits, sale of shares, and bad access to liquidity or a decline in the market price of shares if listed on the stock exchange. This risk adversely affects return on equity. This risk exposes investment depositors to economic losses.
- c. **Transparency risk** is the risk of the consequences of decisions which have been made based on inaccurate or incomplete information. This means, the outcome of poor disclosure losses may occur as a result of bad decisions. Also, this risk occurs when decision-makers are unable to access accurate telecommunications with their counterparties or gain complete information.

#### 5. **SYSTEMIC RISKS**

- a. **Business environment risk** is the risk of a poor, broad institutional environment, including legal risk whereby banks are unable to enforce their contracts. Business environment risk increases banks' exposure to counter-party risk as weak contracts are not easily enforceable.
- b. **Institutional risk** is the risk of divergence between product definition and practices Institutional risk exposes the bank to counter-party risks due to the unsettled nature of the contract.
- c. **Regulatory risk** is the risk of non-compliance with regulations due to confusion, bad management or mistakes. Banks may be penalized for not complying with the rules or regulations. It could be an issue with the regulator or supervisor.

*Source : El-Hawary, Grais & Iqbal 2004, pp. 47-8 (Annix II), and  
2007, pp. 777-8 (Annix II).*

## APPENDIX E: Surveyed Banks: Location, Identification and Remarks

### Bahrain Banks:

Islamic banks: 11

Conventional banks: 5

Bank Name	Type of Bank		Contact Details	Notes
	Isl.	Conv.		
<b>Al-Baraka Islamic Bank B.S.C</b>	*		Head office: P.O Box: 1882 Manama, Bahrain. Tel: + 973 17535300 Fax: + 973 17533993 E-mail: <a href="mailto:Baraka@batelco.com.bh">Baraka@batelco.com.bh</a>	Just 2005,2006 and 1 <sup>st</sup> , 2 <sup>nd</sup> Q 2007 highlights 2000-2006 available online
<b>Arcapita Bank</b>	*		P.O. Box: 1406 Manama, Bahrain Tel: + 973 17 218333 Fax: + 973 17 217555	From 1998 to 2006 available online
<b>Unicorn Investment Banks</b>	*		<b><u>Unicorn Investment Bank</u></b> Shari`a-compliant investment bank based in Manama. <b>Activities:</b> corporate finance and capital markets, mergers and acquisitions, asset management, private equity, and takaful (insurance)	2004- 2007 Annual reports
<b>Shamil Bank</b>	*		General Tel: + 973 17 585000 Fax: + 973 17 585151 E-mail: <a href="mailto:alshamil@shamilbank.net">alshamil@shamilbank.net</a> Public relation Tel: + 973 17 585082	From 2001 to 2007 available online
<b>Bahrain Saudi Bank BSB</b>		*	Senior manager, treasury services Tel: + 973 17 578884 Mob: + 973 39 615161 E-mail: <a href="mailto:fouad.mohsin@bsb.com.bh">fouad.mohsin@bsb.com.bh</a>	From 2003 to 2007 available online
<b>Gulf Finance House</b>	*		Alsalam Tower (6,7,8, 14 & 15) floor Diplomatic area P.O. Box: 10006 Manama, Bahrain Tel; + 973 17 538 538 ext: 434 + 973 17 549 557 direct E-mail: <a href="mailto:info@gfhouse.com">info@gfhouse.com</a>	2005, 2006, 2007 Unavailable online
<b>National Bank of Bahrain</b>		*	P.O Box; 106 Manama, Bahrain Tel: + 973 17 214433 E-mail: <a href="mailto:nbb@nbbonline.com">nbb@nbbonline.com</a>	From 2001 to 2007 available online
<b>International Investment Bank</b>	*		<b><u>International Investment Bank B. S. C.</u></b> Bahrain-based Islamic investment bank set up in 2003 in Manama, to provide investors with Shari`a-compliant investments. Regulated by Bahrain Monetary Agency (BMA)	2004, 2005, 2006, 2007 available online
<b>Faysal Bank</b>	*		(head of finance) ( risk manager) E-mail: <a href="mailto:corpcomm@faysalbank.com">corpcomm@faysalbank.com</a>	2005 & highlight 2007 available online

<b>Bank of Bahrain and Kuwait</b>	*	Tel: +973 17 20 7480 Fax: + 963 17 228200 E-mail: <a href="mailto:noora@bbkonline.com">noora@bbkonline.com</a>	from 2001 to 2007 available online
<b>United Gulf Bank B.S.C</b>	*	P.O Box: 5964 Diplomatic area UGB Tower, Manama, Bahrain Tel: + 973 17 533233 Fax: + 973bn 17 533137 E-mail : <a href="mailto:info@ugbbah.com">info@ugbbah.com</a>	from 2002 to 2007 available online
<b>Gulf International Bank</b>	*	Al-dowali building , 3 palace avenue P.O Box: 1017 Manama, Bahrain Tel: + 973 17 534 000 Fax: + 973 17 522 633 E-mail: <a href="mailto:info@gibbah.com">info@gibbah.com</a>	from 1998 to 2006 available online
<b>Taib Direct.com Bank</b>	*	Mena inquiries & trading Tel: + 973 17 544 499 Fax: + 973 17 531 213 E-mail: <a href="mailto:taibsecurities@taib.com">taibsecurities@taib.com</a>	From 2000 to 2007 available online
<b>Al-Amin Bank</b>	*	Al Baraka tower, 3 <sup>rd</sup> & 4 <sup>th</sup> floor Diplomatic area, Manama, Bahrain P.O Box: 3190 Tel: + 973 17 537551,/ 17 53552 E-mail: <a href="mailto:info@alaminbank.com">info@alaminbank.com</a>	2005 , 2006 and 1 <sup>st</sup> , 2 <sup>nd</sup> Q2007 available online
<b>RUSD Investment Bank</b>	*	Department 35, 3 <sup>rd</sup> floor, Al ahly building P.O Box: 2948 Manama Bahrain Tel: + 973 17 214 455 E-mail: <a href="mailto:info@rusdbank.com">info@rusdbank.com</a>	2001- 2007 available online
<b>Arab Banking Corporation</b>	*	<u>Arab Banking Corporation</u> Bahraini bank offering services in corporate banking, treasury, Islamic banking and private banking; syndicated loans, trade finance, project finance, investment banking, securities trading etc.	1999-2006 A. R.

### Libya Banks:

Islamic banks: 00

Conventional banks: 07

Bank Name	Type of Bank		Contact Details	Notes
	Isl.	Conv.		
<b>Bank of Trading and Development</b>		*	Banghazi Tel:+ 218 61 9080230 + 218 61 2229630 + 218 61 2232638 E-mail : <a href="mailto:info@bankofCD.com">info@bankofCD.com</a>	From 1999 to 2005
<b>British Arab Commercial Bank Ltd</b>		*	Head Office/ London, 8-10 Mansion house Tel: +44 20 7648 7777 El-Fatah Tower, floor 15, Office 154. P.O Box: 91051 Tripoli Tel: + 218 21 335 1489 Fax: + 218 21 335 1732	From 2004 to 2007
<b>Wahda Bank</b>		*	P.O Box: 452 Benghazi Fax:+ 218 61 2224122/ 360 4071 E-mail: <a href="mailto:info@wahdabank.com">info@wahdabank.com</a> <a href="mailto:wahda@wahdabank.com">wahda@wahdabank.com</a>	From 2000 to 2005

<b>Bank of UBAE S.P.D</b>	*	Omer Muktar st. / Invest complex Tel: +218 21 4446598/ 444739 <a href="mailto:Mahmudalielesawi@mail.ubae.it">Mahmudalielesawi@mail.ubae.it</a>	From 2004 to 2006
<b>Sahara Bank</b>	*	Main head office, Tripoli, first Sep. 3332771/ 3337922 <a href="http://www.saharabank.com.ly/ar/main.asp">http://www.saharabank.com.ly/ar/main.asp</a>	(from 03 to 05)
<b>Umma Bank ( Nation Bank)</b>	*	Omar Muktar str. Tripoli ( head office) P.O Box: 685 Tripoli, Libya Tel: + 218 21 4442541/44 + 218 21 3334031/ 35	2003,2004 , 2005
<b>Jamhuria Bank</b>	*	Guryan ( head office) P.O Box: Assistant manager ; Mobile: 091 324 0576	2000, 2005

### United Arab Emirate Banks UEA:

Islamic banks: 06

Conventional banks: 05

Bank Name	Type of Bank		Contact Details	Notes
	Isl.	Conv.		
<b>Dubai Islamic Bank</b>	*		(Head office ) P.O Box: 1080 Dubai. UAE Tel: + 971 4 295 3000 Fax; + 971 4 295 4111 (Customer services) Tel: + 971 4 211 7400/ local 8004008 Free Email: <a href="mailto:contactus@alislami.ae">contactus@alislami.ae</a>	From 2002 to half 2006 available online
<b>Abu-Dhabi Islamic Bank</b>	*			1999-2006 A. R.
<b>Bank of Sharjah</b>		*	E-mail: <a href="mailto:Saudi.besharah@bankofsharjah.com">Saudi.besharah@bankofsharjah.com</a> Director <a href="mailto:Varouj.nerquizian@bankofsharjah.com">Varouj.nerquizian@bankofsharjah.com</a> General manager	Just 2004, 2005 and 2006 available online
<b>Commercial Bank of Dubai</b>		*	General manager(admin & finance): General manager ( credit)	From 2002 to 2007 available online
<b>Emirate Banks Group(Emirates Islamic Bank)</b>	*		Beniyas read. P.O Box: 2923, Deira, Dubai Tel: + 971 4 2256256 Tel: 04 3160101 Fax: 04 2227321 E-mail: <a href="mailto:info@emiratesislamicbank.ae">info@emiratesislamicbank.ae</a>	For banks group; from 2000 to 2006, For the Islamic; banks <i>Just 2005 and reports of 2005 and 2006</i> available online
<b>Sahrjah Islamic Bank</b>	*		<a href="http://www.sib.ae/eng/sib_aboutus.asp">http://www.sib.ae/eng/sib_aboutus.asp</a> Bank based in Sharjah with branches in Dubai and Abu Dhabi; founded in 1973 in association with Banque de Paris de des Pays-Bas, France	
<b>National bank of Abu-Dhabi</b>		*	NBAD Centre Tel: + 971 4 8002211 E-mail: <a href="mailto:customersupport@nbad.com">customersupport@nbad.com</a>	From 1999 to 2006 available online

<b>Mashreq Bank</b>	*	head office Tel: + 971 4 207 7414 Tel: + 971 4 207 7826 E-mail: direct links within website	From 2000 to 2005 available online
<b>National Bank of Dubai</b>	*	General Tel: + 971 4 2222111 Fax: + 971 4 228 3000	2005 and 2006 available online
<b>Dubai Bank</b>	*	Tel: + 971 4 336 5555	Just 2004 available online
<b>Ihilal financial services</b>	*	Tel: + 971 4 3300 399 E-mail: <a href="mailto:info@ihilal.com">info@ihilal.com</a>	Unavailable online

**Qatar Banks:**

Islamic banks: 04

Conventional banks; 02

Bank Name	Type of Bank		Contact Details	Notes
	Isl.	Conv.		
<b>International Islamic Bank</b>	*		<a href="mailto:qiibit@qiib.com.qa">qiibit@qiib.com.qa</a>	Just 2003, 2004 available online
<b>Qatar Islamic Bank</b>	*		risk manager	From 2001 to 2006 available online
<b>Islamic Finance Services (First Finance)</b>	*		Eihab Dabur- general management Tel: 4559900 fax: 4559905 Risk management; Tel: 4559942 OR Tel:4559941	5 years (from 02 to 06) available online
<b>Qatar National Bank QNB</b>		*	Call centre: + 974 440 7777 E-mail: <a href="mailto:ccsupport@qnb.com.qa">ccsupport@qnb.com.qa</a>	4 years from 2003 to 2006 available online
<b>Mashreq bank</b>	*		Direct Banking Centre T: +971 4 2174800 F: +971 4 2238830 Corporate Customer Service T: +971 4 2994233 T: +971 4 6018333 T: +971 4 6018444	2000-2006 A. R.
<b>Commercial Bank of Qatar</b>		*	Head office; Grand St. P.O. Box: 3232 Duha, State of Qatar Tel; + 974 449 0000 Fax: + 974 449 0070 <a href="mailto:info@cbq.com.qa">info@cbq.com.qa</a>	From 2001 to 2005 available online

**Jordanian Banks:**

Islamic banks: 03

Conventional banks: 05

Bank Name	Type of Bank		Contact Details	Notes
	Isl.	Conv.		
<b>Islamic International Arab Bank PLC</b>	*		Postal Code: 11190 Amman BO Box: 925802 Tel: 5694901 Fax: 5694914 <a href="mailto:info@iiabank.com.jo">info@iiabank.com.jo</a>	Annual reports 2005, A. R.
<b>Jordan Islamic</b>	*		Postal Code: 926225	2001-2-006

<b>Bank for Finance and Investment</b>			11190 Amman Tel:5666325 <a href="mailto:jib@islamicbank.com">jib@islamicbank.com</a>	Fax.5666326	Financial HIGHLIGHTS
<b>Arab Bank PLC</b>		*	Postal Code: 950545 11195 Amman Tel:5607231 <a href="mailto:corpcomm@arabbank.com.jo">corpcomm@arabbank.com.jo</a>	Fax.5606793	Annual reports 2005 2006 A. R.
<b>Cairo Amman Bank</b>		*	Postal Code: 950661 11195 Amman Tel:4616910 <a href="mailto:info@cab.jo">info@cab.jo</a>	Fax.4642890	Annual reports 2005, 2006 A. R.
<b>Arab Jordan Investment Bank</b>		*	Postal Code: 8797 11121 Amman Tel:5607126 <a href="mailto:info@ajib.com">info@ajib.com</a>	Fax.5681482	Annual reports 2002-2006 A. R.
<b>Jordan Kuwait Bank</b>		*	Postal Code: 9776 11191 Amman Tel:5688814 <a href="mailto:webmaster@jkbank.com.jo">webmaster@jkbank.com.jo</a>	Fax.5695604	Annual reports 2001-2006 A. R.
<b>The Housing Bank for Trade &amp; Finance</b>		*	Postal Code: 7693 11118 Amman Tel:5607315 <a href="mailto:info@hbt.com.jo">info@hbt.com.jo</a>	Fax.5678121	Annual reports 2003-2006 A. R.
<b>Jordan Ahli Bank</b>		*	Queen Noor Street-Shemesani P.O Box 3103, Amman 11181 Jordan Tel. (+962 6) 5638800 5622281 <a href="mailto:info@ahlibank.com.jo">info@ahlibank.com.jo</a>	Fax. (+962 6)	Annual reports from 2000 to 2006 are available.

*Notices:*

- *Number of the participated countries; Five (5)*
- *Number of the Islamic banks; twenty four banks (24)*
- *Number of the conventional banks; twenty four banks (24)*

**Useful links:**

- <http://www.nenas.com/ac/banks/>
- <http://www.escapeartist.com/banks2/banks2.htm>
- <http://islamic-finance.net/bank.html>
- [http://www.islamicity.com/finance/IslamicBanking\\_References.htm](http://www.islamicity.com/finance/IslamicBanking_References.htm)
- <http://www.answers.com/topic/islamic-banking>

APPENDIX F: Questionnaire Survey



Questionnaire Survey

English Version

PhD Dissertation

School of Accounting, Economics & Finance

University of Southern Queensland

Toowoomba QLD

2007



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25 May 2007

Dear Sir / Madam

**Research Study**

*An Assessment of Risk Factors, and Their Effects on the Rationality of Lending Decisions: A Comparative Study of Conventional Banks and Islamic Banks*

I am currently undertaking research that will be incorporated into my PhD on the “assessment risk factors and their influence on the rationality of lending decisions in conventional banks (CBs) and Islamic banks (IBs) in the Middle East (ME) region”. The research is aimed at comparing CBs with IBs, with the objective of contributing to the framework for policy development. In order to accomplish my research tasks, I am particularly interested in information from your institution, as I am aware of your proactive involvement in banking networks in the region. However, I understand your need to keep a competitive edge in business, and therefore I wish to assure you that any information provided would be treated as strictly confidential and that solicited information would be of a general nature only.

I would appreciate it if you could provide me with an opportunity to sit with you for approximately one hour to gain your opinions and experiences on the banking sector. I fully understand your busy work commitments and would be willing to meet at any time suitable to you. I will contact you in the near future to seek your participation in this research.

Sincerely yours

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**Thank you for participating in the research survey**

Thank you for discussing your banking experiences in the credit field with me. Your comments have proved to be not only extremely interesting, but also very useful to my research. I will forward a copy of the results once analysis has been completed.

Once again, I thank you for being so generous with your time and wish you and your institution every success in your investments in the credit area.

# INTRODUCTION

## **Briefing the Respondent**

Thank you for agreeing to participate in this research. This survey is part of a PhD research study. Its purpose is to investigate the differences between conventional banks (CBs) and Islamic banks (IBs) in dealing with lending policy development and credit risk management. The perspective is from the viewpoint of Islamic banks, however, it is anticipated that differences exist between Islamic and conventional banks. The questions in this questionnaire are divided into 4 main parts.

Strategic considerations such as reading the questions carefully and the way you answer are very important. Thus, the findings of this research will assist financial intermediaries and bankers to build their investment expertise and success based on the opportunities available. This research is strictly confidential and your institution will not be identified in the research report. Because the participants in this study are from different countries in the ME, four respondents from such institutions are required as participants.

1. Executive manager
2. Property board member/ Islamic board member
3. Credit department manager
4. Treasurer / financial department manager

If you agree to participate, you are welcome, at point during the process, to ask me to clarify any points. May I have your permission to assist you in completing this survey? Protocol is not a questionnaire, but provides a framework for the survey. Therefore, I seek your assistance in completing this survey.

### *Survey details:*

Case No: \_\_\_\_\_ Time commenced (date): \_\_\_\_\_ Country name: \_\_\_\_\_

Institute name: \_\_\_\_\_

Position held with the institution: \_\_\_\_\_

Contact details: \_\_\_\_\_

\_\_\_\_\_

**A. About Your Bank/ Financial Institution:**

1. Bank status (select all that apply)

- ( )1 Local ( )2 Islamic ( )3 Private  
 ( )4 International ( )5 Commercial ( )6 Public

2. Bank size—total assets (in million US \$ ) (select one)

- ( )1 Less than 20 ( )2 20 – 49 ( )3 50 – 74 ( )4 75 and over

3. Bank activities—products/services (select all that apply)

- ( )1 Loans granting ( )2 Deposits accepting  
 ( )3 Retirement products ( )4 Insurance securities  
 ( )5 Investment banking ( )6 Others (please

specify)\_\_\_\_\_

4. Bank’s obligations (select all that apply)

- ( )1 Religious affiliation (*shari`a* complains) ( )2 Customer needs & satisfaction  
 ( )3 Monitoring & securing clients’ assets ( )4 Corporate governance  
 ( )5 Social & financial development in the way of *shari`a* teaching

5. From the bank’s lending statistics (please fill the following gaps)

I. Applications unapproved ( provide numeric answer)

- Successful lending (good loans); almost \_\_\_\_\_ per-year
- Unsuccessful lending (poor loans); almost \_\_\_\_\_ per-year

II. Applications unapproved (for whatever reason); almost \_\_\_\_\_ per-year

**B. On Risk Assessment:**

1. From your perspective in recognizing risk type, please indicate how difficult you think it is to assess each of the following types of risk (using the scale provided)

Very Easy (1) Easy (2) Neutral (3) Difficult (4) Very Difficult (5)

I. <i>Transaction risks</i>	( )1	( )2	( )3	( )4	( )5
II. <i>Business risks</i>	( )1	( )2	( )3	( )4	( )5
III. <i>Treasury risks</i>	( )1	( )2	( )3	( )4	( )5
IV. <i>Governance risks</i>	( )1	( )2	( )3	( )4	( )5
V. <i>Systemic risks</i>	( )1	( )2	( )3	( )4	( )5

2. The following table shows that each risk factor is classified into sub-factors, please indicate the rate of risk applying to each factors (select one please)

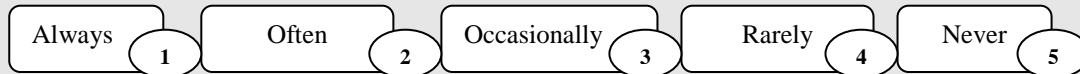
Very applicable (1) Applicable (2) Neutral (3) Inapplicable (4) Very inapplicable (5)

<i>Risk factors</i>	<i>Risk variables</i>	<i>The scale</i>				
i. Transacti on Risks	A. <i>Credit risk ( grading risk)</i>	( )1	( )2	( )3	( )4	( )5
	B. <i>Products tenor plan risk</i>	( )1	( )2	( )3	( )4	( )5
	C. <i>Mark-up risk</i>	( )1	( )2	( )3	( )4	( )5
	D. <i>Foreign exchange Risk</i>	( )1	( )2	( )3	( )4	( )5

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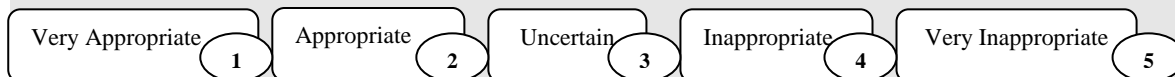
ii.	<i>E. Balance sheet risk</i>	( )1	( )2	( )3	( )4	( )5
	<i>F. Single name single transaction risk</i>	( )1	( )2	( )3	( )4	( )5
iii. Business Risks	<i>G. Trading activity risk</i>	( )1	( )2	( )3	( )4	( )5
	<i>H. Displaced commercial risk</i>	( )1	( )2	( )3	( )4	( )5
	<i>I. Withdrawal risk</i>	( )1	( )2	( )3	( )4	( )5
	<i>J. Solvency risk</i>	( )1	( )2	( )3	( )4	( )5
iv. Treasury Risks	<i>K. Credit skill and training risk</i>	( )1	( )2	( )3	( )4	( )5
	<i>L. Asset &amp; liability management risk ALM</i>	( )1	( )2	( )3	( )4	( )5
	<i>M. Liquidity risk</i>	( )1	( )2	( )3	( )4	( )5
	<i>N. Hedging risk</i>	( )1	( )2	( )3	( )4	( )5
v. Governance Risks	<i>O. Fiduciary risk</i>	( )1	( )2	( )3	( )4	( )5
	<i>P. Transparency risk</i>	( )1	( )2	( )3	( )4	( )5
	<i>Q. Legal risk</i>	( )1	( )2	( )3	( )4	( )5
	<i>R. Operational risk</i>	( )1	( )2	( )3	( )4	( )5
	<i>S. Event, natural disaster risk</i>	( )1	( )2	( )3	( )4	( )5
	<i>T. Business environment risk</i>	( )1	( )2	( )3	( )4	( )5
vi. Systematic Risks	<i>U. Fraud/ compliance risk</i>	( )1	( )2	( )3	( )4	( )5
	<i>V. Technology/systems exposure</i>	( )1	( )2	( )3	( )4	( )5
	<i>W. Payment/settlement risk</i>	( )1	( )2	( )3	( )4	( )5
	<i>X. Institutional risk</i>	( )1	( )2	( )3	( )4	( )5
	<i>Y. Shift in regulation(regulatory risk )</i>	( )1	( )2	( )3	( )4	( )5

3. Would you please rate the following items based on how frequently you think they are factors in your lending decisions.



i. <i>Transaction risks</i>	( )1	( )2	( )3	( )4	( )5
ii. <i>Business risks</i>	( )1	( )2	( )3	( )4	( )5
iii. <i>Treasury risks</i>	( )1	( )2	( )3	( )4	( )5
iv. <i>Governance risks</i>	( )1	( )2	( )3	( )4	( )5
v. <i>Systemic risks</i>	( )1	( )2	( )3	( )4	( )5

4. Please give your opinion about the usefulness of each of the following sources of risk in the following models (match all that apply).



**Internal rating and scoring models** for evaluating risk asset backed securities (ABS), that is, securities backed by a pool of assets for meeting the basic Minimum Capital Requirements (MCR), such as Moody's model, S&P 500 model, Fitch model.

i. <i>Transaction risks</i>	( )1	( )2	( )3	( )4	( )5
ii. <i>Business risks</i>	( )1	( )2	( )3	( )4	( )5
iii. <i>Treasury risks</i>	( )1	( )2	( )3	( )4	( )5
iv. <i>Governance risks</i>	( )1	( )2	( )3	( )4	( )5
v. <i>Systemic risks</i>	( )1	( )2	( )3	( )4	( )5

**Value and risk model (V& R) model;** for measuring and evaluating liquid rates, capital rates and default rates which include the difference between assets performance and expectation of returns liability.

i. <i>Transaction risks</i>	( )1	( )2	( )3	( )4	( )5
ii. <i>Business risks</i>	( )1	( )2	( )3	( )4	( )5
iii. <i>Treasury risks</i>	( )1	( )2	( )3	( )4	( )5
iv. <i>Governance risks</i>	( )1	( )2	( )3	( )4	( )5
v. <i>Systemic risks</i>	( )1	( )2	( )3	( )4	( )5

**Beta (β) & Capital Assets Pricing model (CAP model);** for any mismatched risk results from different of terms and conditions

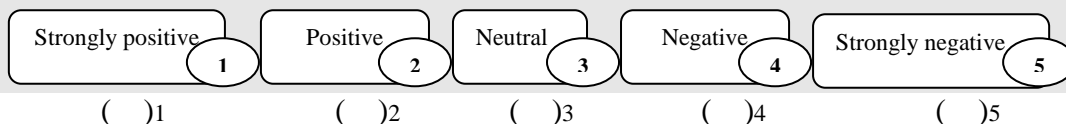
i. <i>Transaction risks</i>	( )1	( )2	( )3	( )4	( )5
ii. <i>Business risks</i>	( )1	( )2	( )3	( )4	( )5
iii. <i>Treasury risks</i>	( )1	( )2	( )3	( )4	( )5
iv. <i>Governance risks</i>	( )1	( )2	( )3	( )4	( )5
v. <i>Systemic risks</i>	( )1	( )2	( )3	( )4	( )5

5. This question is designed to clarify the measurement risk models that you have used in your institution.

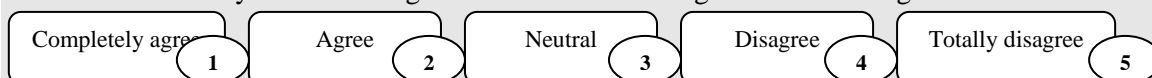
- i. Are you using a specific model to measure the transaction risks?  
No ( ) Yes ( ) *If yes, please specify* \_\_\_\_\_
- ii. Are you using a specific model to measure the business risks?  
No ( ) Yes ( ) *If yes, please specify* \_\_\_\_\_
- iii. Are you using a specific model to measure the treasury risks?  
No ( ) Yes ( ) *If yes, please specify* \_\_\_\_\_
- iv. Are you using a specific model to measure the governance risks?  
No ( ) Yes ( ) *If yes, please specify* \_\_\_\_\_
- v. Are you using a specific model to measure the systemic risks?  
No ( ) Yes ( ) *If yes, please specify* \_\_\_\_\_

**C. On lending portfolio:**

1. Please rate your perception of the relationship between credit portfolio quality and credit risk quantity, using the scale below.



2. Please indicate your level of agreement to the following statements using the scale below.

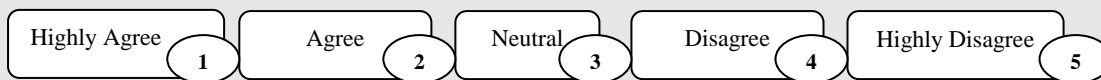


I. Holding a non-diversified credit portfolio means the bank has non-risky assets	( )1	( )2	( )3	( )4	( )5
II. A more highly-diversified credit portfolio means holding non-risky assets in estimated period	( )1	( )2	( )3	( )4	( )5
III. A more highly-diversified credit portfolio means more asset securitisation	( )1	( )2	( )3	( )4	( )5
IV. With regard to the efficiency concept, credit portfolio inputs and outputs are mostly equivalent	( )1	( )2	( )3	( )4	( )5

3. Your answer to the following question is very important to my research interpretation. Please tick which type of credit applies, as well as providing the corresponding percentage. (Percentages total should be 100%)

- Personal/consumer credit approximately \_\_\_\_\_ %.
- Small business firms approximately \_\_\_\_\_ %.
- Large business firms approximately \_\_\_\_\_ %.
- Secured credit:
  - *Collateral credit* approximately \_\_\_\_\_ %.
  - *Aggregate credit* approximately \_\_\_\_\_ %.
- Unsecured credit approximately \_\_\_\_\_ %.
- Others - please specify
  - \_\_\_\_\_ Approximately \_\_\_\_\_ %.
  - \_\_\_\_\_ Approximately \_\_\_\_\_ %.

4. Please indicate your agreement with the following statements using the scale below.



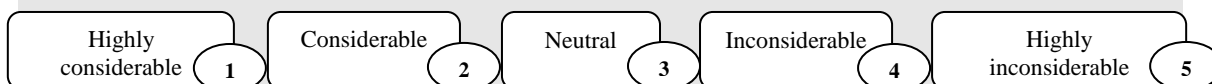
i. Managing and controlling risk factors may lead to increased loan costs	( )1	( )2	( )3	( )4	( )5
ii. Managing and controlling risk factors may lead to a decrease in loan performance	( )1	( )2	( )3	( )4	( )5
iii. Managing and controlling risk factors may influence loan maturity	( )1	( )2	( )3	( )4	( )5
iv. Managing and controlling risk factors may lead to bank stability	( )1	( )2	( )3	( )4	( )5
v. Managing and controlling risk factors may lead to making poor lending decisions	( )1	( )2	( )3	( )4	( )5
vi. Managing and controlling risk factors may not lead to optimising the decision-making	( )1	( )2	( )3	( )4	( )5
vii. Managing and controlling risk factors may not lead to default loans	( )1	( )2	( )3	( )4	( )5
viii. Managing and controlling risk factors may not lead to improved bank productivity and efficiency	( )1	( )2	( )3	( )4	( )5
ix. Measuring risk factors may indemnify the bank from insolvency	( )1	( )2	( )3	( )4	( )5
x. Measuring risk factors may lead to safeguarding the firm from insolvency	( )1	( )2	( )3	( )4	( )5

Cont. C4

XI. Measuring risk factors may lead to complicated loan application processes	( )1	( )2	( )3	( )4	( )5
XII. Measuring risk factors may lead to improved efficiency units	( )1	( )2	( )3	( )4	( )5
XIII. Measuring risk factors may lead to enhancing the quality of the bank's loans portfolio.	( )1	( )2	( )3	( )4	( )5
XIV. Measuring risk factors may lead to an increase in the number of loans granted	( )1	( )2	( )3	( )4	( )5
XV. Measuring risk factors may lead to a decrease in catastrophic credit defaults	( )1	( )2	( )3	( )4	( )5
XVI. Measuring risk factors may lead to making lending decisions with a higher degree of certainty	( )1	( )2	( )3	( )4	( )5
XVII. Measuring risk factors may lead to improved decision-making within units in the future	( )1	( )2	( )3	( )4	( )5

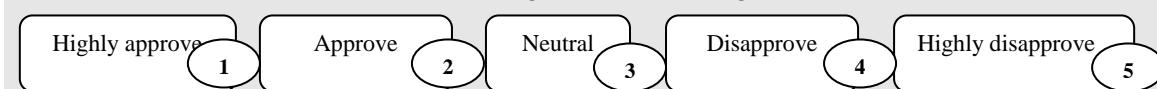
**D. On optimising lending decision-making :**

1. Your expert opinions is sought on your institution board — Please rate the degree of consideration to the following statements when allocating loans using the scale below.



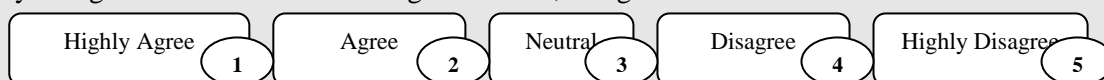
I. The value you are giving to the relationship between credit portfolio and credit risk management	( )1	( )2	( )3	( )4	( )5
II. The value you are giving to the relationship between loans refund efficiency and loan maturity	( )1	( )2	( )3	( )4	( )5
III. The value you are giving to the relationship between risks control and credit decision performance	( )1	( )2	( )3	( )4	( )5
IV. Personal characteristics for requested application	( )1	( )2	( )3	( )4	( )5
V. Business characteristics for requested application	( )1	( )2	( )3	( )4	( )5
VI. The relationship between institution and borrowers	( )1	( )2	( )3	( )4	( )5
VII. Bank's characteristics, (e.g. culture, environment and events)	( )1	( )2	( )3	( )4	( )5
VIII. The match between bank's purpose and goal	( )1	( )2	( )3	( )4	( )5
IX. What type of activities the bank is involved in	( )1	( )2	( )3	( )4	( )5
X. The capital structure of the bank	( )1	( )2	( )3	( )4	( )5
XI. The return on assets and equity for applications	( )1	( )2	( )3	( )4	( )5
XII. When/where the bank accepts deposits and granted loans	( )1	( )2	( )3	( )4	( )5

2. Referring to the loans granting process, please indicate the degree of your judgment (your authorisation) in relation to the following statements, using the scale below.



I. The cost of the transaction is rising according to information availability	( )1	( )2	( )3	( )4	( )5
II. The institution has insufficient capital to continue operations	( )1	( )2	( )3	( )4	( )5
III. The institution has an inability to access liquid funds to meet its obligations	( )1	( )2	( )3	( )4	( )5
IV. The institution has failed to manage the different types of risks	( )1	( )2	( )3	( )4	( )5
V. The institution has flawed internal processes related to people or systems	( )1	( )2	( )3	( )4	( )5
VI. The institution has faced legal action	( )1	( )2	( )3	( )4	( )5
VII. Consequences of decision based on inaccurate or incomplete information	( )1	( )2	( )3	( )4	( )5
VIII. The institution has faced legal risk whereby the institution is unable to enforce their contracts	( )1	( )2	( )3	( )4	( )5
IX. The provision of variety between the product (loan) identity and practices is well disciplined institutionally	( )1	( )2	( )3	( )4	( )5
X. Non-compliance with acts and regulations result in confusion, bad management and mistakes	( )1	( )2	( )3	( )4	( )5
XI. The applicant provides clear and official statements about her/his financial situation	( )1	( )2	( )3	( )4	( )5
XII. The result of your evaluation to the applicant is confidential	( )1	( )2	( )3	( )4	( )5
XIII. Evidence that the applicant is capable of refunding the loan	( )1	( )2	( )3	( )4	( )5
XIV. You do not know the source of the money which has been refunded	( )1	( )2	( )3	( )4	( )5
XV. No evidence that the applicant is going to refund the loan in a certain timeframe	( )1	( )2	( )3	( )4	( )5
XVI. The internal auditor has positively reported on securitisations and investments	( )1	( )2	( )3	( )4	( )5
XVII. The geographical location of the applicant and the bank is different	( )1	( )2	( )3	( )4	( )5
XVIII. The applicant has no previous association with the bank (first time application)	( )1	( )2	( )3	( )4	( )5
XIX. For somehow reason, the approved application conflicts with institutional lending policy	( )1	( )2	( )3	( )4	( )5

3. Credit risk models have become a focus for practitioners and financial supervisors; please rate your agreement with the following statements, using the scale below



I. Credit risk models have emerged just as a significant shift has occurred in debt and loan markets	( )1	( )2	( )3	( )4	( )5
II. Credit risk models have facilitated the pricing of portfolio of exposures included in securitisations	( )1	( )2	( )3	( )4	( )5



III. Credit risk models are being used as a basis for bank’s calculations of regulatory capital	( )1	( )2	( )3	( )4	( )5
IV. Credit risk models encompass bank efficiency performance directly, and are matched with non-performing loans in cost or production	( )1	( )2	( )3	( )4	( )5
V. Credit risk models are possibly related to examiners’ ratings of bank management quality	( )1	( )2	( )3	( )4	( )5
VI. Credit risk models exist because of new markets in credit derivatives and the unprecedented growth in the pre-existing markets for loan sales and securitisations	( )1	( )2	( )3	( )4	( )5
VII. Credit risk models have presented a negative relation between problem loans and cost efficiency—and this statement holds for profitable banks,, as well as for the subset of failing banks	( )1	( )2	( )3	( )4	( )5

**E. About You:**

1. Age (select one)

- ( )1 less than 30      ( )2 30 – 44      ( )3 45 – 59      ( )4 60 and over

2. Education level (select one)

- ( )1 Primary school      ( )2 Secondary school      ( )3 Associate degree  
 ( )4 Undergraduate degree      ( )5 Postgraduate degree

3. Experience in your job ( select one)

- ( )1 Less than 5      ( )2 5 – 9      ( )3 10 – 14      ( )4 More than 14

4. According to the decision-making anticipation rules, are you invited to participate in decision-making with others in your institution? (select one)

- ( )1 Regularly invited      ( )2 Seldom      ( )3 Often      ( )4 Never invited

We greatly appreciate your contribution to this research by completing the questionnaire. We also invite any further comment from you that may help the researcher draw rigorous conclusions to this study.

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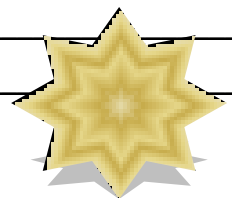
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## APPENDIX G: Descriptive statistics - IB vs. CB

### RA1: Risk Factors

Feature	Conventional Banks			Islamic banks		
	Mean	Median	Std. Dev	Mean	Median	Std. Dev
Transaction risks factor	3.34	3.00	1.214	3.25	3.00	1.352
Business risks factor	3.85	4.00	.940	3.81	4.00	1.000
Treasury risks factor	3.71	4.00	.930	3.81	4.00	.892
Governance risks factor	3.69	4.00	.898	3.62	4.00	.967
Systemic risks factor	3.20	3.00	1.147	3.48	3.00	1.157

### RA2:

#### TrR Classification

Feature	Conventional Banks			Islamic banks		
	Mean	Median	Std. Dev	Mean	Median	Std. Dev
Credit risk ( grading risk)	1.36	1.00	.650	1.56	1.00	.668
Products tenor plan risk	2.08	2.00	.985	2.156	2.00	.844
Mark-up risk	1.86	2.00	.843	1.70	2.00	.594
Foreign exchange risk	1.63	1.00	.921	1.66	2.00	.65
Balance sheet risk	2.23	2.00	.954	2.156	2.00	.828
Single name single transaction risk	2.73	3.00	1.132	2.85	3.00	1.163

#### BR Classification

Feature	Conventional Banks			Islamic banks		
	Mean	Median	Std. Dev	Mean	Median	Std. Dev
Trading activity risk	1.84	2.00	.780	1.81	2.00	.638
Displaced commercial risk	1.78	2.00	.788	1.84	2.00	.667
Withdrawal risk	1.80	2.00	.968	1.66	2.00	.650
Solvency risk	1.70	2.00	.841	1.64	2.00	.609

#### TyR Classification

Feature	Conventional Banks			Islamic banks		
	Mean	Median	Std. Dev	Mean	Median	Std. Dev
Credit skill and training risk	1.78	2.00	.913	1.70	2.00	.639
Asset & liability management risk	1.48	1.00	.793	1.34	1.00	.478
Liquidity risk	1.47	1.00	.836	1.41	1.00	.620
Hedging risk	1.79	2.00	.896	1.58	1.00	.665

#### GR Classification

Feature	Conventional Banks			Islamic banks		
	Mean	Median	Std. Dev	Mean	Median	Std. Dev
Fiduciary risk	1.70	2.00	.783	1.82	2.00	.770

Transparency risk	1.65	1.00	.823	1.64	2.00	.674
Legal risk	1.47	1.00	.762	1.51	1.00	.670
Operational risk	1.67	1.00	.818	1.59	1.00	.663
Event, natural disaster risk	2.21	2.00	.935	2.49	2.00	.899
Business environment risk	2.17	2.00	1.061	2.22	2.00	.837

SR Classification

Feature	Conventional Banks			Islamic banks		
	Mean	Median	Std. Dev	Mean	Median	Std. Dev
Fraud/ compliance risk	1.84	2.00	.807	2.77	2.00	1.517
Technology/systems exposure	1.88	2.00	.7887	2.387	2.00	.981
Payment/settlement risk	2.02	2.00	.8117	2.527	2.00	1.069
Institutional risk	1.99	2.00	.819	2.237	2.00	.890
Shift in regulation(regulatory risk )	2.06	2.00	.950		2.00	.950

RA3

Risk Feasibility

Feature	Conventional Banks			Islamic banks		
	Mean	Median	Std. Dev	Mean	Median	Std. Dev
Transaction Risks Feasibility	2.60	2.00	1.098	2.81	3.00	1.138
Business Risks Feasibility	2.71	3.00	.969	2.78	3.00	1.083
Treasury Risks Feasibility	2.59	2.00	.938	2.66	3.00	.870
Governance Risks Feasibility	2.51	2.00	1.015	2.44	2.00	.957
Systemic Risks Feasibility	2.20	2.00	1.115	2.29	2.00	.993

RA4

Risk Measurement Approaches (Beta & Capital Pricing Models Applications)

Feature	Conventional Banks			Islamic banks		
	Mean	Median	Std. Dev	Mean	Median	Std. Dev
Transaction Risks	2.95	3.00	1.126	2.67	3.00	.883
Business Risks	2.90	3.00	1.096	2.68	3.00	.831
Treasury Risks	2.92	3.00	1.108	2.56	3.00	.913
Governance Risks	2.23	2.00	1.002	2.15	2.00	.892
Systemic Risks	1.52	1.00	1.003	1.73	2.00	.786

(Value at risk Models Applications)

Feature	Conventional Banks			Islamic banks		
	Mean	Median	Std. Dev	Mean	Median	Std. Dev
Transaction Risks	2.20	2.00	.764	2.63	2.00	1.219
Business Risks	1.99	2.00	.728	2.27	2.00	1.004
Treasury Risks	2.21	2.00	.738	2.51	2.00	.899
Governance Risks	2.29	2.00	.852	2.23	2.00	.635
Systemic Risks	2.94	3.00	1.099	2.42	2.00	.815

(Internal rating & Scoring Models Applications)

Feature	Conventional Banks			Islamic banks		
	Mean	Median	Std. Dev	Mean	Median	Std. Dev

Transaction Risks -	1.67	1.00	.887	2.26	2.00	1.302
Business Risks	1.92	2.00	.923	2.14	2.00	.855
Treasury Risks	2.59	2.50	1.010	2.49	3.00	.748
Governance Risks	2.74	3.00	1.119	3.10	3.00	1.314
Systemic Risks	3.62	4.00	1.209	2.95	3.00	1.373

#### RA5

##### Specific Models Applied

Feature	Conventional Banks			Islamic banks		
	Mean	Median	Std. Dev	Mean	Median	Std. Dev
for Transaction Risks Measurement	1.12	1.00	.322	1.11	1.00	.315
for Business Risks Measurement	1.12	1.00	.322	1.10	1.00	.296
for Treasury Risks Measurement	1.05	1.00	.212	1.10	1.00	.296
for Governance Risks Measurement	1.07	1.00	.256	1.10	1.00	.296
for Systemic Risks Measurement	1.13	1.00	.336	1.10	1.00	.315

#### LP1

##### The Relationship

Feature	Conventional Banks			Islamic banks		
	Mean	Median	Std. Dev	Mean	Median	Std. Dev
Lending Portfolio & Risk factors	1.76	1.50	.880	1.69	2.00	.724

#### LP2

##### Lending Portfolio Diversification

Feature	Conventional Banks			Islamic banks		
	Mean	Median	Std. Dev	Mean	Median	Std. Dev
Non-diversified portfolio means non-risky assets	3.19	3.00	1.368	3.19	3.00	1.243
Highly-diversified portfolio means non-risky assets in estimated period	2.13	2.00	.823	2.14	2.00	.976
Highly-diversified portfolio means more asset securitisation	2.13	2.00	.837	2.19	2.00	1.050
Efficiency concept means portfolio inputs equivalent outputs mostly	2.07	2.00	.892	1.93	2.00	.770

#### ReLP3

##### Profile of lending Portfolio

Feature	Conventional Banks			Islamic banks		
	Mean	Median	Std. Dev	Mean	Median	Std. Dev
Personal / Consumer Credit	1.99	2.00	1.012	3.00	3.00	1.443
Small Business Credit	2.49	2.00	1.015	3.26	3.00	1.191
Large Business Credit	2.64	3.00	1.167	3.58	3.00	1.013
Collateral (Secured) Credit	3.09	3.00	1.343	3.66	4.00	1.283
Mortgage (secured) Credit	3.21	3.00	1.284	3.64	4.00	1.240
Unsecured Credit	4.78	5.00	.470	4.38	4.00	.592

Other Credit	4.21	4.00	.688	3.84	4.00	.764
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LP4a

Managing & Controlling Risk Factors

Feature	Conventional Banks			Islamic banks		
	Mean	Median	Std. Dev	Mean	Median	Std. Dev
increased loan costs	3.92	4.00	1.098	4.05	4.00	.685
Decrease in loan performance	4.13	4.00	.665	4.21	4.00	.745
Influence loan maturity	3.12	3.00	1.192	2.45	3.00	.898
Bank stability	2.19	2.00	1.079	1.77	2.00	.773
Making poor lending decisions	4.31	4.00	.801	4.36	4.00	.674
rationalising the decision-making	4.33	5.00	1.034	4.47	5.00	.668
Default loans	1.69	1.00	1.009	1.45	1.00	.602
Improved bank productivity and efficiency	3.93	4.00	1.135	4.25	4.00	.796

LP4b

Measuring Risk Factors

Feature	Conventional Banks			Islamic banks		
	Mean	Median	Std. Dev	Mean	Median	Std. Dev
Indemnify the bank from insolvency	2.14	2.00	.769	2.23	2.00	.890
Safeguarding the firm from insolvency	2.08	2.00	.897	1.92	2.00	.722
Complicated loan application processes	3.71	4.00	1.061	3.79	4.00	1.105
Improved efficiency units	1.94	2.00	.741	1.73	2.00	.584
Enhancing the quality of the bank's loans portfolio	1.67	2.00	.758	1.63	2.00	.635
Increase in the number of loans granted	2.14	1.00	.754	2.45	3.00	.688
Decrease in catastrophic credit defaults	1.59	1.00	.709	1.73	2.000	.584
Making lending decisions with a higher degree of certainty	1.44	1.00	.586	1.53	1.00	.579
improved decision-making within units in the future	1.50	1.00	.682	1.78	2.00	.629

DM1

Allocating Loans Consideration

Feature	Conventional Banks			Islamic banks		
	Mean	Median	Std. Dev	Mean	Median	Std. Dev
The relationship between credit portfolio and credit risk management	1.91	2.00	.713	1.77	2.00	.698
The relationship between loans refund efficiency and loan maturity	1.81	2.00	.744	1.63	2.00	.677
The relationship between risks control and credit decision performance	1.92	2.00	.884	1.82	2.00	.714

Personal characteristics	1.66	2.00	.662	1.73	2.00	.672
Business characteristics	1.66	2.00	.696	1.73	2.00	.692
The relationship between institution and borrowers	2.85	3.00	1.112	2.96	3.00	1.338
Bank's characteristics	2.29	2.00	.919	1.96	2.00	.696
The match between bank's purpose and goal	1.60	1.00	.816	1.55	1.00	.625
Type of activities	2.78	2.00	1.475	1.48	1.00	.670
The capital structure	1.51	1.00	.664	1.77	2.00	.717
The return on assets and equity	1.92	2.00	.948	1.95	2.00	.848
When/where the bank accepts deposits and granted loans	3.19	3.00	1.133	2.18	2.00	1.316

DM2a

Lending Authorisation: Issues Referred to the Risk Portfolio Procedures

Feature	Conventional Banks			Islamic banks		
	Mean	Median	Std. Dev	Mean	Median	Std. Dev
Cost of the transaction is rising according to information availability	3.90	4.00	4.00	4.34	4.00	.731
Insufficient capital to continue operations	4.09	4.00	4.00	4.30	4.00	.594
Inability to access liquid funds to meet its obligations	4.24	4.00	4.00	4.49	5.00	.556
Failed to manage the different types of risks	4.29	4.50	5.00	4.36	5.00	.752
Flawed internal processes related to people or systems	3.99	4.00	4.00	3.97	4.00	.763
Issues Referred to the Risk Portfolio Procedures - Faced legal action	4.13	4.00	4.00	4.49	5.00	.604
Decision based on inaccurate or incomplete information	4.05	4.00	4.00	4.16	4.00	.667
Faced legal risk	4.00	4.00	4.00	4.12	4.00	.706
The product (loan) identity and practices is well disciplined	2.48	2.00	2.00	2.48	2.00	.747
Non-compliance with acts and regulations	2.09	2.00	2.00	2.49	2.00	.766

DM2b

Lending Authorisation: Issues Referred to the Lending Portfolio Procedures

Feature	Conventional Banks			Islamic banks		
	Mean	Median	Std. Dev	Mean	Median	Std. Dev
Providing clear statements about the financial situation	1.72	2.00	.644	1.95	2.00	.743
Confidential evaluation applicant	1.83	2.00	.754	1.55	1.00	.668
Capable of refunding the loan	2.04	2.00	.758	1.90	2.00	.670

Source of the money	3.38	4.00	1.119	4.30	5.00	.811
Refund the loan in a certain timeframe	3.83	4.00	.960	3.97	4.00	.849
The internal auditor has positively reported	2.63	3.00	.687	2.64	3.00	.695
The geographical location	2.91	3.00	.849	2.96	3.00	.772
First time application	3.00	3.00	1.006	2.84	3.00	.727
Approved application conflicts with institutional lending policy	3.66	4.00	1.047	3.88	4.00	.912

DM3

Practitioners Focus

Feature	Conventional Banks			Islamic banks		
	Mean	Median	Std. Dev	Mean	Median	Std. Dev
Risk models emerged just as a significant shift has occurred in debt and loan markets	2.20	2.00	1.166	2.19	2.00	1.009
Risk models facilitated the pricing of portfolio of exposures included in securitisations	1.94	2.00	.859	1.99	2.00	.842
Risk models used as a basis for bank's calculations of regulatory capital	2.14	2.00	1.008	2.21	2.00	.957
Risk models encompass bank efficiency performance directly and matched with non-performance loans in cost or production	1.97	2.00	.860	1.78	2.00	.712
Risk models possibly related to examiners' ratings of bank management quality	1.86	2.00	.883	1.85	2.00	.660
Risk models because of new markets in credit derivatives and the unprecedented growth in the pre-existing markets for loan sales and securitisations	1.76	2.00	.650	1.90	2.00	.730
Risk models presented a negative relation between problem loans and cost efficiency	2.19	2.00	.775	2.38	2.00	.907

## APPENDIX H: Pilot Survey: Summary of Changes

### Summary of Changes after the Pilot Survey

Variable	Item		Participants comment	Action taken
	No	Description		
<b>Financial institution characteristics</b>	1	Banks status	Three participants were found there is a replication in some measurements.	Item was adjusted
	4	Bank obligations	Majority of participants were noticed there were no measurements relevant to the IB, and they suggest add some to modify this item.	Item had been modified
	5	Lending statistics	Seven participants noticed item needs re-arrangement	Item had re-arranged for the reliability concept
<b>Risk assessment</b>	2	Risk profile	Ten participants noticed the objective of the question unclear, and two noticed the question unable to answer	The item was rebuild as a combining question (integrated) seeking for classifying risk not defining them
	4	Risk measurement models	The majority of participants found the item difficult to answer.	The item was revised and made it simple by provide some definitions
	5	Distinguishing risk factors	Thirteen participants notice the item was contradicted with the study objectives	Item had been dropped due to gainsay
<b>Lending portfolio</b>	3	Managing risk factors	Most participants were suggested combine item 3 with item 5, because they deal with the same objective.	These items were combined together to increase their contribution
	5	Measuring risk factors		
<b>Rationalising lending decisions</b>	N/a	N/a	N/a	N/a
<b>Demographical data</b>	2	Gender	The majority noticed these items were worthless to the study objectives	Dropped: due to irrelevant
	4	Primary occupation		Dropped: due to irrelevant
<b>Overall comments (general)</b>	The majority of participants suggest that questionnaire too long and has to be reduced, and also remaining that demographic data into the end may assist to increase the response rate. In contrast, to do so, the questionnaire will be able to gathering wealthy information.			

Note: after reviewing these comments, three items from the primary questionnaire draft were omitted.



## APPENDIX I: Letter of Ethical Clearance



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GFE009

5 February 2008

Mr. Abdelnasser Abdullah  
1/5 Rutkin Street  
Kearneys Spring,  
TOOWOOMBA, 4350

**Re: Ethics Clearance for Research Project – An Assessment of Risk Factors, and Their Effects on the Optimality of Lending Decisions: A Comparative Study of Conventional Banks and Islamic Banks**

Dear Abdelnasser

The USQ Human Research Ethics Committee recently reviewed your amended application for ethical clearance. Your project has been endorsed and full ethics approval was granted 05/02/08. Your approval reference number is: **H07STU710** and is valid until **05/02/09**.

The Committee is required to monitor research projects that have received ethics clearance to ensure their conduct is not jeopardising the rights and interests of those who agreed to participate. Accordingly, you are asked to forward a **written report** to this office after twelve months from the date of this approval or upon completion of the project.

A questionnaire will be sent to you requesting details that will include: the status of the project; a statement from you as principal investigator, that the project is in compliance with any special conditions stated as a condition of ethical approval; and confirming the security of the data collected and the conditions governing access to the data. The questionnaire, available on the web, can be forwarded with your written report.

Please note that you are responsible for notifying the Committee immediately of any matter that might affect the continued ethical acceptability of the proposed procedure.

Yours sincerely

**Gillian Fulton**  
Postgraduate Students and Research Ethics Officer  
Office of Research and Higher Degrees

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## APPENDIX J: Principal Component Analysis

### Total Variance Explained

By using extraction method

		Conventional Banks				Islamic Banks				
Variables	Details	Component	Initial Eigenvalues			Details	Component	Initial Eigenvalues		
			Total	% of Variance	Cumulative %			Total	% of Variance	Cumulative %
<b>1. Risks Profile Assessment</b>										
<b>Risks Evaluation</b>	Transaction Risks Business Risks Treasury Risks Systemic Risks Governance Risks	1	2.84	56.77	56.77	Treasury Risks Business Risks Governance Risks Systemic Risks Transaction Risks	1	2.99	59.73	59.73
<b>Transaction Risks classification</b>	Credit risk ( grading risk) Single name single transaction risk Balance sheet risk	1	2.00	40.07	40.07	Mark-up risk Balance sheet risk Foreign exchange Risk Products tenor plan risk Single name single transaction risk	1	2.53	50.64	50.64
	Mark-up risk Products tenor plan risk	2	1.10	21.94	62.01					
<b>Business Risks Classification</b>	Withdrawal risk Solvency risk Displaced commercial risk Trading activity risk	1	2.33	58.30	58.30	Withdrawal risk Solvency risk Trading activity risk Displaced commercial risk	1	2.21	55.23	55.23
<b>Treasury Risks classification</b>	Hedging risk Liquidity risk Credit skill and training risk Asset & liability management risk ALM	1	2.39	59.75	59.75	Credit skill and training risk Liquidity risk Hedging risk Asset & liability management risk ALM	1	1.82	45.58	45.58

<b>Governance Risks Classification</b>	Transparency risk					Event, natural disaster risk				
	Fiduciary risk	1	2.08	41.60	41.60	Legal risk	1	1.47	48.909	48.91
<b>Governance Risks Classification</b>	Business environment risk					Business environment risk				
	Legal risk	2	1.12	22.30	63.90					
<b>Systematic Risks Classification</b>	Operational risk									
	Fraud/ compliance risk					Technology/systems exposure				
<b>Systematic Risks Classification</b>	Payment/settlement risk					Fraud/ compliance risk				
	Technology/systems exposure	1	2.94	58.72	58.72	Institutional risk	1	2.70	54.08	54.08
<b>Systematic Risks Classification</b>	Institutional risk					Shift in regulation(regulatory risk )				
	Shift in regulation(regulatory risk)					Payment/settlement risk				
<b>All Risks classification</b>	Solvency risk					Mark-up risk				
	Legal risk					Hedging risk				
<b>All Risks classification</b>	Asset & liability management risk					Single name single transaction risk				
	Foreign exchange Risk	1	5.88	39.18	39.18	Displaced commercial risk	1	4.40	31.40	31.40
<b>All Risks classification</b>	Operational risk					Foreign exchange Risk				
	Credit skill and training risk									
<b>All Risks classification</b>	Liquidity risk					Technology/systems exposure				
	Business environment risk					Institutional risk				
<b>All Risks classification</b>	Payment/settlement risk					Fraud/ compliance risk	2	2.29	16.39	47.78
	Institutional risk	2	1.76	11.67	50.85	Shift in regulation(regulatory risk )				
<b>All Risks classification</b>	Mark-up risk					Payment/settlement risk				
	Shift in regulation(regulatory risk)					Withdrawal risk				
<b>All Risks classification</b>	Fiduciary risk					Solvency risk	3	1.41	10.04	57.83
	Credit risk ( grading risk)	3	1.27	8.49	59.34	Credit risk ( grading risk)				
<b>All Risks classification</b>	Trading activity risk					Asset & liability management risk				
<b>Risks Appearance</b>	Transaction Risks					Treasury Risks				
	Business Risks					Transaction Risks				
<b>Risks Appearance</b>	Governance Risks	1	3.07	61.45	61.45	Governance Risks	1	3.75	74.91	74.91
	Systemic Risks					Business Risks				
<b>Risks Appearance</b>	Treasury Risks					Systemic Risks				
<b>Internal rating &amp; Scoring Models</b>	Transaction Risks Applications					Business Risks				
	Business Risks Applications	1	1.96	48.90	48.90	Treasury Risks	1	2.05	68.21	68.21
<b>Internal rating &amp; Scoring Models</b>						Transaction Risks				
	Governance Risks Applications									
<b>Internal rating &amp; Scoring Models</b>	Treasury Risks Applications	2	1.47	36.66	85.56					

<b>Value and Risk Model</b>	Transaction Risks Applications Business Risks Applications Treasury Risks Applications Governance Risks Applications Systemic Risks Applications	1	2.46	49.24	49.24	Transaction Risks Treasury Risks Governance Risks Business Risks	1	2.15	53.67	53.67
<b>Beta &amp; Assets Pricing Model</b>	Transaction Risks Applications Business Risks Applications Treasury Risks Applications Governance Risks Applications	1	2.88	72.06	72.06	Treasury Risks Transaction Risks Business Risks	1	2.29	76.46	76.46
<b>All Models Risks</b>	Business Risks Applications Transaction Risks Applications Treasury Risks Applications Governance Risks Applications	1	3.49	38.81	38.81	Treasury Risks and (Value Treasury Risks and (Beta Transaction Risks and (Beta Business Risks and (Value Business Risks and (Beta	1	3.31	30.06	30.06
	Treasury Risks Applications Governance Risks Applications Business Risks Applications	2	1.80	20.00	58.81	Treasury Risks and (Internal Business Risks and (Internal Transaction Risks and (Internal	2	2.58	23.48	53.54
	Governance Risks Applications Treasury Risks Applications	3	1.27	14.16	72.97	Transaction Risks and (Value Governance Risks and (Value Systemic Risks and (Value	3	1.33	12.12	65.66
<b>Applying Risks</b>	Treasury Risks Measurement Transaction Risks Measurement Governance Risks Measurement Systemic Risks Measurement Business Risks Measurement	1	3.14	62.84	62.84	Treasury Risks Measurement Transaction Risks Measurement Governance Risks Measurement Systemic Risks Measurement Business Risks Measurement	1	3.71	74.20	74.20
<b>2. Lending Portfolio Assessment</b>										
<b>Lending Portfolio Diversification</b>	efficiency concept means portfolio inputs equivalent outputs mostly - highly-diversified portfolio means more asset securitisation highly-diversified portfolio means non-risky assets in estimated The relationship Between Lending Portfolio & Risk factors	1	1.78	44.45	44.45	highly-diversified portfolio means more asset securitisation efficiency concept means portfolio inputs equivalent outputs mostly highly-diversified portfolio means non-risky assets in estimated period	1	1.48	49.35	49.35
<b>Lending Portfolio</b>	Personal / consumer Credit Large Business Credit Small Business Credit	1	1.78	59.27	59.27	Personal / consumer Credit Mortgage (secured) Credit Large Business Credit Small Business Credit Collateral (Secured) Credit	1	3.08	61.68	61.68

<b>Managing and Controlling Lending Portfolio Risks</b>	- influence loan maturity - improved bank productivity and efficiency	1	2.17	43.39	43.39	making poor lending decisions rationalising the decision-making improved bank productivity and efficiency	1	1.97	39.47	39.47
	- increased loan costs					decrease in loan performance increased loan costs				
	- making poor lending decisions - decrease in loan performance	2	1.07	21.46	64.86					
<b>Measuring Lending Portfolio Risks</b>	enhancing the quality of the bank's loans portfolio improved efficiency units making lending decisions with a higher degree of certainty decrease in catastrophic credit defaults increase in the number of loans granted improved decision-making within units in the future	1	2.79	46.57	46.57	decrease in catastrophic credit defaults making lending decisions with a higher degree of certainty improved efficiency units increase in the number of loans granted	1	1.49	37.15	37.15
<b>3. Decision Making Assessment</b>										
<b>Issues Considered when Allocating Loans</b>	business characteristics personal characteristics The capital structure the relationship between risks control and credit decision - the match between bank's purpose and goal	1	3.48	38.69	38.69	- business characteristics - the relationship between institution and borrowers - bank's characteristics - the match between bank's purpose and goal The return on assets and equity	1	2.75	27.53	27.53
	The return on assets and equity - bank's characteristics - the relationship between loans refund efficiency and loan - relationship between credit portfolio and credit risk	2	1.27	14.11	52.81	relationship between credit portfolio and credit risk management the relationship between risks control and credit decision performance - the relationship between loans refund efficiency and loan maturity	2	1.64	16.43	43.96
						When/where the bank accepts deposits and granted loans - type of activities	3	1.32	13.23	57.18

<p><b>Issues Accounted in Lending Decision – making</b></p>	<ul style="list-style-type: none"> <li>- cost of the transaction is rising according to</li> <li>- insufficient capital to continue operations</li> <li>- inability to access liquid funds to meet its obligations</li> <li>- faced legal action</li> <li>- decision based on inaccurate or incomplete</li> <li>- failed to manage the different types of risks</li> <li>- faced legal risk</li> <li>flawed internal processes related to people or</li> </ul>	1	4.06	50.72	50.72	<ul style="list-style-type: none"> <li>inability to access liquid funds to meet its obligations</li> <li>- flawed internal processes related to people or systems</li> <li>- faced legal action</li> <li>- decision based on inaccurate or incomplete information</li> <li>- insufficient capital to continue operations</li> </ul>	1	2.00	39.99	39.99
<p><b>Issues Considered in Lending Decision Making</b></p>	<ul style="list-style-type: none"> <li>- providing clear statements about the</li> <li>- capable of refunding the loan confidential evaluation applicant</li> <li>source of the money</li> <li>The geographical location</li> <li>The internal auditor has positively reported</li> </ul>	1	1.96	32.66	32.66	<ul style="list-style-type: none"> <li>- capable of refunding the loan</li> <li>- first time application</li> <li>providing clear statements about the financial situation</li> <li>The internal auditor has positively reported</li> </ul>	1	1.40	34.99	34.99
<p><b>Issues related to Risks Modes and Decision Making</b></p>	<ul style="list-style-type: none"> <li>used as a basis for bank’s calculations of regulatory capital</li> <li>- facilitated the pricing of portfolio of exposures included in securitisations</li> <li>- presented a negative relation between problem loans and cost efficiency</li> <li>- possibly related to examiners’ ratings of bank management quality</li> <li>because of new markets in credit derivatives and the unprecedented growth in the pre-existing markets for loan sales and securitisations</li> </ul>	1	2.55	50.97	50.97	<ul style="list-style-type: none"> <li>- possibly related to examiners’ ratings of bank management quality</li> <li>- presented a negative relation between problem loans and cost efficiency</li> <li>- facilitated the pricing of portfolio of exposures included in securitisations</li> <li>- used as a basis for bank’s calculations of regulatory capital</li> <li>- because of new markets in credit derivatives and the unprecedented growth in the pre-existing markets for loan sales and securitisations</li> </ul>	1	2.52	50.46	50.46

## APPENDIX K: Correlation Coefficient: Risk Portfolio & Lending Portfolio Factors

### A. Conventional Banking Group

#### 1. Transaction Risk Factor with Lending Portfolio Factors

	<i>TR</i>	<i>LPD</i>	<i>DLT</i>	<i>ILT</i>	<i>LP&amp;P</i>	<i>LPE</i>	<i>CA</i>
<i>TR</i>	1.000						
<i>LPD</i>	.068	1.000					
<i>DLT</i>	-.087	-.002	1.000				
<i>ILT</i>	.288*	-.164	.000	1.000			
<i>LP&amp;P</i>	.158	-.159	.127	.186***	1.000		
<i>LPE</i>	-.031	.424*	-.055	-.091	-.333*	1.000	
<i>CA</i>	-.039	.188***	.020	-.289*	-.264**	.000	1.000

TR: Transaction Risks Factor. LPD: Lending Portfolio Diversification Factor. DLT: Lending Types Factor (Secured loan). ILT: Lending Types Factor (Unsecured loan). LP&P: Managing Risks of Lending Portfolio Factor (Lending Productivity & Performance). LPE: Measuring Risks of Lending Portfolio Factor (Lending efficiency). CA: Measuring Risks of Lending Portfolio Factor (Capital adequacy).

\*. Correlation is significant at the 0.01 level (2-tailed), n: 86.

\*\*. Correlation is significant at the 0.05 level (2-tailed), n: 86.

\*\*\*.Correlation is significant at the 0.10 level (2-tailed), n: 86.

#### 2. Business Risk Factor with Lending Portfolio Factors

	<i>BR</i>	<i>LPD</i>	<i>DLT</i>	<i>ILT</i>	<i>LP&amp;P</i>	<i>LPE</i>	<i>CA</i>
<i>BR</i>	1.000						
<i>LPD</i>	.183***	1.000					
<i>DLT</i>	.205***	-.002	1.000				
<i>ILT</i>	.152	-.164	.000	1.000			
<i>LP&amp;P</i>	.272**	-.159	.127	.186***	1.000		
<i>LPE</i>	.069	.424*	-.055	-.091	-.333*	1.000	
<i>CA</i>	.004	.188***	.020	-.289*	-.264**	.000	1.000

BR: Business Risks Factor. LPD: Lending Portfolio Diversification Factor. DLT: Lending Types Factor (Secured loan). ILT: Lending Types Factor (Unsecured loan). LP&P: Managing Risks of Lending Portfolio Factor (Lending Productivity & Performance). LPE: Measuring Risks of Lending Portfolio Factor (Lending efficiency). CA: Measuring Risks of Lending Portfolio Factor (Capital adequacy).

\*. Correlation is significant at the 0.01 level (2-tailed), n: 86.

\*\*. Correlation is significant at the 0.05 level (2-tailed), n: 86.

\*\*\*.Correlation is significant at the 0.10 level (2-tailed), n: 86.

### 3. Treasury Risk Factor with Lending Portfolio Factors

	<i>TyR</i>	<i>LPD</i>	<i>DLT</i>	<i>ILT</i>	<i>LP&amp;P</i>	<i>LPE</i>	<i>CA</i>
<i>TyR</i>	1.000						
<i>LPD</i>	-.032	1.000					
<i>DLT</i>	.154	-.002	1.000				
<i>ILT</i>	.040	-.164	.000	1.000			
<i>LP&amp;P</i>	.206***	-.159	.127	.186***	1.000		
<i>LPE</i>	-.041	.424*	-.055	-.091	-.333*	1.000	
<i>CA</i>	.018	.188***	.020	-.289*	-.264**	.000	1.000

TyR: Treasury Risks Factor. LPD: Lending Portfolio Diversification Factor. DLT: Lending Types Factor (Secured loan). ILT: Lending Types Factor (Unsecured loan). LP&P: Managing Risks of Lending Portfolio Factor (Lending Productivity & Performance). LPE: Measuring Risks of Lending Portfolio Factor (Lending efficiency). CA: Measuring Risks of Lending Portfolio Factor (Capital adequacy).

\*. Correlation is significant at the 0.01 level (2-tailed), n: 86.

\*\*. Correlation is significant at the 0.05 level (2-tailed), n: 86.

\*\*\*. Correlation is significant at the 0.10 level (2-tailed), n: 86.

### 4. Governance Risk Factor with Lending Portfolio Factors

	<i>GR</i>	<i>LPD</i>	<i>DLT</i>	<i>ILT</i>	<i>LP&amp;P</i>	<i>LPE</i>	<i>CA</i>
<i>GR</i>	1.000						
<i>LPD</i>	.156	1.000					
<i>DLT</i>	.213**	-.002	1.000				
<i>ILT</i>	-.076	-.164	.000	1.000			
<i>LP&amp;P</i>	.235**	-.159	.127	.186***	1.000		
<i>LPE</i>	.227**	.424*	-.055	-.091	-.333*	1.000	
<i>CA</i>	.150	.188***	.020	-.289*	-.264**	.000	1.000

GR: Governance Risks Factor. LPD: Lending Portfolio Diversification Factor. DLT: Lending Types Factor (Secured loan). ILT: Lending Types Factor (Unsecured loan). LP&P: Managing Risks of Lending Portfolio Factor (Lending Productivity & Performance). LPE: Measuring Risks of Lending Portfolio Factor (Lending efficiency). CA: Measuring Risks of Lending Portfolio Factor (Capital adequacy).

\*. Correlation is significant at the 0.01 level (2-tailed), n: 86.

\*\*. Correlation is significant at the 0.05 level (2-tailed), n: 86.

\*\*\*. Correlation is significant at the 0.10 level (2-tailed), n: 86.

### 5. Systematic Risk Factor with Lending Portfolio Factors

	<i>SR</i>	<i>LPD</i>	<i>DLT</i>	<i>ILT</i>	<i>LP&amp;P</i>	<i>LPE</i>	<i>CA</i>
<i>SR</i>	1.000						
<i>LPD</i>	.069	1.000					
<i>DLT</i>	.146	-.002	1.000				
<i>ILT</i>	.070	-.164	.000	1.000			
<i>LP&amp;P</i>	-.153	-.159	.127	.186***	1.000		
<i>LP&amp;P</i>	.237**	.424*	-.055	-.091	-.333*	1.000	



CA	.055	.188***	.020	-.289*	-.264**	.000	1.000
----	------	---------	------	--------	---------	------	-------

SR: Systemic Risks Factor. LPD: Lending Portfolio Diversification Factor. DLT: Lending Types Factor (Secured loan). ILT: Lending Types Factor (Unsecured loan). LP&P: Managing Risks of Lending Portfolio Factor (Lending Productivity & Performance). LPE: Measuring Risks of Lending Portfolio Factor (Lending efficiency). CA: Measuring Risks of Lending Portfolio Factor (Capital adequacy).

\*. Correlation is significant at the 0.01 level (2-tailed), n: 86.

\*\*. Correlation is significant at the 0.05 level (2-tailed), n: 86.

\*\*\*. Correlation is significant at the 0.10 level (2-tailed), n: 86.

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## B. Islamic Banking Group

### 1. Transaction Risk Factor with Lending Portfolio Factors

	TR	LPD	DLT	ILT	LPerM	LProM	CA	LPE
TR	1.000							
LPD	-.119	1.000						
DLT	.068	.102	1.000					
ILT	.097	.031	.000	1.000				
LPerM	.041	-.343*	-.214***	-.048	1.000			
LProM	-.083	-.032	.018	.053	.000	1.000		
CA	-.298**	.060	.086	-.053	-.282**	-.321*	1.000	
LPE	.012	.183	.347*	-.050	-.246**	.003	.000	1.000

TR: Transaction Risks Factor. LPD: Lending Portfolio Diversification Factor. DLP: Lending Types Factor (Direct loan). ILP: Lending Types Factor (Indirect loan). LPerM: Managing Risks of Lending Portfolio Factor (Lending performance). LProM: Managing Risks of Lending Portfolio Factor (Lending productivity). CA: Measuring Risks of Lending Portfolio Factor (Capital Adequacy). LPE: Measuring Risks of Lending Portfolio Factor (lending efficiency).

\*. Correlation is significant at the 0.01 level (2-tailed), n: 73.

\*\*. Correlation is significant at the 0.05 level (2-tailed), n: 73.

\*\*\*. Correlation is significant at the 0.10 level (2-tailed), n: 73.

### 2. Business Risk Factor with Lending Portfolio Factors

	BR	LPD	DLT	ILT	LPerM	LProM	CA	LPE
BR	1.000							
LPD	-.139	1.000						
DLT	.216***	.102	1.000					
ILT	.276**	.031	.000	1.000				
LPerM	.040	-.343*	-.214***	-.048	1.000			
LProM	-.137	-.032	.018	.053	.000	1.000		
CA	-.051	.060	.086	-.053	-.282**	-.321*	1.000	
LPE	-.009	.183	.347*	-.050	-.246**	.003	.000	1.000

BR: Business Risks Factor. LPD: Lending Portfolio Diversification Factor. DLP: Lending Types Factor (Direct loan). ILP: Lending Types Factor (Indirect loan). LPerM: Managing Risks of Lending Portfolio Factor (Lending performance). LProM: Managing Risks of Lending Portfolio Factor (Lending productivity). CA: Measuring Risks of Lending Portfolio Factor (Capital Adequacy). LPE: Measuring Risks of Lending Portfolio Factor (lending efficiency).

	<i>BR</i>	<i>LPD</i>	<i>DLT</i>	<i>ILT</i>	<i>LPerM</i>	<i>LProM</i>	<i>CA</i>	<i>LPE</i>
<i>BR</i>	1.000							
<i>LPD</i>	-.139	1.000						
<i>DLT</i>	.216***	.102	1.000					
<i>ILT</i>	.276**	.031	.000	1.000				
<i>LPerM</i>	.040	-.343*	-.214***	-.048	1.000			
<i>LProM</i>	-.137	-.032	.018	.053	.000	1.000		
<i>CA</i>	-.051	.060	.086	-.053	-.282**	-.321*	1.000	
<i>LPE</i>	-.009	.183	.347*	-.050	-.246**	.003	.000	1.000

\*. Correlation is significant at the 0. 01 level (2-tailed), n: 73.

\*\*.. Correlation is significant at the 0. 05 level (2-tailed), n: 73.

\*\*\*. Correlation is significant at the 0. 10 level (2-tailed), n: 73.

### 1. Treasury Risk Factor with Lending Portfolio Factors

	<i>TyR</i>	<i>LPD</i>	<i>DLT</i>	<i>ILT</i>	<i>LPerM</i>	<i>LProM</i>	<i>CA</i>	<i>LPE</i>
<i>TyR</i>	1.000							
<i>LPD</i>	-.168	1.000						
<i>DLT</i>	.082	.102	1.000					
<i>ILT</i>	.217***	.031	.000	1.000				
<i>LPerM</i>	.013	-.343*	-.214***	-.048	1.000			
<i>LProM</i>	-.130	-.032	.018	.053	.000	1.000		
<i>CA</i>	-.038	.060	.086	-.053	-.282**	-.321*	1.000	
<i>LPE</i>	.031	.183	.347*	-.050	-.246**	.003	.000	1.000

TyR: Treasury Risks Factor. LPD: Lending Portfolio Diversification Factor. DLP: Lending Types Factor (Direct loan). ILP: Lending Types Factor (Indirect loan). LPerM: Managing Risks of Lending Portfolio Factor (Lending performance). LProM: Managing Risks of Lending Portfolio Factor (Lending productivity). CA: Measuring Risks of Lending Portfolio Factor (Capital Adequacy). LPE: Measuring Risks of Lending Portfolio Factor (lending efficiency).

\*. Correlation is significant at the 0. 01 level (2-tailed), n: 73.

\*\*.. Correlation is significant at the 0. 05 level (2-tailed), n: 73.

\*\*\*. Correlation is significant at the 0. 10 level (2-tailed), n: 73.

### 1. Governance Risk Factor with Lending Portfolio Factors

	<i>GR</i>	<i>LPD</i>	<i>DLT</i>	<i>ILT</i>	<i>LPerM</i>	<i>LProM</i>	<i>CA</i>	<i>LPE</i>
<i>GR</i>	1.000							
<i>LPD</i>	-.115	1.000						
<i>DLT</i>	.143	.102	1.000					
<i>ILT</i>	.192	.031	.000	1.000				
<i>LPerM</i>	-.133	-.343*	-.214***	-.048	1.000			
<i>LProM</i>	-.106	-.032	.018	.053	.000	1.000		
<i>CA</i>	-.142	.060	.086	-.053	-.282**	-.321*	1.000	
<i>LPE</i>	-.009	.183	.347*	-.050	-.246**	.003	.000	1.000

	<i>GR</i>	<i>LPD</i>	<i>DLT</i>	<i>ILT</i>	<i>LPerM</i>	<i>LProM</i>	<i>CA</i>	<i>LPE</i>
<i>GR</i>	1.000							
<i>LPD</i>	-.115	1.000						
<i>DLT</i>	.143	.102	1.000					
<i>ILT</i>	.192	.031	.000	1.000				
<i>LPerM</i>	-.133	-.343*	-.214***	-.048	1.000			
<i>LProM</i>	-.106	-.032	.018	.053	.000	1.000		
<i>CA</i>	-.142	.060	.086	-.053	-.282**	-.321*	1.000	
<i>LPE</i>	-.009	.183	.347*	-.050	-.246**	.003	.000	1.000

GR: Governance Risks Factor. LPD: Lending Portfolio Diversification Factor. DLP: Lending Types Factor (Direct loan). ILP: Lending Types Factor (Indirect loan). LPerM: Managing Risks of Lending Portfolio Factor (Lending performance). LProM: Managing Risks of Lending Portfolio Factor (Lending productivity). CA: Measuring Risks of Lending Portfolio Factor (Capital Adequacy). LPE: Measuring Risks of Lending Portfolio Factor (lending efficiency).

\*. Correlation is significant at the 0. 01 level (2-tailed), n: 73.

\*\*. Correlation is significant at the 0. 05 level (2-tailed), n: 73.

\*\*\*.Correlation is significant at the 0. 10 level (2-tailed), n: 73.

### 1. Systematic Risk Factor with Lending Portfolio Factors

	<i>SR</i>	<i>LPD</i>	<i>DLT</i>	<i>ILT</i>	<i>LPerM</i>	<i>LProM</i>	<i>CA</i>	<i>LPE</i>
<i>SR</i>	1.000							
<i>LPD</i>	-.102	1.000						
<i>DLT</i>	.146	.102	1.000					
<i>ILT</i>	.133	.031	.000	1.000				
<i>LPerM</i>	-.118	-.343*	-.214***	-.048	1.000			
<i>LProM</i>	-.239**	-.032	.018	.053	.000	1.000		
<i>CA</i>	.011	.060	.086	-.053	-.282**	-.321*	1.000	
<i>LPE</i>	.112	.183	.347*	-.050	-.246**	.003	.000	1.000

SR: Systemic Risks Factor. LPD: Lending Portfolio Diversification Factor. DLP: Lending Types Factor (Direct loan). ILP: Lending Types Factor (Indirect loan). LPerM: Managing Risks of Lending Portfolio Factor (Lending performance). LProM: Managing Risks of Lending Portfolio Factor (Lending productivity). CA: Measuring Risks of Lending Portfolio Factor (Capital Adequacy). LPE: Measuring Risks of Lending Portfolio Factor (lending efficiency).

\*. Correlation is significant at the 0. 01 level (2-tailed), n: 73.

\*\*. Correlation is significant at the 0. 05 level (2-tailed), n: 73.

\*\*\*.Correlation is significant at the 0. 10 level (2-tailed), n: 73.

## APPENDIX L: Component Factors Extracted

### 1. Factors Identification – CB

#### VARIABLES OF ASSESSING RISK FACTORS

##### Risks Portfolio

Governance Risks	}	Internal & External risks
Business Risks		
Treasury Risks		
Systemic Risks		
Transaction Risks		

##### Risks Portfolio Classification

###### **Transaction Risks Classification**

Mark-up risk	}	TR~ applicable
Foreign exchange risk		
Products tenor plan risk		

Single name single transaction risk	}	TR~less applicable
Balance sheet risk		

###### **Business Risks Classification**

Solvency risk	}	BR~ applicable
Displaced commercial risk		
Withdrawal risk		
Trading activity risk		

###### **Treasury Risks Classification**

Asset & liability management risk (ALM)	}	TyR~ applicable
Liquidity risk		
Hedging risk		
Credit skill and training risk		

###### **Governance Risks Classification**

Fiduciary risk	}	GR~ applicable
Business environment risk		
Transparency risk		

Operational risk	}	GR~ less applicable
Event, natural disaster risk		
Legal risk		

###### **Systemic Risks Classification**

Payment/settlement risk	}	SR~ applicable
Technology/systems exposure		
Institutional risk		
Shift in regulation (regulatory risk)		
Fraud/ compliance risk		

##### Risks Visibility

Treasury Risks Visibility	}	RV~ external /
Systemic Risks Visibility		
Business Risks Visibility		
Governance Risks Visibility		

##### Risks Portfolio Measures

###### **Internal rating & Scoring Models Applications**

Transaction Risks	}	IR/S model – appropriate
Business Risks		

Systemic Risks	}	IR/S model – less appropriate
Governance Risks		

<p><b>Value at Risk Models Applications</b></p> <ul style="list-style-type: none"> <li>Governance Risks</li> <li>Treasury Risks</li> </ul>	}	VaR model –appropriate
<ul style="list-style-type: none"> <li>Transaction Risks</li> <li>Business Risks</li> </ul> <p><b>Beta &amp; Capital Pricing Models Applications</b></p> <ul style="list-style-type: none"> <li>Treasury Risks</li> <li>Business Risks</li> <li>Transaction Risks</li> <li>Governance Risks</li> </ul>	}	VaR model – less appropriate
<p><b>Risks Models Actually Used for</b></p> <ul style="list-style-type: none"> <li>Transaction Risks Measurement</li> <li>Systemic Risks Measurement</li> <li>Business Risks Measurement</li> </ul>	}	Available special models
<ul style="list-style-type: none"> <li>Treasury Risks Measurement</li> <li>Governance Risks Measurement</li> </ul>	}	Unavailable special models

**VARIABLES OF ASSESSING LENDING PORTFOLIO**

<p><b>Lending Portfolio Diversification</b></p> <ul style="list-style-type: none"> <li>Highly-diversified portfolio means non-risky assets in estimated period</li> <li>Highly-diversified portfolio means more asset securitisation</li> <li>Efficiency concept means portfolio inputs equivalent outputs mostly</li> </ul>	}	Lending portfolio diversification
<p><b>Re-Lending Types</b></p> <ul style="list-style-type: none"> <li>Collateral (Secured) Credit</li> <li>Mortgage (secured) Credit</li> <li>Large Business Credit</li> </ul>	}	LP~direct lend
<ul style="list-style-type: none"> <li>Other Credit</li> <li>Unsecured Credit</li> </ul>	}	ILP~indirect lend
<p><b>Default Risks Management</b></p> <ul style="list-style-type: none"> <li>Rationalising the decision-making</li> <li>Making poor lending decisions</li> <li>Decrease in loan performance</li> <li>Influence loan maturity</li> <li>Improved bank productivity and efficiency</li> <li>Increased loan costs</li> </ul>	}	DRMa~Portfolio productivity & performance
<p><b>Default Risks Measurement</b></p> <ul style="list-style-type: none"> <li>Increase in the number of loans granted</li> <li>Making lending decisions with a higher degree of certainty</li> <li>Decrease in catastrophic credit defaults</li> <li>Improved efficiency units</li> <li>Enhancing the quality of the bank's loans portfolio</li> <li>Improved decision-making within units in the future</li> </ul>	}	DRMe~lending efficiency
<ul style="list-style-type: none"> <li>Indemnify the bank from insolvency</li> <li>Safeguarding the firm from insolvency</li> </ul>	}	DRMe~Capital adequacy

**VARIABLES OF ASSESSING LENDING DECISION MAKING**

<p><b>Allocating Loans Considerations</b></p> <ul style="list-style-type: none"> <li>Personal characteristics</li> <li>Business characteristics</li> </ul>	}	Diversification
<ul style="list-style-type: none"> <li>Bank's characteristics</li> </ul>	}	

The relationship between loans refund efficiency and loan maturity  
 The relationship between credit portfolio and credit risk management  
 The return on assets and equity

External

The capital structure  
 The relationship between risks control and credit decision performance  
 The match between bank's purpose and goal

Internal

**Authorising Loans Considerations – Issues Referred to Risks Portfolio**

Inability to access liquid funds to meet its obligations  
 Insufficient capital to continue operations  
 Decision based on inaccurate or incomplete information  
 Faced legal action  
 Faced legal risk

Information asymmetry

Cost of the transaction is rising according to information availability  
 Failed to manage the different types of risks

Risk exposure control

**Authorising Loans Considerations – Issues Referred to Lending Portfolio**

Providing clear statements about the financial situation  
 Confidential evaluation applicant  
 Source of the money

Borrowers consider

Approved application conflicts with institutional lending policy  
 Refund the loan in a certain timeframe

Shareholder consider

First time application  
 Capable of refunding the loan

Lenders consider

The geographical location  
 The internal auditor has positively reported

Location consider

**Issues referred to practitioners focus**

Risk models encompass bank efficiency performance directly  
 and matched with non-performance loans in cost or production  
 Risk models used as a basis for bank's calculations  
 of regulatory capital  
 Risk models possibly related to examiners' ratings  
 of bank management quality  
 Risk models facilitated the pricing of portfolio of exposures  
 included in securitisations

Decision making focus

## 2. Factor Identification – IB

### VARIABLES OF ASSESSING RISK FACTORS

#### Risks Portfolio

- Governance Risks
- Treasury Risks
- Business Risks
- Systemic Risks
- Transaction Risks

Internal & External risks

#### Risks Portfolio Classification

##### **Transaction Risks Classification**

- Mark-up risk
- Products tenor plan risk
- Foreign exchange risk
- Single name single transaction risk
- Balance sheet risk

TR~ applicable

##### **Business Risks Classification**

- Withdrawal risk
- Displaced commercial risk
- Solvency risk
- Trading activity risk

BR~ applicable

##### **Treasury Risks Classification**

- Asset & liability management risk (ALM)
- Liquidity risk
- Credit skill and training risk
- Hedging risk

TyR~ applicable

##### **Governance Risks Classification**

- Transparency risk
- Fiduciary risk
- Operational risk
- Legal risk

GR~ applicable

- Event, natural disaster risk
- Business environment risk

GR~ less applicable

##### **Systemic Risks Classification**

- Technology/systems exposure
- Institutional risk
- Payment/settlement risk
- Fraud/ compliance risk
- Shift in regulation (regulatory risk)

SR~ applicable

#### Risks Visibility

- Treasury Risks Visibility
- Systemic Risks Visibility
- Business Risks Visibility
- Governance Risks Visibility

RV~ external / internal

#### Risks Portfolio Measures

##### **Internal rating & Scoring Models Applications**

- Business Risks
- Treasury Risks Visibility
- Transaction Risks
- Governance Risks
- Systemic Risks

IR/S model – appropriate

##### **Value at Risk Models Applications**

- Business Risks
- Transaction Risks
- Treasury Risks

VaR model –appropriate

##### **Beta & Capital Pricing Models Applications**

- Business Risks
- Treasury Risks
- Transaction Risks

B & CP model appropriate

Governance Risks

Risks Models Actually Used for

- Governance Risks Measurement
- Business Risks Measurement
- Systemic Risks Measurement
- Transaction Risks Measurement
- Treasury Risks Measurement

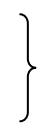


Available special models

VARIABLES OF ASSESSING LENDING PORTFOLIO

Lending Portfolio Diversification

- Highly-diversified portfolio means more asset securitisation
- Highly-diversified portfolio means non-risky assets in estimated period
- Efficiency concept means portfolio inputs equivalent outputs mostly



Lending portfolio diversification

Re-Lending Types

- Mortgage (secured) Credit
- Collateral (Secured) Credit
- Small Business Credit



LP~ direct lend

- Other Credit
- Large Business Credit



ILP~ indirect lend

Default Risks Management

- Making poor lending decisions
- Decrease in loan performance
- Rationalising the decision-making



DRMa ~ Portfolio productivity

- Increased loan costs
- Improved bank productivity and efficiency
- Influence loan maturity



DRMa ~Portfolio performance

Default Risks Measurement

- Indemnify the bank from insolvency
- Enhancing the quality of the bank's loans portfolio
- Safeguarding the firm from insolvency



DRMe ~ lending efficiency

- Decrease in catastrophic credit defaults
- Making lending decisions with a higher degree of certainty
- Improved decision-making within units in the future



DRMe~Capital adequacy

VARIABLES OF ASSESSING LENDING DECISION MAKING

Allocating Loans Considerations

- Business characteristics
- Personal characteristics
- The match between bank's purpose and goal



Diversification

- The relationship between institution and borrowers
- The return on assets and equity
- Bank's characteristics
- The capital structure



External

- The relationship between loans refund efficiency and loan maturity
- The relationship between credit portfolio and credit risk management
- The relationship between risks control and credit decision performance



Internal

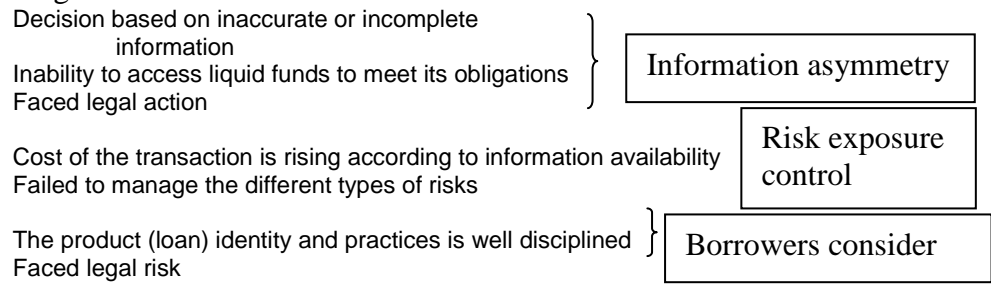
- Type of activities
- When/where the bank accepts deposits and granted loans



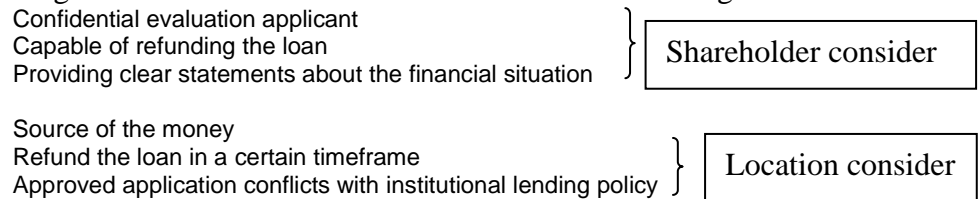
Ethics consideration



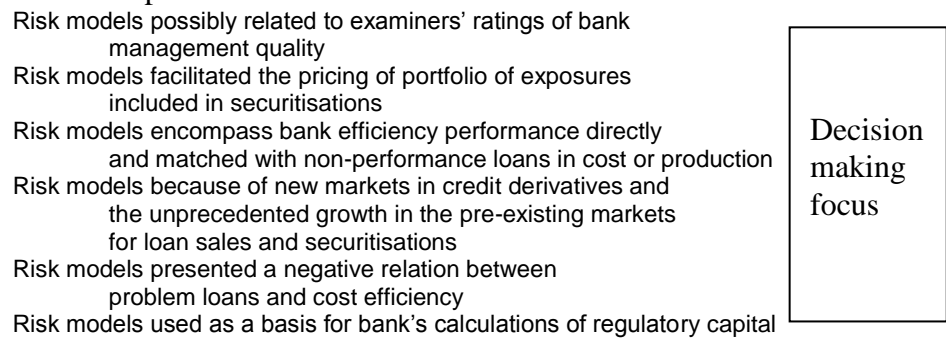
Authorising Loans Considerations – Issues Referred to Risks Portfolio



Authorising Loans Considerations – Issues Referred to Lending Portfolio



Issues referred to practitioners focus



## APPENDIX M: Comparative Pearson Correlations for Risk Factors Influence Lending Decision- making

Matrixes for Risk Factors Influence LDM Significantly												
IB					CB							
<b>Model 1 : Consideration Issues in Loans Allocation</b>												
					T Risks 1	Try Risks	G Risks 2	CC	EC	IC		
					T Risks 1	1.000						
					Try Risks	.399**	1.000					
	N/A				G Risks 2	.264*	.280**	1.000				
					CC	.155	.079	-.217*	1.000			
					EC	.202	-.024	-.181	.000	1.000		
					IC	.152	.520**	.289**	.000	.000	1.000	
<b>Model 2a : Consideration Issues in Loan's Authorisation (risk portfolio consideration)</b>												
	G Risks 2	G Risks 3	IA	REC	T Risks 1	Try Risks	G Risks 2	IA	REC			
G Risks 2	1.000				T Risks 1	1.000						
G Risks 3	.000	1.000			Try Risks	.399**	1.000					
IA	-.283*	-.086	1.000		G Risks 2	.264*	.280**	1.000				
REC	.175	-.243*	.000	1.000	IA	-.173	-.353**	-.126	1.000			
					REC	-.376**	-.351**	.087	.000	1.000		
<b>Model 2b : Consideration Issues in Loan's Authorisation (lending portfolio consideration)</b>												
	G Risks 2	G Risks 3	S Risks	LeC	SC	G Risks 1	G Risks 2	S Risks	S&IC	LeC	LoC	
G Risks 2	1.000					G Risks 1	1.000					
G Risks 3	.000	1.000				G Risks 2	.000	1.000				
S Risks	.087	.506**	1.000			S Risks	.325**	.519**	1.000			
LeC	.106	-.285*	.068	1.000		S&IC	-.299**	-.036	-.361**	1.000		
SC	-.256*	-.044	.076	.000	1.000	LeC	.268*	-.107	-.103	.000	1.000	
						LoC	.158	-.262*	-.239*	.000	.000	1.000
<b>Model 3 : Consideration Issues in DM and Measurement of Risk Factors</b>												
	G Risks 1	D/R			Try Risks	D/R						
G Risks 1	1.000				Try Risks	1.000						
D/R	.256*	1.000			D/R	.321**	1.000					

## APPENDIX N: Risk Factors which Significantly Influence Decision Making Policy

IB		CB
<b>Model 1</b>	Non	<p><b>TR1:</b> Mark-up risk, Foreign exchange risk, Products tenor plan risk.</p> <p><b>TrYR:</b> Asset &amp; liability management risk (ALM), Liquidity risk, Hedging risk, Credit skill &amp; Training risk.</p> <p><b>GR2:</b> Operational risk, Event, Natural disaster risk, Legal risk.</p>
<b>Model 2a</b>	<p><b>GR2:</b> Operational risk, Legal risk.</p> <p><b>GR3:</b> Event, Natural disaster risk, Business environment risk.</p>	<p><b>TR1:</b> Mark-up risk, Foreign exchange risk, Products tenor plan risk.</p> <p><b>TrYR:</b> Asset &amp; liability management risk (ALM), Liquidity risk, Hedging risk, Credit skill and Training risk.</p> <p><b>GR2:</b> Operational risk, Event, Natural disaster risk, Legal risk.</p>
<b>Model 2b</b>	<p><b>GR2:</b> Operational risk, Legal risk.</p> <p><b>GR3:</b> Event, Natural disaster risk, Business environment risk.</p> <p><b>SR:</b> Technology/Systems exposure Institutional risk, Payment /settlement risk, Fraud/ compliance risk, Shift in regulation (regulatory risk).</p>	<p><b>GR1:</b> Fiduciary risk, Business environment risk, Transparency risk.</p> <p><b>GR2:</b> Operational risk, Event, natural disaster risk, Legal risk.</p> <p><b>SR:</b> Payment/settlement risk, Technology/Systems Exposure, Institutional risk, Shift in regulation (regulatory risk), Fraud/ Compliance risk.</p>
<b>Model 3</b>	<p><b>GR1:</b> Transparency risk, Fiduciary risk.</p>	<p><b>TrYR:</b> Asset &amp; Liability Management risk (ALM), Liquidity risk, Hedging risk, Credit skill and Training risk.</p>

***Total Risks in IB & CB***

Operational risk    Legal risk  
 Transparency risk    Fiduciary risk  
 Event & Natural disaster risk  
 Business environment risk  
 Technology & Systems exposure  
 Institutional risk    Payment &  
 settlement risk    Fraud risk  
 Compliance risk    Shift in  
 regulation (regulatory risk)

Mark-up risk    Foreign exchange risk  
 Products tenor plan risk    Payment/settlement  
 risk    Technology /Systems Exposure  
 Institutional risk    Shift in regulation  
 (regulatory risk)    Fraud/ Compliance risk  
 Operational risk    Event, Natural disaster risk  
 Legal risk    Fiduciary risk    Business  
 environment risk    Transparency risk  
 Asset & liability management risk (ALM)  
 Liquidity risk    Hedging risk    Credit skill  
 and Training risk

## APPENDIX O: Computing DEA Models

### Input-oriented & Output-oriented Models

Throughout, the researcher used decision making units (*DMUs*) to represent business operations or processes. Each *DMU* has a set of input/s and output/s representing multiple performance measures. Consider a set of  $n$  observations on the *DMUs*. Each observation,  $DMU_j$  ( $j=1,2,\dots,n$ ), uses  $m$  inputs  $x_{ij}$  ( $i=1,2,\dots,m$ ) to produce  $s$  outputs  $y_{rj}$  ( $r=1,2,\dots,s$ ). The empirical efficient frontier or best practice frontier is determined by these  $n$  observations.

For specific  $x_i$  ( $i=1, 2, \dots, m$ ) and  $y_r$  ( $r=1, 2, \dots, s$ ):

$$\begin{aligned} \sum_{j=1}^n \lambda_j x_{ij} \leq x_i & \quad \sum_{j=1}^n \lambda_j y_{rj} \geq y_r & \quad \sum_{j=1}^n \lambda_j = 1 \\ i = 1, 2, \dots, m & \quad r = 1, 2, \dots, s & \quad j = 1, 2, \dots, n \end{aligned} \quad (7.1)$$

#### 1. Input-oriented Model:

For this DEA model, the input(s) is minimised and the output(s) is kept at their current levels.

$$\theta^* = \min \theta$$

Subject to:

$$\begin{aligned} \sum_{j=1}^n \lambda_j x_{ij} \leq \theta x_{r0} & \quad \sum_{j=1}^n \lambda_j y_{rj} \geq y_{r0} & \quad \sum_{j=1}^n \lambda_j = 1 \text{ and } \lambda_j \geq 0 \\ i = 1, 2, \dots, m & \quad r = 1, 2, \dots, s & \quad j = 1, 2, \dots, n \end{aligned} \quad (7.2)$$

Where:  $DMU_0$  represents one of the  $n$  *DMUs* under evaluation, and  $x_{i0}$  and  $y_{r0}$  are the  $i^{\text{th}}$  input and  $r^{\text{th}}$  output for  $DMU_0$ , respectively.

Since  $\theta = 1$  is a feasible solution to (7.2) the optimal value to (7.2)  $\theta^* \leq 1$ . If  $\theta^* = 1$ , then the current input levels cannot be reduced (proportionally), indicating that  $DMU_0$  is on the frontier. Otherwise, if  $\theta^* < 1$ , then  $DMU_0$  is dominated by the frontier.  $\theta^*$  represents the (input-oriented) efficiency score of  $DMU_0$ .

The individual input reduction is called input slack and in fact both output and input slack values may exist in model (7.3) after calculating (7.2).

$$\begin{aligned} s_i^- &= \theta^* x_{i0} - \sum_{j=1}^n \lambda_j x_{ij} \quad i = 1, 2, \dots, m \\ s_i^+ &= \sum_{j=1}^n \lambda_j y_{rj} - y_{r0} \quad r = 1, 2, \dots, s \end{aligned} \quad (7.3)$$

To determine the possible non-zero slacks after (7.3) and it is solved by

$$\max \sum_{i=1}^m s_i^- + \sum_{r=1}^s s_r^+$$

Subject to:

$$\begin{aligned} \sum_{j=1}^n \lambda_j x_{ij} + s_i^- &= \theta^* x_{i0} & \sum_{j=1}^n \lambda_j y_{rj} - s_r^+ &= y_{r0} & \sum_{j=1}^n \lambda_j &= 1 \ \& \ \lambda_j \geq 0 \\ i &= 1, 2, \dots, m & r &= 1, 2, \dots, s & j &= 1, 2, \dots, n \end{aligned} \quad (7.4)$$

Therefore,  $DMU_0$  is efficient if and only if  $\theta^* = 1$  and  $s_i^{-*} = s_r^{+*} = 0$  for all  $i$  and  $r$ .

In fact model 7.1 and 7.2 represent a two-stage DEA process that involved in the model next

$$(7.5). \text{ mix } \theta - \varepsilon \left( \sum_{i=1}^m s_i^- + \sum_{r=1}^s s_r^+ \right)$$

Subject to:

$$\begin{aligned} \sum_{j=1}^n \lambda_j x_{ij} + s_i^- &= \theta x_{i0} & \sum_{j=1}^n \lambda_j y_{rj} - s_r^+ &= y_{r0} & \sum_{j=1}^n \lambda_j &= 1 \ \& \ \lambda_j \geq 0 \\ i &= 1, 2, \dots, m & r &= 1, 2, \dots, s & j &= 1, 2, \dots, n \end{aligned} \quad (7.5)$$

The presence of non-Archimedean  $\varepsilon$  in the objective function efficiency allows minimisation over  $\theta$  to present the optimisation involving the slacks,  $s_i^-$  and  $s_r^+$ .

## 2. Output-oriented Model:

The output-oriented model can be expressed as follows;

$$\max \phi - \varepsilon \left( \sum_{i=1}^m s_i^- + \sum_{r=1}^s s_r^+ \right)$$

Subject to:

$$\begin{aligned} \sum_{j=1}^n \lambda_j x_{ij} + s_i^- &= \theta x_{i0} & \sum_{j=1}^n \lambda_j y_{rj} - s_r^+ &= \phi y_{r0} & \sum_{j=1}^n \lambda_j &= 1 \ \& \ \lambda_j \geq 0 \\ i &= 1, 2, \dots, m & r &= 1, 2, \dots, s & j &= 1, 2, \dots, n \end{aligned} \quad (7.6)$$

Also this model is calculated in a two-stage process. First, calculating  $\phi^*$  by ignoring the slacks and then optimising the slacks by fixing the  $\phi^*$  in the next model (7.7)  $\max \left( \sum_{i=1}^m s_i^- + \sum_{r=1}^s s_r^+ \right)$

Subject to:

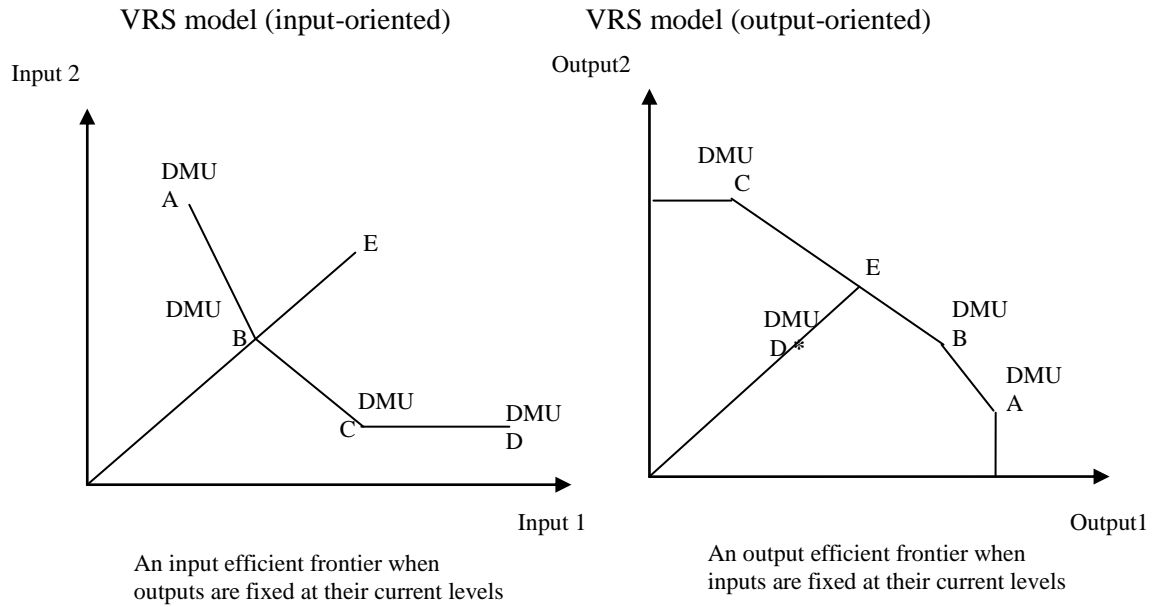
$$\begin{aligned} \sum_{j=1}^n \lambda_j x_{ij} + s_i^- &= \theta x_{i0} & \sum_{j=1}^n \lambda_j y_{rj} - s_r^+ &= \phi^* y_{r0} & \sum_{j=1}^n \lambda_j &= 1 \ \& \ \lambda_j \geq 0 \\ i &= 1, 2, \dots, m & r &= 1, 2, \dots, s & j &= 1, 2, \dots, n \end{aligned} \quad (7.7)$$

Whereas  $DMU_0$  is efficient if and only if  $\phi^* = 1$  and  $s_i^{-*} = s_r^{+*} = 0$  for all  $i$  and  $r$ .

### 3. Graphic Illustration of VRS and CRS Models

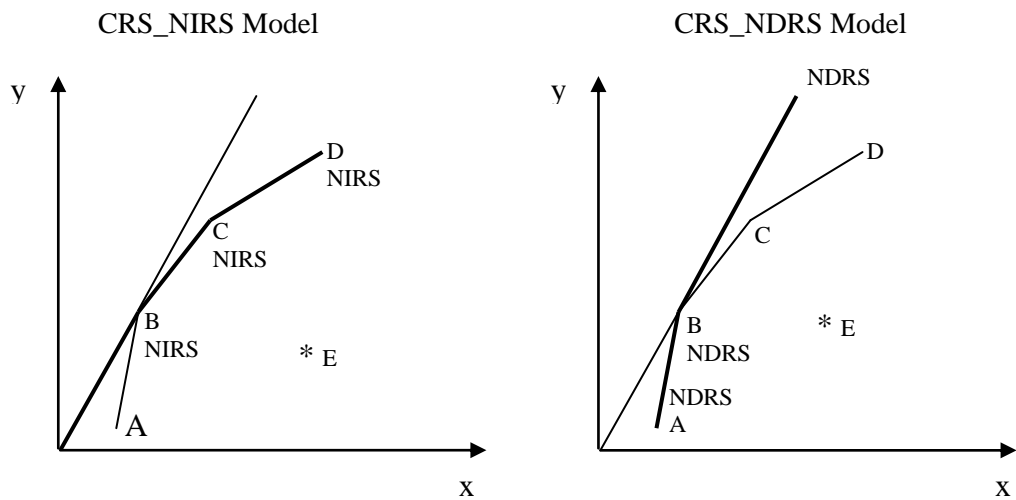
a. The VRS model is graphically depicted as follows:

#### VRS model (input-oriented & output-oriented)



b. The CRS model is graphically depicted as follows:

#### CRS model (NIRS oriented & NDRS oriented)



## APPENDIX P: Descriptive Statistics of Input and Output Variables

### 1. Islamic Banking System:

	Total Deposits US\$	Operation Costs US\$	Non-Int. Expenses US\$	ROE %	ROA %	Revenues US\$	Loan (Investment) US\$	CAR	AAI in TA % (2002 based)	AAI in TA % (yearly based)
Year 2002										
Max	947.58	233.78	144.28	27.2	20.19	89	150.68	64.57	0	0
Min	1.00	0.423	0.30	-455.6	-14.4	0.12	0.04	0.11	0	0
Average	164.55	44.00	21.07	-10.18	86.10	17.69	25.73	18.59	0	0
SD	285.14	56.41	30.30	93.24	403.07	24.04	42.93	19.07	0	0
Year 2003										
Max	1129.88	265.06	156.04	44.22	20.5	120.60	154.62	63.02	156.67	156.67
Min	1.10	0.21	0.14	0	-6.9	0.14	0.10	3.25	-32.66	-32.66
Average	186.09	49.05	27.56	12.37	3.15	19.23	28.19	17.69	21.01	21.01
SD	329.84	62.24	35.63	10.71	4.96	28.30	46.15	17.61	35.81	35.81
Year 2004										
Max	1441.84	355.74	228.763	37.9	15.5	178.42	186.46	64.12	1008.120	331.72
Min	1.23	0.20	0.121	-8.39	0.1	0.06	0.19	3.34	-98.69	-98.79
Average	230.58	62.02	41.40	13.90	3.46	22.80	23.41	18.00	71.54	25.58
SD	375.58	83.36	58.26	10.96	3.52	38.37	48.69	18.06	203.11	76.60
Year 2005										
Max	1435.34	711.25	247.98	42.74	14.08	237.36	210.25	62.5	1609.66	310.77
Min	3.55	0.21	0.13	0	0.5	0.19	0.17	3.12	-98.46	-85.54
Average	265.98	115.59	44.23	19.28	4.69	32.77	28.94	16.49	180.19	57.36
SD	425.51	171.69	57.15	10.78	3.94	50.95	56.71	16.56	335.93	91.95
Year 2006										
Max	1482.71	1234.88	301.72	57.3	17.1	312.29	240.45	57.56	1582.61	825.85
Min	1.07	0.26	0.18	0	0.128	0.48	0.11	2.64	-98.31	-54.74
Average	258.65	163.52	64.284	20.62	5.19	39.91	33.04	16.69	242.51	59.00
SD	445.72	266.58	79.22	12.11	4.70	65.74	62.44	16.25	363.39	166.38

## 2. Conventional Banking System

	Total Deposits US\$	Operation Costs US\$	Interest Expenses US\$	ROE %	ROA %	Revenues US\$	Loan (Investment) US\$	CAR	AAI in TA % (2002 based)	AAI in TA % (yearly based)
Year 2002										
Max	1895.41	377.69	225.66	32.69	9	83.05	600.08	42.67	0	0
Min	0.12	3.48	0	-113	-11.9	0.00	0.09	1.38	0	0
Average	325.97	81.26	41.90	7.72	1.56	22.91	102.91	8.71	0	0
SD	505.18	107.75	61.70	26.69	3.55	28.67	157.82	8.08	0	0
Year 2003										
Max	2019.60	496.61	269.96	31.7	6	90.57	448.81	20.76	149.34	149.34
Min	0.23	3.5	0.98	0	0	0.043	0.06	1.49	-88.17	-88.17
Average	312.12	98.36	51.19	12.72	1.68	24.79	89.88	7.79	5.40	5.40
SD	532.63	128.38	73.81	8.47	1.36	30.78	135.25	3.93	47.69	47.69
Year 2004										
Max	2353.74	487.92	297.44	36.1	4	102.61	630.08	21.66	156.57	215.70
Min	0.66	2.9	1.25	0.93	0.08	0.084	0.09	1.52	-97.06	-97.08
Average	357.15	108.63	54.77	15.15	1.702	27.04	99.44	7.83	20.46	21.44
SD	610.75	137.15	73.75	8.44	1.08	32.55	164.01	4.26	63.32	57.76
Year 2005										
Max	3720.31	634.91	631.15	40.13	10.46	244.86	971.75	20.23	1043.84	667.56
Min	0.91	3.1	1.67	4.51	0.19	0.073	0.34	2.45	-97.65	-24.70
Average	448.10	143.23	86.41	18.86	2.45	37.32	139.60	7.95	109.99	83.12
SD	864.72	189.49	142.88	8.81	1.97	53.73	245.04	4.32	221.29	153.84
Year 2006										
Max	4845.66	721.65	434.95	36.77	5	287.26	1352.85	18.74	1007.83	164.26
Min	1.01	2.6	2.137	5.9	0.58	0.07	0.49	1.53	-93.79	-61.54
Average	588.55	172.63	91.56	18.40	2.08	44.19	198.74	7.94	157.00	35.57
SD	1141.51	224.27	128.09	6.77	1.05	64.48	372.15	4.45	231.47	46.61



## APPENDIX Q: Efficiencies Scores (TE, PTE and ES) for IB and CB

### A. Average Efficiency scours for All CB and IB (As One Sample Data Yearly)

BANKS CAREGORIES	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006
<b>TE (CRS) for All CB &amp; IB Categories</b>					
SIB - Average TE Scores	0.47	0.60	0.53	0.64	0.64
MIB - Average TE Scores	0.75	0.57	0.63	0.71	0.79
LIB - Average TE Scores	0.28	0.37	0.43	0.51	0.44
SCB - Average TE Scores	0.09	0.17	0.16	0.23	0.34
MCB - Average TE Scores	0.50	0.64	0.58	0.62	0.68
LCB - Average TE Scores	0.41	0.36	0.40	0.47	0.45
<b>PTE (VRS) for All CB &amp; IB Categories</b>					
SIB - Average PTE Scores	0.67	0.71	0.76	0.88	0.90
MIB - Average PTE Scores	0.82	0.75	0.81	0.87	0.93
LIB - Average PTE Scores	0.59	0.68	0.70	0.83	0.75
SCB - Average PTE Scores	0.32	0.40	0.40	0.51	0.58
MCB - Average PTE Scores	0.69	0.78	0.79	0.82	0.80
LCB - Average PTE Scores	0.74	0.66	0.70	0.79	0.75
<b>SE (CRS/VRS) for All CB &amp; IB Categories</b>					
SIB - Average SE Scores	0.62	0.73	0.63	0.70	0.69
MIB - Average SE Scores	0.87	0.72	0.77	0.82	0.85
LIB - Average SE Scores	0.43	0.52	0.56	0.59	0.55
SCB - Average SE Scores	0.33	0.40	0.38	0.42	0.46
MCB - Average SE Scores	0.61	0.70	0.66	0.70	0.77
LCB - Average SE Scores	0.44	0.45	0.48	0.53	0.51

### Average Efficiency scours Efficiencies Coefficient for All CB & IB Categories

BANKS CATEGORIES	Technical Efficiency (CRS)	Pure TE (VRS)	Scale Efficiency
SIB - Average Scores	0.52	0.74	0.64
SCB - Average Scores	0.13	0.40	0.30
MIB - Average Scores	0.58	0.78	0.72
MCB - Average Scores	0.55	0.73	0.65
LIB - Average Scores	0.34	0.68	0.47
LCB - Average Scores	0.19	0.58	0.29

**B. Average Efficiency scores for All IB and CB as individual sample(Comparable Similar Banks Categories for Two Samples)**

BANKS CATEGORIES	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006
<b>TE (CRS) for All CB &amp; IB Categories (by period)</b>					
SIB - Average TE Scores	0.76	0.90	0.85	0.94	0.88
SCB - Average TE Scores	0.96	0.94	0.94	0.97	0.92
MIB - Average TE Scores	0.88	0.78	0.83	0.91	0.96
MCB - Average TE Scores	0.87	0.89	0.88	0.87	0.85
LIB - Average TE Scores	0.93	0.86	0.83	0.91	0.83
LCB - Average TE Scores	0.73	0.68	0.72	0.71	0.63
<b>PTE (VRS) for All CB &amp; IB Categories (by period)</b>					
SIB - Average PTE Scores	0.83	0.92	0.88	0.95	0.96
SCB - Average PTE Scores	0.99	0.97	0.99	1	1
MIB - Average PTE Scores	0.90	0.91	0.95	0.97	0.98
MCB - Average PTE Scores	0.93	0.922	0.95	0.96	0.96
LIB - Average PTE Scores	0.97	0.94	0.89	0.97	0.94
LCB - Average PTE Scores	0.94	0.91	0.92	0.96	0.94
<b>SE (CRS/VRS) for All CB &amp; IB Categories (by period)</b>					
SIB - Average SE Scores	0.93	0.98	0.95	0.98	0.92
SCB - Average SE Scores	0.97	0.97	0.95	0.97	0.92
MIB - Average SE Scores	0.93	0.81	0.87	0.93	0.98
MCB - Average SE Scores	0.93	0.95	0.91	0.91	0.89
LIB - Average SE Scores	0.96	0.90	0.91	0.94	0.87
LCB - Average SE Scores	0.74	0.72	0.77	0.72	0.66

**Average Efficiency Scores (Comparable Similar Banks Categories for Two Samples)**

BANKS CATEGORIES	Technical Efficiency (CRS)	Pure TE (VRS)	Scale Efficiency
SIB - Average Scores	0.85	0.88	0.96
SCB - Average Scores	0.93	0.98	0.95
MIB - Average Scores	0.80	0.90	0.87
MCB - Average Scores	0.84	0.93	0.88
LIB - Average Scores	0.86	0.93	0.91
LCB - Average Scores	0.59	0.89	0.65

**C. IB & CB (comparable two samples data)**

BANKS CATEGORIES	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006
<b>TE (CRS) for All CB &amp; IB Systems (by period)</b>					
IB - Average TE Scores	0.60	0.60	0.58	0.69	0.68
CB - Average TE Scores	0.57	0.56	0.56	0.59	0.55
<b>PTE (VRS) for All CB &amp; IB Systems (by period)</b>					
IB - Average PTE Scores	0.74	0.76	0.79	0.89	0.89
CB - Average PTE Scores	0.80	0.85	0.85	0.89	0.86
<b>SE (CRS/VRS) for All CB &amp; IB Systems (by period)</b>					
IB - Average SE Scores	0.74	0.72	0.69	0.76	0.75
CB - Average SE Scores	0.646	0.62	0.61	0.62	0.59

**Average Efficiency Scores for All IB and CB Systems (by efficiency coefficient)**

BANKS CATEGORIES	Technical Efficiency (CRS)	Pure TE (VRS)	Scale Efficiency
IB - Average Scores	0.62	0.81	0.73
CB - Average Scores	0.57	0.85	0.62

**APPENDIX R: Correlation Coefficients for Efficiency Determinants Model**

**Correlation matrix: TE\_O**

	ATN	BSI	CS	DMP	L_EP	LI	LS	PI	RA	SP	SR	TE_O
ATN	1.000											
BSI	0.088	1.000										
CS	0.056	-0.063	1.000									
DMP	0.338	0.393	-0.098	1.000								
L_EP	0.240	0.271	0.017	0.024	1.000							
LI	-0.111	-0.043	0.084	0.051	-0.194	1.000						
LS	-0.012	-0.204	0.132	-0.081	-0.168	-0.032	1.000					
PI	0.116	-0.010	0.437	-0.033	0.175	-0.052	0.070	1.000				
RA	0.056	-0.114	0.564	-0.176	0.129	-0.089	0.090	0.547	1.000			
SP	0.443	0.219	-0.062	0.246	0.253	-0.0854	-0.180	0.043	-0.1237	1.000		
SR	-0.144	0.078	-0.187	0.148	-0.426	0.218	-0.025	-0.265	-0.416	0.108	1.000	
TE_O	-0.228	-0.281	0.211	-0.245	-0.235	0.172	0.297	0.138	0.285	-0.334	-0.199	1.000

**Correlation matrix: TE\_S**

	<b>ATN</b>	<b>BSI</b>	<b>BSY</b>	<b>COB</b>	<b>CS</b>	<b>DMP</b>	<b>L_EP</b>	<b>LI</b>	<b>LS</b>
<b>ATN</b>	1.000								
<b>BSI</b>	0.088	1.000							
<b>BSY</b>	0.057	0.154	1.000						
<b>COB</b>	0.057	0.154	1.000	1.000					
<b>CS</b>	0.056	-0.062	-0.223	-0.223	1.000				
<b>DMP</b>	0.337	0.392	0.179	0.179	-0.092	1.000			
<b>L_EP</b>	0.239	0.270	-0.278	-0.278	0.017	0.024	1.000		
<b>LI</b>	-0.111	-0.042	0.172	0.172	0.084	0.051	-0.194	1.000	
<b>LS</b>	-0.012	-0.202	-0.138	-0.138	0.131	-0.081	-0.168	-0.032	1.000
<b>PI</b>	0.115	-0.009	-0.261	-0.261	0.436	-0.033	0.175	-0.052	0.070
<b>RA</b>	0.056	-0.114	-0.342	-0.342	0.563	-0.176	0.129	-0.089	0.090
<b>SISP</b>	0.057	0.154	1.000	1.000	-0.223	0.179	-0.278	0.172	-0.138
<b>SP</b>	0.4429	0.218	-0.004	-0.004	-0.0624	0.246	0.253	-0.085	-0.180
<b>SR</b>	-0.143	0.078	0.281	0.281	-0.187	0.148	-0.426	0.218	-0.025
<b>TOT</b>	0.057	0.154	1.000	1.000	-0.223	0.179	-0.278	0.172	-0.138
<b>TS</b>	0.057	0.154	1.000	1.000	-0.223	0.179	-0.278	0.172	-0.138
<b>TE_S</b>	-0.241	-0.307	-0.110	-0.110	0.169	-0.255	-0.2051	0.137	0.230

	<b>PI</b>	<b>RA</b>	<b>SISP</b>	<b>SP</b>	<b>SR</b>	<b>TOT</b>	<b>TS</b>	<b>TE_S</b>
<b>PI</b>	1.000							
<b>RA</b>	0.547	1.000						
<b>SISP</b>	-0.261	-0.342	1.000					
<b>SP</b>	0.043	-0.123	-0.004	1.000				
<b>SR</b>	-0.265	-0.416	0.281	0.108	1.000			
<b>TOT</b>	-0.261	-0.342	1.000	-0.004	0.281	1.000		
<b>TS</b>	-0.261	-0.342	1.000	-0.004	0.281	1.000	1.000	
<b>TE_S</b>	0.134	0.251	-0.110	-0.343	-0.257	-0.110	-0.110	1.000

**Correlation matrix: TE\_C**

	<b>ATN</b>	<b>BCA</b>	<b>BSI</b>	<b>BSY</b>	<b>COB</b>	<b>CS</b>	<b>DMP</b>	<b>L_EP</b>	<b>LI</b>
<b>ATN</b>	1.000								
<b>BCA</b>	0.069	1.000							
<b>BSI</b>	0.088	0.317	1.000						
<b>BSY</b>	0.057	0.888	0.154	1.000					
<b>COB</b>	0.057	0.888	0.154	1.000	1.000				
<b>CS</b>	0.056	-0.188	-0.062	-0.223	-0.223	1.000			
<b>DMP</b>	0.337	0.246	0.392	0.179	0.179	-0.092	1.000		
<b>L_EP</b>	0.239	-0.154	0.270	-0.278	-0.278	0.017	0.024	1.000	
<b>LI</b>	-0.111	0.210	-0.042	0.172	0.172	0.084	0.051	-0.194	1.000
<b>LS</b>	-0.012	-0.306	-0.202	-0.138	-0.138	0.131	-0.081	-0.168	-0.032
<b>PI</b>	0.115	-0.236	-0.009	-0.261	-0.261	0.436	-0.033	0.175	-0.052
<b>RA</b>	0.056	-0.353	-0.114	-0.342	-0.342	0.563	-0.176	0.129	-0.089
<b>SISP</b>	0.057	0.888	0.154	1.000	1.000	-0.223	0.179	-0.278	0.172
<b>SP</b>	0.442	0.077	0.218	-0.004	-0.004	-0.062	0.246	0.253	-0.085
<b>SR</b>	-0.143	0.307	0.078	0.281	0.281	-0.187	0.148	-0.426	0.218
<b>TOT</b>	0.057	0.888	0.154	1.000	1.000	-0.223	0.179	-0.278	0.172
<b>TS</b>	0.057	0.888	0.154	1.000	1.000	-0.223	0.179	-0.278	0.172
<b>TE_C</b>	-0.047	-0.246	-0.555	-0.164	-0.164	0.069	-0.214	-0.287	0.100

	<b>LS</b>	<b>PI</b>	<b>RA</b>	<b>SISP</b>	<b>SP</b>	<b>SR</b>	<b>TOT</b>	<b>TS</b>	<b>TE_C</b>
<b>LS</b>	1.000								
<b>PI</b>	0.070	1.000							
<b>RA</b>	0.090	0.547	1.000						
<b>SISP</b>	-0.138	-0.261	-0.342	1.000					
<b>SP</b>	-0.180	0.043	-0.123	-0.004	1.000				
<b>SR</b>	-0.025	-0.265	-0.416	0.281	0.108	1.000			
<b>TOT</b>	-0.138	-0.261	-0.342	1.000	-0.004	0.281	1.000		
<b>TS</b>	-0.138	-0.261	-0.342	1.000	-0.004	0.281	1.000	1.000	
<b>TE_C</b>	0.195	0.104	0.118	-0.164	-0.146	-0.033	-0.164	-0.164	1.000

*The End.*