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# Islamic Banking and the Global Financial Crisis

Evidence from the Gulf Cooperation Council



A thesis submitted in fulfilment of the requirement  
for the Degree of Doctor of Philosophy

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# Abstract

*The 2007/08 Global Financial Crisis (GFC), which was triggered in the American mortgage market in 2007, had unforeseen consequences that are considered to be the worst since the Great Depression of the 1930s. The GFC did not remain within the American banking sector but swiftly spread to other segments and other parts of the world because of globalisation. For example, it caused another severe crisis on the other side of the Atlantic, with European governments announcing that they would provide Greece with urgent financial aid to stop it from going bankrupt, and the country is still struggling not to default on its massive debts.*

*Despite the damage that the GFC caused and left on the global banking sector, Islamic banking continued to grow, with an average annual growth rate in the Gulf Cooperation Council (GCC) region of 25% between 2000 and 2012. This rapid growth has led many advocates of Islamic finance to have the confidence to propose that Islamic banking is a viable alternative to conventional banking. This thesis investigates empirically these arguments, taking into consideration the direct and the indirect exposure of the GFC using a variety of formal financial and econometric tests.*

*The thesis evaluates the operating performance, efficiency and financial stability of Islamic and conventional banks by means of financial ratios, Data Envelope Analysis (DEA), Distance to Default and Z-score, respectively, prior to, during and post the GFC. It investigates three time periods (prior, during and post the GFC) using samples ranging from 76 to 101 banks for each time period, across six Gulf Cooperation Council (GCC) economies, with data from 1998 to 2013.*

*After controlling for ownership differences, internal factors, macroeconomic factors and unobserved omitted variables (varying across countries and years), the analysis shows that Islamic banks outperformed conventional banks during the GFC in terms of capitalisation,*

*profitability, liquidity and cost efficiency. In addition, Islamic banks narrowed that inherent gap with conventional banks in terms of management quality, profit efficiency and financial stability, as measured by Z-scores. To the best of my knowledge, this finding can be considered some of the earliest empirical evidence supporting the theoretical argument that Islamic banks were less exposed to the GFC because of restrictions on dealing in non-complying assets, believed to be a main reason for the crisis, but not due to their use of profit-and-loss sharing (PLS) instruments.*

*However, in the later stages of financial turmoil, when the initial financial shocks of the GFC spilled over from the financial sector into segments of the real economy, Islamic banks suffered even more than conventional banks due to their lax risk-mitigation tools, size disadvantage, rate-of-return risk and, more importantly, their reliance on debt-based instruments, which make Islamic banks less resilient to shocks. This resulted in Islamic banks losing their advantage in capitalisation, performing worse than conventional banks in terms of profitability, efficiency and financial stability. This finding suggests that Islamic banks are more sensitive to conditions of real economic sectors, whereas conventional banks are more vulnerable to global financial shocks.*

*This thesis was limited by the absence of data regarding the Islamic services windows of conventional banks, the unavailability of data on the underlying assets of Islamic banks, and finally the use of accounting-based data, with the exception of using market-based Distance to Default (DD). These limitations made the modelling and the subsequent inferences a very challenging assignment, one which required the dedication of a significant amount of time and effort.*

*Despite the limitations of the research, a number of recommendations can come out of the findings. Bankers at Islamic banks should focus more closely on economic conditions*

*because the Islamic banking system is more affected by these than by global financial conditions. Furthermore, Islamic bankers should invest more in developing risk-management techniques, taking into consideration the unique needs of Islamic banks, to make their performance more stable and less risky. Finally, Islamic banks should consider growing in size to gain from the benefit of scale, as the data show that size is linked to superior performance.*

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## List of Abbreviations and Acronyms

AAOIFI	Accounting and Auditing Organization for Islamic Financial Institutions
CAPINT	fixed capital intensity
CAR	capital adequacy ratio
CD	certificate of deposits
CDO	collateralised debt obligation
CDS	credit default swap
CRS	constant return to scale
CTI	cost-to-income (ratio)
FF	distance to default
DEA	data envelopment analysis
DMU	decision-making unit
ECB	European Central Bank
FCIC	Financial Crisis Inquiry Commission
FDH	Free Disposable Hull (Analysis)
FDIC	Federal Deposit Insurance Cooperation
GCC	Gulf Cooperation Council
GDP	gross domestic product
GFC	Global Financial Crisis
GMM	generalised method of moments (estimator)
IAS	International Accounting Standards
IDB	Islamic Development Bank
IFSB	Islamic Financial Services Board
IIBR	Islamic Interbank Benchmark Rate
IMG	International Monetary Fund
INF	inflation
LIBOR	London Interbank Offered Rate
LTD	loans to deposits (ratio)
MBS	mortgaged-backed securities
MENA	Middle East and North Africa
NBER	National Bureau of Economic Research
NBK	National Bank of Kuwait

NPL	non-performing loan
OLS	ordinary least squares
PLS	profit-and-loss sharing (instruments)
PSP	profit-sharing principles
ROA	returns on assets
ROE	returns on equity
SFA	Stochastic Frontier Approach (Analysis)
SPV	special purpose vehicle
SSB	Sharia Supervisory Board
TARP	Troubled Asset Relief Program
TBTF	too big to fail
TFA	Thick Frontier Approach (Analysis)
UAE	United Arab Emirates
US	United States (of America)
VRS	variable return to scale

# **Chapter 1: Introduction**

## 1.1 Introduction<sup>1</sup>

International financial crises now seem to develop more rapidly and with more disastrous consequences than in the past (Simpson, 2009). The effects of the recent global financial crisis (GFC) have been widespread, with economic downturns affecting large sectors in both developed and developing countries. The global banking system has been devastated by what has been described as the worst financial crisis since the Great Depression (Dymski, 2013). The GFC has sent the global economy into recession, and forced large players within the banking sector, such as Lehman Brothers which had property assets in excess of \$US43 billion, into bankruptcy or, as in the cases of Fannie Mae and Freddie Mac, Northern Rock in the UK, Bears Stearns, Merrill Lynch and Countrywide, to be nationalised (Longstaff, 2010).

The literature suggests that the main causes of the GFC include discrimination, moral failure, poor governance, easy credit, imprudent lending, excessive debt and leverage, and regulation and supervision failure. The GFC had a severe and significant impact on the global economy; for example, Professor Robert Merton, winner of a Nobel Prize, estimated the losses of the world economy ranged between three and four trillion US dollars (Seidu, 2009). The impact of this was enormous, not only in the financial sector but also on every industry, either directly or indirectly. Unsettling economic events have continued, such as job losses, the public losing trust in the financial sector, governments with huge deficits, and a sharp decline in equity markets.

The purpose of this study is to provide an understanding of how well the Islamic banking sector performed compared with conventional banking prior to, during and post the GFC, in terms of operating performance, efficiency and financial stability. By comprehensively studying its performance, bankers, policymakers, economists and regulators of Islamic

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<sup>1</sup> The full proposal and the preliminary results were presented at the 2014 AFAANZ Doctoral Symposium, Auckland, New Zealand

financial institutions may be in a better position to face future financial crises with appropriate policies, practices and theories.

## **1.2 Research Problem**

The GFC's effect on the global banking sector has stimulated intense interest from academic researchers, economists and bankers. However, the unique and rapidly growing Islamic banking sector has not attracted as much interest from academic researchers as the conventional banking system has. The uniqueness of the Islamic banking sector comes from its high annual growth rate of 10–15% (Seidu, 2009), which is twice as fast as the conventional banking sector's; Islamic banks' assets were estimated to reach \$US1.1 trillion internationally in 2012 (John, 2012) and to surpass US\$2.8 trillion by 2015.

The lack of interest from academic researchers is largely because the Islamic banking sector is a very recent development in international banking. In theory, Islamic banking evolved from the principles of profit and loss sharing, but in practice, Islamic banks tend to use instruments mimicking those of conventional banking such as the heavy reliance on debt-based modes of finance, which dominate the assets of Islamic banks, rather than profit-and-loss sharing or investment contracts (Aggarwal & Yousef, 2000; Nethercott, 2012b). This dichotomy between the theory and the practice of Islamic banking, which is discussed in detail in Chapter 2, makes the net impact of the GFC somewhat more debatable, yet currently there is a gap in the literature about Islamic finance and financial crises.

The rapid growth of Islamic banking during the GFC has been discussed by many Islamic banking scholars, who argue that Islamic banks were spared from the first phases of the crisis because most of the reasons and the practices that led to the crisis would not pass the Sharia boards of Islamic institutions. Conversely, conventional banks were the first to feel the full impact of the crisis.

Nevertheless, by analysing the literature of Islamic banking at different micro-levels – namely, at the sector, operations and contract levels – it is apparent that some properties of Islamic banking might have been negatively affected by the economic downturn. The analysis argues that while Islamic banking might have remained in a relatively better position compared with the conventional banking sector during the early phases of the crisis, the Islamic banks were less likely to continue outperforming their counterparts in conventional banking during the subsequent economic downturn. There are several likely reasons for this: the Islamic banking sector is still evolving, it is disadvantaged by its current small size, and it uses complex instruments. Furthermore, Islamic banks are exposed to a higher degree of risk, as well as many different and unique types of risk, but the banks possess few and lax risk-mitigation tools, all of which could lead the Islamic banking sector to be relatively more vulnerable to financial shocks.

To empirically investigate and compare both the direct and indirect exposure of the two banking systems to financial shocks, it is essential to collect two comparable sets of data; that is, one from Islamic banks and one from conventional banks. Generally speaking, there are not sufficient Islamic banks in individual jurisdictions to enable the comparison to be feasible, and, furthermore, conditions are substantially different across regions. However, the Gulf Cooperation Council (GCC) region, which comprises six countries – Saudi Arabia, Kuwait, Bahrain, Qatar, United Arab Emirates and Oman – is an exception for a variety of reasons: (1) the countries within the GCC have common political cultural and economic characteristics; (2) they have a dual banking system, in which conventional and Islamic banks operate side by side; (3) the region accounts for 66.2% of the total assets of Islamic finance worldwide (Ernst & Young, 2015); (4) the GCC is an oil-based region, containing 35% of the world’s total proven oil reserves (Gulf Base, 2013); (5) the GCC is a \$US1.65 trillion economy (as measured by its

GDP)<sup>2</sup> and, furthermore, it is the largest producer as well as exporter of oil; and finally, (6) one member of the GCC (Saudi Arabia) is a member of the G20 economies.

### **1.3 Objectives**

The objectives of this thesis are classified into two groups: general and specific. The general objective is to offer bankers, policymakers, economists, investors and regulators of Islamic financial institutions a better understanding of how the Islamic banking sector within the GCC performed prior to, during and post the GFC, as well as to fill the gap in the literature about Islamic finance, the GCC and financial crises.

The specific objectives of the thesis are:

1. To evaluate the financial performance of Islamic banks prior to, during and post the GFC, and then compare their performance with that of non-Islamic banks over the same period.
2. To evaluate the efficiency of Islamic banks prior to, during and post the GFC, and then compare their performance with that of non-Islamic banks over the same period.
3. To investigate the financial stability of the Islamic banking sector prior to, during and post the GFC, and then compare their performance with that of non-Islamic banks over the same period.

### **1.4 Research Questions**

The thesis attempts to address the following three questions, which are extracted from the three specific objectives listed above:

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<sup>2</sup> As of 2014; the figure was calculated by the author from data obtained from the World Bank.

### Research Question 1

Do Profit and Loss Sharing (PLS) principles make the operating performances of the Islamic banking sector more resilient to external shocks than its peer, the conventional banking system, taking the GFC as an example?

### Research Question 2

Do Profit and Loss Sharing (PLS) principles make the efficiency of the Islamic banking sector more resilient to external shocks than its peer, the conventional banking system, taking the GFC as an example?

### Research Question 3

Did Profit and Loss Sharing (PLS) principles make Islamic banks more or less stable than their peers, the conventional banks, prior to and during the GFC?

## **1.5 Thesis Outline**

This thesis comprises eight chapters and two appendices, and is divided into three major parts (see Table 1). Part 1 has four chapters, the first of which is this introduction. It is followed by Chapter 2, which reviews the related literature on the GFC, its main causes and subsequent implications; this review will help the reader to understand the nature of the crisis and how it might have affected Islamic banking. Chapter 3 gives an introduction to the theory and modern practice of Islamic banking and reviews the latest developments leading to the evolution of the modern Islamic banking sector; it also presents an overview of the main instruments used in modern Islamic banking. Chapter 3 aims to prepare the reader for Chapter 4, which discusses how Islamic banks might have been directly and indirectly affected by the GFC.

Part 2 comprises the three empirical chapters of the thesis. Each of the chapters in Part 2 deals with one of the three objectives of the thesis: Chapter 5 evaluates the operating performance of Islamic banks and the GFC; Chapter 6 investigates the efficiency of Islamic

banks and the GFC; and Chapter 7 assesses the financial stability of Islamic banks and the GFC.

Part 3 comprises the final chapter of the thesis and also the two appendices. Chapter 8 presents a summary and conclusion of the research findings, as well as a discussion of their limitations and implications. It also presents some recommendations and ideas for future research.

**Table 1: Thesis Outline**

<b>Part</b>	<b>Chapter</b>	<b>Contents</b>
Part 1: Background and Related Literature	Chapter 1	Introduction
	Chapter 2	The Subprime Mortgages Crisis of 2007: Evolution, Causes and Implications
	Chapter 3	Islamic Banking: Theory and Practice, Current Developments and Main Instruments
	Chapter 4	Islamic Banking and the Global Financial Crisis: Direct Exposure versus Indirect Exposure
Part 2: Empirical Work	Chapter 5	Operating Performance and the Global Financial Crisis
	Chapter 6	Cost and Profit Efficiency and the Global Financial Crisis
	Chapter 7	Financial Stability and the Global Financial Crisis
Part 3: Conclusion and Supplementary Material	Chapter 8	Conclusion
	Appendices	Arabic Terms The Results of the Period from 2005–2012

## **Chapter 2: The Subprime Mortgages Crisis of 2007: Evolution, Causes and Implications**

## 2.1 Introduction

The Global Financial Crisis (GFC), widely believed to have been created by exploiting the low-income residents of the United States of America (US), spread rapidly to affect the rest of the world, sending the global economy into a deep depression that is considered to be the worst since the Great Depression of the 1930s ([Dymski, 2013](#)). First, the term *financial crisis* needs to be defined. Kayed and Hassan (2011) define it as:

A variety of situations in which investors unexpectedly lose substantial amount of their investments, and financial institutions suddenly lose significant proportion of their value. Financial crises include, among others, stock market crashes, financial bubbles, currency crises, and sovereign defaults. (p. 563)

Kayed and Hassan (2011) also define *subprime mortgages*, a term which has been widely used during the crisis:

A subprime loan is a type of loan that is offered at a rate above prime to individuals who do not qualify for prime rate loans. The loan is usually stipulated with a relatively higher interest rate because it is often issued to a higher-risk borrower. The term subprime was popularized by the media during the credit crunch. (p. 563)

The objective of this chapter is to discuss the subprime crisis, its main causes and the implications of the crisis.

## 2.2 Causes of the Global Financial Crisis

An understanding of how the GFC was created is needed in order to distinguish whether there were differences in the ways conventional and Islamic banks performed during the crisis. The Financial Crisis Inquiry Commission (FCIC) concluded that there were a number of reasons for the 2008 subprime financial crisis, including low interest rates, easy credit, scant regulation

and toxic mortgages, which led to a full-blown crisis in the autumn of that year (FCIC, 2011). The FCIC (2011) also added that risky mortgages had been securitised, packaged and repackaged, and sold to investors around the world.

When the “subprime bubble” burst, there were billions of dollars of losses from mortgage-related securities, and this shocked financial markets and the financial institutions that were highly exposed to those mortgages. In addition, these losses were significantly magnified by the use of derivatives. The main causes of the crisis were not independent of one another, but were highly interrelated and difficult to separate.

### **2.2.1 Discrimination, Moral Failure and Poor Governance**

It is argued that the origin of the subprime crisis is rooted in the idea of subprime lending itself, which is based on inequality, discrimination and exploitation. For many decades, low-income and immigrant communities were deprived from obtaining credit by a practice that was known as “redlining”, where red lines were drawn on maps of areas where mortgage lending was considered a high financial risk, often on a racially discriminatory basis (Galster & Godfrey, 2005; Rogers, 2013; Turner, Ross, Galster, & Yinger, 2002).

Although this racial discrimination was no longer legal, it continued into the 21st century in the form of unfair and exploitative terms of credit for these communities. Banks and mortgage brokers targeted these areas with high-cost loans despite the fact that these communities were the least able to bear this kind of lending (Bocian, Ernst, & Li, 2006; Bowdler, 2005; Cohen, 2013; Dymski, 2013).

The expansion of this kind of lending was facilitated by the use of innovative risk-shifting tools (such as securitisation) and high-tech information tools, which led to an increase in lending to lower-income clients, whereas lending to middle- and upper-income clients was declining (Dymski, 2013). Wilson (2009) argues that this kind of loan (subprime) was one of

the main causes of the global financial crisis. He characterises “subprime borrowers” as those borrowers who had previously bad credit and had a low income, making it highly likely they would not be able to repay their mortgages. He adds that moralists question the validity of the high-return concept, which justifies charging a high interest rate to low-income subprime borrowers, and a low rate to high-income, credit-worthy borrowers (Wilson, 2009).

Another moral failure can be found at the bank level. The FCIC investigations revealed shocking examples of governance breakdowns and irresponsibility; for example, the managers of AIG ignored the terms and risks of \$US79 billion worth of derivatives that were exposed mortgage-related assets. Managers hid their excessive leverage in derivative positions in off-balance sheet entities that were provided to the investing public (FCIC, 2011).

Siddiqi (2009) believes that most causes of the crisis were embodied in a moral failure that resulted from conflicts of interest, stating:

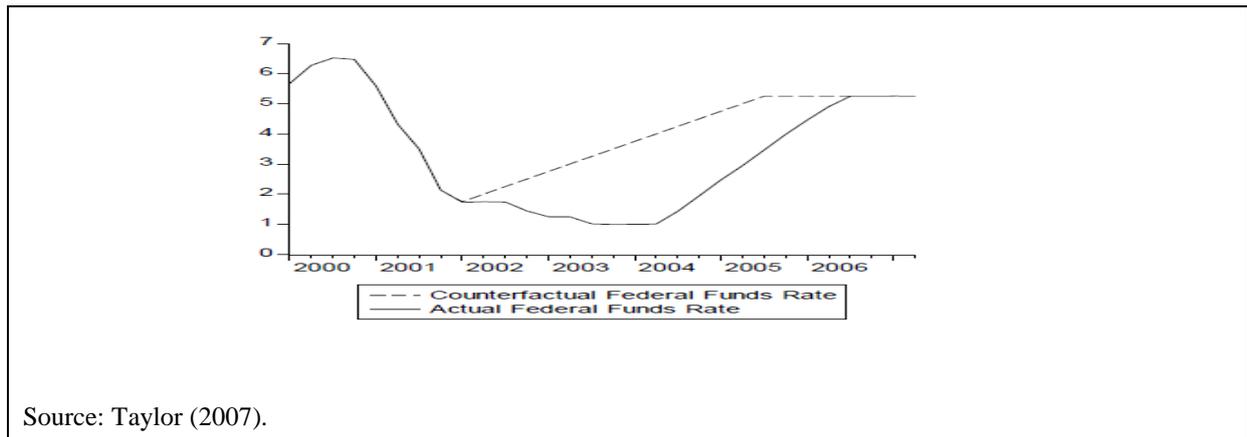
Financial institutions include banks, investment companies, and insurance companies etc., managed by hired professionals. Those who govern financial conglomerates by virtue of owning enough shares have motives different from ordinary shareholders. Almost the entire population in developed countries is involved in supplying capital through purchase of stocks, bonds, insurance policies, pension funds, etc. While these “principals” are interested in profits they care about many other things too, among them stability, jobs, social justice, and anxiety free communities. Not so the hired managers who consider profit maximisation to be their mission as it earns them maximum bonus and continued employment. There are those amongst middlemen who earn fees. They earn more when transactions multiply. In an environment where no one cares about others, focused as everyone is on his or her own interest, public interest is supposedly guarded by regulators. (p. 4)

Nobel Prize-winning economist Paul Samuelson warned of the consequences of the “me, me, now, now, consume, consume generation” several years before the crisis took place (Iley & Lewis, 2013). Greenspan (2010) supports Siddiqi’s (2009) view on the incentives of hired managers and their interests, which are not aligned with the shareholders’ interests. He states that while the top executives of Bear Stearns and Lehman Brothers lost millions of dollars from the failure of their firms, none of them has filed for personal bankruptcy and their wealth has enabled them to maintain their previous standard of living (Greenspan, 2010).

### **2.2.2 Easy Credit and Imprudent Lending**

After the dot-com market crash and September 11 terrorist attacks in 2001, the interest rate in the US was reduced from 6.5% in 2000 to 1% in 2003, which was economically justified. However, John Taylor argues that the Federal Reserve interest rates should have been raised much earlier (see Figure 1) (Taylor, 2007). These low interest rates stimulated the US economy and made credit more accessible, enabling American consumers to increase their borrowing to unprecedented levels (Chang, 2011). Greenspan (2009), former chairperson of the US Federal Reserve, points out that the adaptation of the “easy money” policy was one of the major causes of the crisis.

**Figure 1: John Taylor Argues that Federal Reserve Interest Rates Were Too Low**



Chapra (2009) suggests that imprudent lending was the result of three factors: (1) lack of adequate market discipline in the financial sector, resulting from risk shifting; (2) the “mind-boggling” expansion of derivatives, specifically credit default swaps; and (3) the “too big to fail” concept, which reassured major players in the financial sector that the central bank would probably rescue them and not allow them to collapse.

The FCIC (2011) added that “there was an explosion in risky subprime lending and securitization” that financial institutions traded in, and they bought and sold mortgage securities without examining or caring about their quality. In some cases, institutions even knew that those securities were defective. Dymski (2013) suggests that mass securitisation had changed the traditional model of financial institutions holding portfolios made of short- and long-term loans given to well-defined borrowers. Instead, a new model had been adopted that allowed financial institutions to originate and distribute loans, moving them from being interest based to fee based, and making the financial institutions less inclined to carefully assess loan applications, thus leading to the subprime crisis.

Ahmed (2009) also discusses this argument, saying that complex products used by financial institutions enabled them to transfer the risk of default to others, which resulted in the breakdown of the relationship between lender and borrower. This breakdown generated risks both before and after the contract. Ahmed (2009) states:

As the loans were packaged and sold, there was little incentive to scrutinise the financial health and capabilities of the clients by loan originators before contracts were signed. This resulted in lowering the standards of due diligence, resulting in subprime lending. In the post-contract stage, the Master Servicer had no incentive to reschedule the loans in case of a default and instead took the easy way out of foreclosure. (p. 14)

Because of the “originate and distribute” model, loose lending standards were encouraged (driven by a desire to obtain higher profits for an extended period) and this led to a risky lending environment that finally damaged the interests of both the borrowers and the lenders (Iley & Lewis, 2013). Bord and Santos (2014) and Keys, Mukherjee, Seru, and Vig (2010) empirically investigated the performance of loans that were generated by the same banks. They found that loans that were securitised performed worse than loans that were kept in the banks’ portfolios – this can be seen as evidence of “incentive effects”.

### **2.2.3 Excessive Debt and Leverage**

The FCIC (2011) states that “too many financial firms acted recklessly, taking on too much risk with too little capital and with too much dependence on short-term funding” (p. xviii). By taking this excessive risk, financial institutions made enormous profits. For example, in 2007, major players in the financial sector, mostly investment banks such as Lehman Brothers, Goldman Sachs, Bear Stearns and Morgan Stanley, were operating with extremely thin capital (see Figure 2). Furthermore, most of these companies’ borrowings were from the overnight market and needed to be renewed every day.

An extreme case of leverage was that of government-sponsored enterprises Fannie Mae and Freddie Mac, which held a leverage ratio of 75 to 1 (FCIC, 2011). Greenspan (2010) states that in the period leading up to the subprime crisis, banks and financial institutions operated with a layer of capital that was too thin (with leverage as high as 20 to 30 times their tangible capital), with significant risk-underpricing of their increasingly complex products. Jean-Claude

Trichet, president of the European Central Bank, has pointed out that “a bubble is more likely to develop when investors and financial institutions can leverage their positions by investing borrowed funds” (Chapra, 2009, p. 13).

**Figure 2: The Leverage Ratio of Major Investment Banks from 2003 to 2007**



### 2.2.4 Regulation and Supervision Failure

The FCIC (2011) concludes that the Federal Reserve failed to stop the flow of toxic mortgages, which could have been achieved by setting prudent mortgage-lending standards when it was in a position to do so. Similarly, Kaye, and Hassan (2011) argue that all the crisis causes were facilitated by inadequate and inappropriate government regulatory supervision. It is argued that the shadow banking system (comprising institutions such as investment banks and hedge funds), which was highly exposed to toxic assets, played a significant role in the credit market despite not being subject to the same regulations as deposit-taking institutions such as commercial banks.

Ahmed (2009) suggests that one of the reasons for the failure of government supervision was the dynamic and innovative nature of the financial sector. He points out that the public authorities needed to understand the new risks associated with these new instruments, and to make the appropriate legal and policy changes to deal with them. Because this did not happen during the period leading up to the subprime crisis, regulatory regimes became unable to fulfil their purpose efficiently, and when they tried to do it during the crisis, it was too late (Mayes, 2009a).

At the macroeconomic level, it has been noted that the GFC invalidated the argument promoted by free-market advocates that “markets are efficient on their own” and market forces are able to manage and correct market inefficiencies should they arise (Kayed & Hassan, 2011). Likewise, Dillman (2013) argues that the central assumption that drove policy decisions during the last three decades was that the “market does a better job than government would do on assessing risk” – but it turned out that market did a poor job at all levels during the crisis.

### Figure 3: Timeline of the Subprime and Financial Crises

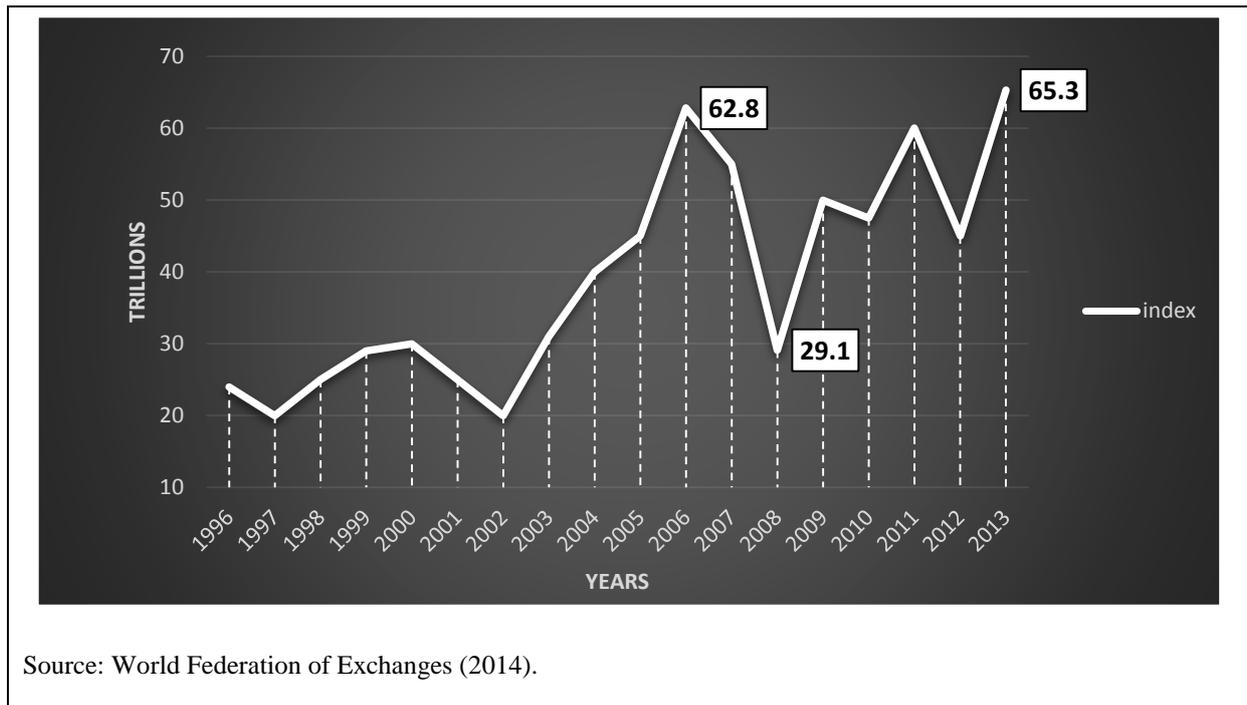
- Late 2006:** The U.S. housing market slows after two years of increases in official interest rates. Delinquencies rise; a wave of bankruptcies.
- Feb-7-2007:** Europe's biggest bank, HSBC Holdings, blamed soured U.S. subprime loans for its first-ever profit warning.
- Apr-2-2007:** Subprime lender New Century Financial Corp. files for bankruptcy.
- Jun-20-2007:** Two Bear Stearns funds sell \$4 billion of assets to cover redemptions and expected margin calls arising from subprime losses.
- Jul-10-2007:** Standard & Poor's said it may cut ratings on some \$12 billion of subprime debt.
- Jul-17-2007:** Bear Stearns says two hedge funds with subprime exposure have very little value; credit spreads soar.
- Jul-20-2007:** Home foreclosures soar 93% from the previous year.
- Aug-9-2007:** BNP Paribas suspends redemptions in \$2.2 billion of asset-backed funds; says it cannot determine security values.
- Sep-13-2007:** UK mortgage lender Northern Rock seeks financial support from the Bank of England; report sparks a run by worried depositors.
- Oct-1-2007:** Swiss bank UBS said it would write down \$3.4 billion in its fixed-income portfolio; first quarterly loss in nine years.
- Oct-30-2007:** Merrill Lynch ousts Chairman and Chief Executive Stan O'Neal after reporting biggest quarterly loss in company's history.
- Nov-4-2007:** Citigroup announces a further \$8-11 billion of subprime-related write-downs and losses. Charles Prince resigns as CEO.
- Dec-12-2007:** Central banks coordinate the launch of the temporary Term Auction Facility (TAF) to address pressures in short-term funding markets.
- Jan-1-2008:** Bank of America purchases Countrywide Financial in an all-stock transaction.
- Feb-13-2008:** President Bush signs the Economic Stimulus Act of 2008 into law.
- Mar-11-2008:** Federal Reserve announces creation of Term Securities Lending Facility (TSLF).
- Mar-16-2008:** Federal Reserve announces creation of Primary Dealer Credit Facility (PDCF).
- Mar-24-2008:** JP Morgan acquires Bear Stearns in rescue partially financed by Federal Reserve Bank of New York.
- Jun-5-2008:** Standard & Poor's announces downgrade of monoline insurers AMBAC and MBIA.
- Jul-11-2008:** Office of Thrift Supervision closes IndyMac Bank, F.S.B.
- Sep-7-2008:** Federal Housing Finance Agency places Fannie Mae and Freddie Mac in government conservatorship.
- Sep-15-2008:** Bank of America announces purchase of Merrill Lynch; Lehman Brothers files Chapter 11 bankruptcy.
- Sep-16-2008:** Federal Reserve authorizes lending up to \$85 billion to AIG.
- Sep-25-2008:** Office of Thrift Supervision closes Washington Mutual Bank.
- Sep-29-2008:** Federal Deposit Insurance Corporation (FDIC) announces that Citigroup will purchase the banking operations of Wachovia Corp.
- Oct-3-2008:** Congress passes Emergency Economic Stabilization Act establishing \$700 billion The Troubled Asset Relief Program (TARP).
- Nov-25-2008:** Federal Reserve Board announces creation of Term Asset-Backed Securities Lending Facility (TALF).
- Dec-19-2008:** U.S. Treasury authorizes loans for General Motors and Chrysler from the TARP.

Source: Reuters, Federal Reserve of St. Louis.

## 2.3 Implications of the Global Financial Crisis on the World Economy

The Global Financial Crisis is considered the biggest since the Great Depression of the 1930s. Professor Robert Merton, winner of a Nobel Prize, estimated the losses of the world economy ranged between three and four trillion US dollars (Seidu, 2009).

**Figure 4: World Stock Market Capitalisation from 1996 to 2013**



The impact of this was enormous, not only in the financial sector but also on every industry, either directly or indirectly. The effects included the following:

- Equity markets in the US and worldwide declined sharply and lost more than half of their market value between the fourth quarter of 2007 and the second quarter of 2009 (see Figure 4).
- In the US alone, 485 banks went bankrupt, or were sold or nationalised, between 2007 and 2013 (FDIC, 2013); for example, Lehman Brothers, which had property assets in excess of \$US43 billion (Kayed & Hassan, 2011), Fannie Mae and Freddie Mac (FCIC, 2011), and Bears Stearns, Merrill Lynch, and Countrywide (Longstaff,

2010). The same happened in the United Kingdom; for example, Northern Rock (Elliott, 2011).

- Central banks in countries around the world (e.g. Canada, Australia, China, Hong Kong, South Korea, Sweden and Saudi Arabia) reduced their key interest rates in order to avoid falling into recession (Kayed & Hassan, 2011).
- Some governments (e.g. Canada, Japan, South Korea, Austria, Germany, Netherlands, Norway, Saudi Arabia, Russia, Spain and Sweden) created urgent rescue packages from taxpayers' funds to support their financial systems (Seidu, 2009). These rescue packages and government guarantees negatively affected the solvency of these countries as a whole (Mayes, 2011), contributing to the sovereign debt crisis that followed.
- Twenty-nine out of 33 developed economies experienced recession during the period 2008 to 2009 (Douglas, Fatema, & Hawkins, 2010).
- The Icelandic economy, which depends heavily on the banking sector, faced a serious threat of national bankruptcy. The Icelandic government nationalised two of its banks, Glitnir and Landsbanki, in an attempt to stabilise its financial system (Mayes, 2009b), and was one of the first nations to require urgent financial aid from the International Monetary Fund (IMF) (Boyes, 2009).
- Instability and loss of confidence caused international markets and economies to decline. Governments intervened to assure markets, investors and depositors. Many governments and central banks (e.g. Australia, Hong Kong, Singapore, Austria, Belgium, Germany, Ireland and Spain) guaranteed bank liabilities in an attempt to assure the market (Seidu, 2009).
- Many institutional and individual investors lost their savings and investments, such as those in pensions and retirement schemes.

- Sixty million people lost their jobs as a consequence of the worldwide recession (Douglas et al., 2010).
- Foreclosure has had a negative impact on the credit history of many low-income families, and this can make finding new jobs, renting houses or obtaining loans extremely difficult for them (Thomas, 2013).
- By one Federal Reserve estimate, the US lost an entire year's worth of economic activity (almost \$US14 trillion) during the period 2007 to 2009 (Grofum, 2013).

## **2.4 Summary**

In this chapter, I reviewed the theoretical literature regarding the Global Financial Crisis (GFC) and its causes and implications. The reviewed literature suggests that the main causes of the crisis are discrimination, moral failure, poor governance, easy credit, imprudent lending, excessive debt and leverage, and regulation and supervision failure. The implications of the crisis have been reviewed, suggesting that many segments of the financial as well as real economy sectors were extremely negatively affected by the GFC.

## **Chapter 3: Islamic Banking: Theory and Practice, Current Developments and Main Instruments**

### **3.1 Introduction**

In this chapter, I give a brief overview of the theory of Islamic banking and explain how and why there is a gap between the theory and the modern practice of Islamic banking. Also I review the latest developments leading to the evolution of modern Islamic banking, followed by an overview of the main instruments used in the modern Islamic banking.

The purpose of this chapter is to give the reader a better understanding of the main issues related to Islamic banking. The chapter is organised as follows: section 3.2 discusses the theory of Islamic banking, section 3.3 presents the evolution of the modern Islamic banking sector, section 3.4. reviews the underlying instruments used in Islamic banking, and section 3.5 summarises the main points of the chapter.

### **3.2 The Theory of Islamic Banking**

The theory of Islamic banking stems from the holy *Qur'an* which prohibits trading money as a commodity.<sup>3</sup> As an alternative, Islam allows trade: “God has permitted trade and has forbidden interest” (Qur'an, 2:275). Trade can take the form of investment contracts (profit-and-loss sharing), such as *musharaka* and *mudaraba*, or debt-based contracts (mark up), such as *murabaha* and *tawarruq*. The theory of Islamic banking evolved from the principles of profit and loss sharing, but in practice, Islamic banks tend to rely heavily on debt-based modes of finance, which dominate the assets of Islamic banks, rather than profit and loss sharing or investment contracts (Aggarwal & Yousef, 2000; Nethercott, 2012b). For example, according to Fedad (2010), a chief economist at the Islamic Development Bank (IDB), debt-like contracts dominate 90% of the total assets of banks in Saudi Arabia. Thus, one can observe that there might be a dichotomy between theory and practice in Islamic banking (Khan, 1996).

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<sup>3</sup> See Appendix 1 for all the Arabic terms used in this thesis.

There are a number of reasons why traditional finance practices based on principles of profit and loss sharing are not the preferred mode to be chosen by modern Islamic banks. Most Islamic banks are based in countries with developing economies, which suffer from information asymmetry. This can lead to agency problems and moral hazards, as entrepreneurs may use funds provided by banks for their own benefits, causing banks to be biased towards debt-based contracts (Aggarwal & Yousef, 2000; Mirakhor & Zaidi, 2007; Sundararajan & Errico, 2002). Khan and Mirakhor (1987), Kuran (1993) and Nethercott (2012b) argue that adverse-selection explanation can lead banks to focus on debt-based contracts, especially with less knowledgeable borrowers. Another reason for this mode of finance not being widely used is that profit-and-loss sharing contracts require financial institutions to invest more in managerial expertise to monitor funded projects, which increases overheads and the cost of funds (Mirakhor & Zaidi, 2007).

Moreover, Islamic banks still constitute a relatively small segment of the banking sectors in which they operate, which might place pressure on them to offer products and generate returns that conform to conventional banks' (Lewis, 2013). These challenges lead Islamic scholars to develop products comparable to those of conventional banking systems and to invest in compliance securities, without breaching the principles of Islamic finance. In the following sections, I will discuss further issues related to the theory of Islamic banking in an attempt to offer a better understanding of this banking sector. However, it is important to note that the theory does not offer clear answers as to how Islamic banks and conventional banks are different from each other, an ambiguity that has also been noted by Beck, Demirgüç-Kunt, and Merrouche (2013) and Čihák and Hesse (2010).

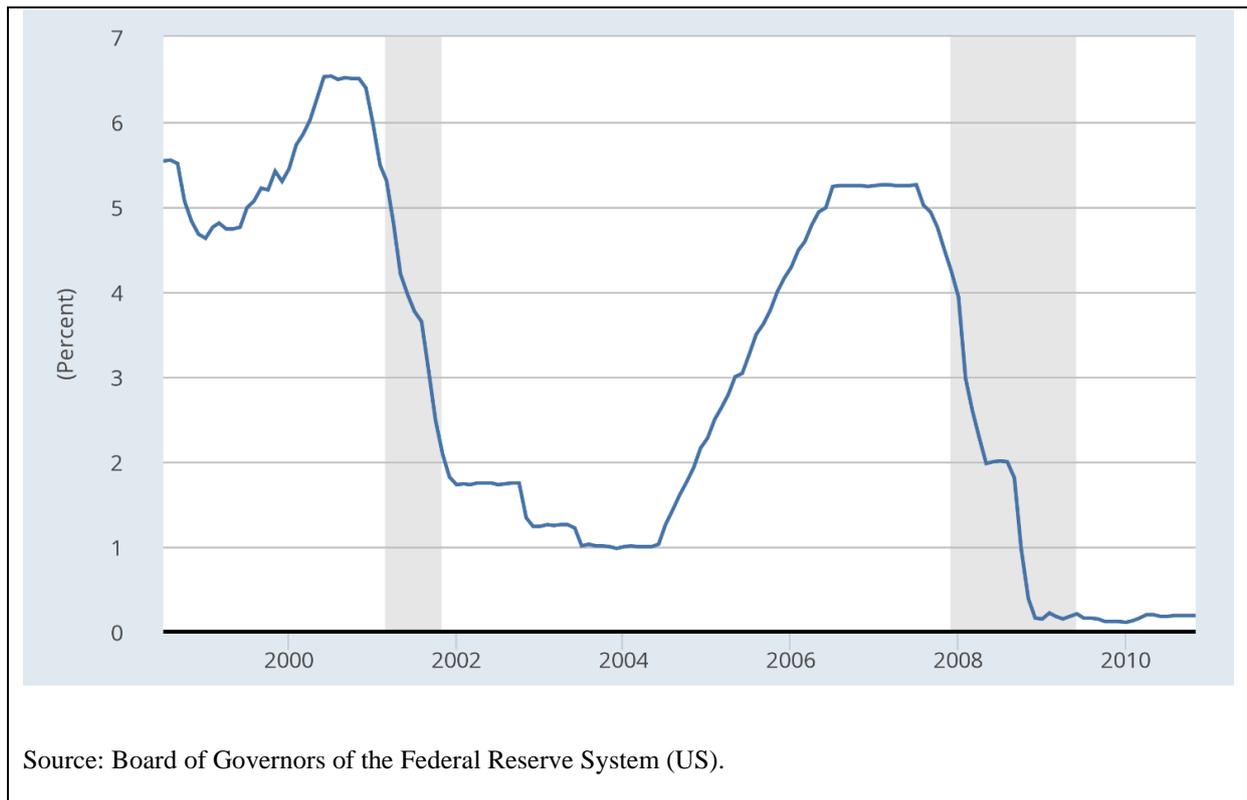
### 3.3 Evolution of the Modern Islamic Banking Sector

The Islamic financial sector has experienced substantial developments in the new century; these have boosted its size, products and number of institutions. The developments have created substantial funds which, along with existing funds, have been reinvested within Islamic countries such as the Gulf Cooperation Council (GCC) states and Malaysia, rather than them being reinvested in Western assets, which was the case for many decades. Simpson (2008), Warde (2012) and Jones (2009) note some of the developments in the Islamic financial industry, which can be summarised as follows:

- After the terrorist attacks on the US on 9 September 2001 (“9/11”), there was a fear that Western governments might freeze the assets of many institutional and individual investors of Islamic countries (Simpson, 2008; Warde, 2012), which lead to concerns about the political risk of continued investment in Western assets. Westerners’ responses to the events of 9/11 also created a perception that Islam as a religion was under attack, which resulted in religious reaction, in turn leading to higher demands for Islamic finance products by Muslim investors. As a result of the growth in demand and of the perception of being under siege, Islamic finance experts and regulators worked more closely than ever to develop new products such as *sukuk* products and to form some new entities to harmonise and standardise the practice of Islamic banking; for example, the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) in Bahrain, and the Islamic Financial Services Board (IFSB) in Malaysia (Warde, 2012).
- American and European economies have been less attractive because of the “dot com” collapse, which took place in 2000 (Simpson, 2008).
- Corporate governance failure and agency issues such as occurred with Enron and WorldCom have undermined investors’ confidence in American securities.

- Oil prices have escalated to record levels, which has been yielding substantial revenues to many Middle Eastern and Muslim economies.
- US interests rates decreased significantly from 2002 to 2004, making the American market less attractive (see Figure 5) (Jones, 2009; Simpson, 2008).

**Figure 5: US Federal Funds Rate from 1998 to 2010**



As a result of all these developments, the economies of many Islamic countries have escalated and in some cases tripled in size, as happened in the GCC region between 2002 and 2008 (Gulf Base, 2013). And, as a consequence of this economic boom, the banking industry, especially the Islamic banking industry, has been growing rapidly ever since.

### 3.4 Main Instruments of Islamic Banking

#### 3.4.1 Partnership Contracts

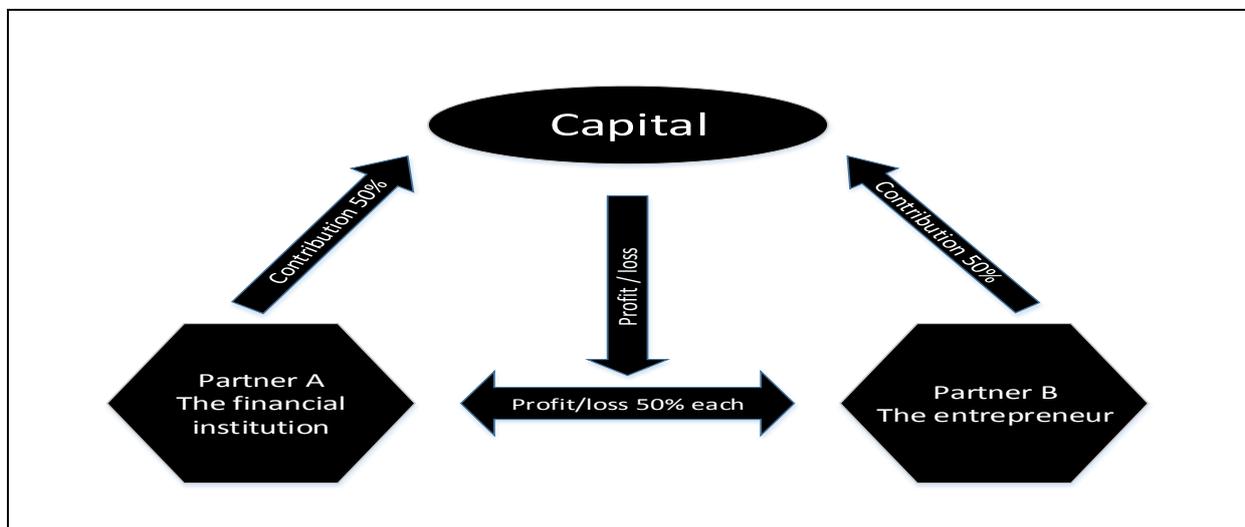
##### 3.4.1.1 *Musharaka* (Partnership)

The *musharaka* contract in Islamic banking is the most obvious form of a participation contract or profit-and-loss sharing model (see Figure 6); it is simply a form of joint-venture contracts or pure equity (Abdul-Rahman, 2009; Aggarwal & Yousef, 2000; Johansen & Hanif, 2012).

AAOIFI (2010b) defines *musharaka* as:

A partnership between two or more parties whereby each partner contributes a specific amount of money in a manner that gives each one a right to deal in the assets of the partnership, on condition that the profit is distributed according to the partnership agreement and that the losses are borne in accordance with the contribution of each partner to the capital. (p. 204)

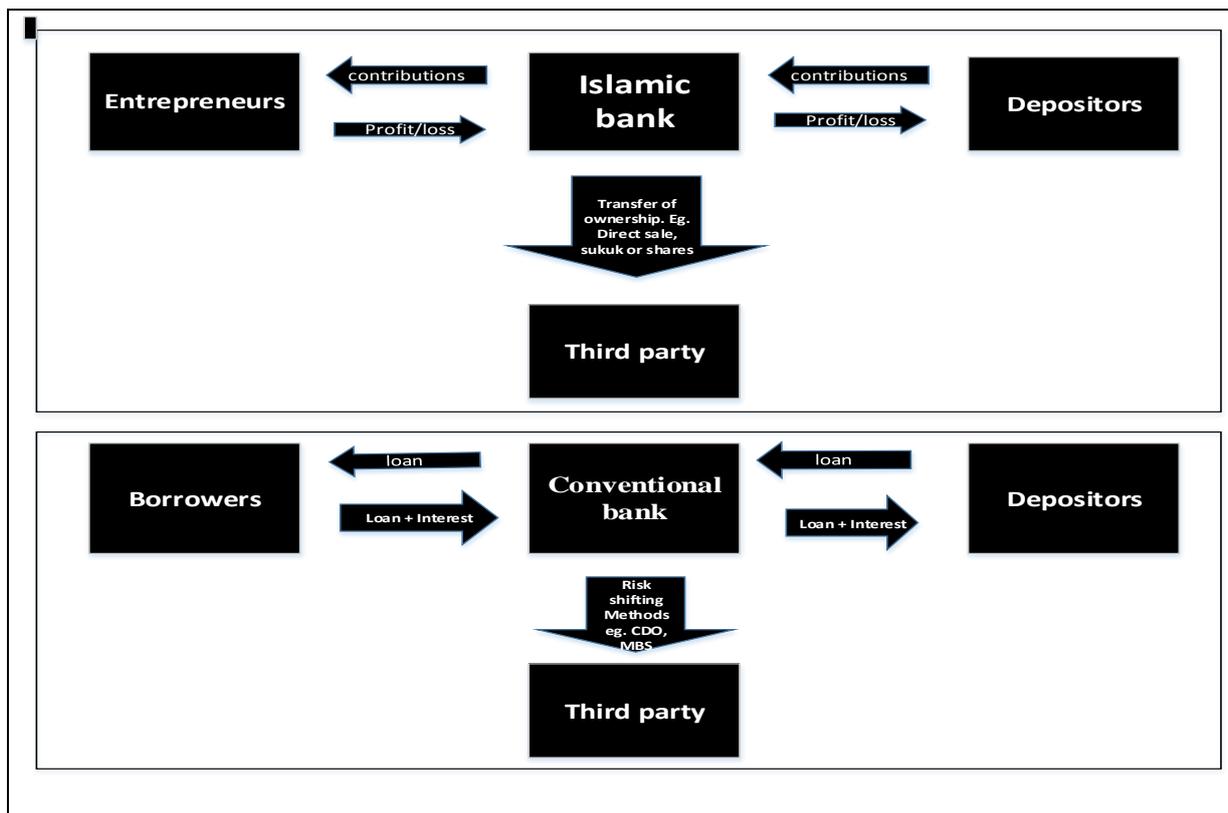
**Figure 6: Basic *Musharaka* Structure**



In practice, the term of the venture or *musharaka* contract can vary from short to long term. There are several forms of the *musharaka* contract that are considered a short-term partnership, such as the diminishing partnership contract (*musharaka mutanaqisa*). Under diminishing partnership, the entrepreneur agrees to buy a pre-agreed number of shares from

the financial institution on pre-agreed dates, resulting in the financial institution's shares gradually decreasing, as well as its profits or the agreed lease in the case of *ijara / musharaka* contracts (Johansen & Hanif, 2012).

**Figure 7: Basic Difference Between the *Musharaka* Structure and an Ordinary Bank Loan**



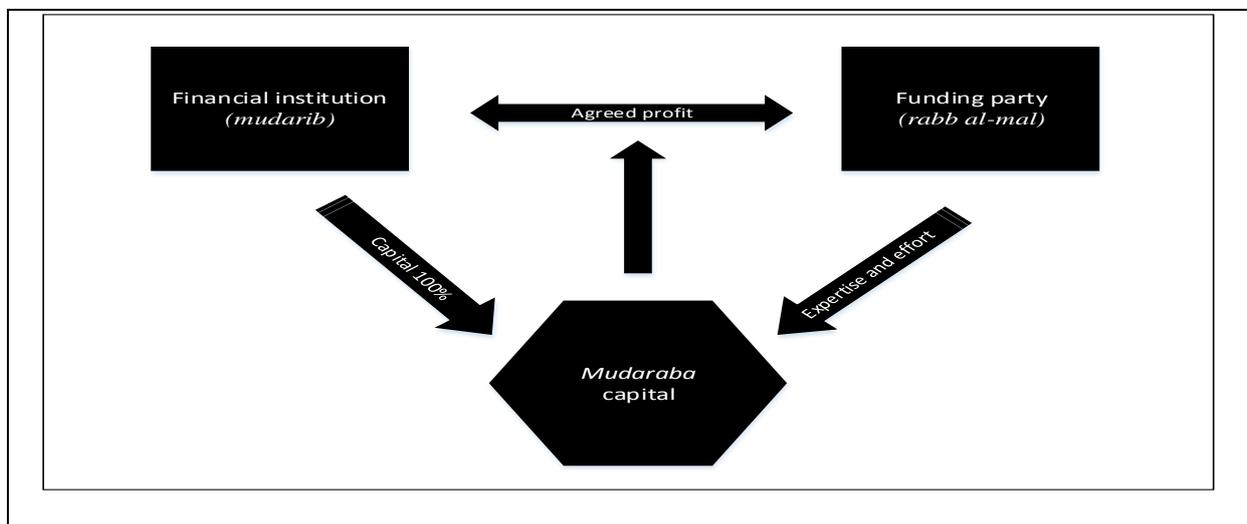
It is common practice that the entrepreneur is responsible for the management of the venture. Due to the entrepreneur's management, the financial institution has the right to take action against the entrepreneur to cover all or some of its actual losses if these losses are caused by the entrepreneur's mismanagement of the project. Broadly, in basic *musharaka*, the financial institution is exposed to many risks associated with conducting ordinary business (see Figure 7). However, in diminishing *musharaka*, while the ownership risk decreases, an additional risk is created (credit risk) when the entrepreneur fails to make their periodic rental payments or buy the pre-agreed number of shares in the contract.

### 3.4.1.2 Mudaraba (Money Management)

*Mudaraba* is one of the investment contracts that Islamic banks offer to their clients. Under this contract, the financial institution acts as a money manager for its customers or as an agent for its customers to find other managers who meet the customers' objectives (Abdul-Rahman, 2009). Abdul-Rahman (2009) defines *mudaraba* as:

...a partnership in profit whereby one party (*rabb al-mal*) provides capital and the other provides labour (*mudarib*). (p. 235)

**Figure 8: Basic Structure of a Mudaraba Contract**



Prima facie *mudaraba* and *musharaka* are very similar. However, it is important to distinguish between them to eliminate confusion. *Musharaka* implies all parties contribute to the capital of the venture or the project, as well as the management, with the sharing of the profit and loss being according to the relative ownership stakes. Conversely, the funding in *mudaraba* is made by one party (*rabb al-mal*), and the project is run by the other party (*mudarib*) (see Figure 8), with the financial losses borne by the funding party (Johansen & Hanif, 2012) and profits distributed in a pre-agreed ratio (Zaher & Hassan, 2001). Therefore, a

*mudaraba* contract is sometimes said to constitute profit-sharing principles (PSP) (Kahf & Khan, 1992).

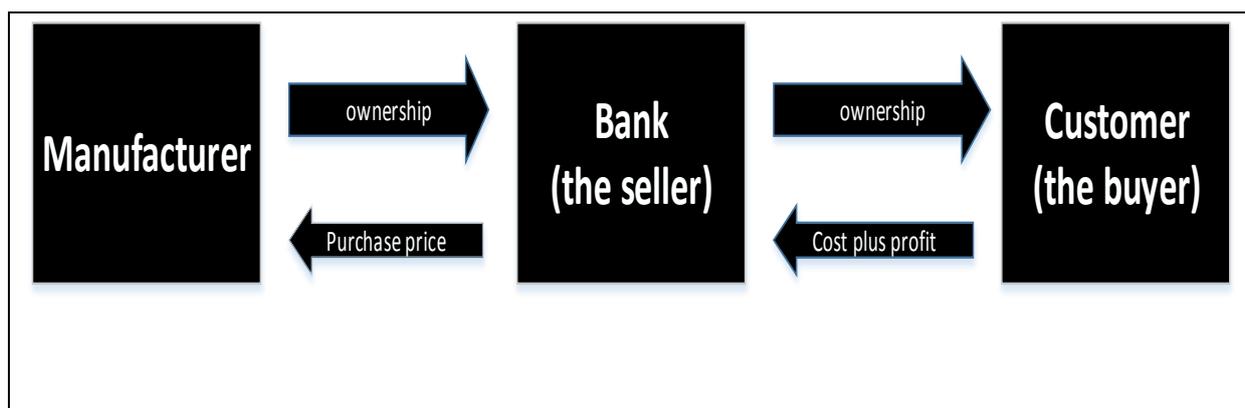
### 3.4.2 Trading Contracts

A second category of Islamic banking contracts is based on trade between the financial institution and the client; these are not based on equity and profit-and-loss sharing (including the investment contracts discussed above). There are two main models under this category, including debt-based contracts and usufruct lease contracts. The two models are discussed below.

#### 3.4.2.1 *Murabaha* (Cost Plus or Mark Up)

*Murabaha* is one of the trading contracts offered by Islamic banks. It is considered the most commonly employed contract in modern Islamic finance due to its flexibility and simplicity of use in practice (Nethercott, 2012b). *Murabaha* is simple because it has a deferred sale or credit sale with a fixed cost and profit margin settled in advance (see Figure 9).

**Figure 9: Basic Structure of a *Murabaha* Contract**



IFSB (2013a) defines *murabaha* as a contract in which the Islamic institution sells to a client at purchasing cost (purchase price plus any direct costs), as well as a pre-set profit margin or mark up, a specified type of asset that is already in the possession of the buyer at the time of creating the contract. In detail, the bank (the seller) buys an asset, good or commodity (subject

matter) upon request of a customer (the buyer). Once the bank takes ownership of the subject matter, they sell it (transfer title) to the customer based on a pre-agreed profit on top of the disclosed cost, as well as agreeing on the deferred-payment scheme (AAOIFI, 2010b).

### **3.4.2.2 *Tawarruq (Monetisation)***

Monetisation or *tawarruq* is simply an additional phase of *murabaha*. This form of the *murabaha* contract aims to liquidate the subject matter, which in the case of organised *tawarruq* involves liquidating a commodity such as aluminium. Organised *tawarruq* refers to a situation in which the Islamic financial institution acts as the seller and also as an agent acting on behalf of the buyer to buy and sell the subject matter and provide the buyer (*mustawriq*) with the cash proceedings (Al-Shubaily, 2006; Al-Suwailem, 2009). AAOIFI (2010) defines monetisation as:

...referring to the process of purchasing a commodity for a deferred price determined through *musawama* (bargaining) or *murabaha* (mark-up sale) and selling it to a third party for a spot price so as to obtain cash. (p. 525)

This form of contract minimises the ownership risk faced by the financial institution in normal *murabaha* and is sometimes argued to reduce this ownership risk to zero (Nethercott, 2012b). The *tawarruq* transaction is executed in a relatively shorter amount of time, which mitigates the ownership risk. In addition, the nature of the subject matter is not complex, which significantly reduces the possibility of dispute between the parties, as the main concern of the transaction is the cash proceedings not the actual subject matter (Al-Suwailem, 2009; Harvard-SE Workshop, 2007).

*Tawarruq* has many applications in practice such as reverse *tawarruq* in which the financial institution is the buyer instead of the seller. This type of contract is sometimes

compared with conventional fixed-term deposits or certificate of deposits (CDs) of conventional banks (Al-Suwailem, 2009).

In addition, *tawarruq* can be used as a liquidity-management tool in interbank funding, such as in the case of the central bank of the United Arab Emirates. However, in practice, *tawarruq* has been limited to situations in which a bank faces a serious liquidity shortage (Nethercott, 2012b)

In practice, there have been many attempts to innovate risk-management tools, such as Islamic swaps. However, these remain greatly underdeveloped and under investigation. Islamic institutions mitigate the credit risk associated with such contracts by taking collateral such as property as performance security (Ahmed & Khan, 2007) or third-party guarantees (IFSB, 2013a). In addition, in some cases, future cash flows are taken as performance security. For example, in Saudi Arabia, banks require individuals to transfer their monthly wages directly from the employer, which allows banks to deduct their periodic repayments from the borrower's wage.

This method is principally used with individual borrowers who work in the public sector or in high-profile companies that are known to have a very low employment turnover. By doing so, banks, Islamic as well as conventional, reduce the risk of this model of finance to a minimum. However, it remains unclear how such contracts perform during economic downturns when many people lose their jobs and property becomes difficult to liquidate due to liquidity shortage and a decline in property prices.

### 3.4.2.3 *Ijara (Usufruct Lease Contract)*

*Ijara* is one of the contracts of usufruct (*manfa'a*) that Islamic banks offer to their customers. *Ijara* refers to giving something on rent (Usmani, 2002; Nethercott, 2012a), which is similar to a conventional lease where an Islamic bank (the lessor) leases the asset to a client (the lessee) for pre-scheduled periodic lease payments for a specified period (Zaher & Hassan, 2001). There are several forms of *ijara* contracts, including the following:

- *Ijara* refers to a contract in which a bank (the lessor) leases an asset such as a building, equipment or any facility to a customer (the lessee) for pre-agreed rental payments, and for a specified period; the title of the subject matter remains in the hands of the bank (lessor) (Al-Suwailem, 2010; Nethercott, 2012a; Shanmugam & Zahari, 2009; Usmani, 2002).
- *Al-ijara thumma al-bai* (leasing and subsequent purchase) occurs in addition to the *ijara* contract described above. On the expiry of the *ijara* contract, the lessee enters into the purchase contract to acquire the subject matter, not only its usufruct, from the lessor at a pre-agreed price. This form is similar to a hire-purchase contract offered by conventional banks (Shanmugam & Zahari, 2009).
- *Ijara muntahia bittamlik* (lease ending in ownership) involves an *ijara* (leasing) contract that includes a promise by the lessor to sell the subject matter to the lessee, either upon the expiry date of the lease contract or by giving the lessee the right to buy the subject matter during the *ijara* contract (Al-Shubaily, 2006; Al-Suwailem, 2010; Nethercott, 2012a; Shanmugam & Zahari, 2009).

AAOIFI (2010), the Harvard-SE Workshop (2009), Nethercott (2012a) and Usmani (2002) describe the basic rules of *ijara* that must be satisfied for any *ijara* contract to be valid:

1. *Ijara* is a contract where the lessor of the subject matter gives the right of its usufruct to another party (lessee) for a pre-agreed time and rental price.
2. The subject matter of the lease must have valuable use. Therefore, anything with no usufruct cannot be leased.
3. The title of the subject matter must remain with the lessor, and only its usufruct (*manfa'a*) is transferred to the lessee. Therefore, anything that can be consumed such as food or fuel cannot be leased under *ijara*.
4. All liabilities arising from ownership must be borne by the lessor (e.g. maintenance and insurance [*takaful*]), but the liabilities arising from the use of the asset are payable by the lessee.

It is clear that Islamic finance faces risks such as ownership risk in *murabaha* and *ijara* contracts.

Similar to *musharaka* contracts, the Islamic institution remains the titleholder of the underlying assets of *ijara*. Therefore, *ijara* is permissible, and there are no restrictions on shifting the risk of such contracts to a third party by means of a direct sale or securitisation (*sukuk*) (Ahmed, 2009; Khan & Ahmed, 2001), which transfers all risks attached to *ijara* including default, ownership and market risk.

However, as *ijara* principally focuses on property funding, when a property market crashes, as happened during the subprime crisis of 2008, Islamic financial institutions face a significant level of default because of job losses and because lessees believe they are paying too much for the lease as the market value of the property falls sharply. As a result of such a crash, financial institutions, including Islamic and conventional banks, would find it extremely difficult to liquidate *ijara* property assets in a timely manner and at a value that covers the

initial investment. This was the case in Dubai and Qatar during the GFC and the subsequent downturn in the two countries' economies.

### **3.4.3 Sukuk (Islamic Bonds)**

*Sukuk* is defined by AAOIFI (2010b) as “certificates of equal value representing undivided shares in the ownership of tangible assets, usufructs and services or (in the ownership of) the assets of particular projects or special investment activity” (p. 307). *Sukuk* plays a significant role in the development of Islamic finance and is sometimes described as the “Hollywood star of Islamic finance” (Wouters, 2010). There are several differences between conventional bonds and Islamic *sukuk*; however, the principal difference is that where conventional bonds are considered as a debt instrument, Islamic *sukuk* present an equity claim (Wouters, 2010). AAOIFI has recognised 14 different *sukuk* structures. However, Sheikh Taqi Usmani, the chairman of the AAOIFI Shariah Board, has criticised most of the *sukuk*, especially those using *musharaka* or *mudaraba* modes, stating that these simply imitate conventional bonds and consequently do not serve the objectives of Sharia (Usmani, 2007).

## **3.5 Summary**

In this chapter, I have given a brief overview of the theory of Islamic banking and the latest developments leading to the evolution of modern Islamic banking. I have followed this by an overview of the main instruments used in modern Islamic banking today. The discussion reveals that there is a gap between the theory of Islamic finance and the current practice of the modern Islamic banking sector resulting from moral hazard concerns, a lack of managerial expertise to oversee the PLS projects, and competition with well-positioned conventional banks.

I have also summarised the substantial developments that the Islamic financial sector has experienced in the new century, leading it to grow rapidly, and briefly touched on the issues

of political risk, economic conditions, and corporate governance failure in the developed market, fuelled by the record increase in oil prices.

Finally, I have reviewed the main instruments used in modern Islamic banking including profit-and-loss sharing (PLS) contracts as well as trading contracts, as well as the structures and risks associated with these contracts and how Islamic banks mitigate these risks in practice. This review will help the reader to understand how such instruments perform during financial shocks.

# **Chapter 4: Islamic Banking and the Global Financial Crisis: Direct Exposure versus Indirect Exposure <sup>4</sup>**

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<sup>4</sup> Some parts of this chapter have been submitted to the journal *Asian-Pacific Economic Literature*.

## **4.1 Introduction**

After discussing the Global Financial Crisis (GFC) and its main causes and implications in Chapter 2, and giving a background of Islamic banking in theory and practice, including the main developments and instruments in use in the sector, in Chapter 3, I now discuss some properties of Islamic banking that might explain why the sector was not so directly exposed to the GFC as Western banks were. These properties are suggested by leading scholars of Islamic banking as the reason why Islamic banks survived the first round of the GFC, an argument which I discuss in detail in section 4.2.

However, Islamic banking does not operate in a vacuum – the sector is part of the global financial system and therefore not insulated from it. Although Islamic banks follow the principles of Islamic finance, which are enforced by multi-dimensional supervisory devices, and hence were not directly exposed to the toxic assets that precipitated the GFC, the sector was nevertheless also affected by the crisis. Therefore, when the global economy goes into recession, the entire financial system and real economy sectors, including Islamic banks, will likely be affected. The indirect exposure of Islamic banking to the GFC is discussed in section 4.3, and this is followed by section 4.4, which contains the summary and conclusion of the chapter.

## **4.2 Islamic Banks and the Lack of Being Directly Exposed to the GFC**

After critically reviewing the related literature on the GFC and the theory and practice of Islamic banking, one is able to move smoothly on to discuss the direct and indirect impact of the GFC on Islamic banking.

The performance of Islamic banking during the global financial crisis has been discussed by many banking experts, such as Ahmed (2009), Chapra (2009), Kayed and Hassan (2011), Khan (2009), Siddiqi (2009) and Wilson (2009). There is general agreement that

Islamic finance principles prevented Islamic financial institutions from being directly exposed to the crisis because most (if not all) of the practices and financial instruments, such as mortgaged-backed securities (MBS), collateralised debt obligations (CDO) and credit default swaps (CDS), that expose financial institutions to counter-party risk and are believed to be responsible for the crisis, are not permitted under Islamic banking principles.

In his article in the *Financial Times*, Andrew Wood (2009) stated that, “The Islamic finance industry has been relatively immune to the effects of US subprime problems.” Similarly, Warde (2012) believes that Islamic banks survived the first phases of the crisis because most of the cases and the practices that led to the crisis would not pass the Sharia boards of Islamic institutions. Conversely, conventional banks were the first to absorb the full effects of the crisis.

This has given advocates of Islamic finance the confidence to propose that Islamic banking is a viable alternative to conventional banking; for example, Chapra (2009) argues that adopting Islamic banking principles would minimise the severity and frequency of financial crises, due to the principles’ avoidance of the major pitfalls of the traditional banking system. The basis of the arguments of these scholars is discussed below.

#### **4.2.1 Prohibition of *Riba* (Usury Law)**

Islam prohibits the receipt or payment of any pre-set fixed rate of return on money that is borrowed or lent. El-Gamal (2000), Khan (2009) and Parashar and Venkatesh (2010) explain that this prohibition is because *riba* (interest) drives poor people deeper into poverty while creating more wealth for lenders who do not carry the risk associated with doing business or any activity. Islam considers transactions based on interest to be unjust, unfair and morally unjustifiable (El-Gamal, 2000). It is worth noting that in the past, other religions such as Judaism and Christianity also prohibited the payment of interest (for more than 1,400 years in

the case of Christianity) (Lewis, 2007). Similarly, Hinduism and Buddhism consider the payment of interest to be immoral and unethical (Kayed & Hassan, 2011).

As an alternative to interest, Islam allows trade: “God has permitted trade and has forbidden interest” (Qur’an, 2:275). Trade contracts can take the form of investment contracts such as *musharaka* and *mudaraba*, or debt-based contracts such as *murabaha* and *tawarruq*. These contracts are discussed in detail later on in this chapter as well as in Chapter 3.

The first group of contracts, namely investment instruments, allows the bank and the entrepreneur to bear the risk and share the profits (and losses) equally, a practice termed “profit-and-loss sharing” (PLS). Thus, trade is a partnership rather than the lender-borrower relationship found in the traditional banking sector (Chapra, 2009). Mirakhor and Zaidi (2007) believe that this kind of contract would introduce a higher degree of discipline into the financial system because it would motivate financial institutions to gauge the risks more carefully and effectively monitor the use of funds by the entrepreneur. Incidentally and similarly, Greenspan (2010) argues that:

As partnerships, Lehman Brothers and Bear Stearns almost surely would not have gone away from their historically low leverages. Before incorporation, fearful of the joint and several liabilities to which general partnerships are subject, those entities shied away from virtually any risk they could avoid. (p. 232)

Greenspan adds that implementing an incentive structure of partnerships should be a goal in any future reform and suggests that banks should be required to issue some form of debt instrument that can be converted to equity when equity capital becomes impaired.

The second group of contracts, namely debt-based contracts, are permitted in the Islamic financial sector under the following very strict conditions:

1. Leased or sold assets must be tangible (real); this eliminates some negative aspects such as speculative transactions, which are considered *gharar* (excessive uncertainty) and also *mizr* (gambling) (Chapra, 2009).
2. The bank must own the asset before selling it; this means the financier will bear some risks in order to gain returns.
3. Contracts must be genuine trades with the intention of giving and taking delivery; it is believed this condition will eliminate derivative and speculative trading (Chapra, 2009).
4. Debt cannot be sold; consequently, the financier bears some of the risk associated with the transaction and thus is motivated to perform a careful evaluation of risk and reduce the unnecessary expansion of the value and volume of transactions (Ahmed, 2009; Chapra, 2009).

It can be seen from the nature of Islamic banking contracts that the toxic assets that are considered the main causes of the GFC do not comply with basic Islamic finance principles, as these assets were based on interest and debt-selling activity. Therefore, Islamic institutions would not be allowed to issue or buy such assets.

#### **4.2.2 Ethical Practices**

As already discussed, one of the major causes of the crisis were moral failings and unethical practices which occurred over an extended period. According to Siddiqi (2009), these practices can be found in many forms, including lack of transparency and information asymmetry regarding the potential risk associated with transactions, as well as the opaque and complex “innovative” instruments for transferring the risk of default from the financial institutions to the buyers of those instruments. As previously noted, Siddiqi explains that a moral failure is the product of the mismatch and conflict of interests between all parties in a transaction.

Siddiqi argues that under Islamic banking principles, it is not possible to undertake such practices, for a number of reasons. First, the return and the risk of the business contract must be clearly and explicitly stated and well understood by all parties to the transaction. The bank is obliged to observe high standards of disclosure and transparency in dealing with its potential partners (stakeholders) (Kayed & Hassan, 2011). Second, Islamic banks are only allowed to deal in permissible products and services, which must be *halal* (legitimate) in accordance with Islamic principles. Thus, business activities in industries involving weapons production, alcohol, pork, interest-based financial instruments, indecent entertainment, *maisir* (gambling), *gharar* (excessive uncertainty; see a more detailed definition of this concept later in the next paragraph) and tobacco are excluded (Alqahtani, 2012; Brown, Hassan, & Skully, 2007).

Siddiqi (2009) argues that risk shifting is *maisir* due to its excessive *gharar*, which is prohibited in Islam. *Gharar* is defined as the sale of items whose existence or characteristics are not certain, due to their risky nature, which makes the trade similar to gambling. In modern financial transactions, the two areas where *gharar* is most obvious are insurance and financial derivatives such as CDOs and other derivative securities (El-Gamal, 2000). Because Islamic banks are not allowed to deal in these kinds of financial instruments, they would have been less exposed during the GFC. In traditional banking, a ban on risk shifting would solve the issue of incentive mismatch because all parties in a transaction would gain if the contract successfully reached its end. This would create real wealth, not only for the transaction parties but also for society.

#### **4.2.3 Supervision Mechanism**

The third argument is concerned with the regulation and supervision mechanism of Islamic banking, and how the principles of Islamic finance are followed strictly by banking management at every level. This issue is manifold according to Islamic banking principles, starting with the

persons themselves, within the financial institution, and to some external standard-setting organisations.

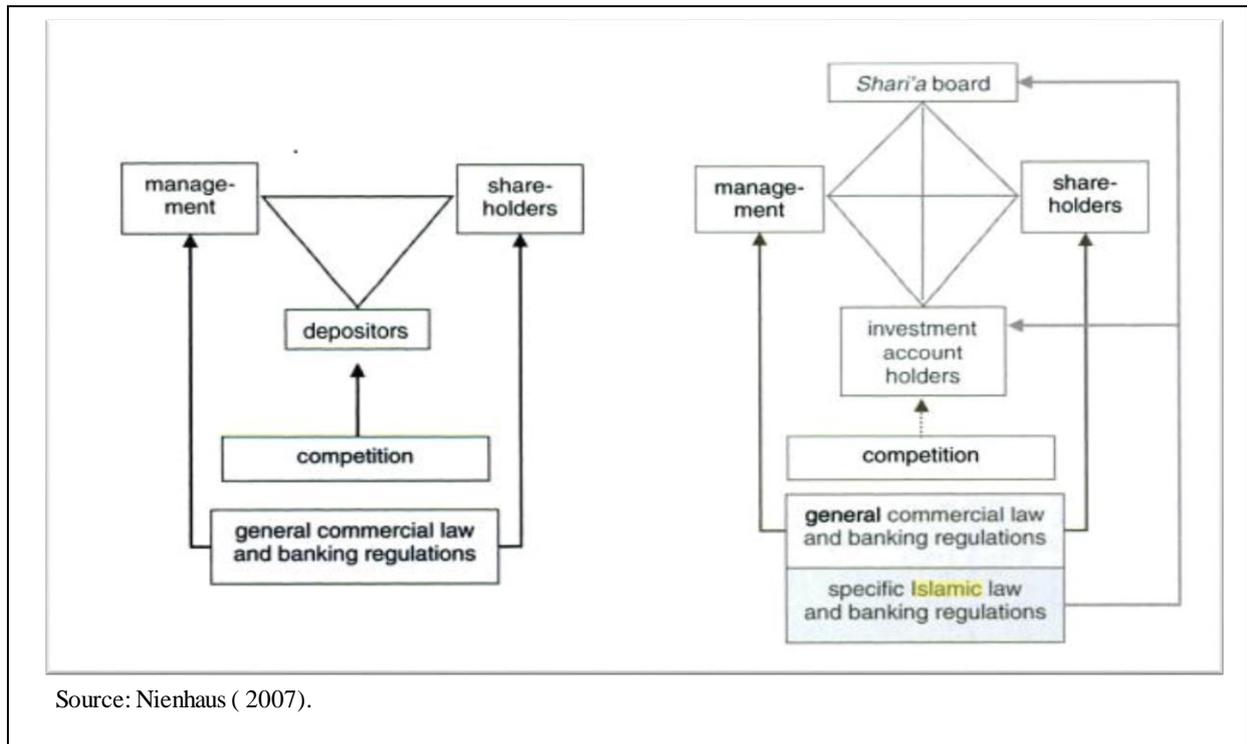
#### ***4.2.3.1 Muslim Self-Discipline***

Muslim self-discipline prohibits Muslims from being involved in any activities that might be fraudulent, exploitative, dishonest, ambiguous or *haram* (non-permissible) (Kayed & Hassan, 2011). It should be emphasised that these activities are also forbidden by other religions and ethical systems such as Christianity and Judaism, which prohibit any actions breaching the principles of fair dealing (Lewis, 2013). However, the prohibition of *riba* (usury), particularly, prevents Muslims from dealing in such activities in any form, whereas they are common practice in traditional banking.

#### ***4.2.3.2 Sharia Supervisory Board (SSB)***

The Sharia Supervisory Board (SSB) is a very important and active supervisory device that sits at the top of an Islamic financial company's governing structure (see Figure 10). Typically, (unlike conventional banks) every Islamic bank has an SSB, consisting of Islamic banking experts, as an internal device of supervision to ensure that all bank practices, business dealings, investments and financial instruments comply with the principles of Islamic banking (Brown et al., 2007). This board, which has at least three members, is appointed by shareholders at the organisation's annual meeting (AAOIFI, 2010a). The role of the SSB is not limited to merely giving advice on what is acceptable or not according to Islamic principles; it also monitors the implementation of their guidelines (Rider, 2012).

**Figure 10: Comparing the Governance Structure of Islamic and Conventional Institutions**



At the end of the financial year, the SSB issues a report to the shareholders. This is considered an essential part of the bank’s annual report and is highly valued by shareholders and depositors because if a bank breaches Islamic principles, it might face Sharia-compliance risk, which can lead to a serious loss of trust and credibility, triggering bank failure and causing systemic risk (Qattan, 2006).

Generally speaking, sound governance is needed for financial institutions because failures put not only shareholders’ equity at risk but also that of other parties such as depositors, insurance companies and the financial sector as a whole. In the Islamic banking context, this issue is more important than in conventional banks because Islamic banks are exposed to higher and multiple types of risk (Nienhaus, 2007; Sundararajan & Errico, 2002). For example, deposit insurance is not allowed under Islamic finance principles, which means depositors’ funds are very vulnerable to the decisions made by management. Also, the holders of investments are exposed to all the risks faced by shareholders but they do not have the right to monitor the

management, which makes this additional dimension of oversight by the SSB necessary to protect the investors' interests (Nienhaus, 2007).

#### ***4.2.3.3 External Supervisory Boards<sup>5</sup>***

As well as the SSB, Islamic banks are also overseen by External Supervisory Boards such as the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI), which is a not-for-profit organisation that issues accounting, auditing, ethics, governance and Sharia standards for Islamic banks. It is worth noting that conventional banks do not have similar external bodies, which arguably gives Islamic banks an advantage over their peer conventional banks. At the time of writing, the AAOIF had issued 88 standards: 48 on Sharia law, 26 on accounting, five on auditing, seven on governance and two on codes of ethics (AAOIFI, 2013). AAOIFI has more than 200 institutional members from more than 40 nations, including central banks, regulatory authorities and conventional banks offering Islamic services. Moreover, as part of regulatory requirements or Islamic institutions' internal guidelines, AAOIFI standards are followed in jurisdictions that offer Islamic banking services, including in the Middle East, South Asia, Asia Pacific, Africa, Central Asia, North America and Europe (AAOIFI, 2013).

Another supervisory organisation is the Islamic Financial Services Board (IFSB), which is one of many professional and standard-setting organisations that work to keep abreast of the evolving needs of the fast-growing Islamic financial sector. The IFSB has issued 21 standards to date, which contain guidelines on transparency and market discipline standards to enhance the soundness and stability of Islamic financial services; for example, the IFSB has issued standards on Capital Adequacy, Liquidity Risk, Stress Testing, Supervisory Review Process and Islamic Insurance (IFSB, 2014). At the end of 2013, IFSB had 185 members operating in 45 nations. This research has used the definitions, standards and guidelines of these two

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<sup>5</sup> Both Islamic and conventional banks are under the supervision of central banks which treat them equally with few differences across countries.

organisations, as they are the largest and most influential bodies in the Islamic financial industry.

Overall, these three mechanisms of supervision ensure that unethical practices that breach the Islamic banking principles are avoided.

### **4.3 Islamic Banks and the Indirect Exposure to the GFC**

The financial crisis that occurred between 2007 and 2009 did not leave the global economy unscathed, sending many economies from one recession into another. Unsettling economic events have continued since that time, beginning with the great economic difficulties that the crisis caused such as job losses, the loss of the public's trust in the financial sector, and governments with huge deficits. The financial crisis began in the private sector but spread to the public sector, triggering another financial crisis on the other side of the Atlantic, with European governments announcing that they would provide Greece with urgent financial aid to save it from bankruptcy. Shortly thereafter, other Eurozone countries required financial assistance packages, making the remaining members of the Eurozone nervous about their vast budget deficits. This situation is sometimes referred to as the second recession after the first recession of 2008 (Iley & Lewis, 2013) or the "double-dip recession" in some European countries. In March 2015, the European Central Bank (ECB) announced it was launching a €1.1 trillion quantitative-easing programme aimed to counter deflation and stimulate economic growth across the Eurozone.

The troubles in the US are not over yet, as in 2010, the US economy was generating new jobs at a slower pace than planned and recovering more slowly than was expected (Hall, 2011). Moreover, in August 2011, the Standard & Poor's rating agency announced a downgrading of US debt from triple A. However, more recently, in October 2015, the US unemployment rate reached 5%, down from 10% in October 2009 (according to the Federal

Reserve Bank of St. Louis). This drop in the unemployment rate is considered to be a sign of economic recovery, making the Federal Reserve willing to raise interest rates for the first time since June 2006. However, the Federal Reserve inflation is still well below the 2% target, Japan remains depressed, despite the efforts of the Abe administration, and a wide range of emerging economies are again slowing down (Iley & Lewis, 2013).

There is a set of questions about Islamic banking that needs to be addressed: Does the Islamic banking sector absorb financial shocks differently? What makes the Islamic banking sector different? And how long does it take for the Islamic banking sector to recover from financial shocks? Answering these questions is not an easy task. In the next section of this chapter, I try to explain how Islamic banks perform under financial distress by analysing them at the microeconomic level: section 4.3.1 discusses sector structure and operations, and section 4.3.2 analyses the nature of the underlying contracts offered by Islamic banks. The chapter concludes with section 4.4, the summary of the chapter.

### **4.3.1 Operational Level**

#### ***4.3.1.1 Rate of Return***

Table 2 shows that during the period between 1998 and 2012, the total assets of the Islamic banking industry in this sample of the GCC region grew 20-fold (2002%) compared with an asset growth of 468% for the conventional banking sector. This extraordinary growth in assets has meant that the market share of Islamic banks has gone from being just marginal to nearly one-third the size of the conventional sector and one-quarter of the total banking industry. In Malaysia, Islamic banks now account for 21.6% of the total market share of banking (Lewis, 2013), and in Pakistan, the market share of Islamic banks is approximately 10%, with the Pakistani government introducing a plan to increase the sector's share to 15% by 2018 (Vizcaino, 2014).

**Table 2: Growth in Total Assets of the Banking Sector in the GCC Region Between 1998 and 2012 (\$US 000)**

<b>Year</b>	<b>Conventional</b>	<b>Islamic</b>	<b>Total</b>	<b>Islamic to Conventional</b>	<b>Islamic to Total</b>
1998	\$ 197,044.24	\$ 15,859.39	\$ 212,903.63	8%	7%
1999	\$ 217,953.20	\$ 21,597.32	\$ 239,550.52	10%	9%
2000	\$ 233,988.94	\$ 24,897.13	\$ 258,886.07	11%	10%
2001	\$ 241,969.86	\$ 28,028.16	\$ 269,998.01	12%	10%
2002	\$ 263,999.62	\$ 33,563.53	\$ 297,563.15	13%	11%
2003	\$ 288,380.92	\$ 44,309.90	\$ 332,690.82	15%	13%
2004	\$ 314,910.60	\$ 75,617.53	\$ 390,528.13	24%	19%
2005	\$ 392,710.82	\$ 106,992.12	\$ 499,702.94	27%	21%
2006	\$ 523,896.24	\$ 140,135.09	\$ 664,031.33	27%	21%
2007	\$ 753,565.68	\$ 193,517.16	\$ 947,082.84	26%	20%
2008	\$ 875,734.75	\$ 249,755.41	\$ 1,125,490.16	29%	22%
2009	\$ 888,836.25	\$ 265,076.67	\$ 1,153,912.92	30%	23%
2010	\$ 936,091.11	\$ 291,503.13	\$ 1,227,594.23	31%	24%
2011	\$ 1,013,447.36	\$ 321,477.55	\$ 1,334,924.91	32%	24%
2012	\$ 1,118,443.33	\$ 333,402.43	\$ 1,451,845.76	30%	23%
<b>% Growth 1998–2012</b>	<b>468%</b>	<b>2002%</b>	<b>582%</b>	<b>270%</b>	<b>344%</b>

**Table 3: The Ratio of Total Assets of Islamic to Conventional Banks Between 1998 and 2012 (By Country) (%)**

<b>Year</b>	<b>Saudi Arabia</b>	<b>Qatar</b>	<b>Kuwait</b>	<b>UAE</b>	<b>Bahrain</b>	<b>Oman</b>	<b>Average</b>
1998	1.47	17.69	44.36	8.60	0.31	0.00	12.07
1999	6.13	16.77	46.08	10.82	0.35	0.00	13.36
2000	6.08	16.28	50.64	12.85	0.53	0.00	14.40
2001	5.84	16.45	50.75	16.91	0.97	0.00	15.15
2002	6.28	16.30	49.87	21.13	1.33	0.00	15.82
2003	7.10	16.82	51.52	22.17	9.06	0.00	17.78
2004	21.08	18.27	61.35	23.73	15.70	0.00	23.36
2005	24.08	16.16	75.56	26.38	17.67	0.00	26.64
2006	23.96	16.64	63.82	25.51	18.04	0.00	24.66
2007	23.25	19.19	54.08	22.46	20.51	0.00	23.25
2008	25.24	20.73	57.69	25.61	30.11	0.00	26.56
2009	26.34	24.04	59.84	25.35	38.69	0.00	29.04
2010	28.51	28.46	64.44	25.15	37.92	0.00	30.75
2011	32.51	31.31	63.68	22.07	40.37	0.00	31.66
2012	30.62	33.90	60.40	19.05	35.99	0.82	30.13
<b>% Growth 1998–2012</b>	<b>1988.75</b>	<b>91.64</b>	<b>36.18</b>	<b>121.65</b>	<b>11551.41</b>	<b>0.00</b>	<b>2068.21</b>

Previous figures (also see Table 3) indicate that Islamic banks still constitute a relatively small segment of the banking sectors in which they operate, which might place pressure on them to generate returns that conform to conventional banks (Lewis, 2013).

This fact explains their reliance on some widely used conventional benchmarks such as the London Interbank Offered Rate (LIBOR) when they price some of their products, including, but not limited to, *murabaha* and *tawarruq* (Ayub, 2009; Khan & Ahmed, 2001; Khan & Bhatti, 2008). Moreover, the profit margin, which is based on LIBOR, is fixed throughout the duration of the contract (Zainol & Kassim 2012), leading Islamic banks to be exposed to the rate-of-return risk (Ariss & Sarieddine, 2007; Zainol & Kassim, 2012), which does not consider their assets' risk profiles (Thomson Reuters, 2011) or risks related to Sharia compliance (Nethercott, 2012b; Usmani, 2002). In an attempt to establish its own benchmark that best suits the needs of the sector, a new benchmark has been introduced and sponsored by Thomson Reuters, namely the Islamic Interbank Benchmark Rate (IIBR), using contributions from a panel of 18 leading Islamic banks; this new benchmark indicates the average expected cost of funding for the Islamic finance industry.

#### ***4.3.1.2 Risk-Mitigation Tools***

Securitisation, which is used to mitigate a variety of risks such as rate-of-return risk and provides liquidity to a financial institution (Zainol & Kassim, 2012), is not an accessible option for Islamic institutions. In principle, securitisation involves grouping together the banks' instruments that have similar characteristics to create credit-enhanced claims against the future cash flows generated from this portfolio and selling them to a third party such as other financial institutions or investors (Greenbaum & Thakor, 2007). There are different classes of securitisation depending on the risk profile and credit rating of the assets being sold; for example, a hedge fund may buy the most risky securities aiming to make a high return, whereas a pension fund may purchase relatively safer securities (Jones, 2009).

In the context of Islamic banking, it is permissible for Islamic institutions to securitise some types of their assets where the financial institution has the title of the underlying assets, such as in *ijara* and *musharaka* contracts. In contrast, Islamic banking considers debt-based contracts, such as *murabaha* and *tawarruq* contracts, debt selling, which is forbidden under Islamic financial principles (Zainol & Kassim, 2012).

In practice, in most of the markets in which Islamic banks operate, there are no functioning, well-developed and regulated money markets, which makes this option impossible for both Islamic and conventional banks (Jobst, 2007). Moreover, there has been a lack of consensus among Islamic-finance scholars about the degree to which tranching and swaps are permissible (Hanif & Johansen, 2012). However, conventional banks still have the advantage, as there are some other options, including the private sale of their loans or buying insurance covers such as credit default swaps (CDSs), to avoid the risk exposure of these assets; such options are not available to Islamic banks. Another issue that complicates the operations of Islamic banks is the restrictions on many common tools to manage liquidity risk, such as interbank market and government securities, due to the fact these tools all are based on interest.<sup>6</sup>

The same is true for other risk-management tools such as options, futures and forward contracts. Such restrictions increase the risk involved in Islamic banks' operations (Sundararajan & Errico, 2002). In an attempt to manage the risk, Islamic banks have no choice but to maintain a relatively large portion of their assets in reserve accounts with the reserve bank, which may negatively affect their profitability as a result of the banks not being able to make full use of the assets they hold (Zainol & Kassim, 2012).

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<sup>6</sup> Malaysia could be one of the few exceptions as it has developed its own Islamic interbank market (see Ismath Bacha, 2008). The central bank of the United Arab Emirates uses *tawarruq* as a liquidity-management tool in the interbank market (Nethercott, 2012b).

#### **4.3.1.3 Innovative Products**

Islamic banks have enjoyed a steady financial growth in the size and range of their new and innovative products, along with financial stability for prolonged periods, which has given Islamic banking its modern shape.<sup>7</sup> The GFC has demonstrated that extended periods of financial stability can lead financial institutions to underestimate risks significantly, causing innovative products to create unexpected problems (Mayes, 2009a). For example, when East Cameron Partners Gas (ECT) went bankrupt, it was unclear how its *sukuk* and the *sukuk* holders would be dealt with (Hanif & Johansen, 2012). Prolonged financial stability could explain the slow development of risk-management tools in Islamic banks compared with the rapid growth in their size and products.

#### **4.3.1.4 Size Effect**

Although there has been a dramatic increase in the assets of Islamic finance over the past decade, the average size of Islamic banks remains a great deal smaller than their counterparts' in conventional banks. This is demonstrated in Figure 11 and Table 4, which suggest that the increase in assets led to the formation of new Islamic banks, rather than increasing the size of existing banks.

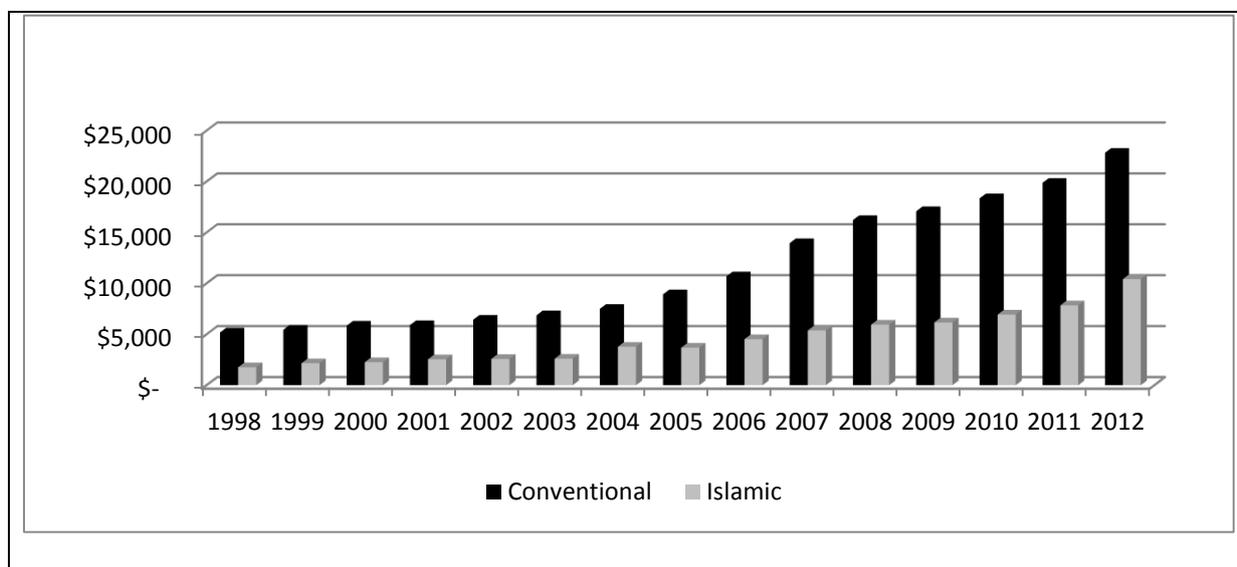
It is widely reported that the size of any enterprise is important, which leads to the consideration of the classic and long-existing concept of “economies of scale”. Economy of scale refers to the “theory of the relationship between the scale of use of a properly chosen productive service and the rate of output of the enterprise” (Stigler, 1958, p. 54). Here attention is paid to the context of the banking sector and the effect of the classical economies of scale, which has been well documented in banking literature (Berger, 2003; Bernanke, 2006; Feng &

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<sup>7</sup> See Chapter 3 for more details about the major developments that have taken place in the new century.

Serletis, 2010; Hughes, Mester & Moon, 2001; McAllister & McManus, 1993; Petersen & Rajan, 2002; Wheelock & Wilson, 2012).

**Figure 11: Average Total Assets of Conventional and Islamic Banks in the GCC Region from 1998 to 2012**



Another concept, which is relatively more recent, is that of “too big to fail”, which attracts special attention in the literature about the GFC (Baker & McArthur, 2009; Bertay, Demirgüç-Kunt, & Huizinga, 2013; Chapra, 2009; Freixas & Rochet, 1997; Greenspan, 2010; Kaye & Hassan, 2011). Several benefits arise from the scale of operations of financial institutions, as discussed below.

Economies of Scale

Diversification of bank portfolios is a crucial tool to mitigate unsystematic risk. If investors form a coalition, they will be able to hold a more diversified portfolio than an individual investor would have on their own, which implies the portfolio of the coalition is relatively less risky (Freixas & Rochet, 1997; Greenbaum & Thakor, 2007). According to Diamond and Dybvig (1983), one benefit of large scale is related to the nature of investments and liquidity needs. Diamond and Dybvig suggest that a large number of investors would be able to invest in illiquid securities that are more profitable without facing a serious liquidity risk, as banks

would have enough liquidity to meet the liquidity needs of their investors. Another benefit of economies of scale is based on transaction costs, which suggests that if a fixed cost is attached to financial transactions, lenders or borrowers tend to collate together to share the transaction costs (Freixas & Rochet, 1997).

Another argument is based on informational reusability, which Greenbaum and Thakor, (2007) describe as: “[W]hen information is cross-sectionally reusable, the larger the number of information producers in the intermediary, the greater the benefit of information reusability” (p. 108). Greenbaum and Thakor (2007) interpret this argument as demonstrating that information can be used frequently by a large number of brokers within the financial institution while the cost of producing this information occurs only once.

Another point that is related to information is that larger banks can afford to acquire information-processing equipment and software, which smaller banks find too expensive to purchase (Wheelock & Wilson, 2012). In addition, smaller banks are found to acquire such equipment and software after larger banks, which creates another disadvantage for them (Berger, 2003).

Based on these theoretical and empirical benefits, and given the fact that Islamic banks are smaller than conventional banks, it can be assumed that Islamic banks operate in an environment of cost disadvantage and relatively higher risk, as well as being limited to fewer types of contracts, which would have several negative implications during periods of financial crisis and economic downturn.

### Too Big to Fail

Recent cases of rescue packages given by central banks to large troubled financial institutions during financial unease have introduced a benefit of bank size, namely “too big to fail” (TBTF), which has virtually become official government policy (Baker & McArthur, 2009). This term

was known after the failure of Continental Illinois National Bank, which was the seventh largest bank in the US until it collapsed in May 1984 (Haltom, 2013). The “too big to fail” concept means that the economic and political consequences of the failure of a large financial institution would be devastating. For example, in 2008, failures of large financial institutions in Iceland triggered nationwide bankruptcy (Bertay et al., 2013). Given the consequences of the failure of large financial institutions, governments often have no choice but to bail them out.

Government intervention encourages a moral hazard because large financial institutions may take excessive risks because they know that the government will help them in times of need (Bertay et al., 2013; Freixas & Rochet, 1997; Mayes, 2009a). However, to some extent, when Lehman Brothers went bankrupt, the notion that large banks were too big to fail no longer held true, triggering the threat of a domino effect through the global financial system (Elliott, 2011). As a result of the concept of “too big to fail”, there has been a great deal of debate on whether large financial institutions are necessary. For example, in the United Kingdom, the Bank of England has been evaluating the possibility of splitting up large banks to mitigate risks to the British treasury.

Similarly, since 2010 in the US, bank mergers that result in a bank with total liabilities exceeding 10% of its consolidated liabilities have been prohibited (Bertay et al., 2013). Others suggest that this concept is outdated, and the banking system should have a means to continue functioning while permitting troubled banks to fail (Mayes, 2009a). Another benefit of being an institution that is too big to fail is that the cost of funds is relatively cheaper for large banks than for smaller banks due to government aid (Baker & McArthur, 2009; Bertay et al., 2013). For example, in the US, the average cost of funds between large and small banks widened from 29 to 78 basis points after the announcement of the Troubled Asset Relief Program (TARP) (Baker & McArthur, 2009).

Based on the average size of Islamic banks compared with conventional banks (see Figure 11, and Table 4), Islamic banks would be less likely to be saved by their governments. This is because central banks have limited funds available for bailout programmes, which means central banks tend to help the largest and the most influential players in the economy. Islamic banks are most likely not to be among the major players; therefore, they are less likely to benefit from such privileges, which in turn makes them more vulnerable to financial distress. It is worth noting that no Islamic institution in any country has had to be bailed out with taxpayers' money (Lewis, 2013). El Moussawi and Obeid (2011) suggest that small Islamic banks should merge to benefit from economies of scale, which would reduce their costs and in turn enhance their competitive strengths. In 2012, three Islamic Bahraini-based financial institutions – Capinvest, Elaf Bank and Capital Management House – agreed to merge to create a larger and more competitive entity (Bloomberg, 2012). Similarly, in February 2014, BMI Bank and Al Salam Bank completed their merger agreement (Gulf Business, 2014).

**Table 4: Average Total Assets of Conventional and Islamic Banks in the GCC Region from 1998 to 2012 (\$US 000)**

<b>Year</b>	<b>Conventional</b>	<b>Islamic</b>	<b>Average Size</b>	<b>Islamic to Conventional</b>
1998	\$ 5,185,374.75	\$ 1,762,154.83	\$ 4,529,864.55	34%
1999	\$ 5,448,830.01	\$ 2,159,731.96	\$ 4,791,010.40	40%
2000	\$ 5,849,723.58	\$ 2,263,375.50	\$ 5,076,197.52	39%
2001	\$ 5,901,703.84	\$ 2,548,014.29	\$ 5,192,269.51	43%
2002	\$ 6,439,015.17	\$ 2,581,809.78	\$ 5,510,428.69	40%
2003	\$ 6,866,212.32	\$ 2,606,464.86	\$ 5,638,827.46	38%
2004	\$ 7,497,871.42	\$ 3,780,876.29	\$ 6,298,840.73	50%
2005	\$ 8,925,245.81	\$ 3,689,383.61	\$ 6,845,245.76	41%
2006	\$ 10,691,760.00	\$ 4,520,486.91	\$ 8,300,391.68	42%
2007	\$ 13,954,919.96	\$ 5,375,476.74	\$ 10,523,142.67	39%
2008	\$ 16,217,310.17	\$ 5,946,557.42	\$ 11,723,855.84	37%
2009	\$ 17,093,004.81	\$ 6,164,573.72	\$ 12,146,451.79	36%
2010	\$ 18,354,727.60	\$ 6,940,550.65	\$ 13,199,938.01	38%
2011	\$ 19,871,516.87	\$ 7,840,915.82	\$ 14,510,053.36	39%
2012	\$ 22,825,374.14	\$ 10,418,825.90	\$ 17,924,021.75	46%
<b>Average</b>	<b>\$ 12,007,228.07</b>	<b>\$ 5,544,528.49</b>	<b>\$ 9,680,656.22</b>	<b>46%</b>
<b>Growth in Bank Size</b>	<b>340%</b>	<b>491%</b>	<b>296%</b>	

It can be concluded from the discussion on the sector growth that the Islamic banking sector might suffer from size disadvantages, which might have negatively affected the Islamic banks during the economic collapse following the GFC. In addition, extended financial stability might have given Islamic institutions a false sense of security or overconfidence, leading them to underestimate risks associated with their expansion in size and products.

#### **4.3.2 Contract Level <sup>8</sup>**

The theory of Islamic finance evolved based on the principles of sharing profit and loss. However, modern Islamic banks have deviated from these principles and now rely on debt-based contracts (Khan, 1996). Despite the fact that Islamic banking has existed for at least the past 40 years, the different types of risks attached to its contracts have not been fully comprehended and consequently it is not clear how Islamic banks manage these risks (Ahmed, 2009).

Each contract has its own nature and risk (see Table 5), ranging from full exposure to any type of risk faced by ordinary ownership, and this is the case with the profit-and-loss sharing contracts of *musharaka*. Other instruments do not use this concept, instead using trading or debt-based contracts rather than investment, which means the financial institution does not share the profit or loss with the buyer of the contract; this is the case with *murabaha* and *tawarruq* contracts.

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<sup>8</sup> The main contracts of Islamic banking have been described in more detail in Chapter 3.

**Table 5: The Underlying Instruments of Islamic Banking and the Risk Associated with Them<sup>9</sup>**

	<i>musharaka</i>	<i>musharaka mutanaqisa</i>	<i>mudarba</i>	<i>murabha</i>	<i>tawarureq</i>	<i>iara</i>	<i>ijara muntahia bittamlik</i>
Type	Equity-based	Equity-based	Equity-based	debt-based	debt-based	usufruct	usufruct
Saleable	YES	YES	YES	NO	NO	YES	YES
Ownership Risk	NO	NO	NO	YES	NO / YES <sup>10</sup>	NO	NO
Market Risk	YES	YES	YES	NO	NO	YES	YES
Moral Hazard	YES	YES	YES	NO	NO	NO	NO
Rate-of-Return Risk	NO	NO	NO	YES	YES	YES	YES
Credit Risk	NO	YES	NO	YES	YES	YES	YES
Liquidity Risk	NO	NO	NO	YES	YES	NO	NO
Sharia Risk	NO	NO	YES	YES	NO	NO	NO

<sup>9</sup> This table aims to simplify the issue of risks in the assets side of Islamic banks. However, in practice, the instruments of Islamic banking are more complex and consequently the risks are not easy to understand (Ahmed 2009). Furthermore, the law and practice vary from one country to another, which also alters the banks' risk exposure.

<sup>10</sup> The ownership risk is less in organised *tawarruq* as the transaction is executed in a relatively shorter period of time, which is not the case for unorganised *tawarruq*, and the nature of the commodity makes the likelihood of dispute highly unlikely.

In practice, Islamic banks tend to rely heavily on debt-based contracts, which dominate the assets of Islamic banks, rather than profit-and-loss sharing or investment contracts (Aggarwal & Yousef, 2000; Nethercott, 2012b). Most Islamic banks are based in countries with developing economies, which suffer from a great degree of information imperfection. This leads to agency problems, as entrepreneurs may use the funds provided by banks for their own benefit, which makes banks biased towards debt-based contracts (Aggarwal & Yousef, 2000; Mirakhor & Zaidi, 2007; Sundararajan & Errico, 2002). Khan and Mirakhor (1987), Kuran (1993) and Nethercott (2012b) argue that adverse selection can lead banks to focus on debt-based contracts, especially with less knowledgeable borrowers.

Another reason for Islamic banks' focus on debt-based contracts is that profit-and-loss sharing contracts require the financial institution to invest more in managerial expertise to monitor funded projects, which increases their expenses and consequently the cost of funds (Mirakhor & Zaidi, 2007). Therefore, critical discussion is needed on the underlying modern banking contracts that Islamic banks have to offer to meet the needs of their customers and partners and to generate economic growth, without breaching the principles of Islam. By understanding the nature of these principles, one can come to understand how Islamic banks would perform in a situation of economic turmoil.

#### **4.3.2.1 *Musharaka***

The *musharaka* contract in Islamic banking is purely a form of joint-venture contract or pure equity, and is the clearest form of a partnership contract or profit-and-loss sharing contract. During a period of economic downturn in which the losses are not solely caused by the entrepreneur's management, all the parties to the transaction, including the depositors, the bank and the entrepreneur, would share the losses according to their stake in the project (IFSB, 2013a). This form of contract mitigates the distress faced by the bank and the losses to its shareholders, unlike with debt in conventional banking contracts where the bank or a third party

to which the contract has been shifted bears the entire loss. This type of contract can behave as a buffer to absorb shocks with depositors (partners) during crises, which has some similarity with contingent contracts in conventional banking.

In addition to the sharing of profit and loss, *musharaka* as a genuine joint venture gives the Islamic banks the choice to sell their stake in a project at any time, which is not permissible in other debt-based contracts in Islamic banking (e.g. *murabaha*) (Abdul-Rahman, 1999). The exit choice can be conducted in several manners such as direct sale, issuing *sukuk*, or through ordinary shares.

#### **4.3.2.2 Mudaraba**

*Mudaraba* is one of the investment modes that Islamic banks offer to their customers. In poor economic conditions, the financial institution or the entrepreneur who runs a project, in the case of a two-tier *mudaraba* in which the financial institution enters into another *mudaraba* contract with an entrepreneur, the *mudarib* may lose part of or the entire *mudaraba* fund. In this event, the fund's owners lose their capital. Although the financial institution is not exposed to any direct financial losses, it is exposed to other forms of losses such as time, effort and probably the loss of reputation as a money manager (Abdul-Rahman, 2009, Johansen & Hanif, 2012; Kahf & Khan, 1992).

In addition to these losses, there is another cost that the Islamic bank bears, which is the opportunity cost of forgoing a possible profit if it had devoted its resources, personnel and time to other investments. Broadly, the manager (*mudarib*) would bear some or all of the financial losses if there were strong evidence that they mismanaged or breached the *mudaraba* agreement (Johansen & Hanif, 2012).

#### **4.3.2.3 Murabaha**

Under a *murabaha* contract, the Islamic financial institution is exposed to at least two types of risk: credit and ownership risk. Credit risk occurs because a *murabaha* contract involves deferred payment, which means this risk is similar to that faced by conventional banks.

Ownership risk occurs because the Islamic bank must first own the subject matter before selling it to the customer based on deferred payments, and this sale is based on a promise from the customer to buy the subject matter once it is in the possession of the bank. Until the ownership is transferred to the final buyer, the bank is liable for any damage or loss of the subject matter, which creates a unique risk for Islamic banks. Thus, ownership risk is an additional type of risk for Islamic banks, and one that conventional banks do not face (Harvard-SE Workshop, 2009).

As mentioned earlier, the transaction is based on a promise from the customer, and the extent to which this promise is enforceable is debatable. In short, such promises range from those that are a mere promise that is not enforceable (non-binding), to a promise in which the customer may be penalised for any losses as result of breaching their promise (binding). However, it is permissible for the financial institution to take a security deposit (*hamish jiddiyah*), although it is not permissible to take a down payment (IFSB, 2013b). The bank can use this security deposit to cover any actual losses if the customer does not complete the transaction (which is specifically the difference between the cost of the subject matter and the selling price to a third party) and the bank is allowed to charge the customer for the loss of profit margin or opportunity (AAOIFI, 2010).

Another manner in which to manage such risks is to appoint the customer to act on behalf of the bank to purchase the assets and then transfer the title to the customer on the completion of the transaction (Lewis, 2013). In an environment of economic downturn in which

many customers are likely to breach their promises, Islamic financial institutions might find it extremely difficult to liquidate the subject or to find buyers for the subject matter immediately, or they may offer such subject matter at a great discount, exceeding the initial security deposits, which would place a liquidity pressure on the Islamic bank or cause capital losses.

#### **4.3.2.4 *Tawarruq***

*Tawarruq* has been heavily criticised by Islamic-finance scholars, and in some cases prohibited, because they believe this type of contract imitates ordinary bank loans, and all the trading processes are used solely to circumvent the prohibition of exchanging money for money with different amounts, which is exactly the same as conventional bank loans (Al-Shubaily, 2006; Harvard-SE Workshop, 2007).

Although *tawarruq* is based on commodities such as aluminium or steel, the buyer does not take possession of the subject matter, or at least it is extremely difficult or impossible that the buyer would be able to take such possession. It is this characteristic of the *tawarruq* contract that violates an essential condition of valid trading contracts in Islamic finance, namely *qabd*, and can be considered *hiyal* (legal stratagem) (Islamic Fiqh Academy, 2003).

Al-Suwailem (2009) takes a comprehensive view of *tawarruq* and reverse *tawarruq*, stating that if “organized *tawarruq* is a source of cash for the customer, then reverse *tawarruq* becomes a source of cash for the bank itself. Cash financing (cash for cash) has become the base for the activities of many Islamic banks, in both assets and liabilities. This spells the end of the role of Islamic banks, which used to be based on real activities on both sides” (p. 40).

Siddiqi (1983), a highly respected Islamic-finance scholar, adopts a macroeconomic view, arguing that *tawarruq* shifts the economy from the asset market towards the debt market. He also argues that debt leads to gambling-like speculation and greater instability in the

economy and concludes that the effect of *tawarruq* on the economy is far more harmful than beneficial (Harvard-SE Workshop, 2007).

Even though this contract is asset based, it is not backed by tangible assets as with most other contracts in Islamic banking. This makes a *tawarruq* contract more risky because there are no assets to cover losses, or at least part of losses, in the event of default. Overall, it can be seen that such products are not based on real economic activity and can be understood in the context of conventional banks' lending and borrowing transactions (Harvard-SE Workshop, 2007, 2009). There is no profit-and-loss sharing in this contract, which implies that the bank will bear the entirety of the credit risk and loss. In the case of a crisis in which many lenders (buyers) fail to pay their loans, the bank would be obliged to pay the depositors in full.

The expansion of debt-based contracts could lead Islamic banks to face a great deal of credit risk given that in principle they are not permitted to shift risk to a third party, such as is done when entering into CDS contracts. Unlike the investment contracts, securitisation is not an option because both *marabha* and *tawarruq* are considered debt-based contracts, and in Islam, debt selling is prohibited, which might lead Islamic banks to face liquidity risk (Ahmed, 2009; Hakim, 2007).

*Tawarruq* creates an additional and unique type of risk, reputation risk, which Qattan (2006) states is a result of a lack of consensus and agreement on this type of contract, and which can trigger bank failure. Similarly, Siddiqi (1983) and Khan (1987) suggest that debt-based contracts should be avoided or at least used restrictively, as they believe that such contracts can be used as a "back door" to *riba* (interest). In Islamic law, no profit can be generated without being exposed to the risk associated with the transaction. Based on this, from the conventional banking perspective, not shifting the risk (or at least some of the risk) can lead to substantial losses in an economic downturn. Therefore, Islamic banks would suffer under this type of contract.

#### 4.3.2.5 *Ijara*

Similar to *musharaka* contracts, the Islamic financial institution remains the titleholder of the underlying assets of *ijara*. Therefore, *ijara* is permissible, and there are no restrictions on shifting the risk of such contracts to a third party by means of a direct sale or securitisation (*sukuk*) (Ahmed, 2009; Khan & Ahmed, 2001), which transfers all risks attached to *ijara* including default, ownership and market risk.

However, as *ijara* principally focuses on property funding, when a property market crashes, as happened during the subprime crisis of 2008, Islamic financial institutions face a significant level of default because of job losses and because lessees believe they are paying too much for the lease as the market value of the property falls sharply. As a result of such a crash, financial institutions, including Islamic and conventional banks, would find it extremely difficult to liquidate *ijara* property assets in a timely manner and at a value that covers the initial investment.

This was the case in Dubai and Qatar during the GFC and the subsequent downturn in the wider economy. In such a situation, financial institutions are exposed to liquidity risk and might face liquidity shortage if their exposure to the property market is significantly high. An example of this occurred in Dubai, which faced serious financial troubles in 2009 and requested a restructuring of \$US26 billion of debt, of which \$US4 billion were in *ijara sukuk* (Salah, 2010). This event, termed the “Dubai Debt Crisis”, caused all financiers to be directly exposed and led GCC markets into panic. However, the neighbouring oil-based state of Abu Dhabi decided to grant Dubai \$US10 billion to repay some of its debts, which is believed to have stabilised the entire region’s financial sector because most of the financial institutions were highly exposed to this crisis (Salah, 2010).

#### 4.3.2.6 Sukuk

There are a variety of risks involved with *sukuk*; for example, risks associated with the modes of *sukuk*, asset structures and risk associated with the market. *Sukuk* faces all the risks related to types of contracts such as *musharaka*, *mudaraba* or *ijara*. There are two principal asset structures in *sukuk* – asset-backed structures and asset-based structures – (Hanif & Johansen, 2012; Khnifer, 2010b), and also a less common structure – the hybrid structure – which can be converted into equity in the originator’s company or exchanged with the equity of a third party (Wouters, 2010).

Asset-backed implies that the asset’s title is transferred (true sale) to a special purpose vehicle (SPV) and the *sukuk* holders are only exposed to risks associated with the assets (McMillen, 2008). Consequently, the *sukuk* holders are isolated from risks associated with the originator, which makes it “bankruptcy remote” (IFSB, 2013b). Conversely, under the asset-based *sukuk*, it is the originator, not the *sukuk* holders, who keeps the title of the underlying assets, which implies that the *sukuk* holders would be directly exposed to the originator’s financial distress; for example, the originator’s bankruptcy risk, customers’ credit risk, as well as its operational risk (McMillen, 2008). Another type of risk of *sukuk* is Sharia-compliance risk because there has been a lack of consensus among Islamic-finance scholars on the permissibility of many types of *sukuk* (Usmani, 2007).

Finally, the availability of a liquid secondary market remains a problematic issue in Islamic finance. The *sukuk* market was the most devastated segment of Islamic finance during the GFC. According to Khnifer (2010a), in 2009 alone, there were 15 *sukuk* default cases, which placed individual investors, as well as institutional investors and those involved with them, in serious financial distress.

#### **4.4. Summary**

In this chapter, I reviewed the theoretical literature regarding the possibility of Islamic banks being directly and indirectly exposed to GFC. The literature on the direct exposure proposed by an armada of leading scholars of Islamic finance suggests that Islamic finance principles including ethical practices, the prohibition of interest (*riba*), and multi-level supervision mechanisms would have made Islamic banks' direct exposure to the GFC highly unlikely. It is found that most, if not all, of the practices and financial instruments that are believed to be responsible for the GFC are not permitted under Islamic banking principles. This suggests that Islamic banks should have survived the direct impact of the GFC due to their avoidance of the unpermitted toxic assets – but not owing to their use of PLS instruments.

However, once some of the properties of Islamic banking are reviewed and discussed at different micro-levels – namely, the sector, operations and contract levels – it is found that Islamic banks might have been negatively affected by the economic downturn that followed the GFC. This discussion argues that while Islamic banks might have remained in a relatively better position compared with the traditional banks' during the early phases of the GFC, Islamic banks were less likely to continue outperforming their counterparts in conventional banking during the associated downturn in the wider economy. This is due to the scale-disadvantage of Islamic banks, as well as the complex instruments and lax risk-mitigation tools available to them. That is, Islamic banks are exposed to a higher degree of risk, as well as many different and unique types of risk, and they possess few risk-mitigation tools; both of these factors could lead Islamic banks to be relatively more vulnerable to financial shocks.

This indirect effect suggests that if Islamic banks had been relying on PLS rather than debt-based instruments, they would have been more resilient to financial shocks from the subsequent downturn in the real economy because losses would have been shared among all

parties. In the following empirical chapters, I empirically investigate both arguments, regarding the direct and the indirect exposure, using a variety of formal financial and econometric tests.

# Chapter 5: Operating Performance and the Global Financial Crisis<sup>11</sup>

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<sup>11</sup> An early version of this chapter was presented at the 17th Malaysian Finance Association Conference 2015, Universiti Teknologi MARA (UiTM) Sabah, and at the 10th International Conference on Islamic Economics and Finance, Doha-Qatar. It has also been revised and resubmitted to the *Pacific-Basin Finance Journal*.

## 5.1 Introduction

In this chapter, I empirically evaluate and compare the operating performance of Islamic banks in the GCC and non-Islamic banks to investigate whether the arguments regarding the dichotomy between the theory and the practice of Islamic banking altered the main areas of the operating performance during different stages of the GFC.<sup>12</sup>

Comparisons of the performance of Islamic and conventional banking during the GFC have been undertaken by some researchers, such as Abdulle and Kassim (2012), Beck et al. (2013), Miniaoui and Gohou (2013), and Parashar and Venkatesh (2010), among others. However, there are several factors in the design of this study that distinguishes it from earlier empirical research. First, the construction of a homogeneous sample consisting of six countries in the GCC with common characteristics ensures that the findings are less likely to be driven by differences between sample countries as other countries with Islamic banks show important differences. Second, by using annual data, I can assess and compare the real impact of the GFC during different phases of the crisis. Furthermore, the inclusion of the post-crisis period enables an investigation of the pace of recovery, and whether this differed between Islamic and conventional banks. And third, I control for some unique characteristics that might explain differences between the two types of banking, such as the impact of foreign and state ownership, as well as listing status. Statistical and economic differences in the performance of Islamic and conventional banks within the same economy have been found, which suggests these differences should be taken into account in comparative studies.

It is worth noting that Qatari Islamic banks have been found to outperform conventional banks in terms of asset quality, management quality, earnings and liquidity, and so perhaps can be considered an example of best practice of Islamic banking in the GCC region. The data show

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<sup>12</sup> See Chapter 2.

strong evidence that in the early stages of the GFC, Islamic banks outperformed conventional banks in terms of capitalisation, profitability and liquidity, as well as in narrowing the gap in efficiency, with no difference in asset quality. This finding supports the argument that Islamic banks were less exposed to the GFC due to their restrictions on dealing in non-complying assets, believed to be one of the main reasons for the crisis.

However, in the later stages of financial turmoil when the financial shocks spilled over from the financial sector into segments of the real economy, Islamic banks suffered even more than conventional banks and lost their superiority in capitalisation, performing less well than conventional banks in terms of profitability and efficiency. This finding suggests that Islamic banks may be more vulnerable to real economic conditions, whereas conventional banks are more vulnerable in the event of global financial shocks. The remainder of this chapter is organised as follows: section 5.2 considers previous empirical experience, section 5.3 presents the data and methodology, section 5.4 contains the empirical analysis and results, and section 5.5 summarises the chapter.

## **5.2 Previous Empirical Evidence**

A substantial body of literature compares Islamic and conventional banks, using financial indicators (Abdulle & Kassim, 2012; Ahmad & Hassan, 2007; Awan, 2009; Bashir, 2003; Beck et al., 2013; Jaffar & Manarvi, 2011; Miniaoui & Gohou, 2013; Olson & Zoubi, 2008, 2011; Parashar & Venkatesh, 2010; Rosly & Bakar, 2003; Samad, 2004; Samad & Hassan, 2000) (see Table 6 for more results of some selected studies). Here I review papers comparing the operating performance of Islamic and conventional banks, with reference to the GFC.

Hasan and Dridi (2010) investigated the performance of banks from eight countries with dual Islamic and conventional banking systems from 2007 to 2009. The authors found that Islamic banks experienced a larger decline in profitability in 2009, and better credit and

asset growth in 2008 and 2009. However, the authors warned that their results did not capture the full impact of the crisis still unfolding, suggesting their results be taken as provisional.

Parashar and Venkatesh (2010) conducted one of the earliest empirical studies to investigate the performance of Islamic banking during the GFC. They analysed five areas of operating performance – capital adequacy, efficiency, profitability, liquidity and leverage – using a small sample of 12 banks of similar size, six of which were Islamic banks in the GCC region, between 2006 and 2009. After using a *t*-test to compare the two types of banking, the authors concluded that during the GFC, conventional banks outperformed Islamic banks in terms of capital, leverage and return on average equity but, conversely, Islamic banks enjoyed relatively superior performance in terms of returns on average assets and liquidity.

Other studies take an intermediate position. Beck et al. (2013) evaluated three areas of performance – the business model, efficiency and stability of Islamic banks compared with conventional banks – in 22 countries including the GCC region, ranging from well-developed to underdeveloped economies, between 1995 and 2009. The authors tried to account for major variations between the sample countries by employing some econometric techniques to control for time-variant country-fixed effects. They find a major cross-country variation in the differences between conventional and Islamic banks. During the GFC, Islamic banks were well capitalised, showed higher asset quality and were less likely to disintermediate.

From the review of empirical studies, it is evident that there has been no conclusive answer to the question of whether Islamic banks performed differently from conventional banks during the GFC. The results of previous studies vary from suggesting no difference, to a major difference in favour of Islamic banks, and even to a significant difference in favour of conventional banks.

Some other studies have investigated the differences between Islamic and conventional banking in a single-country case, namely in the United Arab Emirates (UAE) and Malaysia. Miniaoui and Gohou (2013) evaluated profitability and productivity by employing eight financial indicators for one GCC state, the UAE, between 1995 and 2010, using balance sheet items for 25 banks. The authors found that during the GFC, conventional banks outperformed Islamic banks; however, post the GFC, Islamic banks closed the gap for most of the performance indicators used. A possible reason for the outperformance of the conventional banks might be due to the high exposure of Islamic banks to the Dubai Debt Crisis in 2009, which has been discussed earlier (see section 4.3.2.5).

In the Malaysian context, Abdulle and Kassim (2012) compared the performance of Islamic and conventional banks for profitability, liquidity and credit risk, between 2006 and 2008; their analysis comprised 15 banks, six of which were Islamic. The authors found that during the GFC there was no significant difference in unprofitability and credit risk, and that Islamic banks held more liquid assets than conventional banks, making them resilient to liquidity risks.

In the present chapter, I contribute to the ongoing debate by conducting an empirical analysis, taking account of the following considerations. First, I restrict the study to a homogeneous sample from six countries with common economic, political and cultural characteristics, as well as using the same accounting standards – namely, countries from the GCC, which comprises 66.2% of the total assets of Islamic banking. This restriction limits the chance that the findings are not driven by the differences between sample countries or due to variations in accounting standards. Second, I use year-by-year data, which allows me to document the real effects at different phases of the crisis. Third, I include the recovery period (post-GFC) in order to investigate the pace of recovery and whether it differs between Islamic and conventional banks. Furthermore, I control for some well-documented factors that might

explain differences between the two types of banking; for example, the impact of foreign and state ownership, as well as listing status. Finally, I use multiple econometric estimators, namely fixed effects as well as the dynamic panel generalised method of moments (GMM) estimator when it is more appropriate to avoid some serious econometric issues.

**Table 6: Selected Papers and Their Main Findings**

Author(s)	Area(s)	Sample		Finding(s)	GFC
Abdulle and Kassim (2012)	Three performance indicators, profitability, liquidity and credit risk	Malaysia 2006 to 2010	15 banks (six Islamic)	No major difference in profitability and credit risk; Islamic banks hold more liquid assets during crisis	YES
Awan (2009)	Capital adequacy, asset quality, earnings and liquidity	Pakistan 2006–2008	18 banks (six Islamic)	Profitability of Islamic banks is far better than selected conventional banks; Islamic banks outperform conventional banks in assets	NO
Bashir (2003)	Determinants of profitability and efficiency	Eight Middle Eastern countries 1993–1998	14 Islamic banks	High capital-to-asset and loan-to-asset ratios lead to higher profitability	NO
Beck et al. (2013)	Business model, efficiency and stability	22 countries with dual banking systems 1995–2009	510 banks (88 Islamic)	Islamic banks less cost-effective, have higher intermediation ratio, higher asset quality and are better capitalised; during GFC, Islamic banks outperformed in terms of capitalisation and asset quality	YES
Miniaoui and Gohou (2013)	Profitability and productivity	UAE 1995–2010	25 banks	During the GFC, the conventional banking system outperformed the Islamic; after the crisis, Islamic banks seem to close the difference	YES
Olson and Zoubi (2008)	26 financial ratios into logit	GCC 2000–2005	237 observations (96 Islamic)	Correctly distinguish Islamic from conventional banks	NO
Parashar and Venkatesh (2010)	Five performance indicators: capital adequacy, efficiency, profitability, liquidity and leverage	GCC 2006–2009	12 banks (six Islamic)	During the GFC, Islamic banks suffered more than conventional banks in terms of capital, leverage and return on average equity; conversely, conventional banks suffered more than Islamic banks in terms of return on average assets and liquidity	YES
Rosly and Bakar (2003)	Financial ratios	Malaysia 1996–1999	26 banks (two Islamic)	Islamic higher returns on assets (ROA); less effective than conventional banks	NO
Samad (2004)	Nine financial ratios for: (a) profitability, (b) liquidity risk, and (c) credit risk	Bahrain 1991–2001	21 banks (six Islamic)	No major difference in profitability and liquidity; different in credit risk	NO
Samad and Hassan (2000)	Financial ratios	Malaysia 1984–1997	Nine banks (one Islamic)	Islamic banks are relatively more liquid and less risky than a group of eight conventional banks	NO

## **5.3 Data and Methodology**

### **5.3.1 Data**

The financial data for the 101 banks from the six GCC states, between 1998 and 2012, were sourced from the Bankscope database. Macroeconomic data, including inflation and gross domestic product (GDP) data, were obtained from the International Monetary Fund (IMF) and the World Bank. Because data from before 2000 is not completely available electronically, and many banks, especially Islamic banks, were formed during the period under investigation, the resulting dataset for the operating indicators is strongly unbalanced, ranging from 808 to 1,075 observations on each of the variables (out of a possible 1,515) (see Table 7 for more details). In an attempt to mitigate this lack of balance, I then shortened the time from 1998–2012 to 2005–2012 to ensure that the dataset is more balanced; however, the general results did not change significantly.

I include countries with a dual banking system; that is, where conventional and Islamic banks operate side by side, which is the case in the GCC countries. By including “country-year dummies”, I am able to handle factors that cannot be observed but vary across countries and years. Regarding banks’ data levels, I include banks with a minimum of one year’s data. Finally, to ensure that the results were not driven by the presence of some extreme values, especially important in a relatively small dataset, I tried winsorising all variables at the first and 99th percentiles. However, as this process did not eliminate outliers, I decided to use the fifth and 95th percentiles, which shows better handling of outliers. It is worth reporting that the number of observations treated by this procedure varies from one variable to another; for example, eight ROA observations were found to be outliers.

**Table 7: Dataset Used for Analysis of the Operating Performance**

	Total number of banks	(%)
<b><i>Sample by Country:</i></b>		
Saudi Arabia	13	12.87
Qatar	10	9.83
Kuwait	15	14.85
UAE	25	24.75
Bahrain	31	30.69
Oman	<u>7</u>	<u>6.93</u>
<b>Total</b>	<b>101</b>	<b>100</b>
<b><i>Ownership:</i></b>		
State owned	42	41.58
Privately owned	<u>59</u>	<u>58.42</u>
<b>Total</b>	<b>101</b>	<b>100</b>
Foreign owned	14	16.83
Domestically owned	<u>87</u>	<u>86.14</u>
<b>Total</b>	<b>101</b>	<b>100</b>
<b><i>Listing Status:</i></b>		
Listed	71	70.30
Unlisted	<u>30</u>	<u>29.70</u>
<b>Total</b>	<b>101</b>	<b>100</b>
<b><i>Bank Type:</i></b>		
Conventional	54	54.46
Islamic	<u>46</u>	<u>45.54</u>
<b>Total</b>	<b>101</b>	<b>100</b>

For the classification of bank type – whether Islamic or conventional – I double-checked the classification offered by the Bankscope dataset with information from each bank’s documentation and website. I only included fully fledged Islamic banks, excluding conventional banks offering Islamic banking services.

Identifying the precise dates of the GFC was important. The National Bureau of Economic Research (NBER) identifies December 2007 to June 2009 as the dates of the recession, while Iley and Lewis (2013) argue that 7 February 2007 was the beginning of the crisis. Clearly, the dating of the GFC is not a straightforward matter. However, taking into consideration that the Bankscope database only offers annual data, making the task harder, I considered 2007 to be the beginning of the GFC.

### **5.3.2 Methodology**

This research study examines and compares the operating performance of Islamic banks with the performance of conventional banks. The analysis is divided into two stages: first, estimating the financial ratios, and second, comparing conventional and Islamic banks after controlling for some internal and external factors, as well as macroeconomic factors. To evaluate operating performance, a set of indicators are applied using financial statement items: the so-called CAMEL model. This is a standardised approach consisting of five components:

- (C) Capital adequacy
- (A) Asset quality indicators
- (M) Management efficiency
- (E) Earning and profitability
- (L) Liquidity ratios

#### ***5.3.2.1 First Stage: CAMEL Model***

The CAMEL model has been used in a substantial body of literature and offers a unique opportunity to compare the results of this study with those in the existing literature.<sup>13</sup> Moreover, the model helps to investigate the impact of the GFC on each area of performance individually. The model was proposed by the Federal Deposit Insurance Cooperation (FDIC) in the 1970s and provides a framework for empirical studies to evaluate the financial health of banks.

Variations in accounting standards raises serious concerns about the validity of comparisons of different types of banking systems across a variety of countries; that is, whether these financial indicators can make meaningful and fair comparisons. However, as central banks in each GCC state require all banks to adopt the International Accounting Standards (IAS) in preparing financial statements (Olson & Zoubi, 2008), it should be possible to compare the

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<sup>13</sup> I use CAMEL rather than CAMELS as the “S” represents the sensitivity to market risks, which is to be investigated in greater detail in Chapter 7.

financial indicators of conventional and Islamic banks, as well as compare the results across GCC countries.

Another concern is whether all of these financial indicators are suitable for use in the context of Islamic banks, where many indicators contain interest revenue and expenses, as the principles of Islamic finance prohibit charging or earning interest of any form. Therefore, I avoided using any indicators containing an interest component, even though the Bankscope database reports these indicators for both types of banks (Beck et al., 2013).

### Capital Adequacy

The first category of the CAMEL model concerns capital adequacy. Sound capital adequacy policy allows banks to survive in times of crisis and absorb shocks and losses. Loosely speaking, two types of capital strength measures have been widely used in previous research: risk- and non-risk-weighted ratios. It is thought that the risk-weighted ratio – which according to Basel II must not be lower than 8% – can be manipulated by banks as it gives management the chance to not disclose the health of their institutions. Non-risk-weighted measures use the leverage level as a proxy for capital strength, as used by Cihák and Poghosyan (2009), Mannasoo and Mayes (2009), Mayes and Stremmel (2012), Olson and Zoubi (2011), Samad (2004), and Tatom and Houston (2011) in their studies. Furthermore, Mayes and Stremmel (2012) find that non-risk-weighted capital measures explain bank distress and failures better than the risk-weighted ratio, adopted by Basel III. I therefore employed the two types of capital ratio as follows:

$$\textit{Total capital ratio} = \textit{Total capital (Tier 1 + Tier 2)} / \textit{risk-weighted ratios}$$

$$\textit{Capital strength} = \textit{total equity} / \textit{total assets}$$

### Asset Quality

Asset quality is a major issue that commercial banks take into account, as they are very sensitive to losses. The ratio measuring the asset quality as non-performing loans to gross loans is more widely used, such as by Halling and Hayden (2006), Mayes and Stremmel (2012), Samad (2004), Tatom and Houston (2011), and Micco, Panizza, and Yañez (2007). Another ratio is loan loss provisions scaled by gross loan, with the expectation that the higher the loan losses the bank faces, the higher the provisions it will make (Cihák & Poghosyan, 2009; Farook, Hassan, & Clinch, 2014). The two ratios are as follows:

$$NPLs = \text{Non-performing loans} / \text{gross loans}$$

$$\text{Loan loss provisions} = \text{Loan loss provisions} / \text{gross loans}$$

### Management Efficiency

The aim of this component of the CAMEL model is to evaluate the skill of bank management, which plays a significant role in determining financial and operating success. There is no ideal indicator to assess this component. Some studies employ earning indicators to evaluate management performance (Halling & Hayden, 2006), whereas others use asset quality ratios (Cole & White, 2012). In this study, the proxy for this component uses the Federal Deposit Insurance Corporation's introduction of an indicator of efficiency, the cost-to-income ratio (CTI), which is also widely used in practice (Beck et al., 2013; Olson & Zoubi, 2008). This indicator can be calculated as follows:

$$CTI \text{ ratio} = \text{total overheads} / \text{gross income}$$

## Earnings

Earnings or profitability is a central indicator of a bank's financial health and the possibility of its failure. Stable earnings over time reflect economic and capital performance. For this component of the CAMEL model, I use the two most common accounting indicators of bank financial performance: the return on assets (ROA) ratio, and the net income to shareholder equity, return on equity (ROE) ratio. These ratios have been used by researchers such as Alam, Booth, Lee, and Thordarson (2000), Awan (2009), Cole and White (2012), Mannasoo and Mayes (2005, 2009), Olson and Zoubi (2008), Rosly and Bakar (2003), Samad (2004), and Tatom and Houston (2011). Furthermore, the use of these ratios will allow the comparison of the results of this study with other findings in the field of Islamic banking. The ratios are calculated as follows:

$$ROA = \text{net income} / \text{total assets}$$

$$ROE = \text{net income} / \text{stockholder equity}$$

## Liquidity

The fifth component of the CAMEL model is liquidity indicators. Liquidity is a major issue that cannot be overemphasised for banks. It shows the bank's ability to repay short-term liabilities and withdrawals by its depositors. The more a bank maintains high liquid assets, the lower the possibility that the bank will become distressed. However, although maintaining more liquid assets reduces the possibility of a bank's distress, it also negatively affects its profitability as it reduces the bank's ability to issue more loans.

Different indicators can be used to determine bank liquidity. One indicator developed by academics is deposits divided by loans to assets. This ratio is used by Cihák and Poghosyan (2009) and Mannasoo and Mayes (2005, 2009). Another ratio for measuring liquidity is that of loans to deposits (LTD), widely used in studies of Islamic banks, such as those by Olson and

Zoubi (2008), Samad (2004), and Samad and Hassan (2000), and also in international studies (Alam et al., 2000; Mayes & Stremmel, 2012; Tatom & Houston, 2011). Therefore, three indicators are used in this chapter: liquid assets, LTD, and the proposition of fees and commissions earned by banks. Using three different indicators gives a closer view of the business model and whether conventional and Islamic banks in the GCC region conduct their operations differently.

$$\textit{Maturity match} = \textit{Liquid assets} / \textit{deposits short-term funding}$$

$$\textit{LTD} = (\textit{net loans}) / \textit{total deposits}$$

$$\textit{Fees and commissions income} = \textit{net fees and commissions} / \textit{gross income}$$

#### **5.3.2.2 Second Stage: Regression Analysis**

In the second stage of this analysis of financial performance, I compare the financial performance of Islamic banks with that of conventional banks prior to and during the GFC. One approach in comparing the counterparts is by performing an equality-of-means *t*-test to examine whether there is a statistically significant difference in performance between Islamic and non-Islamic banks within the GCC prior to and during the GFC. This method is a common approach for comparing the two banking systems (Awan, 2009; Parashar and Venkatesh, 2010; Rosly & Bakar, 2003; Samad & Hassan, 2000). However, a simple *t*-test would ignore all other internal and external factors that should be considered, as they have been found to influence performance.

Therefore, a model is constructed to take into account the factors identified in the literature as possibly explaining any differences in performance – a much more complex exercise. It is important to make the two samples as comparable as possible by considering the potential factors likely to affect each banking system independently. After estimating the CAMEL components in the first stage of this analysis, a longitudinal data analysis (panel data

with fixed effects indicated by Hausman test) is fitted, which controls for some omitted variable biases that cannot be observed and that vary across time and entities (Stock & Watson, 2012), thus treating CAMEL components indicators as the dependent variables (see Table 8).

In the first group of variables, I include six interaction terms (Islam\*2007 to Islam\*2012) for each year between 2007 and 2012, and the types of banks (Islamic), to investigate whether the impact of the GFC significantly differed during different phases of the crisis, as well as the pace of recovery during the post-crisis period.

The second group of variables controls for the size and age of the bank, as common variables in this field.

A third group of factors takes account of the differences in the ownership structures of banks in this research, including government ownership, foreign ownership and listing status. Ownership plays a key role in determining the financial performance of financial institutions. For example, state-owned banks perform more poorly than privately owned banks due to their larger holdings of government securities, higher costs from larger staff, and larger loan loss provisions, reflecting weaker asset quality (Farazi, Feyen, & Rocha, 2011).

Foreign ownership can also alter the performance of banks, as noted by Micco et al. (2007) and Claessens, Demirgüç-Kunt, and Huizinga (2001). Both groups of authors found that foreign-owned banks have higher profits and interest margins and lower non-performing loans than do domestically owned banks in developing countries. Some empirical evidence supports the argument that listing status affects bank performance. For example, Kobeissi and Sun (2010) found that listed banks have higher net-interest margins due to their lower interest expenses and higher interest revenues, and obtain funds at relatively lower funding costs. The authors further argue that these banks are subject to a higher degree of governance and disclosure requirements, introducing greater discipline to their operations.

**Table 8: Definitions of Panel Data Variables used for Operating Performance**

N	Variables	Definition
1	<i>Capital</i>	(1) Total capital (CAR) = (Tier 1 + Tier 2) / risk-weighted ratios (2) Equity to Assets ratio (CAR LEV)
2	<i>Asset Quality</i>	(1) Non-Performing Loans to Gross Loans (NPLs) (2) Loan Loss Provisions to Gross Loans (provisions)
3	<i>Management Efficiency</i>	Cost-to-income (CTI) ratio = Total Overheads / Gross Income
4	<i>Earnings</i>	(1) ROA = Net Income / Total Assets (2) ROE = Net Income / Stockholder Equity
5	<i>Liquidity</i>	(1) LTD = Net Loans / Total Deposits (2) Maturity match (Liquid Assets/ Deposits) = Liquid Assets / Deposits & Short-Term Funding (3) Fees (Fees / Income) = Net Fees & Commissions / Gross Income
6	<i>Islam</i>	Dummy variables equal to one if the bank is Islamic; zero otherwise
7	<i>Year</i>	Dummy variables equal to one for each year from 2007–2012; zero otherwise
8	<i>Islam*Year</i>	Interaction terms between the type of bank and years from 2007–2012
9	<i>SIZE</i>	Natural log of Total Assets
10	<i>AGE</i>	Difference in the number of years between the year of incorporation and 2007
11	<i>STATE</i>	Dummy variables equal to one if the bank is state owned; zero otherwise
12	<i>FOREIGN</i>	Dummy variables equal to one if the bank is foreign owned; zero otherwise
13	<i>LISTED</i>	Dummy variables equal to one if the bank is listed on a stock market; zero otherwise
14	<i>GDP</i>	Year-to-year percentage change in country's gross domestic product
15	<i>INF</i>	Annual country inflation rate in percentage
16	<i>OIL</i>	Natural log of average annual oil prices

The last group of independent variables comprises well-known macroeconomic factors, including the growth of each country's GDP, as it is well documented that growth has a positive effect on bank profitability. In short, when the economy is growing at a decent rate, a well-managed bank would be expected to grow and profit from loans and securities (Demirgüç-Kunt & Maksimovic, 1996). Each country's inflation rate (INF) is also included in this group, as this effect might negatively impact bank profitability if overheads increase (Bashir, 2003). Finally,

I include the natural log of average annual oil prices to take into account the fact that all of the countries in the sample are oil-based economies where oil revenues are the major source of government income and the banking industry is heavily dependent on it (Olson & Zoubi, 2008).

Table 9 presents the correlation matrix showing that the independent variables are not highly correlated, suggesting that multi-collinearity is highly unlikely in the analysis. In the first step, I investigate whether the practices of Islamic banking differ across the six GCC countries, by running a fixed-effect panel data regression, including interaction terms between the Islamic bank dummy (Islam) and the five country dummies,<sup>14</sup> as follows:

$$CAMEL = \alpha + \beta_1 Islam * Bahrain + \beta_2 Islam * Kuwait + \beta_4 Islam * Qatar + \beta_5 Islam * Saudi Arabia + \beta_6 Islam * UAE + \beta_7 SIZE + \beta_8 AGE + \beta_9 YearFE + e \quad (1)$$

I control for two common factors – the size and age of the bank – as their importance was discussed earlier. I also include a time (years) fixed effect, after testing to determine if time (years) fixed effect are jointly significant, which would suggest that a control for unobserved factors that vary across time is necessary in the model.

In the second step, I compare the operating performance of conventional and Islamic banks measured by CAMEL model components, the main purpose of this chapter, by formalising the following *Country\*Year* fixed-effect model, after controlling for a variety of ownership, internal and macroeconomic factors that might explain the differences in the relationship between the two types of banks:

$$CAMEL = \alpha + \beta_1 Islam * 2007 + \beta_2 Islam * 2008 + \beta_3 Islam * 2009 + \beta_4 Islam * 2010 + \beta_5 Islam * 2011 + \beta_6 Islam * 2012 + \beta_{10} LISTED + \beta_{11} FOREIGN + \beta_{12} STATE + \beta_{13} GDP + \beta_{14} Inflation + \beta_{15} SIZE + \beta_{16} AGE + \beta_{17} Country * YearFE + e \quad (2)$$

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<sup>14</sup> I excluded Oman from this regression as it has only one newly formed Islamic bank, which would make the comparison less meaningful.

For the earnings component, I add some additional independent variables well documented in the literature, to determine the bank's profitability: capital ratio, cost to income, loan loss provisions scaled by gross loans, liquidity and non-interest income. These variables represent the other CAMEL components in the study that have been suggested in much literature, such as Dietrich and Wanzenried (2011), Olson and Zoubi (2011) and Trujillo-Ponce (2013), among others.

Although these additional variables are well known to determine earnings and increase the explanatory power of the estimation, they might raise a serious econometric issue. Endogeneity can potentially be more served as reverse causality is likely to occur. For example, while I expect management efficiency to affect the profitability of banks, banks that are more profitable can take up more staff, and consequently, decrease their efficiency (García-Herrero, Gavilá, & Santabárbara, 2009). To overcome this issue, I use for profitability, beside the fixed-effect model, the dynamic panel generalised method of moments (GMM) estimator (which is known as system GMM), proposed by Arellano and Bover (1995) and Blundell and Bond (1998).

**Table 9: Correlation Matrix for Operating Performance**

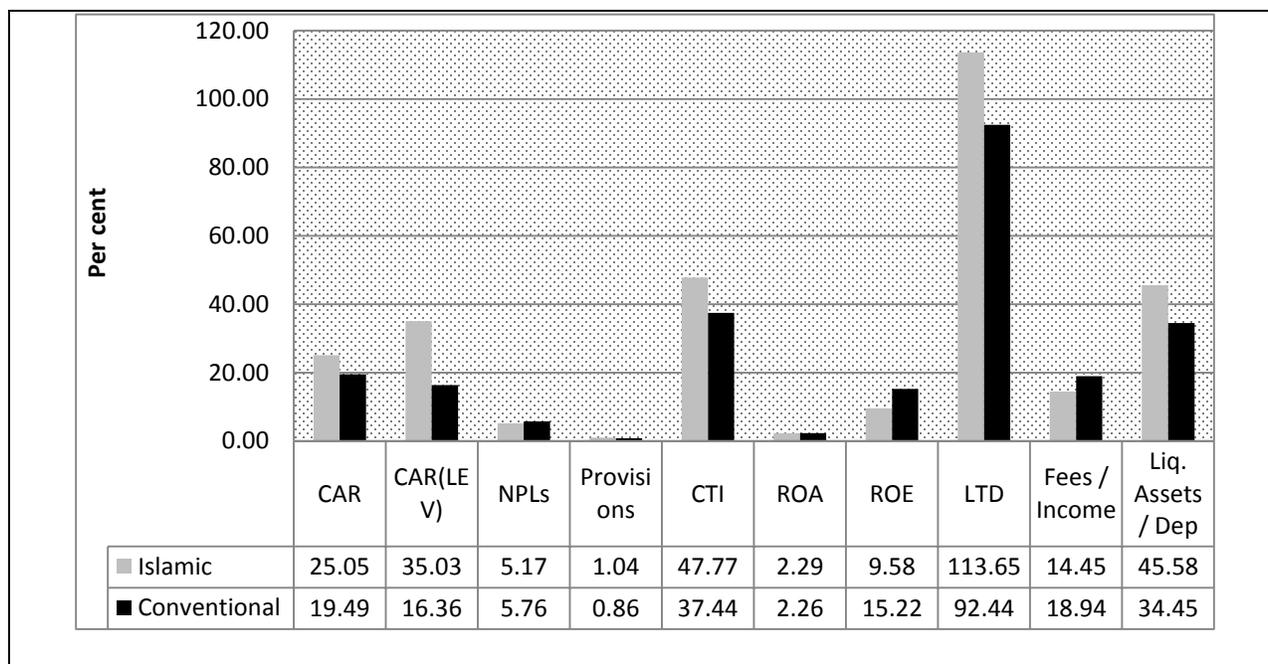
	CAR	LEV	NPLs	Provisions	CTI	ROA	ROE	LTD	Fees / Income	Liquid Assets / Deposits	SIZE (TA)	AGE	GDP	INFL.	OIL	LISTED	FOREIGN	STATE
<b>CAR</b>	1																	
<b>LEV</b>	0.6478	1																
<b>NPLs</b>	-0.0462	-0.0096	1															
<b>Provisions</b>	0.1055	-0.0174	0.3214	1														
<b>CTI</b>	-0.0113	0.0144	0.0724	0.1209	1													
<b>ROA</b>	0.1915	0.2666	-0.4043	-0.167	-0.5294	1												
<b>ROE</b>	-0.0902	-0.147	-0.4677	-0.193	-0.5286	0.8416	1											
<b>LTD</b>	-0.0023	0.1911	-0.0313	-0.1605	-0.0329	0.0931	-0.0191	1										
<b>Fees / Income</b>	0.4269	0.3722	0.0276	0.2182	-0.002	0.0367	-0.094	-0.2302	1									
<b>Liquid Assets / Deposits</b>	-0.0166	-0.0835	-0.0077	-0.0682	-0.0036	0.0537	0.0925	-0.1029	-0.052	1								
<b>SIZE(TA)</b>	-0.3101	-0.3659	-0.0044	-0.2762	-0.2369	-0.0025	0.1374	-0.0404	-0.3775	0.1673	1							
<b>AGE</b>	-0.0374	-0.2327	-0.0741	0.0173	-0.3386	0.1933	0.3122	-0.1601	-0.2179	0.1825	0.315	1						
<b>GDP</b>	-0.0451	0.0813	-0.3583	-0.1489	-0.137	0.2802	0.2652	-0.0551	0.0721	0.0665	-0.0153	0.0443	1					
<b>INFLATION</b>	-0.1165	0.0557	-0.2038	-0.1914	-0.1416	0.1993	0.159	0.085	-0.0799	0.1242	0.0613	0.0331	0.2412	1				
<b>OIL</b>	0.0159	0.1394	-0.3133	0.0039	-0.0106	-0.0753	-0.1805	0.1620	0.0076	-0.1669	0.4269	-0.0784	-0.0303	0.0314	1			
<b>LISTED</b>	-0.1258	-0.1453	-0.0128	-0.1513	-0.1197	0.1394	0.1811	0.2136	-0.3748	0.0363	0.2273	0.0988	-0.0373	0.0626	0.0537	1		
<b>FOREIGN</b>	-0.1477	-0.1587	-0.0603	-0.0789	0.1204	-0.0189	0.0545	-0.1015	-0.0367	0.1532	-0.0094	0.0088	-0.036	-0.1072	-0.0944	-0.08	1	
<b>STATE</b>	0.1557	0.0385	-0.091	-0.0082	0.0463	-0.0879	-0.0845	0.1122	-0.0197	0.0277	0.0303	-0.0726	0.0029	0.0579	0.0446	0.054	-0.2821	1

## 5.4. Results and Discussion

### 5.4.1 Descriptive Statistics

To begin the analysis of whether Islamic and conventional banks performed differently during the economic turmoil, I compare the five areas of operating performance, proxied by 10 ratios, to assess the performance of the banks over the period under investigation (see Table 8). To ensure that the variations between Islamic and conventional banks are not driven the increased presence of Islamic banks during the later years of the period under investigation, I excluded the period from 1998 to 2004, thus making the sample more balanced. However, the main results do not change significantly, suggesting that the aggregation issue is unlikely to be relevant (see Appendix 2).

**Figure 12: Comparison Between Islamic and Conventional Banks for the 10 Ratios**



For capital ratios, it is evident from Table 10 and Figure 12 that the average of CAR is far greater than the requirement of Basel II, which requires banks to hold a minimum of 8% of risk-weighted capital. Islamic banks are significantly better capitalised and less leveraged than conventional banks, and the results are statistically and economically significant, under both more sophisticated risk weighting and simple equity to total assets ratios. A possible explanation for this variation is that Islamic banks do not rely on debt financing like conventional banks do, instead depending on shareholder equity for their essential source of funds (Olson & Zoubi, 2008).

Another reason is that Islamic banks reserve a larger layer of capital to subset their lack of sound risk-management tools (Ahmed, 2009). For asset quality indicators, the data do not find any significant differences between the two types of banks, in line with Olson and Zoubi (2008), but not consistent with Beck et al.'s (2013) finding that Islamic banks have better quality assets.

This finding has important implications for Islamic banks as, in theory, Islamic banks should always have a superior asset quality because they are not allowed to shift the credit risk of their trade contracts, such as *murabaha* (which comprise the largest proportion of their assets), to a third party by any risk-shifting tools, such as CDS or the originate and distribute model of securitisation. This fact should motivate Islamic banks to perform a careful evaluation of risk, which should result in better asset quality (Abdulle & Kassim, 2012; Ahmed, 2009; Chapra, 2009). However, the data found no support for this argument. Another possible explanation is that while both types of banks might hold a similar assets quality, Islamic banks might find it more difficult to mitigate their risks later on owing to their underdeveloped risk-management tools.

For management quality measured by CTI, the data show that Islamic banks have an economically higher ratio, a finding that is in line with those of other studies (Beck et al., 2013;

Miniaoui & Gohou, 2013). A possible reason for their poorer efficiency is that Islamic banks have relatively higher overheads because they consist of a team overseeing Islamic banking transactions, such as a Sharia supervisory board and experts monitoring joint-venture contracts and product development (Aggarwal & Yousef, 2000; Rosly & Bakar, 2003).

Furthermore, transaction costs might be a source of efficiency; for example, some Islamic bank contracts, such as *tawarruq* and *murabaha*, require relatively longer processes to execute compared with ordinary loans (Al-Suwailem, 2009; Harvard-SE Workshop, 2007; Nethercott, 2012b). For earnings, the analysis does not find any statistical difference for ROA, but there is an economically significant difference for ROE in favour of conventional banks. However, ROA is argued to be a fairer tool for the comparison of Islamic and conventional banks' earnings, because it shows how efficiently the bank converts its assets into earnings (Dietrich & Wanzenried, 2011; Rosly & Bakar, 2003).

Conversely, ROE is known to be affected by ROA as well as by the bank's degree of financial leverage, which in the case of Islamic banking is significantly lower than conventional banks' (Bashir, 2003), which would lead ROE to be lower because the equity (denominator) is larger. This effect would make the comparison less meaningful. However, I am interested in investigating whether the gap between the two types of banks remains stable over time.

**Table 10: Descriptive Statistics for Both Types of Banks**

GROUP	Proxy	Mean	Islamic	Conventional	t-test	Min.	Max.	Std. Dev.	Std. Islamic	Std. Conv	Obes. Islamic	Obes. Conv	Obes. Total
(C)apital	CAR	20.99	25.05	19.49	-9.52***	12.6	42.23	7.78	9.78	6.27	218	590	808
	CAR(LEV)	23.08	35.03	16.36	-15.40***	8.42	87.23	21.07	28.33	10.85	387	688	1075
(A)sset Quality	NPLs	5.59	5.17	5.76	1.54	0.78	20.67	5.05	5.20	4.99	241	596	837
	provisions	0.91	1.04	0.86	-2.44**	-0.13	3.70	0.97	1.13	0.90	238	588	824
(M)anagement Quality	CTI	40.99	47.77	37.44	-9.19***	16.97	87.33	17.27	20.70	13.91	331	632	963
(E)arning	ROA	2.27	2.29	2.26	-0.19	-2.77	8.43	2.34	3.16	1.73	387	688	1075
	ROE	13.19	9.58	15.22	9.16***	-10.98	30.08	10.06	11.66	8.38	387	688	1075
(L)iquidity	LTD	78.86	83.92	76.59	-3.50***	29.14	159.82	28.73	39.79	21.67	270	600	870
	Fee / Income	17.46	14.45	18.94	7.36***	2.3	35.89	8.75	0.10	0.08	290	592	882
	Liq / Dep	38.02	45.58	34.45	-7.30***	7.19	122.52	27.91	0.39	0.20	292	619	911
SIZE	TA(Millions)	\$9,680	\$5,544	\$12,000	7.37***	\$12	\$101,000	1.41E+07			387	688	1075
AGE	no. years	27	18	34	20.28***	5	87	17.11					

Key: \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1

The findings regarding ROA and ROE contradict those of Awan (2009), Olson and Zoubi (2008) and Rosly and Bakar (2003), who found that Islamic banks generate higher income. A possible explanation for this apparently contradictory finding is that most studies cover relatively short periods, and only those during the Islamic banking boom at the beginning of the new century and prior to the GFC. The data used in the current analysis, however, cover a relatively longer period, including the boom, GFC and recovery periods. The result suggests that in the long term, Islamic banks do not outperform conventional banks in their sustainable earnings. This can also be observed from the variation in the standard deviation (SD) of the earnings of the two types of bank, indicating that Islamic banks are riskier.

All three liquidity indicators show significant differences between the two types of banks. The LTD ratio indicates that Islamic banks mediate more of the deposits they hold, a finding that is consistent with those of Beck et al. (2013) and Olson and Zoubi (2008). The ratio of the proportion of fee income to operational income shows that conventional banks are more involved in fee income than Islamic banks, who rely more on traditional banking models that generate income from intermediating activities rather than from fees and commissions. A possible explanation for Islamic banks' lower dependence on fees is the restrictions on many banking services that are not compliant with the principles of Islamic finance; this explanation is in line with that of Beck et al. (2013). Maturity match ratio shows that Islamic banks are significantly more liquid and consequently less exposed to liquidity risk. The size and age of banks, as measured by total assets and the number of years the banks have been in business, respectively, indicate that Islamic banks are far smaller and younger than conventional banks, which I investigate and control for later in this chapter.

#### **5.4.2 Cross-Country Variations**

In this section I investigate whether the operating performance of Islamic banks compared with conventional banks varies across countries with similar economic, political and cultural characteristics. Overall, it can be seen from Table 11 that the operating performance of Islamic banks, when compared with conventional banks' in the GCC region, varies greatly between countries. This finding confirms that of Beck et al. (2013) who identify similar results in their sample of 22 countries. The finding also suggests that when conducting a comparative analysis of Islamic and conventional banking across countries, these differences should be controlled for.

For capital, the result of the two proxies indicates that there is an economic difference between Islamic and conventional banks in all of the countries in the study, with the exception of Qatar, where there is no significant difference between the two.

For asset quality, the result is mixed, ranging from no difference to significant difference in favour of Islamic banking, and vice versa. It is worth noting that Qatari Islamic banks are found to be more efficient, more profitable, more liquid and have superior asset quality than conventional banks, but are less dependent on fee income and less capitalised – a finding that contradicts evidence from other countries in the sample, as well as from previous studies. There is no significant difference, however, between Islamic banks and conventional banks in Saudi Arabia in terms of asset quality, return on assets and fee income, although Islamic banks were found to be less efficient and generated lower return on equity.

The analysis also shows that the size of the banks, as measured by total assets, is found to have a significant role as a control variable, whereas the age of the banks is not economically significant.

**Table 11: Regression Results for all CAMEL Compounds Sorted by Each Country of the GCC Interaction with Islamic Banks Dummy**

VARIABLES	<u>(C)apital</u>		<u>(A)sset quality</u>		<u>(M)anagement</u>	<u>(E)arning</u>		<u>(L)iquidity</u>		
	(1) CAP	(2) LEV	(3) NPLs	(4) provisions	(5) CTI	(6) ROA	(7) ROE	(8) LTD	(9) LIQ2DP	(10) FEE
<b>BAH*Islam</b>	6.10*** (4.84)	17.27*** (7.54)	0.55 (0.55)	0.38*** (2.00)	8.37*** (3.68)	0.27 (0.81)	-2.41** (-2.37)	22.47** (2.43)	16.88*** (3.63)	-4.18*** (-3.11)
<b>KUW*Islam</b>	1.34* (1.68)	4.58*** (2.72)	2.36*** (3.33)	0.47*** (3.25)	3.50 (1.37)	-0.43* (-1.69)	-3.12*** (-3.16)	-13.20** (-2.39)	-1.80 (-0.55)	-4.33*** (-3.77)
<b>QATAR*Islam</b>	0.75 (0.55)	-2.90 (-1.62)	-3.13*** (-7.38)	-0.57*** (-3.47)	-9.97*** (-3.61)	1.22*** (4.11)	7.14*** (7.94)	20.42* (1.93)	21.26** (2.49)	-6.20*** (-3.65)
<b>SAUDI*Islam</b>	4.74*** (3.10)	22.89*** (5.19)	-0.06 (-0.11)	0.02 (0.14)	12.23*** (4.80)	0.11 (0.38)	-5.33*** (-3.92)	-13.23*** (-2.65)	7.35* (1.69)	-0.34 (-0.16)
<b>UAE*Islam</b>	2.56** (2.08)	0.03 (0.02)	-2.47*** (-5.86)	-0.17*** (-1.71)	8.10*** (4.53)	-0.79*** (-4.28)	-4.68*** (-5.45)	8.88 (1.39)	-8.69*** (-2.85)	-4.91*** (-5.18)
<b>SIZE</b>	-2.72*** (-11.89)	-7.55*** (-17.78)	-1.13*** (-6.68)	-0.06*** (-2.19)	-1.84*** (-3.77)	-0.20*** (-3.27)	1.34*** (6.15)	-5.25*** (-3.92)	-4.79*** (-5.55)	0.58** (2.05)
<b>AGE</b>	0.02* (1.69)	-0.04 (-1.38)	0.01 1.84	-0.00 (1.68)	-0.15*** (-4.17)	0.01 (1.32)	0.08*** (4.75)	-0.64*** (-7.18)	-.11** (-2.33)	0.01 (0.90)
<b>Constant</b>	61.43*** (16.78)	134.84*** (20.31)	22.54*** (8.67)	1.85*** (4.29)	71.38*** (9.57)	5.18*** (5.45)	-8.77*** (-2.68)	198.97*** (9.79)	113.01*** (8.46)	9.34** (2.14)
<b>Observations</b>	808	1,075	828	826	952	1,075	1,075	955	911	874
<b>R-squared</b>	0.34	0.55	0.24	0.18	0.23	0.27	0.42	0.22	0.20	0.11
<b>Country FE</b>	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>Year FE</b>	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
<b>Robust stand. dev.</b>	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
<b>Winsorised</b>	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%

Key: Robust *t*-statistics in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

### **5.4.3 Conventional and Islamic Banks and the Economic Turmoil**

In this section I compare the operating performance of conventional and Islamic banks during and post the GFC, to investigate whether the effect of the crisis and the pace of recovery for the two banking systems are significantly different, the main objective of this chapter. To make the comparison possible and meaningful, I control for some observable factors, including the internal factors of ownership, size and age, and two macroeconomic factors: GDP and inflation. Furthermore, I control for unobservable factors that vary across time and country by including year-country fixed effects (see Equation 2).

#### **5.4.3.1 (C) Capital Adequacy**

For the year-to-year variables interacting with the Islamic banks dummy (Islam\*2007–Islam\*2012), I can see from Table 12 that Islamic banks managed to maintain superiority, as measured by two indicators (models 1 and 2), during the GFC from 2007 to 2009. This finding confirms that of Parashar and Venkatesh (2010). However, the Islamic banks failed to maintain this superiority during the recovery period, with an insignificant difference at the 10% level. Without controlling for any factors, Islamic banks were found to be significantly better capitalised during the recovery period between 2010 and 2012, and that finding can be interpreted by omitting some highly important variables, confirming the importance of controlling to conduct a meaningful comparative analysis.

As far as the two capital ratios are concerned, I found that the less sophisticated capital ratio, measured by the ratio of equity to total assets, shows a higher explanatory power than the more sophisticated risk-weighted capital ratio, as shown by the *R*-squared value of 60% for the less sophisticated ratio compared with the *R*-squared value of 43% for the more sophisticated ratio.

Ownership plays a significant role in determining capital with all variables (except foreign ownership for Model 1) being economically significant. Capitalisation level (measured by the equity to total assets ratio) increased by 13% and 3.45%, respectively, for listing status and foreign ownership, but reduced by 2% for state ownership. The results of listing status and state ownership effects on capitalisation are not in line with those of Iannotta, Nocera, and Sironi (2007), who found that listed and state-owned banks are better capitalised than unlisted and private banks, even though listed banks have a relatively easier access to capital markets.

#### ***5.4.3.2 (A) sset Quality***

For asset quality, Models 3 and 4 show that during the GFC and the recovery period there are no significant differences between conventional and Islamic banks, which is contrary to Beck et al.'s (2013) findings that Islamic banks showed better asset quality. Without controlling for other effects, I found Islamic banks to have lower non-performing loans in the first year of the crisis (2007). All ownership variables are statistically significant with listing status, and foreign and state-owned banks having lower non-performing-loans ratios. The finding of the listed banks is consistent with Iannotta et al.'s (2007) findings that listed banks have higher asset quality because they are positively affected by market discipline mechanisms.

The finding for state-owned banks is somewhat striking because it contradicts the expected signs from previous theoretical and empirical studies, such as Sapienza (2004), who argues that government-owned banks have lower quality loans because they would intervene to expand their country's financial system or to fund projects not profitable enough for privately owned banks to accept. However, in the GCC context, state-owned banks are well positioned, older and larger than private banks, which may explain the difference. State-owned banks have lower provisions as well as earnings (see Models 6 and 7), supporting the argument that there is a positive relationship between earnings and provisions. Banks would reduce their provisions to improve their reported earnings if they were low (Farook et al., 2014).

### **5.3.3.3 (M)anagement Quality**

It is apparent from Table 12 and Model 5 that for the efficiency ratio of cost to gross income, which I use as a proxy for management quality, the gap between conventional and Islamic banks narrowed from a long-term average of 10 points to only 0.29 and 4.42 in the first and the second years of the GFC, respectively; both of these coefficients are insignificant. This suggests that during the GFC, Islamic banks narrowed the enormous gap in efficiency, inherent in the performance of Islamic banking. However, from 2009 onwards, the gap increased again, significantly, to more than the long-term average of 10 points.

Listing status and foreign ownership are not found to influence banks' efficiency, whereas state ownership is. The latter finding regarding state ownership is in line with a substantial body of previous studies, including Iannotta et al. (2007) and Farazi et al. (2011). These authors attribute inefficiency to government intervention, resulting in higher costs, such as the effects of staffing policy and being obligated to deliver financial services to remote areas even though they are not profitable, something that private banks are not expected to do.

### **5.3.3.4 (E)arnings**

Table 13 presents the results of the two ROA and ROE earnings indicators using a fixed-effect model (Models 1–6) and GMM estimator (Models 7–9). During the GFC, Islamic banks outperformed conventional banks in terms of profitability, and these results are statistically and economically significant. The long-term ROA average is 2.27%, with no statistically significant difference between the two banking systems, and in 2007 and 2008, the ROA was 1.31% and 1.34% higher in favour of Islamic banks; the same difference can be observed for ROE. Although the GMM estimation results are slightly different from the fixed-effect results, they do support the underlying argument. The signs of the ROE coefficients are positive, and although the coefficients are statistically insignificant in 2007 and 2008, the finding can still be considered as a positive result in favour of Islamic banks given the fact that the long-run

difference between the two types of banks is significantly higher for conventional banks (see Table 13). This result can explain the outperformance of conventional banks in terms of cost efficiency (CTI) (see Table 12 and Model 5.)

However, the passage of time reveals that after the effects of the GFC spilled over into the real economy, Islamic banks quickly and significantly lost their earnings superiority. This finding supports the argument I put forth, namely that Islamic banks are more exposed to shocks from the real economy than from the international financial sector. Only in 2011 and 2012 could Islamic banks close the gap and show signs of recovery, as evidenced by the statistically insignificant coefficients for those two years. The extra internal variables that I added to this model – namely the capital, cost-to-gross-income, and loan-loss provisions – are found to be highly significant in determining banks' profitability for both ratios of ROA and ROE. Furthermore, the results of GMM models are found to be more significant than fixed-effect estimations, and have the expected signs.

The loans-to-deposits ratio is found to determine ROE and ROA in GMM estimations with a negative relationship. This finding is inconsistent with that of Pasiouras and Kosmidou (2007) but in line with the study of Kosmidou (2008). Fees income is found to determine profitability in GMM estimations, but not in fixed-effect estimations. However, excluding fees income from the models decreases their explanatory power, as indicated by the adjusted *R*-squared values, which suggests that fees income is needed in the model even though it is insignificant.

Loan-loss provisions, a proxy for asset quality, and CTI, a proxy for management efficiency, are found to be economically significant.

Listing is not found to influence earning patterns, whereas foreign ownership shows mixed results. The data show that state ownership negatively affects profitability, confirming

Sapienza's (2004) argument that state-owned banks charge lower interest rates, explaining their lower profit. Similarly, Farazi et al. (2011) suggest that state-owned banks have lower income due to their larger government security holdings and higher costs. Iannotta et al. (2007) suggest a different interpretation for this issue, arguing that state-owned banks in developing countries (as in this present study) play development roles, thus lowering their profitability as they do not focus on profit maximisation, responding instead to social mandate.

#### **5.3.3.5 (L)iquidity**

Turning our focus to the results of three liquidity-related ratios, the values in Table 12, Model 6 suggest that Islamic banks lost their intermediating superiority during the GFC and recovery periods, despite all coefficients being positive; however, the difference between Islamic and conventional banks is not statistically significant at the 10% level. The reason for this is that during the second year of the GFC and afterwards, conventional banks closed the gap by increasing their intermediation level – converting deposits to loans – from the 73% loans-to-deposits ratio to around 80%, whereas Islamic banks maintained their pre-crisis level of 83%. In regard to the liquid-assets-to-deposits ratio (Model 7), Islamic banks have maintained their superiority during the entire period, meaning that regardless of their profitability, they are less likely to face maturity mismatch and consequently the probability of bank runs.

Finally, it can be observed from Model 8 that conventional banks maintain their superiority in generating more income from fees and commissions. However, their level has dropped gradually and become insignificant, indicating that they offset the drop in fee income by an increase in intermediating more deposits, whereas Islamic banks maintain their fee income relatively unchanged.

As for the ownership effect, listed banks are found to have a higher intermediation ratio but less liquidity, which confirms Iannotta et al.'s (2007) findings. Their holding of relatively

fewer liquid assets is likely because listed banks have relatively easier access to capital markets in times of need than do non-listed banks. Foreign banks generate more income from non-lending activities, possibly due to their wider international networks and range of services offered to customers.

**Table 12: Regression Results for Each Year From 2007 to 2012, Interacting with Islamic Dummies After Controlling for Some Well-Known Macroeconomic Ownership Effects and Internal Factors**

VARIABLES	<u>(C)apital</u>		<u>(A)sset Quality</u>		<u>(M)anagement</u>	<u>(L)iquidity</u>		
	(1) CAR	(2) LEV	(3) NPLs	(4) Provisions	(5) CTI	(6) LTD	(7) Liquid Assets / Deposits	(8) Fees / Income
Islam07	6.11*** (3.32)	6.98** (2.34)	0.44 (0.58)	-0.11 (-0.56)	0.29 (0.08)	-0.50 (-0.04)	8.71 (1.29)	-3.16 (-1.32)
Islam08	2.90* (1.74)	7.64** (2.43)	-0.15 (-0.26)	0.21 (0.85)	4.42 (0.98)	-1.78 (-0.14)	18.20*** (2.74)	- (-2.88)
Islam09	2.49* (1.74)	6.47** (2.13)	-0.64 (-1.18)	-0.11 (-0.40)	14.62*** (3.39)	-0.33 (-0.03)	15.41** (2.25)	-3.29 (-1.57)
Islam10	0.93 (0.57)	4.61 (1.48)	-0.67 (-1.05)	0.06 (0.23)	9.19** (2.11)	8.60 (0.64)	10.31* (1.74)	-3.88** (-2.03)
Islam11	1.11 (0.75)	4.97 (1.63)	-0.00 (-0.00)	-0.32 (-1.22)	13.87*** (3.69)	10.46 (0.85)	20.41*** (3.12)	-1.69 (-0.86)
Islam12	-0.05 (-0.04)	4.09 (1.16)	-0.02 (-0.03)	0.00 (0.01)	10.01*** (2.83)	11.83 (0.93)	13.91** (2.38)	-2.11 (-1.16)
STATE	1.47*** (2.89)	2.00* (1.93)	-0.17 (-0.74)	-0.29*** (-4.26)	4.52*** (4.48)	-0.71 (-0.22)	-0.67 (-0.36)	-0.59 (-0.96)
FOREIGN	-0.77 (-1.27)	-3.45*** (-2.22)	-0.77** (-2.39)	-0.12 (-1.24)	-0.30 (-0.17)	3.87 (0.80)	3.51 (1.44)	2.54** (2.51)
LISTED	-2.54*** (-3.43)	-13.13*** (-7.72)	-0.85* (-1.80)	-0.04 (-0.35)	-0.34 (-0.24)	-11.37** (-2.25)	-26.11*** (-9.09)	0.12 (0.12)
GDP	0.00 (0.03)	0.44*** (3.57)	-0.08** (-2.18)	-0.04*** (-4.32)	-0.10 (-0.67)	1.13*** (2.68)	0.49** (2.04)	0.24*** (2.81)
INFL	-0.24*** (-2.70)	-0.18 (-1.10)	-0.04 (-0.98)	-0.01 (-0.76)	0.28 (1.26)	-0.30 (-0.44)	-0.30 (-0.82)	0.08 (0.64)
OIL	0.07*** (5.46)	0.12*** (5.04)	-0.03*** (-3.10)	0.00 (1.07)	-0.02 (-0.52)	0.02 (0.22)	-0.19*** (-3.85)	0.00 (0.12)
SIZE	-3.23*** (-13.80)	-8.47*** (-19.82)	-0.28** (-1.98)	-0.05* (-1.77)	-2.66*** (-5.14)	-4.51*** (-2.86)	-3.18*** (-3.48)	0.43 (1.52)
AGE	0.01 (0.59)	-0.09*** (-3.21)	0.02** (2.14)	-0.00* (-1.80)	-0.12*** (-3.56)	-0.58*** (-5.73)	-0.08 (-1.50)	0.02 (0.95)
Constant	66.97*** (19.09)	152.78*** (24.02)	12.53*** (5.49)	2.19*** (4.96)	85.30*** (11.53)	190.76*** (8.19)	120.34*** (8.94)	8.48* (1.94)
Observations	808	1,075	661	826	952	955	911	874
R-squared	0.43	0.60	0.31	0.23	0.28	0.22	0.32	0.14
Country FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Robust std dev	YES	YES	YES	YES	YES	YES	YES	YES
Winsorised	5%	5%	5%	5%	5%	5%	5%	5%

Key: Robust t-statistics in parentheses: \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1

**Table 13: Regression Results for Earning Components Using Fixed Effects and System GMM**

VARIABLES	Fixed Effects						System GMM		
	(1) ROA	(2) ROA	(3) ROA	(4) ROE	(5) ROE	(6) ROE	(7) ROA	(8) ROE	(9) ROE
L.ROA / ROE							0.31*** (6.92)	0.09 (1.19)	0.20*** (3.56)
Islam07	1.24** (2.40)	1.24** (2.50)	1.34*** (2.73)	5.33*** (2.77)	4.99*** (2.78)	5.34*** (3.16)	1.18** (2.15)	1.24 (0.61)	1.81 (0.94)
Islam08	1.60** (2.41)	1.40** (2.15)	1.22* (1.92)	5.51** (2.37)	5.16** (2.29)	4.25* (1.83)	0.79 (1.20)	1.10 (0.44)	2.56 (1.26)
Islam09	-0.20 (-0.77)	-0.27 (-1.09)	-0.27 (-1.07)	-1.03 (-0.65)	-1.11 (-0.72)	-1.95 (-1.33)	-1.13* (-1.66)	-6.42*** (-2.93)	-9.40*** (-4.16)
Islam10	-0.44 (-1.15)	-0.62 (-1.61)	-0.71* (-1.69)	-2.21 (-1.18)	-2.44 (-1.26)	-3.71* (-1.85)	-1.11* (-1.72)	-9.10*** (-3.25)	-7.95*** (-3.51)
Islam11	-0.01 (-0.04)	0.00 (0.01)	-0.08 (-0.31)	-0.20 (-0.12)	-0.35 (-0.21)	-0.36 (-0.24)	-0.70 (-1.02)	-8.13** (-2.41)	-5.07** (-2.35)
Islam12	-0.02 (-0.07)	-0.03 (-0.13)	-0.04 (-0.19)	0.27 (0.17)	0.23 (0.16)	-0.01 (-0.01)	-1.14* (-1.69)	-8.00* (-1.84)	-3.50 (-1.35)
STATE	-0.31*** (-3.71)	-0.35*** (-4.20)	-0.40*** (-4.66)	-0.61 (-1.35)	-0.90* (-1.95)	-1.14** (-2.54)	-0.98* (-1.74)	-11.62** (-2.36)	1.73 (0.35)
FOREIGN	-0.16 (-1.23)	-0.15 (-1.24)	-0.22* (-1.75)	-0.16 (-0.20)	-0.33 (-0.45)	-0.45 (-0.61)	-1.22 (-1.29)	-8.50 (-1.51)	5.81 (0.94)
LISTED	0.32** (1.98)	0.34** (2.09)	0.24 (1.47)	1.25 (1.40)	0.70 (0.79)	0.96 (1.11)	0.34 (1.31)	2.88 (1.00)	-2.83 (-1.23)
GDP	0.02 (1.60)	0.02* (1.79)	0.02* (1.92)	-0.06 (-0.81)	-0.06 (-0.96)	-0.06 (-0.93)	-0.02*** (-2.65)	-0.07 (-0.64)	-0.00 (-0.02)
INFL	-0.01 (-0.59)	-0.01 (-0.64)	-0.01 (-0.80)	-0.17* (-1.73)	-0.17* (-1.77)	-0.16 (-1.63)	0.03 (1.28)	0.11 (0.80)	-0.15 (-1.43)
OIL	-0.00 (-0.68)	-0.00 (-0.84)	-0.00 (-0.58)	-0.03** (-2.19)	-0.03** (-2.22)	-0.03** (-2.40)	0.02*** (3.71)	0.05 (1.26)	-0.03* (-1.88)
AGE	-0.00 (-0.51)	-0.00 (-0.42)	-0.00 (-0.99)	0.02 (1.22)	0.02 (1.59)	0.03** (2.13)	-0.08*** (-4.96)	-0.45*** (-3.72)	-0.03 (-0.33)
SIZE	-0.11** (-2.10)	-0.09 (-1.53)	-0.07 (-1.16)	-0.02 (-0.06)	0.15 (0.48)	0.28 (0.89)	0.12 (0.66)	1.09 (0.94)	0.87 (0.90)
CTI	-0.05*** (-9.40)	-0.05*** (-9.32)	-0.05*** (-9.29)	-0.25*** (-9.80)	-0.25*** (-10.02)	-0.23*** (-9.64)	-0.06*** (-12.76)	-0.25*** (-9.42)	-0.23*** (-7.97)
CAR	0.05*** (4.58)	0.05*** (4.87)	0.06*** (5.47)	-0.10** (-2.44)	-0.09** (-2.04)	-0.07 (-1.41)	0.04*** (6.61)	-0.02 (-0.17)	- (-)
Provisions	-0.11** (-2.11)	-0.11** (-2.29)	-0.64 (-1.21)	-0.94*** (-3.71)	-0.75*** (-3.00)	-0.68*** (-2.84)	-0.19*** (-5.65)	-0.92*** (-4.71)	-0.76*** (-8.18)
Fees	-0.00 (-0.32)	-0.00 (-0.10)	- (-)	0.00 (0.05)	- (-)	- (-)	0.02* (1.80)	0.05* (1.70)	0.02 (1.14)
LTD	0.00 (0.13)	- (-)	- (-)	-0.02* (-1.84)	-0.01 (-1.34)	- (-)	-0.01*** (-2.83)	-0.03** (-2.33)	-0.01 (-1.04)
Constant	4.70*** (4.84)	4.15*** (3.99)	3.76*** (3.39)	29.50*** (5.55)	26.41*** (4.88)	21.59*** (3.82)	323.62*** (3.23)	1,201.90* (1.93)	0.00 (-)
Observations	808	808	808	808	808	808	620	620	620
Wald-test	-	-	-	-	-	-	(32)56826.97	(32) 87334.50	(31) 356226
Hansen test (p-value)	-	-	-	-	-	-	1.00	1.00	1.00
AB test AR(1) (p-value)	-	-	-	-	-	-	0.00	0.01	0.02
AB test AR(2) (p-value)	-	-	-	-	-	-	0.11	0.19	0.20
R-squared	0.5671	0.5674	0.5443	0.5761	0.5596	0.5563	-	-	-
Adj. R-squared.	0.5406	0.5421	0.5199	0.5502	0.5348	0.5325	-	-	-
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Winsorised	5%	5%	5%	5%	5%	5%	5%	5%	5%

Key: Robust *t*-statistics\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

#### **5.4.4 Robustness Tests**

To ensure that the results are robust, I tried a variety of specifications and different combinations of variables, with no statistically significant differences. I used a white noise robust standard error to control for the presence of heteroscedasticity. I also tested whether a fixed-effect model is more appropriate to the analysis than a random-effect model, using the Hausman test, which confirmed that the fixed-effect model is more appropriate. I used the GMM estimator when it is more appropriate, namely in analysing the earnings component to avoid some econometric issues. All time (year) dummies were included only if they were jointly statistically different from zero, which was the case in all of the equations except the fees equation. The result from this analysis implies that it is necessary to control for unobserved factors varying across time in the model; factors that could not be controlled were excluded from the models. Furthermore, I tried using clustered standard errors across countries and banks to control for the presence of autocorrelation.

In general, even with all these robustness tests, the main results did not change significantly. Although there were a few exceptions for some control variables, which is in line with Baltagi's (2008) study, Baltagi points out this issue is not problematic in micro panels and can only cause problems in macro panels with long-time series (more than 20–30 years), which is not the case here. For these two reasons, I decided not to include clustered standard errors in the models. I tried some different proxies for indicators found to be insignificant, including asset quality. As an alternative, I tried reserve to gross loans as a proxy for asset quality; however, the result did not change. Furthermore, I excluded Oman from the sample because the country has only one newly formed Islamic bank; again, the results did not change. Finally, I re-estimated the regressions in Table 14, using two dummy variables representing crisis and post-crisis periods, to double-check whether the year-to-year parameters are jointly significant and I found strong evidence that the results hold.

**Table 14: Financial Indicators Based on GFC Period (2007–2008) and Post-GFC Period (2009–2012)**

Variables	<u>(C)apital</u>		<u>(A)sset Quality</u>		<u>(M)anagement</u>	<u>(E)arning</u>			<u>(L)iquidity</u>	
	(1) CAR	(2) LEV	(3) NPLs	(4) Provisions	(5) CTI	(6) ROA	(7) ROE	(8) LTD	(9) Liquid Assets / Deposits	(10) Fees / Income
GFC*Islam	4.42***	7.32***	0.11	0.06	2.43	1.41***	5.56***	4.77	13.59***	-4.32***
Post GFC*Islam	-3.42	-3.32	-0.16	-0.37	-0.83	-3.36	-3.83	-0.83	-2.82	(-3.09)
	1.21	5.08***	0.05	-0.09	11.98***	-0.25*	-1.43*	4.04	15.03***	-2.74***
	-1.53	-3.03	-0.1	(-0.71)	-5.71	(-1.64)	(-1.65)	-1.01	-4.59	(-2.78)
LISTED	-2.53***	-13.13***	-1.89***	-0.03	-0.34	-0.38***	-0.85**	14.78***	-26.07***	-0.06
	(-3.41)	(-7.73)	(-3.13)	(-0.31)	(-0.24)	(-4.62)	(-2.00)	-4.24	(-9.09)	(-0.06)
FOREIGN	-0.74	-3.43**	-1.73***	-0.12	-0.3	-0.20*	-0.66	-3.11	3.46	2.56**
	(-1.23)	(-2.22)	(-3.96)	(-1.25)	(-0.17)	(-1.73)	(-0.90)	(-1.04)	-1.42	-2.53
STATE	1.48***	2.01*	-0.61*	-0.29***	4.52***	0.35**	1.95**	4.04*	-0.68	-0.69
	-2.91	-1.94	(-1.94)	(-4.28)	-4.48	-2.26	-2.48	-1.9	(-0.37)	(-1.14)
GPD	0.01	0.44***	-0.12**	-0.04***	-0.1	-0.09*	0.05	0.72***	0.47**	0.21***
	-0.14	-3.58	(-2.39)	(-4.40)	(-0.67)	(-1.72)	-0.18	-2.68	-1.97	-3.11
Inflation	-0.24***	-0.18	0.04	-0.01	0.28	0	0.02*	-0.29	-0.32	0.19**
	(-2.64)	(-1.11)	-0.79	(-0.78)	-1.26	(-0.78)	-1.69	(-0.72)	(-0.88)	-2.18
SIZE	-3.25***	-8.47***	-0.92***	-0.05*	-2.66***	0.01	-0.13**	-5.01***	-3.18***	0.55**
	(-13.96)	(-19.88)	(-5.05)	(-1.77)	(-5.14)	-0.92	(-1.97)	(-4.54)	(-3.48)	-2.29
AGE	0.01	-0.09***	0.01	-0.00*	-0.12***	-0.02	-0.23**	-0.06	-0.08	0.01
	-0.61	(-3.22)	-1.53	(-1.80)	(-3.56)	(-1.15)	(-2.53)	(-1.09)	(-1.50)	-0.6
CTI	-	-	-	-	-	-0.05***	-0.25***	-	-	-
						(-9.75)	(-10.26)			
CAR	-	-	-	-	-	0.04***	-0.15***	-	-	-
						-4.1	(-3.69)			
Provisions	-	-	-	-	-	-0.47***	-3.42***	-	-	-
						(-5.48)	(-8.27)			
Fees	-	-	-	-	-	0	0.03	-	-	-
						-0.35	-0.89			
LTD	-	-	-	-	-	-	-0.02*	-	-	-
							(-1.86)			
Constant	67.90***	154.04***	20.30***	2.34***	84.90***	4.73***	29.41***	125.60***	102.26***	7.42**
	-19.48	-24.28	-7.07	-4.92	-11.31	-4.54	-5.24	-8.11	-6.76	-1.98
Observations	808	1,075	828	826	952	808	808	870	911	874
R-squared	0.43	0.6	0.28	0.23	0.28	0.6	0.63	911	0.32	0.13
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	NO
Robust std deviation	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Winsorised	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%

Key: Robust *t*-statistics: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Because quarterly data are unavailable, I tried to include 2009 into the crisis period as NBER suggests that the end of the US recession was June 2009. The results of this model (not reported) shows that when 2009 is included, the crisis period becomes statistically insignificant in many cases. This result suggests that 2008 can be considered as the cut-off date between the crisis and the post-crisis periods.

## **5.5 Summary**

In this chapter, I empirically evaluated and compared the operating performance of Islamic and conventional banks prior to, during and post the GFC, in terms of their capital, asset quality, management quality, earnings and liquidity via the CAMEL model. The analysis, using data from 1998 to 2012, was based on a sample of 101 banks across six countries of the GCC region, which share similar economic, political and cultural characteristics. I diminished omitted variable biases by controlling for ownership differences, internal factors, macroeconomic factors and unobserved omitted variables varying across countries and years. I found that Islamic banks are better capitalised, more liquid and have higher intermediation levels than conventional banks for the overall sample period (1998 to 2012) and during different economic conditions. Conversely, conventional banks outperform Islamic banks in management efficiency, fee income and return to their shareholders' equity, and had slightly better asset quality, as proxied by loan-loss provisions. Furthermore, I found no significant difference between the two banking systems in terms of their return on total assets or non-performing loans.

Regarding cross-country variations, I found statistical and economic differences in the performance of Islamic and conventional banks within the same economy, suggesting these differences should be taken into account in comparative studies. Qatari Islamic banks were found to outperform conventional banks in terms of asset quality, management quality, earnings

and liquidity, and hence can be considered to be an example of best practice in Islamic banking in the GCC region.

The data show strong evidence that Islamic banks outperformed conventional banks during the GFC in terms of capitalisation, profitability and liquidity, and narrowed the gap in efficiency over the same period, with no difference in asset quality. This supports the argument that Islamic banks were less exposed to the GFC due to the restrictions, based on Sharia law, on dealing in toxic assets. However, when the financial shock spilled from the financial sector into the real economy during the later stages of the GFC, Islamic banks were found to be less resilient to real economy shocks owing to the banks' reliance on debt-based rather than PLS contracts. As a result, Islamic banks suffered even more than conventional banks and lost their superiority in capitalisation, performing more poorly than conventional banks in terms of profitability and efficiency. This finding implies that Islamic banks are more vulnerable to real economic conditions, whereas conventional banks are more vulnerable in times of global financial shocks.

## **Chapter 6: Cost and Profit Efficiency and the Global Financial Crisis<sup>15</sup>**

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<sup>15</sup> A conference paper based on this chapter was presented at the Conference on Applied Financial Modelling, which was held 4 February 2016 at Deakin University, Melbourne, Australia, and at the XXIV International Rome Conference on Money, Banking and Finance. The author has also has been invited to submit a paper based on this chapter to the *Journal of International Financial Markets, Institutions & Money*.

## 6.1 Introduction

The purpose of this chapter is to continue the empirical analysis to provide an understanding of how well the Islamic banking sector performed in terms of operating efficiency, compared with conventional banking, prior to, during and post the GFC. Efficiency analysis summarises the main areas of performance, either financial or non-financial, into a single score which accounting ratios analysis is not able to do (Rouse, Harrison, & Chen, 2010). By analysing its efficiency, bankers, policymakers, economists and regulators of Islamic financial institutions may be in a better situation to face future financial crises with appropriate policies, practices and theories.

This chapter empirically evaluates the cost and profit efficiency of Islamic banks compared with conventional banks in the GCC, which in 2015 represented 66.2% of the total assets of Islamic finance worldwide (Ernst & Young, 2015). Comparisons of the performance of Islamic and conventional banking during the GFC have already been undertaken by some researchers, including Belanès, Ftiti, and Rym (2015), Mobarek and Kalonov (2014), and Rosman, Wahab, and Zainol (2014). However, the current study differs from earlier empirical research on multiple levels.

First, at the data level, I use a homogeneous sample, consisting of six countries in the GCC with common economic, political and cultural characteristics to ensure that results are less likely to be driven by differences between sample countries. Furthermore, I use annual data in order to assess and compare the real effect of the GFC during different stages of the crisis.

Second, at the methodological level, the analysis estimates cost and profit efficiency rather than technical efficiency, which was used in prior studies. Cost and profit efficiency are broader concepts than technical efficiency as they take into account the prices of inputs and outputs. Furthermore, employing multiple innovative econometric estimators, namely Tobit

and Truncated estimators with bootstrapping, avoids some serious econometric issues that can lead to invalid inferences.

Third, at the theoretical level, I include the post-GFC period to investigate the impact of indirect exposure and the pace of recovery, and whether this differed between Islamic and conventional banks.

Finally, I examine some unique characteristics that might explain differences between the two banking systems, namely the effect of ownership to test some hypotheses found in other markets such as home fields versus global factors for foreign banks, as well as agency theory for state-owned banks.

The data offer strong evidence that during the GFC, Islamic banks were more cost efficient than conventional banks. In addition, Islamic banks closed the inherent gap between the two banking systems in terms of profit efficiency to an insignificant level, compared with the highly significant level in the period prior to the GFC and through the entire period under investigation. These findings could be taken as strong support of the theoretical argument that Islamic banks were less exposed to the GFC due to their constraints on trading in prohibited assets under Islamic finance principles, given that subprime assets are considered one of the key causes of the crisis.

Conversely, when the financial shock spilled over from the financial sector to the real economy industries during the period post-GFC, Islamic banks suffered even greater than conventional banks in terms of profit efficiency and lost the cost efficiency superiority gained during the GFC. This suggests that Islamic banking is more linked with real economic conditions, while conventional banking is more linked with the global financial industry. For ownership, some evidence was found for home-field advantage but not for global advantage or agency theory.

The remainder of this chapter is organised as follows: section 6.2 considers previous empirical evidence, section 6.3 presents the data and methodology, section 6.4 presents the empirical analysis and results, and section 6.5 summarises the chapter.

## **6.2 Previous Empirical Evidence**

A substantial body of literature investigates the efficiency of Islamic banking using economic-based efficiency measures (see Table 15). However, this thesis only reviews studies that examine the operational efficiency of Islamic banking during the GFC. There appears to be only three such empirical studies: Belanès et al. (2015), Mobarek and Kalonov (2014), and Rosman et al. (2014).

Rosman et al. (2014) examined the technical efficiency of Islamic banks in 19 Middle Eastern and Asian countries between 2007 and 2010, using a sample of 79 Islamic banks. The authors concluded that Islamic banks were able to maintain their efficiency level during the GFC, and found that capital and profitability were the main determinants of efficiency. However, the authors did not use a second-stage analysis involving a regression model to investigate the impact of the GFC; instead, their conclusions were based on the first stage, namely the efficiency scores over time.

Belanès et al. (2015) studied the impact of the GFC on the technical efficiency of 30 Islamic banks in the GCC using Data Envelopment Analysis (DEA) from 2005 to 2011. They found that there was a slight but not “considerable” decline in the banks’ efficiency levels during the GFC. Again, this study was based on only one stage with no statistical procedures.

Mobarek and Kalonov (2014) were the only researchers to employ a cross-sectional comparison between Islamic and conventional banking, though their main focus was on the relationship between financial soundness and technical efficiency rather than the impact of the

GFC. However, based on annual efficiency scores, the authors did conclude that the GFC had no visible impact on Islamic banking.

One common limitation of all of the three papers just discussed is that the authors did not use a formal statistical procedure to assess the significance of their results when making conclusions about the impact of the GFC on Islamic banks.

This chapter aims to contribute to the ongoing debate by conducting an empirical analysis with the following considerations. First, the study is restricted to a homogeneous sample from six countries with common economic, political and cultural characteristics – namely the GCC, which covers 66.2% of the total assets of Islamic banking. This limits the chance of the findings being driven by the differences between sample countries. Second, the use of annual data enables the documentation of the real impact at different phases of the crisis. Third, the recovery period post-GFC is included to investigate the pace of recovery and whether the pace differs between Islamic and conventional banks. Finally, some well-documented factors that might explain the differences between the two types of banking are controlled for, and a formal statistical procedure using multi-econometric techniques is employed.

**Table 15: Selected Papers on the Efficiency of Islamic Banking Using Economic-Based Efficiency Measures**

Author(s)	Technique(s)	Sample		Findings	Effect of the GFC
Abdul-Majid, Saal, and Battisti (2010)	Distance function approach	10 Islamic countries 1996–2002	111 banks (23 Islamic)	Islamic banks have lower outputs for given inputs; country effects play a significant part	NO
Ahmad and Rahim Abdul- Rahman (2012)	Technical efficiency	Malaysia 2003–2007	10 banks (2 Islamic)	Conventional banks outperformed Islamic banks in all efficiency measures	NO
Al-Khasawneh, Bassadat, Aktan, and Darshini Pun Thapa (2012)	Cost and revenue efficiency (DEA)	North Africa 2003–2006	20 banks (9 Islamic)	Islamic banks had higher revenues and cost efficiency	NO
Bader, Mohamad, Ariff & Hassan (2008)	Cost, revenue and profit efficiency (DEA)	21 Islamic countries 1990–2005	80 banks (43 Islamic)	No significant differences were found between the efficiency of conventional and Islamic banks	NO
Belanès et al. (2015)	Technical efficiency	GCC 2005–2011	30 Islamic banks	There was a slight decline in efficiency level during the GFC	YES
Brown and Skully (2006)	Cost efficiency (DEA)	11 Islamic countries 2005	20 Islamic banks	No obvious patterns found among profitability, Islamic financing and efficiency	NO
Gishkori & Ullah (2013)	Technical efficiency (DEA)	Pakistan 2007–2011	34 banks (5 Islamic)	Islamic banks were less efficient	NO
Hassan, Mohamad, and Bader (2009)	Cost, revenue and profit efficiency (DEA) Technical efficiency (SFA / DEA)	MENA 1990–2005	44 banks (22 Islamic)	No significant differences were found between the efficiency of conventional and Islamic banks	NO
Kamarudin, Nordin, Muhammad, and Hamid (2014)	Cost, revenue and profit efficiency (DEA) Technical efficiency (DEA)	GCC 2007–2011	74 banks (27 Islamic)	Islamic banks have lower cost, revenue and profit efficiency than conventional banks	NO
Mobarek & Kalonov (2014)	Technical efficiency (SFA / DEA) Cost and profit efficiency (SFA)	18 Islamic countries 2004–2009	408 banks (101 Islamic)	Conventional banks were more efficient than Islamic banks. The impact of the GFC was not visible.	YES
Mokhtar, Abdullah, and Alhabshi (2008)	Technical / cost efficiency (DEA) Technical efficiency (DEA)	Malaysia 1997–2003	21 Islamic windows, 2 Islamic banks, 20 conventional banks	Islamic banks were more efficient than the Islamic windows but less efficient than the conventional banks	NO
Olson and Zoubi (2011)	Cost and profit efficiency (DFA)	MENA 2000–2008	96 banks (16 Islamic)	Islamic (conventional) banks were more (less) profitable but less (more) cost efficient.	NO
Rosman et al. (2014)	Technical efficiency (DEA)	19 Islamic countries 2007–2010	79 Islamic banks	Islamic banks were able to sustain operations through the crisis	YES
Srairi (2010)	Cost and profit efficiency (SFA) Technical efficiency (DEA)	GCC 1999–2007	71 banks (23 Islamic)	Conventional banks were more efficient than Islamic banks: there was a positive correlation of efficiency with bank capitalisation and earnings and a negative correlation with operation cost; a higher level of lending increased (decreased) the profit (cost) efficiency	NO
Tai (2014)	Cost function (DFA) Technical efficiency	GCC 2003–2011	58 banks (11 Islamic)	Both the most efficient bank and the least efficient bank were Islamic	NO
Yudistira (2004)	Technical efficiency (DEA) Technical efficiency	Worldwid e1997–2000	18 Islamic banks	Islamic banks suffered from the Asian crisis	NO

## **6.3 Data and Methodology**

### **6.3.1 Data**

The balance sheet data for the six GCC countries were sourced from the Bankscope database for 80 banks between 1999 and 2012. It is worth noting that the number of banks is fewer than analysed in the previous chapter because of data unavailability. Macroeconomic data, including inflation and gross domestic product (GDP) data, were obtained from the International Monetary Fund (IMF) and the World Bank. The GCC region was chosen for a variety of reasons including that the GCC is a \$US1.65 trillion economy measured by its GDP, and Saudi Arabia, a member of the GCC, is among the G20 economies.

An unbalanced dataset (see Table 16 for more details) is employed because data from before 2000 are not completely available electronically, and many banks, especially Islamic banks, were formed during the period under investigation. For both of these reasons, the dataset for the efficiency inputs and outputs is strongly unbalanced, with a total of 741 observations of efficiency scores out of a possible 1,120. Countries with a dual banking system, in which conventional and Islamic banks operate side by side, were all included, although the data from Oman was not comprehensive. The only Islamic bank in Oman had insufficient data and so was not included in the analysis, although the conventional Omani banks were kept for this study because Oman is a member of the GCC and has similar political, economic and social characteristics to the other members. The inclusion of country-year dummies in the analysis ensures that factors that cannot be observed but that vary across countries and years can be handled. Banks with a minimum of one year's data are included.

Furthermore, ensuring that the estimation of DEA is not driven by the presence of some extreme values is crucial as this can be a serious issue in estimating efficiency scores (Margaritis & Psillaki, 2010). Therefore, any observations whose input / output prices are

greater than 2.5 standard deviations from the mean value of the corresponding year are excluded (Isik & Hassan, 2002). All independent variables are winsorised at the fifth and 95th percentiles.

**Table 16: Dataset Used for Analysing Operating Efficiency**

	Number of banks	%
<b><i>Sample by country:</i></b>		
Saudi Arabia	11	13.8
Qatar	10	12.5
Kuwait	11	13.8
UAE	22	27.5
Bahrain	20	25
Oman	<u>6</u>	<u>7.5</u>
<b>Total</b>	<b>80</b>	<b>100</b>
<b><i>Ownership:</i></b>		
State (co)owned	38	47.5
Privately owned	<u>42</u>	<u>52.5</u>
<b>Total</b>	<b>80</b>	<b>100</b>
Foreign (co)owned	15	18.2
Domestically owned	<u>65</u>	<u>81.8</u>
<b>Total</b>	<b>80</b>	<b>100</b>
<b><i>Listing status:</i></b>		
Listed	64	80
Unlisted	<u>16</u>	<u>20</u>
<b>Total</b>	<b>80</b>	<b>100</b>
<b><i>Bank type:</i></b>		
Conventional	50	62.5
Islamic	<u>30</u>	<u>37.5</u>
<b>Total</b>	<b>80</b>	<b>100</b>

For the classification of bank type – Islamic or conventional – the classification offered by the Bankscope dataset was double-checked with information from each bank’s documentation and website. Only fully-fledged Islamic banks were included; conventional banks offering Islamic banking services were treated as conventional.

Identifying the precise dates of the GFC was important. The National Bureau of Economic Research (NBER) identifies December 2007 to June 2009 as the dates of the recession, while Iley and Lewis (2013) argue that the crisis began on 7 February 2007. Clearly, the dating of the financial crisis is not straightforward. However, as the Bankscope database

only offers annual data, making the task harder, 2007 is considered here to be the beginning of the crisis.

## **6.3.2 Methodology**

### ***6.3.2.1 Non-parametric Approach for Cost and Profit Efficiency***

Many different models have been used by researchers to look at cost and profit efficiency; for example, non-parametric techniques such as DEA and Free Disposable Hull (FDH) Analysis, and parametric techniques such as the Stochastic Frontier Approach (SFA), the Thick Frontier Approach (TFA) and the Distribution-free Approach (DFA). For this study, I decided to use DEA, a non-parametric approach, to construct an efficiency frontier, employing linear programming developed by Charnes, Cooper, and Rhodes (1978).

This method is a deterministic technique that does not require prior assumptions, which means there is no need to estimate regression parameters or to distinguish between dependent and independent variables or error terms (Margaritis & Psillaki, 2010). However, this does not mean that DEA is free of drawbacks. Outliers are one of the most serious issues in non-parametric approaches, unlike outliers in parametric approaches, which can be detected by conducting diagnostic tests on residuals (Wilson, 1993). In addition, parametric approaches allow for controlling for some factors, such as country-level factors in the main estimation of the frontier (Srairi, 2010).

This study employs a non-parametric model to estimate cost and profit efficiency, taking into account the model's main drawbacks. Prior studies investigating the impact of the GFC on Islamic banking used technical efficiency (Belanès et al., 2015; Mobarek & Kalonov, 2014; Rosman et al., 2014), whereas this study investigates cost and profit efficiency. According to Pasiouras, Tanna, and Zopounidis (2009), cost efficiency is a broader concept than technical efficiency as it takes into consideration both technical and allocative efficiency.

Profit efficiency is also a broader concept as it encompasses both costs and revenues in the estimation of efficiency. This study focuses on Constant Return to Scale (CRS), which has a higher discriminative power, rather than Variable Return to Scale (VRS), which compares a bank only with banks of a similar size. The main reason for choosing CRS is that scale effect is accounted for and tested in the second stage of the analysis, following the procedures of Ariff and Can (2008) and Zelenyuk and Zelenyuk (2015).

Zhu (2014) proposed the following formula for cost efficiency:

$$\begin{aligned}
 & \min \sum_{i=1}^m p_i^o \tilde{x}_{io} \\
 & \text{subject to} \\
 \text{CRS} \quad & \sum_{j=1}^n \lambda_j x_{ij} \leq \tilde{x}_{io} \quad i = 1, 2, \dots, m; \\
 & \sum_{j=1}^n \lambda_j y_{rj} \geq y_{ro} \quad r = 1, 2, \dots, s; \\
 & \lambda_j, \tilde{x}_{io} \geq 0
 \end{aligned}$$

where  $p$  is unit price of the input  $i$  and unit price of the output  $r$  of  $o$  the decision-making units (DMU). These price data may vary from one DMU to another.

The following formula for profit efficiency proposed by Zhu (2014) is employed in this study:

$$\begin{aligned}
 & \max \sum_{r=1}^s q_r^o \tilde{y}_{ro} - \sum_{i=1}^m p_i^o \tilde{x}_{io} \\
 & \text{subject to} \\
 \text{CRS} \quad & \sum_{j=1}^n \lambda_j x_{ij} \leq \tilde{x}_{io} \quad i = 1, 2, \dots, m \\
 & \sum_{j=1}^n \lambda_j y_{rj} \geq \tilde{y}_{ro} \quad r = 1, 2, \dots, s \\
 & \tilde{x}_{io} \leq x_{io}, \tilde{y}_{ro} \geq y_{ro} \\
 & \lambda_j \geq 0
 \end{aligned}$$

Empirically, DEA has been heavily used not only in the context of banking internationally (Ariff & Can, 2008; Barr & Siems, 1994; Barth, Lin, Ma, Seade, & Song, 2013; Delis, Koutsomanoli-Fillipaki, Staikouras & Katerina, 2009; Isik & Hassan, 2002; Margaritis & Psillaki, 2010; Moradi-Motlagh & Babacan, 2015; Ray & Das, 2010; Staub et al., 2010; Tatom & Houston, 2011), but also in Islamic banking literature to evaluate bank efficiency

(Abdul-Majid et al., 2010; Ahmad & Rahim Abdul-Rahman, 2012; Al-Khasawneh et al., 2012; Bader et al., 2008; Brown & Skully, 2006; Gishkori & Ullah, 2013; Hassan et al., 2009; Kamarudin et al., 2014; Mobarek & Kalonov, 2014; Mokhtar et al., 2008; Olson & Zoubi, 2011; Rosman et al., 2014; Srairi, 2010; Tai, 2014; Yudistira, 2004).

**Table 17: DEA Inputs and Outputs**

Variables		Mean (000)	Std Dev.	Conventional	Islamic	t-test
Inputs	Deposits	\$9,830,965.00	1.26E+07	\$ 10,700,000.00	\$7,032,833.00	3.4***
	Labour	\$94,502.88	1.14E+05	\$95,752.35	\$90,486.22	0.53
Outputs	Loans	\$7,452,820.00	9.93E+06	\$ 7,963,980.00	\$5,809,597.00	2.53**
	Other earning assets	\$4,087,671.00	5.21E+06	\$ 4,563,841.00	\$2,556,931.00	4.53***
Input prices	Price of funds	0.0297	0.0263	0.0277	0.036	-3.71***
	Price of labour	0.0092	0.0047	0.0084	0.0115	-7.66***
Output prices	Price of loans	0.0515	0.0397	0.0482	0.0622	-4.15***
	Price of OEA	0.0712	0.2391	0.0707	0.0726	-0.09

Key: \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1

The choice of the set of inputs and outputs is an issue still not settled in banking studies and is heavily subject to data availability and the approach selected. For example, in some cases deposits are treated as an input (Barth et al., 2013; Ray & Das, 2010; Staub et al., 2010) which is appropriate under the intermediation approach, whereas in others they are treated as an output (Berger, Hasan, & Zhou, 2009; Berger & Humphrey, 1997; Kashani & Obay, 2010) which is suitable under the value-added approach.

Before deciding on inputs and outputs to be included in the estimation of the frontier, it is first necessary to decide what approach should be adapted from the literature. Following a large body of studies, this study adopts the intermediation approach suggested by Sealey and Lindley (1977). Other approaches include production, which examines how efficiently an individual bank (usually bank branches) uses its resources, such as manpower and capital, to produce services for clients (e.g. Glass, McKillop, & Rasaratnam, 2010), and the value-added

approach, which treats the bank as an enterprise getting income from the proceeds of selling products and the costs of their production (e.g. Sahoo, Mehdiloozad, & Tone, 2014).

The intermediation approach takes a macro-perspective of the banking sector as a whole, treating banks as an intermediary between depositors and borrowers, which is the most appropriate approach taking into account the nature of banking activity. Accordingly, banks are assumed here to produce two outputs – loans and other earning assets – by employing two inputs – labour and deposits (see Table 17 for the set of inputs and outputs and their prices).

This study initially used three inputs; however, because there was insufficient data on physical capability for Islamic banks, only two inputs were used for the main analysis. The two input prices are calculated as: (1) the total interest expenses to deposits, and (2) the personnel expenses to total assets. Ideally, it should be personnel divided by the total number of employees but as this piece of data is not available, I scale it by total assets following Karas, Schoors, & Weill (2010), among many others.

The two output prices are calculated as: (1) the interest revenues on loans to loans, and (2) other operating income divided by other earning assets.

### ***6.3.2.2 Second-Stage Regression Analysis***

After estimating the cost and profit efficiency scores in the first stage of this analysis, the cost and profit efficiency of Islamic banks prior to and during the GFC are compared with conventional banks' using two econometric techniques: Tobit and Truncated with bootstrap. Tobit is used because this estimator takes into account the limited nature of the efficiency scores, which are treated as the dependent variables that ordinary least squares (OLS) cannot handle. Banker and Natarajan (2008) used OLS and show that their estimation is consistent. However, Simar and Wilson (2011) prove that this model is very restrictive and consistency is valid only under very unusual assumptions of the generation of the data process.

The Tobit model is set up with a left bound of zero and a right bound of one, and has been used in the literature to investigate factors that determine efficiency after estimating the efficiency scores in the first stage of an analysis (e.g. Ariff & Can, 2008; Bravo-Ureta et al., 2007; Casu & Molyneux, 2003; Rosman et al., 2014).

However, it is argued that the Tobit estimator does not solve two serious statistical issues, namely the inherent serial correlation in the estimated efficiency scores in the first stage, and the correlation among the inputs and outputs, which are used in estimating the DEA scores, with second-stage environmental factors (Simar & Wilson, 2007; 2011). Simar and Wilson (2007) criticise all the models used in the second stage, such as OLS and Tobit, suggesting that Tobit yields biased and inconsistent estimation, and in some cases can generate “catastrophic” estimation, such as the results of their Monte Carlo experiments.<sup>16</sup>

Alternatively, Simar and Wilson (2007, 2011) propose the use of a Truncated estimator with bootstrap procedures. The bootstrap procedure is used for the Truncated and Tobit estimators to improve statistical accuracy. This technique provides the only feasible method for valid inference in a two-stage analysis. Therefore, Tobit and Truncated estimators are both used in the second stage of this study, but the estimation of the latter is relied upon where the results of the two estimators are contradictory.

In both econometric techniques, dummies for countries and years are included after testing to determine if they are jointly significant. Inclusion of dummies controls for some omitted variable biases that cannot be observed and that vary across time and entities (Stock & Watson, 2012).

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<sup>16</sup> See Simar and Wilson (2007, 2011) for a full discussion of this issue.

**Table 18: Definitions of Panel Data Variables**

N	Variables	Definition
1	<i>Cost Efficiency (CRS)</i>	DEA scores based on input-oriented and inputs / outputs prices
2	<i>Profit Efficiency (CRS)</i>	DEA scores based on output-oriented and inputs / outputs prices
3	<i>Capital</i>	Total capital (CAR) = (Tier 1 + Tier 2) / risk-weighted ratios
4	<i>Asset Quality</i>	Non-performing loans (NPLs) to gross loan
5	<i>Management Quality</i>	Cost-to-income (CTI) ratio = total overheads / gross income
6	<i>Business Model</i>	Log (other earning assets / total assets)
7	<i>Capital Intensity</i>	Log (fixed capital / labour expenses)
8	<i>Earnings</i>	ROA = Net income / total assets
9	<i>Islam</i>	Dummy variables equal to one if the bank is Islamic; zero otherwise
10	<i>Year</i>	Dummy variables equal to one for each year from 2007 to 2012; zero otherwise
11	<i>Islam*Year</i>	Interaction terms between the type of bank and years from 2007 to 2012
12	<i>SIZE</i>	Natural log of total assets
13	<i>STATE</i>	Dummy variables equal to one if the bank is state owned; zero otherwise
14	<i>FOREIGN</i>	Dummy variables equal to one if the bank is foreign owned; zero otherwise
15	<i>LISTED</i>	Dummy variables equal to one if the bank is listed on a stock market; zero otherwise
16	<i>GDP</i>	Year-to-year percentage change in country's gross domestic product
17	<i>INF</i>	Annual country inflation rate in percentage
18	<i>OIL</i>	Natural log of average annual oil prices

The first group of variables is interaction terms, which is the main group of interest (see Table 18). The group contains a set of six interaction terms (Islam×2007 to Islam×2012) for each year between 2007 and 2012, and for the two types of banks, to examine whether the effect of the GFC varied significantly during the different stages of the crisis (2007–2008), and whether the speed of recovery differed during the post-crisis period (2009–2012).

A second group of variables was used to control for bank-specific or internal factors that are widely recognised in the literature as influencing the efficiency of banks. Size of the bank (ln(TA)) is the first factor. Evidence on the relationship between bank size and efficiency is inconclusive, with some studies finding a significantly positive relationship (e.g. Ariff & Can,

2008; Moradi-Motlagh & Babacan, 2015; Srairi, 2010), and others find a negative relationship (e.g. Isik & Hassan, 2002), or even no statistically significant relationship at all (Staub et al., 2010).

Second, capital ratio (CAR) is used as a proxy for capital risk or capital strength, as recent studies have found a positive / negative correlation between efficiency and capital strength (Olson & Zoubi, 2011; Rosman et al., 2014; Zelenyuk & Zelenyuk, 2015).<sup>17</sup> A higher layer of capital should make banks more stable, which in turn attracts investors to place their deposits, but it can also lead banks to forgo opportunity and become over-capitalised to originate more loans and consequently become less efficient.

A third variable, namely the ratio of non-performing loans (NPLs) to total loans, represents the credit risk or assets quality of a bank; this ratio is well documented in the literature to have a negative relationship with efficiency (Ariff & Can, 2008; Zelenyuk & Zelenyuk, 2015). This negative relationship is expected because a lower default ratio would lead banks to issue more loans and become more efficient as a result.

The fourth variable is the cost-to-income (CTI) ratio, which is used as a proxy for management quality. It is sometimes referred to as the inefficiency ratio as it is found to have a negative impact on efficiency (Olson & Zoubi, 2011; Rosman et al., 2014). This is because sound control on running overheads by the management allows banks to have more available funds to originate more loans and consequently be more efficient.

A fifth variable is the ratio of other earning assets to total assets (OEA / TA) to control for the bank business model. Isik and Hassan (2002) and Staikouras, Mamatzakis, and Koutsomanoli-Filippaki (2008) found this ratio to be positively correlated with efficiency.

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<sup>17</sup> This study initially used the ratio of assets to equity, but this was replaced with the total capital ratio which was found to have greater explanatory power.

However, if banks engage too heavily in financial securities at the cost of generating loans, the relationship could become negative as loans are more profitable than securities (Olson & Zoubi, 2011).

Sixth, an economic perception suggests that the higher capital the bank has per employee, the more efficient the bank is expected to be (Zelenyuk & Zelenyuk, 2015). This ratio is referred to as Fixed Capital Intensity, which is defined as fixed capital to labour expenses (CAPINT) and was empirically found by Isik and Hassan (2002) to positively influence efficiency.

Finally, earnings is suggested to positively increase efficiency (Ariff & Can, 2008; Sufian, 2009),<sup>18</sup> since more profitable banks can be attractive for depositors and clients, and higher profits would be expected to make more funds available as an internal channel of growth.

A third set of parameters to handle the differences in the ownership structures of banks includes state ownership (STATE), foreign ownership (FOREIGN) and listing status (LISTED). There is a large body of literature on the impact of ownership on bank efficiency with very significant differences in the findings. Ariff and Can (2008) and Bonin, Hasan, and Wachtel (2005) found that foreign-owned banks scored the highest level of efficiency, followed by privately owned banks, and finally government-owned banks. Tecles and Tabak (2010) found comparable results for profit efficiency of banks in Brazil but the opposite for cost efficiency, which is in line with the findings of Ray and Das (2010) for banks in India.

Berger et al. (2009) and Tecles and Tabak (2010) suggest that the difference in cost efficiency might stem from state-owned banks being used by the government to enforce its social mandate, whereas the difference in profit efficiency is due to the banks benefiting from

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<sup>18</sup> Different proxies have been used, including profit margin (PM) and return on equity (ROE). However, ROA showed a superior explanatory power in explaining efficiency.

government subsidies. For foreign-owned banks, the authors suggest that the banks' investment in technology might negatively affect their cost but generate more profit. However, the findings are not straightforward and many cases can be mixed (e.g. Karas, Schoors, & Weill, 2010; Semih Yildirim, & Philippatos, 2007).<sup>19</sup>

The last set of explanatory variables include well-known macroeconomic factors, including each country's GDP growth and inflation rate (INF), to control for the macroeconomic environment. These factors are well documented to have a positive impact on bank efficiency (Barth et al., 2013; Pasiouras et al., 2009; Srairi, 2010). Finally, annual oil prices are included because all the GCC countries have oil-based economies and oil incomes are the main source of government revenues (Olson & Zoubi, 2008).

Table 19 presents the correlation matrix, which shows that the explanatory variables are not highly correlated, indicating that multi-collinearity is unlikely in this data. Figure 13 shows the distributions of the cost and profit efficiency scores, including that there no outliers in DEA scores.

The first step investigates whether the efficiency of Islamic banking varies across the GCC states by running a Truncated regression (see Table 18 for the definitions of variables), including interaction terms between the Islamic banks dummy (Islam) and the five country dummies as follows:

$$\begin{aligned}
 \text{Cost / profit efficiency scores} = & \alpha + \beta_1 \text{Islam} * \text{Bahrain} + \beta_2 \text{Islam} * \text{Kuwait} + \\
 & \beta_4 \text{Islam} * \text{Qatar} + \beta_5 \text{Islam} * \text{Saudi Arabia} + \beta_6 \text{Islam} * \text{UAE} \\
 & + \beta_7 \text{SIZE} + \beta_8 \text{AGE} + \beta_9 \text{YearFE} + e
 \end{aligned} \tag{3}$$

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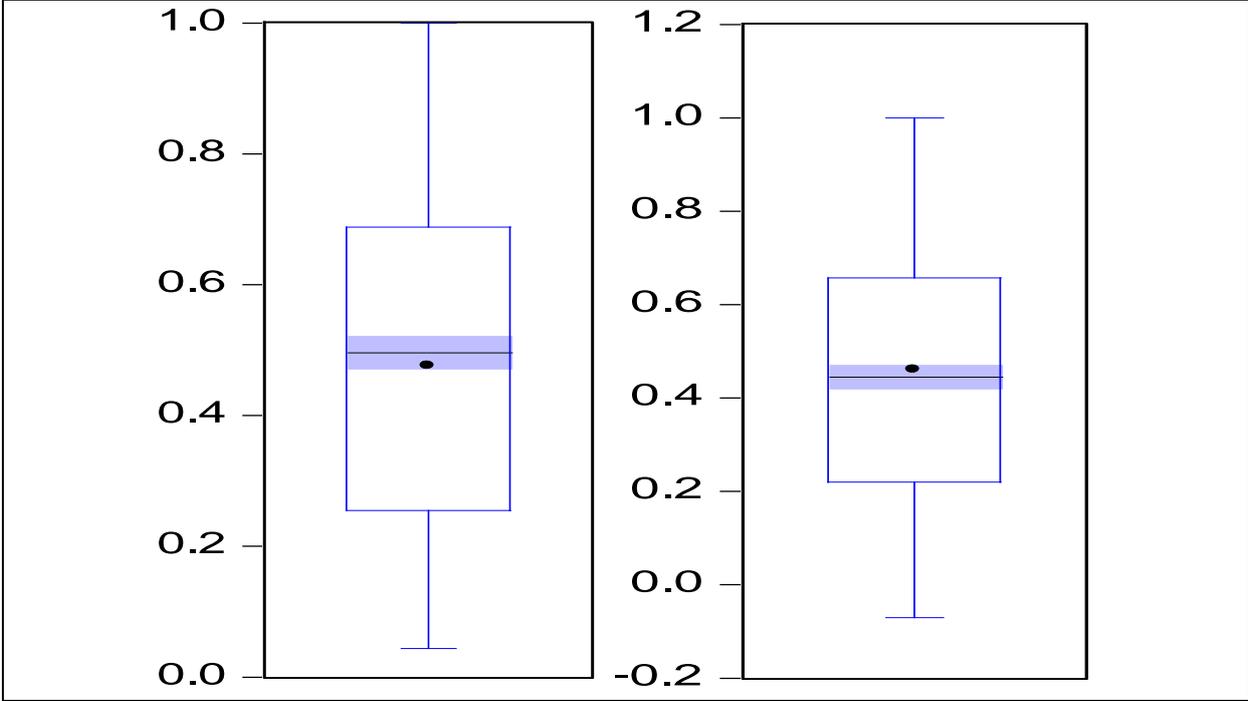
<sup>19</sup> The impact of ownership is only briefly discussed here, as the main objective of this thesis is to investigate the impact of the GFC. Further discussion of the impact of ownership is provided in Chapter 4.

Note that Oman is excluded from this regression because it has only one newly formed Islamic bank with insufficient data.

The second step compares the cost and profit efficiency of conventional and Islamic banks, by formalising the following model:

$$\begin{aligned}
 \text{Cost / profit efficiency scores} = & \alpha + \beta_1 \text{Islam} \times 2007 + \beta_2 \text{Islam} \times 2008 + \beta_3 \text{Islam} \times 2009 + \\
 & \beta_4 \text{Islam} \times 2010 + \beta_5 \text{Islam} \times 2011 + \beta_6 \text{Islam} \times 2012 + \\
 & \beta_{10} \text{LISTED} + \beta_{11} \text{FOREIGN} + \beta_{12} \text{STATE} + \beta_{13} \text{GDP} \\
 & + \beta_{14} \text{Inflation} + \beta_{15} \text{OIL} + \beta_{16} \text{SIZE} + \\
 & \beta_{17} \text{Country} * \text{YearFE} + e
 \end{aligned}
 \tag{4}$$

**Figure 13: The Distributions of the Cost and Profit Efficiency Scores, Respectively**



**Table 19: Correlation Matrix for the Efficiency Data**

	CC22	PC22	STATE	FOREIGN	LISTED	Islamic	In(TA)	CAR	CTI	NPLs	ROA	OEA / LOAN	CAPinden	Inflation	GDP	OIL
CC22	1															
PC22	0.4	1														
STATE	-0.01	0.02	1													
FOREIGN	-0.01	0.04	-0.28	1												
LISTED	0.02	0.04	0.01	0.15	1											
Islamic	0.01	-0.1	-0.13	-0.09	-0.02	1										
In(TA)	0.37	0.09	0.01	0.05	-0.04	-0.05	1									
CAR	-0.22	-0.06	0.12	-0.16	-0.03	0.22	-0.28	1								
CTI	0	-0.01	0.04	0.2	-0.13	0.26	-0.26	0.04	1							
NPLs	-0.18	-0.05	-0.08	0	-0.05	-0.12	-0.27	0	0.15	1						
ROA	-0.05	-0.05	-0.09	-0.07	0.1	0.02	-0.07	0.21	-0.55	-0.18	1					
OEA / LOAN	0.12	0.03	0.04	0.01	-0.39	-0.03	0	0.15	0.16	0.23	-0.07	1				
CAPinden	-0.02	-0.02	-0.06	-0.09	0.12	0.18	0.01	0.06	-0.03	-0.05	0.09	-0.13	1			
Inflation	-0.06	-0.06	0.08	-0.16	0.05	0.03	0.06	-0.1	-0.18	-0.29	0.21	-0.21	0.03	1		
GDP	-0.01	-0.01	0.02	-0.08	-0.11	-0.01	-0.08	-0.02	-0.14	-0.22	0.3	0.05	-0.01	0.29	1	
OIL	-0.05	-0.09	0.02	-0.09	-0.03	0.18	0.33	0.01	-0.02	-0.29	-0.05	-0.33	0.01	0.08	0.00	1

## 6.4 Results and Discussion

### 6.4.1 Pairwise and Cross-Country Comparisons

To begin the analysis of whether Islamic and conventional banks performed differently during and following the economic turmoil of the GFC, the efficiency scores and internal factors to be used in the second stage of this analysis are compared.

It can be seen from Table 20 that the overall cost and profit efficiency are 0.4764 and 0.4759, respectively, implying that the bank management could decrease (increase) their costs (profit) by more than a half and produce the same level of outputs. These levels are quite low in comparison with other banking systems worldwide (Berger & Humphrey, 2000) and are comparable to the levels found in the Brazilian banking system between 2000 and 2007 (Staub et al., 2010).

**Table 20: Descriptive Statistics for Islamic and Conventional Banks**

Group	Islamic (1)	Conventional (2)	Mean	<i>t</i> -test (1)+(2)
Cost Efficiency (CRS)	0.4989	0.4693	0.4764	-1.23
Profit Efficiency (CRS)	0.4207	0.4933	0.4759	1.82*
Cost Efficiency (VRS)	0.6877	0.7175	0.7104	1.26
Profit Efficiency (VRS)	0.5905	0.6589	0.6426	1.90*
Capital (%)	22.25	19.51	20.17	-4.74***
Asset Quality (%)	3.92	4.86	4.6	3.32***
Management Quality (%)	45.77	36.52	39.41	-8.75***
Business Model (%)	35.50	34.93	35.11	-0.46
Capital Intensity (%)	139.45	133.56	135.31	-0.85
Earnings (%)	2.46	2.23	2.3	-1.58
Total Assets (Million)	\$ 7,033,866.00	\$ 12,600,000.00	\$ 10,800,000.00	5.36***

Key: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Based on the type of bank, there is no significant difference for cost efficiency between Islamic and conventional banks, which is in line with the findings of Bader et al. (2008) and Hassan et al. (2009). Nevertheless, Islamic banks are found to be less profit efficient in

comparison with conventional banks, which is consistent with the findings of Kamarudin et al. (2014), Olson and Zoubi (2011) and Srairi (2010). Note that for conventional banks, cost is lower than the profit efficiency, meaning that the most important inefficiencies are on the profit side rather than the cost side. Conversely, Islamic banks' most important source of inefficiencies are mainly within the profit side, implying that Islamic banks find more difficulties dealing with external factors, such as competition with conventional banks, than controlling the utilisation of internal resources.

A possible reason for this finding is that Islamic banks still make up a relatively small segment of the banking sector (Alqahtani, Mayes, & Brown, 2015; Lewis, 2013), putting pressure on them to produce incomes that conform to those of conventional banks. Moreover, the use of some well-known conventional benchmarks, such as the London Interbank Offered Rate (LIBOR), when Islamic banks price their unique products (Zainol & Kassim, 2012), makes them subject to interest rate risk.

To ensure that the difference between Islamic and conventional banks was not driven by the increased presence of Islamic banks during later years of the period under investigation, I excluded the period from 1999 to 2004, making the sample more balanced. However, the main results do not change significantly, suggesting that the aggregation issue is unlikely to be relevant (see Appendix 2). Finally, to ensure that the efficiency findings are robust and not driven by bank size, the scores are re-estimated using VRS (see Table 20). It can be observed that the efficiency level increases as bank size increases, suggesting evidence in favour of a positive relationship between scale of operation and efficiency level and against the CRS assumption that the DMUs operate on an optimal scale. However, for the sake of comparison between conventional and Islamic banks, it can be seen that the cost efficiency remains statistically significant and the profit efficiency remains statistically insignificant, regardless of bank size.

Turning to the bank-specific factors, banks in the GCC region are well capitalised (Table 20) with the average capital being far greater than the requirement of Basel II, which requires banks to hold a minimum 8% of risk-weighted capital. Islamic banks are significantly better capitalised than conventional banks, which is in line with most of the previous evidence (e.g. Alqahtani et al., 2015; Alqahtani & Mayes, 2015; Olson & Zoubi, 2008; Parashar & Venkatesh, 2010). A possible explanation for this higher level of capitalisation is that Islamic banks reserve more capital to offset their underdeveloped risk-management practice (Ahmed, 2009).

For asset quality indicators (NPLs), a significant difference was found between the two types of banks, which is consistent with Beck et al.'s (2013) findings that Islamic banks have superior quality assets to conventional banks'. This finding supports the theory that Islamic banks should always have a superior asset quality because they are not allowed to shift the credit risk of their debt-like contracts, such as *murabaha* (which represent the largest share of their assets), to a third party by any risk-shifting means, such as CDS or securitisation, which should provoke the banks to perform a careful assessment of risk (Abdulle & Kassim, 2012; Ahmed, 2009; Chapra, 2009).

For management quality proxied by CTI, the finding that Islamic banks have a higher ratio confirms the findings of earlier studies (e.g. Alqahtani et al., 2015; Beck et al., 2013; Miniaoui & Gohou, 2013). A possible reason for their relatively high ratio is that Islamic banks have relatively higher overheads since they include a team supervising Islamic banking contracts, such as a Sharia supervisory committee and experts monitoring joint-venture contracts and product development (Aggarwal & Yousef, 2000; Rosly & Abu Bakar, 2003). This finding is also supported by Islamic banks' relatively higher prices for labour and funds compared with conventional banks' (see Table 17).

Table 20 shows that there is no significant difference between Islamic and conventional banks in terms of their business model, as proxied by the ratio of other earning assets to total assets, which is somewhat surprising. For example, unlike conventional banks, Islamic banks are restricted from investing in government and corporate securities as these kinds of assets are based on interest (*riba*). A possible explanation for this finding is that Islamic banks invest in the viable alternative to conventional bonds, the *sukuk* (Islamic bond). (*Sukuk* is one of the fastest growing segments of the Islamic finance industry and is sometimes described as the “Hollywood star of Islamic finance” (Wouters, 2010), growing by 19% in the GCC in the first eight months of 2014 compared with the same period of 2013 (Standard & Poor’s, 2014).)

For the capital intensity ratio, it can be observed that Islamic banks invest more capital per employee; however, the difference is not statistically significant at the 10% level. Similarly, earnings measured by ROA were found to be statistically insignificant, a finding that contradicts those of Awan (2009), Olson and Zoubi (2008) and Rosly and Bakar (2003), who found that Islamic banks generate higher income. A possible explanation for this apparently contradictory finding is that most previous papers studied relatively short periods and only during the flourishing of Islamic banks at the beginning of the new century and prior to the GFC. Thus, it can be argued that over the longer run, Islamic banks do not generate higher income than conventional banks.

To check whether the pairwise results in Table 20 can be generalised across all the GCC states, the efficiency scores on interaction terms were regressed for each state interacting with bank type. It can be seen from Table 21 that Bahraini Islamic banks were the most cost- and profit-efficient banks (Models 2, 4). Although Kuwaiti Islamic banks showed a higher level of cost efficiency compared with their conventional banking peers, they were found to have lower profit efficiency. A possible reason for this is that Kuwaiti Islamic banks might be able to manage their internal resources more efficiently but not in competition with the long-existing

conventional banks in the Kuwaiti credit market. For example, the largest bank in Kuwait is the National Bank of Kuwait (NBK), which received the highest rating in all emerging markets by all the international rating agencies in 2002 (Ariss, Rezvanian, & Mehdian, 2007). The NBK is a conventional bank and acquired 30% of the loans market in Kuwait, indicating that the market is highly concentrated (KAMCO Research, 2014).

In addition, controlling for size ( $\ln(TA)$ ) is essential and can alter the results significantly, suggesting it should be taken into account in a comparative analysis.

**Table 21: Truncated Regression Results for Cost and Profit Efficiency Sorted by Each GCC Country's Interaction with an Islamic Bank Dummy**

VARIABLES	(1) CE	(2) CE	(3) PE	(4) PE
BAHRAIN	-0.00 (-0.13)	0.11*** (3.77)	0.05 (1.23)	0.08* (1.86)
KUWAIT	0.10* (1.72)	0.09* (1.67)	-0.08 (-1.15)	-0.13* (-1.92)
QATAR	0.07* (1.88)	0.10* (1.82)	-0.14** (-2.05)	-0.09 (-0.74)
SAUDI	-0.03 (-0.61)	-0.06 (-1.43)	-0.10* (-1.71)	-0.10 (-1.20)
UAE	0.02 (0.77)	0.07** (2.27)	0.04 (1.25)	0.02 (0.61)
$\ln(TA)$	-	0.10*** (13.16)	-	0.06*** (3.64)
Constant	0.47 (39.75)	-1.02*** (-8.91)	0.53 (8.26)	-0.43* (-1.72)
Observations	742	742	742	742
Year FE	NO	YES	NO	NO
Bootstrap	500	500	500	500
Log LH	-97.50	-19.54	-176.13	-410.54

Key: Z-statistics in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

#### 6.4.2 Conventional and Islamic Banks and the Economic Turmoil

The operating efficiency of conventional and Islamic banks during and post the GFC is compared to investigate whether the impact of the crisis and the pace of recovery are significantly different. To make the investigation possible and meaningful, some internal and

external factors are controlled for – including ownership, macroeconomic factors and some bank-specific variables – as well as factors that vary across time and country, using year-country dummies (see Equation 1) with the two estimators (Tobit and Truncated regressions).

It can be seen from Table 22 and Table 23 that the two estimators yield comparable estimates; their level of significance is identical, although the values of the coefficients are slightly different. The source of the variation could be the presence of serial correlations that the Tobit estimator cannot address, which gives the Truncated estimator the upper hand (Simar & Wilson, 2007; 2011).

**Table 22: Results of Efficiency Based on Tobit Regressions**

VARIABLES	(1) CE	(2) CE	(3) CE	(4) CE	(5) PE	(6) PE	(7) PE	(8) PE
Islam×07	0.06 (0.67)	0.07 (0.99)	0.06 (0.96)	0.06 (1.01)	-0.08 (-0.64)	-0.09 (-0.65)	-0.09 (-0.76)	-0.09 (-0.70)
Islam×08	0.15* (1.86)	0.15* (1.69)	0.15** (2.37)	0.15** (2.03)	0.05 (0.43)	0.05 (0.40)	0.05 (0.50)	0.05 (0.38)
Islam×09	0.11* (1.69)	0.11* (1.91)	0.11* (1.74)	0.11* (1.75)	0.04 (0.39)	0.04 (0.35)	0.04 (0.33)	0.04 (0.30)
Islam×10	-0.00 (-0.02)	-0.00 (-0.02)	-0.00 (-0.03)	0.00 (0.00)	-0.02 (-0.24)	-0.02 (-0.25)	-0.02 (-0.22)	-0.02 (-0.23)
Islam×11	0.02 (0.31)	0.02 (0.35)	0.02 (0.29)	0.02 (0.27)	-0.21** (-2.01)	-0.21** (-2.42)	-0.21* (-1.91)	-0.21** (-1.96)
Islam×12	-0.03 (-0.29)	-0.03 (-0.36)	-0.02 (-0.32)	-0.03 (-0.40)	-0.20* (-1.95)	-0.20* (-1.78)	-0.20* (-1.72)	-0.20** (-2.31)
STATE	-0.03 (-1.29)	-0.03 (-1.58)	-0.03 (-1.56)	-0.04 (-1.54)	-0.02 (-0.52)	-0.02 (-0.62)	-0.02 (-0.57)	-0.02 (-0.58)
FOREIGN	-0.09*** (-2.71)	-0.09*** (-3.47)	-0.09*** (-2.81)	-0.08** (-2.49)	0.02 (0.40)	0.02 (0.44)	0.02 (0.49)	0.02 (0.54)
LISTED	0.08** (2.34)	0.08** (2.50)	0.08*** (2.72)	0.07** (2.10)	0.06 (1.35)	0.06 (1.34)	0.06 (1.38)	0.06 (1.42)
CAR	-0.01*** (-3.24)	-0.01*** (-3.84)	-0.01*** (-4.08)	-0.01*** (-3.86)	-0.00* (-1.65)	-0.00* (-1.70)	-0.00* (-1.82)	-0.00* (-1.67)
NPLs	-0.01*** (-3.95)	-0.01*** (-4.45)	-0.01*** (-4.64)	-0.01*** (-4.13)	-0.01** (-2.02)	-0.01** (-2.23)	-0.01*** (-3.12)	-0.01*** (-2.82)
CTI	0.00* (1.69)	0.00* (1.72)	0.00* (1.65)	0.00* (1.68)	0.00 (0.85)	0.00 (0.85)	0.00 (1.00)	0.00 (0.95)
ROA	0.00 (0.28)	-	-	-	-0.01 (-0.43)	-	-	-
OEATA	0.00 (1.22)	0.00 (1.38)	0.00 (1.40)	-	0.00 (0.18)	0.00 (0.22)	-	-
CAPINT	-0.01 (-0.61)	-0.01 (-0.68)	-	-	-0.01 (-0.31)	-0.01 (-0.26)	-0.01 (-0.36)	-
In(TA)	0.10*** (9.33)	0.10*** (10.84)	0.10*** (8.53)	0.11*** (9.73)	0.04** (2.21)	0.04** (2.36)	0.04** (2.24)	0.05*** (2.73)
Inflation	-0.00 (-0.60)	-0.00 (-0.83)	-0.00 (-0.71)	-0.00 (-0.79)	-0.01* (-1.69)	-0.01 (-1.61)	-0.01* (-1.77)	-0.01* (-1.78)
GDP	0.01** (2.09)	0.01** (2.22)	0.01** (2.03)	0.01** (2.10)	0.01 (1.54)	0.01 (1.64)	0.01* (1.85)	0.01 (1.40)
OIL	-0.00*** (-3.05)	-0.00*** (-2.77)	-0.00*** (-2.70)	-0.00*** (-2.74)	-0.00 (-0.92)	-0.00 (-1.12)	-0.00 (-1.11)	-0.00 (-1.10)
Constant	-0.90*** (-4.19)	-0.89*** (-4.21)	-0.91*** (-3.91)	-0.88*** (-4.60)	-0.07 (-0.20)	-0.10 (-0.31)	-0.10 (-0.28)	-0.11 (-0.36)
Observations	742	742	742	742	742	742	742	742
Country FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Bootstrap	2000	2000	2000	2000	2000	2000	2000	2000
Pseudo R <sup>2</sup>	0.8922	0.8920	0.8874	0.8816	0.1320	0.1317	0.1317	0.1312
R <sup>2</sup>	0.3549	0.3549	0.3538	0.3521	0.1444	0.1441	0.1438	0.1430
AIC	107.92	105.99	105.43	105.16	677.75	675.92	673.97	672.57
BIC	276.80	270.42	265.48	260.76	846.63	840.36	833.96	828.17
Log LH	-15.96	-15.99	-16.71	-17.58	-300.87	-300.96	-300.98	-301.28

Key: Z-statistics in parentheses: \*\*\* p &lt; 0.01, \*\* p &lt; 0.05, \* p &lt; 0.1

**Table 23: Results of Efficiency Based on Truncated Regressions**

VARIABLES	(1) CE	(2) CE	(3) CE	(4) CE	(5) PE	(6) PE	(7) PE	(8) PE
Islam×07	0.07 (1.08)	0.08 (1.20)	0.07 (1.12)	0.07 (1.28)	-0.07 (-0.59)	-0.07 (-0.63)	-0.08 (-0.65)	-0.09 (-0.66)
Islam×08	0.15** (2.29)	0.15** (2.24)	0.15** (2.07)	0.16** (1.96)	0.06 (0.49)	0.06 (0.56)	0.06 (0.52)	0.05 (0.49)
Islam×09	0.12* (1.74)	0.12* (1.68)	0.11* (1.69)	0.11* (1.78)	0.04 (0.34)	0.03 (0.32)	0.04 (0.35)	0.03 (0.35)
Islam×10	0.01 (0.10)	0.01 (0.10)	0.01 (0.10)	0.01 (0.11)	-0.02 (-0.21)	-0.02 (-0.23)	-0.02 (-0.21)	-0.02 (-0.21)
Islam×11	0.02 (0.36)	0.02 (0.38)	0.02 (0.34)	0.02 (0.34)	-0.17** (-2.08)	-0.17** (-2.22)	-0.17** (-2.29)	-0.17* (-1.76)
Islam×12	-0.02 (-0.36)	-0.02 (-0.35)	-0.02 (-0.45)	-0.02 (-0.35)	-0.16* (-1.74)	-0.16* (-1.70)	-0.16* (-1.66)	-0.16* (-1.76)
STATE	-0.03* (-1.65)	-0.03 (-1.28)	-0.03 (-1.29)	-0.03 (-1.41)	-0.02 (-0.60)	-0.02 (-0.59)	-0.02 (-0.68)	-0.02 (-0.55)
FOREIGN	-0.09*** (-3.55)	-0.09*** (-2.63)	-0.09*** (-3.19)	-0.08*** (-3.22)	0.01 (0.43)	0.01 (0.32)	0.02 (0.41)	0.02 (0.51)
LISTED	0.07** (2.31)	0.07** (2.09)	0.08*** (2.58)	0.07** (2.39)	0.06 (1.40)	0.06 (1.52)	0.06* (1.78)	0.05 (1.50)
CAR	-0.01*** (-3.10)	-0.01*** (-3.49)	-0.01*** (-3.81)	-0.01*** (-2.98)	-0.00* (-1.71)	-0.00** (-2.18)	-0.00* (-1.86)	-0.00* (-1.86)
NPLs	-0.01*** (-4.78)	-0.01*** (-4.79)	-0.01*** (-4.93)	-0.01*** (-4.86)	-0.01** (-2.48)	-0.01*** (-2.84)	-0.01** (-2.52)	-0.01*** (-2.73)
CTI	0.00 (1.40)	0.00 (1.39)	0.00 (1.51)	0.00 (1.50)	0.00 (0.57)	0.00 (0.56)	0.00 (0.56)	0.00 (0.87)
ROA	0.00 (0.21)	-	-	-	-0.01 (-0.64)	-0.01 (-0.49)	-0.01 (-0.59)	-
OEATA	0.00 (1.17)	0.00 (1.15)	0.00 (1.53)	-	0.00 (0.38)	0.00 (0.43)	-	-
CAPINT	-0.01 (-0.56)	-0.01 (-0.65)	-	-	-0.01 (-0.28)	-	-	-
In(TA)	0.10*** (8.04)	0.10*** (7.66)	0.10*** (10.66)	0.10*** (8.89)	0.03** (2.11)	0.04** (2.39)	0.04** (2.19)	0.04** (2.37)
Inflation	-0.00 (-0.58)	-0.00 (-0.73)	-0.00 (-0.71)	-0.00 (-0.67)	-0.01* (-1.76)	-0.01* (-1.82)	-0.01 (-1.49)	-0.01* (-1.82)
GDP	0.01** (2.02)	0.01** (2.09)	0.01** (2.11)	0.01** (2.22)	0.01 (1.39)	0.01 (1.38)	0.01 (1.50)	0.01* (1.78)
OIL	-0.00*** (-3.04)	-0.00*** (-3.32)	-0.00*** (-3.44)	-0.00*** (-3.09)	-0.00 (-0.99)	-0.00 (-0.93)	-0.00 (-0.95)	-0.00 (-1.16)
Constant	-0.87*** (-3.64)	-0.86*** (-3.65)	-0.88*** (-4.65)	-0.85*** (-4.10)	0.04 (0.13)	0.03 (0.10)	0.05 (0.16)	0.01 (0.02)
Observations	742	742	742	742	742	742	742	742
Country FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Bootstrap	2000	2000	2000	2000	2000	2000	2000	2000
AIC	-4.40	-6.35	-6.82	7.30	322.73	321.23	319.45	317.73
BIC	164.47	158.07	153.22	148.29	491.60	485.72	479.49	473.33
Log LH	40.20	40.17	39.41	38.65	-123.36	-123.61	-123.72	-123.86

Key: Z-statistics in parentheses \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1

Moving to the period between 2007 and 2009, it can be seen from the results of the two estimators that during the GFC Islamic banks outperformed conventional banks in terms of cost efficiency (Models 1-4, and Figure 14) and the results are statistically and economically

significant. The years 2008 and 2009 were 0.15 and 0.11% more efficient, respectively, in favour of Islamic banks (see Figure 14). This gap is enormous given the fact that during the period prior the GFC and during the entire period under research, the cost efficiency average is 0.4989, with no statistical differences between Islamic and conventional banks.

**Figure 14: Cost Efficiency Differences after Controlling for Internal and External Factors**



For profit efficiency (Models 5–8, and Figure 15), it can be observed that during the period 2007 to 2009 that the gap between conventional and Islamic banks in terms of profit efficiency narrowed from a long-term average of 0.072 efficiency points in favour of conventional banks to only 0.06 and 0.04 in favour of Islamic banks in the second (2008) and the third years (2009) of the crisis, respectively, with neither coefficient being significant.

The difference in the gap between the two banking systems is due to a drop in the profit efficiency of conventional banks during that period rather than an increase in the efficiency of Islamic banks. A comparison with prior studies on the efficiency and impact of the GFC is meaningless because these studies apply technical efficiency on time-series samples containing only Islamic banks without a cross-sectional comparison with conventional banks.<sup>20</sup> However, the results are somewhat comparable with those of Rosman et al. (2014), as Islamic banks in

<sup>20</sup> See Belanès et al. (2015) and Rosman et al. (2014).

their sample were able to keep up their efficiency level during the GFC. Nevertheless, Belanès et al. (2015) found a slight decrease in efficiency of Islamic banks during the GFC, which contradicts the result of this analysis.

**Figure 15: Profit Efficiency Differences after Controlling for Internal and External Factors**



The results for both cost and profit efficiency support the theoretical argument as well as the empirical finding of the previous chapter that Islamic banks should have been less affected by the GFC because most dealings and financial contracts that are believed to have been accountable for the crisis are not acceptable under Islamic banking principles (Ahmed, 2009; Chapra, 2009; Kayed & Hassan, 2011; Siddiqi, 2009; Warde, 2012; R. Wilson, 2009; Wood, 2009).

Turning the analysis to the post-crisis phase (2010–2012), when the financial shock spread from the financial sector into the real economy segments, Islamic banks lost their superiority in terms of cost efficiency. This can be seen by the interaction terms (Islam×10–Islam×12) in Models 1–4 and Figure 12 being insignificant and the values of the coefficients ranging from 0.01 to –0.02 throughout the three years. However, Islamic banks are found to have suffered significantly in terms of profit efficiency during 2011 and 2012. The gap in profit

efficiency exceeded the long-term equilibrium from 7.26 differences to 0.17 and 0.16 efficiency points, respectively.

This is the result of an enormous decline in profit efficiency. The results suggest that while Islamic banks were able to manage their internal resources wisely during the economic downturn, they failed to maintain the superiority gained during the early phases of the GFC or at least the historical difference between them and conventional banks. A possible reason for the variation in results is that cost efficiency is under the control of banks, whereas profit efficiency is subject to external effects such as competition in the market.

State ownership was not found to have a significant influence on the cost or profit efficiency level. This implies that state (co-)owned banks are well positioned and, despite their possible social mandate towards society, they can manage their costs and compete in the market in terms of generating profit as much as their privately owned peers. A possible reason for this is that while state-owned banks are used by the government to implement its social mandate as well as financing it in times of need, they are compensated by other benefits such as cheaper rents and large public servant payroll accounts (Staub et al., 2010). The finding from the current study contradicts the majority of previous studies such as those of Berger et al. (2009) and Tecles and Tabak (2010).

For foreign (co-)ownership, there was strong evidence that foreign ownership had a negative effect on cost efficiency but not on profit efficiency. A possible explanation for this negative effect on cost efficiency is the diseconomies of running or monitoring a business from a distance (Berger, DeYoung, Genay & Udell, 2000) as well as the need for off-shore owners to invest in advanced technology (Berger et al., 2009).

Listing status was found to significantly improve the cost efficiency of banks in the sample. This result can be explained by the fact that listed firms are subject to tighter

transparency and disclosure requirements by the financial market authorities, which results in better governance (Farazi et al. (2011). This reasoning is in line with the survey of bank governance in the Middle East and North Africa prepared by the OECD (2009), which reveals that corporate governance of non-listed banks is normally poorer than it is for listed banks.

For bank internal factors, three out of the seven factors considered in the analysis were found to influence the cost and profit efficiency of banks in the GCC: capital risk, assets quality and size of bank. Conversely, management quality, profitability, business model and fixed capital intensity were not found to be significant at the 10% significance level. Capital risk, proxied by the CAR ratio, was found to negatively affect cost as well as profit efficiency, which is in line with the empirical findings of Srairi (2010). This finding supports the argument that banks can be over-capitalised, resulting in missing opportunities to issue more loans and leading them to become less efficient. Nevertheless, the finding is inconsistent with the moral hazard hypothesis that banks with a thicker layer of capital should be more careful, leading to a higher level of efficiency (Staub et al., 2010).

As expected, credit risk measured by the NPL ratio was found to positively enhance both cost and profit efficiency levels, which is well documented in the banking literature (e.g. Ariff & Can, 2008; Zelenyuk & Zelenyuk, 2015). Bank size, measured by total assets, was found to be by far the most influential factor in improving cost and profit efficiency, which is also in line with the empirical evidence of others (Ariff & Can, 2008; Moradi-Motlagh & Ban, 2015; Srairi, 2010). This finding supports the theory of benefits from economies of scale such as lower transaction costs (Freixas & Rochet, 1997) and a greater degree of information reusability (Greenbaum & Thakor, 2007).

Finally, some checks were performed to ensure the robustness of the results. First, the number of bootstrap replications was increased from 2000 replications in the main analysis

(Table 22 and Table 23) to 5,000;<sup>21</sup> however, this increase in replications had no impact on the main results. Second, the efficient banks were excluded from the Truncated regression in Table 24, by changing the cutting point of truncation from one to 0.99, 0.95 and 0.90, to ensure that the results were not driven by the presence of many efficient banks. Even so, regardless of the cut-off point, the results remained robust for all three truncation points (see Table 24).

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<sup>21</sup> Not reported.

**Table 24: Robustness Checks for Truncated Regression Using 0.99, 0.95 and 0.90 Truncation Points**

VARIABLES	(1) CE 0.99	(2) CE 0.95	(3) CE 0.90	(4) PE 0.99	(5) PE 0.95	(6) PE 0.90
Islam×07	0.07 (0.95)	0.07 (0.95)	0.07 (1.24)	-0.07 (-0.65)	-0.07 (-0.62)	-0.07 (-0.59)
Islam×08	0.15** (2.33)	0.15** (2.05)	0.15** (2.20)	0.06 (0.51)	0.06 (0.63)	0.06 (0.48)
Islam×09	0.12* (1.69)	0.12* (1.68)	0.12* (1.73)	0.04 (0.35)	0.04 (0.40)	0.04 (0.38)
Islam×10	0.01 (0.10)	0.01 (0.10)	0.01 (0.09)	-0.02 (-0.22)	-0.02 (-0.25)	-0.02 (-0.20)
Islam×11	0.02 (0.40)	0.02 (0.41)	0.02 (0.36)	-0.17** (-1.98)	-0.17* (-1.80)	-0.17** (-2.07)
Islam×12	-0.02 (-0.27)	-0.02 (-0.30)	-0.02 (-0.35)	-0.16* (-1.73)	-0.16* (-1.96)	-0.16* (-1.70)
STATE	-0.03 (-1.33)	-0.03 (-1.57)	-0.03 (-1.18)	-0.02 (-0.61)	-0.02 (-0.56)	-0.02 (-0.49)
FOREIGN	-0.09*** (-3.12)	-0.09*** (-2.86)	-0.09** (-2.42)	0.01 (0.36)	0.01 (0.36)	0.01 (0.39)
LISTED	0.07*** (3.12)	0.07*** (2.85)	0.07** (2.45)	0.06* (1.68)	0.06* (1.69)	0.06* (1.65)
CAR	-0.01*** (-3.19)	-0.01*** (-3.89)	-0.01*** (-3.72)	-0.00* (-1.67)	-0.00* (-1.67)	-0.00* (-1.82)
NPLs	-0.01*** (-5.26)	-0.01*** (-4.08)	-0.01*** (-4.84)	-0.01*** (-2.61)	-0.01*** (-3.10)	-0.01** (-2.03)
CTI	0.00 (1.60)	0.00 (1.63)	0.00 (1.54)	0.00 (0.54)	0.00 (0.47)	0.00 (0.46)
ROA	0.00 (0.27)	0.00 (0.28)	0.00 (0.27)	-0.01 (-0.53)	-0.01 (-0.46)	-0.01 (-0.56)
OEATA	0.00 (1.30)	0.00 (1.21)	0.00 (1.52)	0.00 (0.41)	0.00 (0.48)	0.00 (0.43)
CAPINT	-0.01 (-0.76)	-0.01 (-0.69)	-0.01 (-0.60)	-0.01 (-0.30)	-0.01 (-0.27)	-0.01 (-0.31)
In(TA)	0.10*** (8.91)	0.10*** (8.16)	0.10*** (8.64)	0.03** (2.07)	0.03** (2.03)	0.03* (1.88)
Inflation	-0.00 (-0.62)	-0.00 (-0.74)	-0.00 (-0.67)	-0.01* (-1.72)	-0.01 (-1.53)	-0.01* (-1.80)
GDP	0.01* (1.95)	0.01** (2.08)	0.01 (1.63)	0.01 (1.47)	0.01 (1.63)	0.01 (1.53)
OIL	-0.00*** (-2.62)	-0.00*** (-3.27)	-0.00*** (-3.25)	-0.00 (-0.99)	-0.00 (-1.13)	-0.00 (-0.99)
Constant	-0.87*** (-4.63)	-0.87*** (-4.08)	-0.87*** (-3.99)	0.04 (0.14)	0.04 (0.12)	0.04 (0.12)
Observations	742	742	742	742	742	742
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Bootstrap	2000	2000	2000	2000	2000	2000
Log LH	5%	5%	5%	5%	5%	5%

Key: Z-statistics in parentheses: \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1

## 6.5 Summary

In this chapter, I empirically evaluated and compared the cost and profit efficiency of Islamic and conventional banks, based on non-parametric DEA, prior to, during and post the GFC. The analysis, using data from 1999 to 2012, involved a sample of 80 banks across six countries of the GCC region, which share common economic, political and cultural characteristics. Variable biases were reduced by controlling for ownership structure, bank internal factors, macroeconomic factors and unobserved omitted variables varying across countries and years.

I found that in the long term and during different economic conditions, there was no significant difference between Islamic and conventional banks in terms of cost efficiency. Conversely, I found conventional banks to be more efficient in terms of profit efficiency than Islamic banks. However, the two banking systems had a low level of cost and profit efficiency in comparison with other international evidence.

Regarding cross-country comparisons, I found statistically significant differences between the efficiency of Islamic and conventional banks within the same state. Bahraini Islamic banks were found to have higher cost and profit efficiencies compared with conventional banks; hence, Bahraini Islamic banks can be considered an example of best practice in Islamic banking for an individual country in the GCC region.

Regarding the GFC, the data provided strong empirical evidence to support the theoretical argument, as well the empirical evidence in the previous chapter, that Islamic banks were more cost efficient than conventional banks during the GFC. Islamic banks also narrowed the gap in terms of profit efficiency to an insignificant level compared with the highly significant level during the period prior the GFC and the entire period under research. This finding can be considered strong support for the theoretical argument that Islamic banks were less exposed to the GFC owing to their constraints on trading in non-Sharia assets, which were

considered one of the main causes for the crisis. However, when the financial shock spread from within the financial sector into the real economy during the post-GFC period, Islamic banks suffered even more than conventional banks in terms of profit efficiency and they lost the cost efficiency gained during the GFC. This finding implies that Islamic banks are more linked with real economic conditions, whereas conventional banks are more integrated with the global financial sector.

In regards to ownership, I found evidence for the hypothesis of home-field advantage since domestic banks were more cost efficient than foreign banks in the GCC region, suggesting that the latter do not enjoy global advantage. I did not find, however, significant support for the agency theory hypothesis in the GCC since there is no statistically significant difference between state (co-)owned and privately owned banks. Listing status, however, was associated with superior efficiency, supporting the argument that listed firms are subject to stricter governance and disclosure standards.

## **Chapter 7: Financial Stability and the Global Financial Crisis<sup>22</sup>**

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<sup>22</sup> An early version of this chapter was presented at the the10th International Conference on Islamic Economics and Finance, Doha-Qatar. Some parts have been accepted in M. Kabir Hassan (Ed.), *Empirical Studies on Islam and Economic Life*, Edward Elgar. The chapter has also been submitted to *The World Economy – Special issue on Roles of Islamic Economics and Finance in the World Economy*.

## 7.1. Introduction

Since the occurrence of the Global Financial Crisis (GFC) and its aftermath, banks' financial stability has been one of the hottest topics in policymaking agendas across developed and emerging markets (Beck, Hesse, Kick, & von Westernhagen, 2009). In the previous two empirical chapters, I have evaluated and compared the performance of Islamic and conventional banks in terms of their financial performance as well as efficiency; this comparison has taken into account many areas of performance individually and as a whole.

In this chapter, I continue my investigation assessing another vital area of a bank's performance: financial stability. Once again, I compare the performance of Islamic banks with that of conventional banks in the GCC, a region that represents 66.2% of the total assets of Islamic finance worldwide (Ernst & Young, 2015). This exercise has already been undertaken by a few researchers, including Abedifar, Molyneux and Tarazi (2013), Beck et al. (2013), and Bourkhis and Nabi (2013). However, several features distinguish the current study from earlier empirical research.

First, I employ accounting-based as well as market-based measures of financial stability.

Second, I restrict the study to a homogeneous sample from six countries with common economic, political and cultural characteristics, as well as using the same accounting standards – namely, countries from the GCC. This limits the chances that the findings are driven by the differences between sample countries.

Third, I use year-by-year data, which allows me to document the real effects at different phases of the crisis and determine whether stability varies over time.

Fourth, I include the post-GFC period to investigate the pace of recovery and whether it differs between Islamic and conventional banks.

Fifth, I control for some well-documented factors that might explain the differences between the two types of banking, such as the impact of foreign and state ownership.

Finally, I employ two econometric techniques – static and dynamic estimators of robustness and the panel generalised method of moments (system GMM) – to confirm that the results are robust.

I find that market-based distance to default (DD) fails to reflect useful information regarding the financial health of banks in the GCC region whereas the accounting-based Z-score is able to reflect banks' financial health. Based on the Z-score, I find that in the long term, conventional banks are more stable than Islamic banks, supporting the argument that Islamic banks have a higher financial risk than conventional banks. The difference remains statistically significant for the large banks subgroup but is not for the small banks subgroup. Large Islamic banks are slightly less stable than small Islamic banks whereas large conventional banks are more stable than small conventional. With respect to economic turmoil, the difference between the two banking types was not statistically significant during the GFC.

However, when the financial shock spread to the real economy sectors during the later phases of the GFC, Islamic banks suffered an economically significant higher level of financial instability than conventional banks'. This empirical finding confirms those of Alqahtani et al. (2015) who found that Islamic banks survived the early phases of the crisis in terms of their operating performance but performed worse later on. Again, this result holds for large Islamic banks but not for small Islamic banks, with the small banks showing a relatively better handling of the economic downturn than the large banks. This finding supports the argument of Čihák and Hesse (2010) that Islamic banks are more stable when they operate at a small scale but that they lose this stability when they increase their scale of operations.

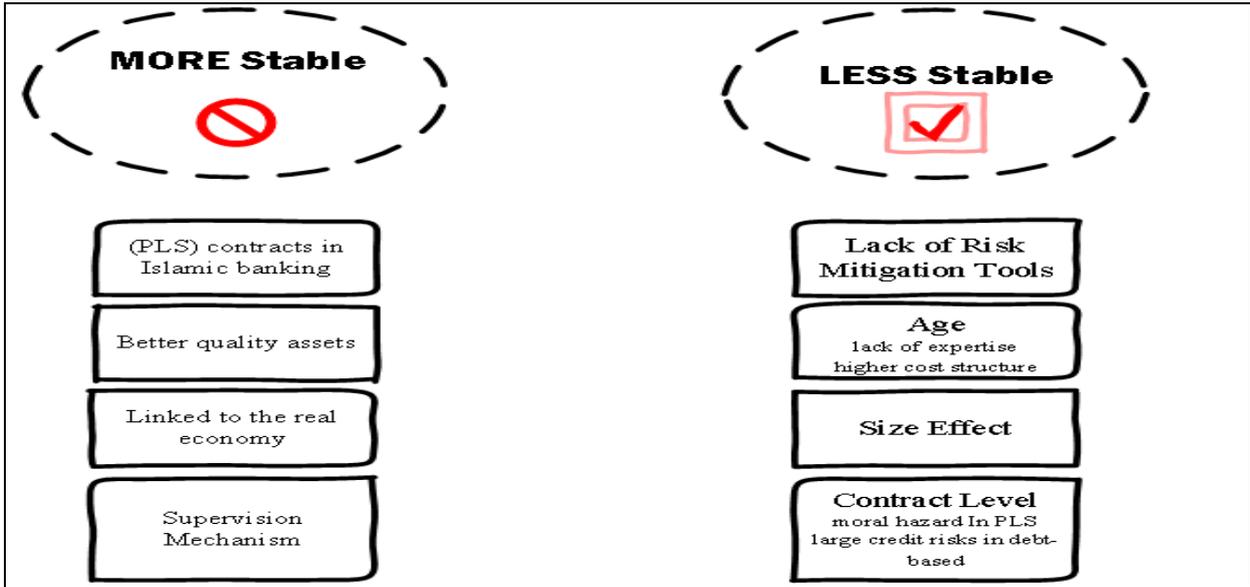
The remainder of this chapter is organised as follows: section 7.2 considers related literature and previous experience, section 7.3 presents the data and methodology, section 7.4 contains the empirical analysis and results, and section 7.5 summarises the chapter.

## 7.2 Related Literature

### 7.2.1 Financial Stability and Islamic Banking

The theory used in Islamic banking stems from the holy *Qur'an*,<sup>23</sup> which prohibits trading money as a commodity.<sup>24</sup> As an alternative, Islam allows trade: “God has permitted trade and has forbidden interest” (Qur’an, 2:275). Trade can take the form of investment contracts (profit-and-loss sharing (PLS)), such as *musharaka* and *mudaraba*, or debt-based contracts (mark up), such as *murabaha* and *tawarruq*. With regard to financial stability, the theory and practice of Islamic banking do not give a clear answer concerning whether Islamic banks should be more or less financially stable than traditional banks (see Figure 16). Previous theoretical and empirical studies offer conflicting evidence.

Figure 16: Financial Stability and Islamic Banking



The first line of argument supporting the idea that Islamic banks should be more stable is based on the use of PLS contracts in Islamic banking. This practice is believed to act as a financial buffer to absorb shocks with investment accounts holders so that any shocks to the

<sup>23</sup> The religious text of Islam that Muslims believe to be a revelation from God.

<sup>24</sup> This has been discussed in greater detail in Chapter 3.

assets of PLS contracts can be absorbed on the liabilities side (Bourkhis & Nabi, 2013; Čihák & Hesse, 2010).

Another argument suggests that Islamic banks should hold better quality assets than conventional banks for two reasons: (1) under PLS contracts, the Islamic bank does not require collateral from the entrepreneur to mitigate credit risk (Bourkhis & Nabi, 2013), and (2) under debt-based contracts (mark up), once the loan is issued, the bank cannot sell it or shift the risk to a third party by any means because debt selling is prohibited under Islamic finance principles (Ahmed, 2009; Zainol & Kassim, 2012). Because of these two reasons, the bank bears some of the risk associated with the transaction and thus is motivated to perform a careful evaluation of risk and reduce the unnecessary expansion of the value and volume of transactions (Ahmed, 2009; Chapra, 2009).

Furthermore, debt-based contracts must be based on genuine trade with the intention of giving and taking delivery. This practice is believed to link the operations of the Islamic bank to the real economy, reducing high leverage and preventing exposure to the derivative and speculative trading that leads to financial instability (Chapra, 2009).

The final argument concerns the regulation and supervision mechanisms of Islamic banking and how the principles of Islamic finance are followed strictly by banking management at every level. This issue is manifold according to Islamic banking principles, starting with the persons themselves, within the financial institution, and to some external standard-setting organisations. This multi-level supervision mechanism is argued to make Islamic banks better governed and consequently more stable, as lax supervision is suggested to be one of the main causes of financial institutions failing (Kayed & Hassan, 2011).

Nevertheless, it can also be argued that Islamic banks are less stable than conventional banks, for a number of other reasons. The first argument is based on risk-management practices

employed by Islamic banks. Islamic banks are prevented from using many common tools to manage liquidity risk, such as the interbank market and government securities, because these tools are all interest based. The same is true for other risk-management tools such as options, futures and forward contracts. Such restrictions increase the operational risk for Islamic banks (Sundararajan & Errico, 2002).

Size effects can also work against Islamic banks as they are relatively small compared with conventional banks, which might prevent Islamic banks from enjoying the benefits of economies of scale such as better diversification of bank portfolios, thus increasing unsystematic risks to which they are exposed (Greenbaum & Thakor, 2007).

Age can also be considered a negative feature of Islamic banks, which are significantly younger businesses than the long-established traditional banks, even in the same region, including the GCC region. This effect can make Islamic banks suffer from a higher cost structure (Beck et al., 2013) and lack of expertise in managing associated risks (Aggarwal & Yousef, 2000). At the contract level, the expansion of debt-based contracts could lead Islamic banks to face large credit risks, given that in principle they are not permitted to shift risk to a third party, such as is done when entering into credit-default swap contracts. Unlike in the case of investment contracts, securitisation is not an option as these contracts are considered debt based, and debt selling is prohibited in Islam; thus, Islamic banks are exposed to liquidity risks (Ahmed, 2009; Hakim, 2007). PLS contracts can encourage Islamic banks to take more risks as the capital and the rate of return are not guaranteed, which results in a moral hazard and less market discipline (Beck et al., 2013; Čihák & Hesse, 2010).

### **7.2.2 Previous Empirical Evidence**

An enormous body of literature compares Islamic and conventional banks in terms of their financial indicators (e.g. Abdulle & Kassim, 2012; Ahmad & Hassan, 2007; Awan, 2009;

Bashir, 2003; Beck et al., 2013; Jaffar & Manarvi, 2011; Miniaoui & Gohou, 2013; Olson & Zoubi, 2008, 2011; Parashar & Venkatesh, 2010) and in the area of operational efficiency (e.g. Abdul-Majid et al., 2010; Bader, Mohamad, Ariff, & Hassan, 2008; Brown et al., 2007; Rosman et al., 2014; Srairi, 2010; Sufian, 2007; Yahya, Muhammad, & Hadi, 2012). However, empirical studies investigating the financial stability of Islamic banks are still limited (but see Abedifar et al., 2013; Beck et al., 2013; Bourkhis & Nabi, 2013; Čihák & Hesse, 2010; Rajhi & Hassairi, 2013, whose main findings are presented in Table 25).

In short, Bourkhis and Nabi (2013), Čihák and Hesse (2010), and Rajhi and Hassairi, (2013) all find Islamic banks are more financially stable than conventional banks, whereas Beck et al. (2013) find the opposite. However, taking size into account, the results become more complex, with some evidence indicating that large conventional banks tend to be more stable than large Islamic banks and small Islamic banks more stable than small conventional banks (Abedifar et al, 2013; Čihák & Hesse, 2010). Regarding the impact of the GFC, the results are also mixed, varying from no difference to a statistically significant difference in favour of Islamic banks. In summary, the results of previous studies are mixed, highlighting the need for more empirical research.

Based on the review of the extant theoretical and empirical studies (see Table 25), it is evident that there is no conclusive answer to the question of whether Islamic banks are more or less stable than conventional banks in general, or with reference to the effect of the GFC.

The present study contributes to the ongoing debate by conducting a formal empirical analysis, taking account of a range of considerations that, to the best of my knowledge, have not been considered in prior studies. First, I employ accounting-based as well as market-based measures for financial stability. Second, I restrict the study to a homogeneous sample from six countries with common economic, political and cultural characteristics, and which use the same accounting standards – namely, countries from the GCC, which holds 66.2% of the total assets

of Islamic banks. This limits the chance that my findings are not driven by the differences between sample countries. Third, I use year-by-year data, which allows me to document the real effects at different phases of the crisis and whether the stability varies over time. Fourth, I include the recovery period (post-GFC) to investigate the pace of recovery and whether it differs between Islamic and conventional banks. Finally, I control for some well-documented factors that might explain the differences between the two types of banking, such as the impact of foreign and state ownership.

**Table 25: The Most Recent Papers and Their Main Findings, Including Whether They Examined the Effects of the 2008 Global Financial Crisis (GFC)**

Author(s)	Technique(s)	Sample		Finding(s)	GFC
Abedifar et al. (2013)	Credit risk using the ratio of loan loss reserves to gross loans, and insolvency risk using Z-score	24 countries 1999–2009	553 banks (118 Islamic)	Small Islamic banks (IBs) more stable than small conventional banks (CBs); large IBs exhibit lower stability than large CBs; credit risk of IBs is less sensitive to interest rates; IBs had lower credit risk than CBs prior and during the GFC	YES
Beck et al. (2013)	Business model, efficiency and stability using Z-score and liquidity ratio	22 countries with dual banking systems 1995–2009	510 banks (88 Islamic)	IBs significantly less stable than CBs using Z-score but not different in terms of liquidity; during the GFC, there were no significant differences	YES
Bourkhis & Nabi (2013)	Stability using Z-score	16 countries 1998–2009	68 banks (34 Islamic)	Overall, IBs more stable than conventional banks, but no significant difference between IBs and CBs in terms of the effect of the GFC on banking soundness	YES
Čihák & Hesse (2010)	Stability using Z-score	19 countries 1993–2004	474 banks (77 Islamic)	Overall, IBs more stable than CBs; small IBs more stable than small CBs; large CBs tend to be more stable than large IBs; small IBs tend to be more stable than large IBs	NO
Rajhi & Hassairi (2013)	Stability using Z-score	16 countries 2000–2008	557 banks (90 Islamic)	IBs have higher stability than CBs; credit risk and income diversity are the most common determinants of insolvency for IBs	NO

## **7.3 Data and Methodology**

### **7.3.1 Data**

The financial and market data for 76 banks from the six GCC states were sourced from the OSIRIS-Bureau van Dijk database for all listed banks in the GCC region, in annual frequency between 2000 and 2013. The number of banks varies from the numbers used in the analyses in the previous two chapters because for the analyses in this chapter I only include listed banks. The reason for restricting the analysis to listed banks is that the market-based model of DD requires market data.

Macroeconomic data including inflation and gross domestic product (GDP) were obtained from the International Monetary Fund. I use an unbalanced dataset because data from before 2000 are not completely available electronically, and many banks, especially Islamic banks, were formed during the period under investigation. Both of these factors result in the dataset being strongly unbalanced, ranging from 535 to 895 observations (out of a possible 1,064). The sample characteristics of the banks in the dataset used for analysing financial stability are presented in Table 26.

I include countries with a dual banking system, in which conventional and Islamic banks operate side by side, as is the case of the GCC countries used in this analysis. The inclusion of country-year dummies ensures that I am able to handle factors that cannot be observed but that vary across countries and years. Regarding the banks' data levels, I include banks with a minimum of one year's data. For the classification of bank type – whether Islamic or conventional – I double-checked the classification offered by the OSIRIS database with information from each bank's documentation and website.

I only include fully fledged Islamic banks in the analysis and treat conventional banks offering Islamic banking services as conventional. I limit the analysis to listed banks to ensure

that the results for the market-based measure are comparable with the accounting-based measure, and are not driven by the presence of small unlisted banks in the dataset for the accounting-based analysis.

**Table 26: Dataset Used for Analysis of the Financial Stability**

	Number of banks	%
<b><i>Sample by country:</i></b>		
Bahrain	12	16%
Kuwait	16	21%
Oman	7	9%
Qatar	8	11%
Saudi	11	14%
United Aran Emirates	<u>22</u>	<u>29%</u>
<b>Total</b>	<b>76</b>	<b>100%</b>
<b><i>Ownership:</i></b>		
Private	40	53%
State	<u>36</u>	<u>47%</u>
<b>Total</b>	<b>76</b>	<b>100%</b>
Domestic	66	87%
Foreign	<u>10</u>	<u>13%</u>
<b>Total</b>	<b>76</b>	<b>100%</b>
<b><i>Bank type:</i></b>		
Conventional	52	68%
Islamic	<u>24</u>	<u>32%</u>
<b>Total</b>	<b>76</b>	<b>100%</b>

Identifying the precise dates of the GFC is vital to capture its impact. The National Bureau of Economic Research identifies December 2007 to June 2009 as the dates of the recession, whereas Iley and Lewis (2013) argue that 7 February 2007 was the beginning of the crisis. Clearly, dating the GFC is not a straightforward matter. However, taking into consideration that the Bankscope database only offers annual data, making the task harder, I considered 2007 to be the beginning of the crisis.

## 7.3.2 Methodology

### 7.3.2.1 Financial Stability Measures

#### Z-score

The first dependent variable to evaluate financial stability is the well-known Z-score. This measure has been used in a vast body of literature (e.g. Boyd & Runkle, 1993; Hesse & Čihák, 2007; Iwamoto & Mori, 2011; Laeven & Levine, 2009; Lown, Osler, Sufi, & Strahan, 2000; Worrell, Maechler, & Mitra, 2007). It has also been used in the literature relating to Islamic banking (see Table 25), and Čihák and Hesse (2010) suggest that it is appropriate to use with respect to Islamic banking. It is calculated as:

$$Z\text{-score} = (ROA + E / A) / SD(ROA) \quad (5)$$

where: *ROA* is return on assets, which is measured by net profit divided by total assets

*E / A* is total equity divided by total assets, and

*SD(ROA)* is the standard deviation of assets over the entire period.

In short, an increase in the Z-score is equal to a decrease in the upper bound of the insolvency risk. Specifically, the score indicates the number of standard deviations that the return of the bank on its assets has to fall below its expected value before equity is depleted and the bank becomes insolvent.

### Distance to Default (DD)

The second dependent variable to evaluate financial stability is Merton's DD. It can be defined as the number of standard deviations away from the default point. Its calculation assumes that a bank becomes bankrupt once the market value of its assets reaches or drops below the book value of debt. DD calculation stems from the option pricing model proposed by Black and Scholes (1973):

$$DD_t = \frac{\log\left(\frac{V_t}{D_t}\right) + \left(r_f - \frac{\sigma_t^2}{2}\right) \cdot T}{\sigma_t \sqrt{T}} \quad (6)$$

where:  $V_t$  is market value of bank's asset at time  $t$

$r_f$  is risk-free interest rate

$D_t$  is book value of the debt at time  $t$

$\sigma_t$  is volatility of bank's asset at time  $t$ , and

$T$  is maturity of the debt.

The market value of assets ( $V_t$ ) and its volatility ( $\sigma_t$ ) are unobserved and therefore need to be estimated. It is assumed that the holders of equity have the residual claim on a firm's assets. Merton (1974) proposes that equity can be treated as a call option on the bank's assets, with a strike price equal to the face value of debt. Therefore, option pricing theory can be utilised to estimate the market value and volatility of the bank's assets from its market value of equity and its volatility by solving the following equations:

$$V_t = \frac{VE_t + D_t e^{-r_f T} N(d_2)}{N(d_1)} \quad (7)$$

$$\sigma_t = \frac{VE_t}{V_t} \frac{\sigma_{E,t}}{N(d_1)} \quad (8)$$

where:  $VE$  is value of bank's equity

$N$  is the cumulative normal distribution, and

$\sigma_E$  is equity volatility.

Finally, the probability of default can be computed as the cumulative probability distribution of the DD-score.

### ***7.3.2.2 Regression Analysis***

In the second stage of this analysis, I compare the financial stability of Islamic banks with that of conventional banks prior to, during and post the GFC. This requires a model to be constructed that takes into account the factors identified in the literature as possibly explaining any differences in stability – a much more complex exercise. The four underlying groups of factors that are controlled for in the regression analysis are presented in Table 27, and definitions of the variables in Table 28. It is important to make the two samples as comparable as possible by considering the potential factors likely to affect each banking system independently. After estimating the  $Z$  and DD scores in the first stage of this analysis, a longitudinal data analysis (panel data with fixed effects) is fitted, which controls for some omitted variable biases that cannot be observed and that vary across time and entities (Stock & Watson, 2012), with the stability scores treated as the dependent variables (see Table 28).

**Table 27: Four Groups of Independent Variables used in the Second Stage of the Analysis**

<b><u>First Group</u></b>	<b><u>Second Group</u></b>	<b><u>Third Group</u></b>	<b><u>Fourth Group</u></b>
<b>Interaction Terms</b>	<b>Bank Level Factors</b>	<b>Ownership structure</b>	<b>Macroeconomic factors</b>
Islam*2007	Capital adequacy	State	GDP
Islam*2008	Asset quality	Foreign	Inflation
Islam*2009	Management efficiency	–	Oil
Islam*2010	Earning	–	–
Islam*2011	Liquidity	–	–
Islam*2012	Size	–	–
Islam*2013	Age	–	–
–	Diversity ratio	–	–

In the first group of variables, I include seven interaction terms (Islam\*2007 to Islam\*2013) for each year between 2007 and 2013, and the type of bank (Islamic), to investigate whether the impact of the GFC significantly differed during different phases of the crisis, as well as the pace of recovery during the post-crisis period.

The second group of variables controls for an array of factors at the bank level, including the size and age of the bank, as common variables in this field. I also control for internal factors using the well-known CAMEL rating system, which covers the five main areas of financial strength: capital adequacy, asset quality, management efficiency, earnings and liquidity (see section 5.3.2.1 for a detailed description of the CAMEL model; see Table 28 for proxies and the expected signs). The CAMEL rating system has been partly or fully used in past empirical studies such as those by Abedifar et al. (2013), Bourkhis and Nabi (2013), and Čihák and Hesse (2010).

**Table 28: Definitions of Panel Data Variables used for Financial Stability Analysis**

N	Variable	Type	Definition	Sign
1	<i>Z-score</i>	Dependent	$Z\text{-score} = (\text{ROA} + \text{EA}) / \text{SD}(\text{ROA})$	–
2	<i>DD</i>	Dependent	Merton's distance to default model	–
3	<i>(C)AP</i>	Explanatory	(1) Total capital, and (2) equity to assets ratios	(+)
4	<i>(A)SST</i>	Explanatory	(1) Non-performing loans to gross loan, (2) provision to interest revenues, and (3) (net loans) / assets	(–)
5	<i>(M)GMT</i>	Explanatory	Cost-to-income (CTI) ratio	(–)
6	<i>(E)ARN</i>	Explanatory	(1) ROA, (2) ROE and (3) PM ratios	(+)
7	<i>(L)iquid</i>	Explanatory	Liquid assets / deposits	(+)
8	<i>Income diversity</i>	Explanatory	$1 - \left[ \frac{\text{net interest income} - \text{other operating income}}{\text{total operating Income}} \right]$	(+)
9	<i>ISLAM</i>	Explanatory	Dummy variable equal to one if the bank is Islamic; zero otherwise	–
10	<i>YEAR</i>	Explanatory	Dummy variable equal to one for each year from 2007–2013; zero otherwise	–
11	<i>Islam*Year</i>	Explanatory	Interaction terms between the type of bank and years from 2007–2013	–
12	<i>SIZE</i>	Explanatory	Natural log of total assets	(+)
13	<i>AGE</i>	Explanatory	Number of years since the bank was incorporated	(+)
14	<i>STATE</i>	Explanatory	Dummy variable equal to one if the bank is Islamic; zero otherwise	(+/-)
15	<i>FORG</i>	Explanatory	Dummy variable equal to one if the bank is foreign; zero otherwise	(+/-)
16	<i>GDP</i>	Explanatory	Year-to-year percentage change in country's gross domestic product	(+)
17	<i>INF</i>	Explanatory	Annual country inflation rate in percentage	(–)
18	<i>OIL</i>	Explanatory	Natural log of average annual oil prices	(–)
19	<i>Growth</i>	Explanatory	$\text{Log}(\text{Total assets} / \text{Total assets}_{-1})$	(–)

Following Laeven and Levine (2007), I compute the income diversity ratio to control for differences in the income sources of banks (see Table 28). Ideally in the context of Islamic banks, I would include the proportion of income stemming from PLS and debt-like contracts; however, this piece of information is not available.

Finally, because DD is variance based, it is expected that Islamic banks will have a greater variance because they are growing faster. During the period between 2000 and 2013, Islamic banks in the sample grew at an average annual growth rate of 26% as opposed to 18% for conventional banks; therefore, an additional variable (growth) is added to control for this effect.

A third group of factors takes account of the differences between the banks in ownership structure, including government and foreign ownership. Ownership is known to play a key role in determining the financial stability of banks. According to Crystal, Dages, and Goldberg (2002) and De Haas and Lelyveld (2006), during times of crisis, banks with diverse ownership show higher stability in terms of credit growth than do domestic banks. On the other hand, Jeanneau and Micu (2002) found that bank lending to developing countries is positively correlated with the economic cycles in the major developed countries. Finally, Crystal et al. (2002) found no significant difference in banks' financial stability between the different ownership structures, suggesting that a bank's financial health is more relevant than ownership after controlling for problem loan ratios.

Another matter related to bank ownership is government involvement. Again, theory does not give a clear prediction of the effect of government involvement and financial stability. While state ownership might reduce risk-taking behaviour by banks because high returns are probably not the main concern of such banks, state ownership can also increase instability because of weaker banking skills due to weak governance structures (Beck et al., 2009).

The last group of independent variables comprises well-known macroeconomic factors – the growth of each country's GDP and inflation rate (INF) – as well as the average annual oil

price, because the economies of the countries in the GCC are so oil-dependent. These three variables are included in the analysis to control for the effect of the macroeconomic cycle.

Finally, to ensure that the results were not driven by the presence of some extreme values (particularly important in a relatively small dataset), I tried winsorising all variables at the 1st and 99th percentiles, and again at the 5th and 95th percentiles. After both analyses, I decided to use the 5th and 95th percentiles because these limits showed a relatively better handling of outliers, although they did not eliminate them. As an alternative method to control for the outliers, I use a robust estimation technique proposed by Hampel, Ronchetti, Rousseeuw, and Stahel (1986). This method assigns observations with large residuals lower weights, resulting in the analysis being less sensitive to outliers. In addition, I report the standard error, following the pseudo-values technique proposed by Street, Carroll, and Ruppert, (1988).

To answer the main question of this chapter – whether Islamic banks were more stable than conventional banks during the different phases of the GFC – I construct the following panel data model (see Table 28 for the definitions of the variables and their expected signs):

$$\begin{aligned}
 Z / DD \text{ scores} = & \alpha + \beta_1 Islam*2007 + \beta_2 Islam*2008 + \beta_3 Islam*2009 + \beta_4 Islam*2010 \\
 & + \beta_5 Islam*2011 + \beta_6 Islam*2012 + \beta_7 Islam*2013 + \beta_8(C)AP + \\
 & \beta_9(A)SST + \beta_{10}(M)GMT + \beta_{11}(E)ARN + \beta_{12}(L)iquid + \beta_{13}Diversity + \beta_{14} \\
 & FORE + \beta_{15}STATE + \beta_{16}GDP + \beta_{17}INF + \beta_{18}SIZE + \beta_{19}AGE + \\
 & \beta_{20}Growth + \beta_{21}Country*YearFE + e
 \end{aligned} \tag{9}$$

As an additional step, I also check robustness by estimating the same regression for different bank sizes, with large banks defined as those above the 50th percentile of the total number of banks, and small banks as those below the 50th percentile.

Table 29 presents the correlation matrix of the regression, which shows that the independent variables are not highly correlated. This finding suggests that multi-collinearity is highly unlikely in the analysis.

**Table 29: Correlation Matrix for the Analysis of Financial Stability**

	DD	EDF	Z-score	E / A	CAR	ROA	ROE	PM	NPLs	Loan-loss-prov / net-int-rev	CTI	Liquid assets / dep	Loan / TA	Diversity	Short2total	Long2total	Equity std	Size (TA)	Age (years)	Growth	
DD	1																				
EDF	-0.15	1																			
Z-score	0.15	0.06	1																		
E / A	0.05	-0.03	0.16	1																	
CAR	0.05	-0.10	0.27	0.67	1																
ROA	-0.17	0.01	0.03	0.42	0.32	1															
ROE	-0.17	0.05	0.05	-0.11	-0.08	0.75	1														
PM	-0.06	0.03	0.12	0.19	0.07	0.66	0.77	1													
NPLs	0.04	-0.08	-0.10	-0.09	0.06	-0.17	-0.22	-0.34	1												
Loan-loss-prov / net-int-rev	-0.08	-0.06	-0.14	-0.13	0	-0.32	-0.44	-0.66	0.32	1											
CTI	0.16	-0.07	0	-0.04	0.01	-0.47	-0.51	-0.56	0.26	-0.01	1										
Liquid assets / dep	-0.11	-0.09	-0.11	0.26	0.32	0.22	0.05	0.1	0.16	-0.10	0.03	1									
Loan / TA	-0.08	0.16	-0.08	-0.13	-0.26	-0.06	0.03	-0.11	-0.08	0.16	-0.12	-0.45	1								
Diversity	-0.20	0.01	-0.15	0.04	0.07	0.36	0.25	0.13	-0.04	0.06	-0.13	0.2	-0.35	1							
Short / total	0.03	-0.01	-0.11	-0.02	-0.04	0.1	0.11	0.09	-0.07	-0.09	0.02	-0.20	-0.08	-0.06	1						
Long / total	-0.03	0.01	0.11	0.02	0.04	-0.10	-0.11	-0.09	0.07	0.09	-0.02	0.2	0.08	0.06	-1	1					
Equitystd	-0.56	0.77	-0.01	0.03	-0.06	0.13	0.11	0.05	-0.10	0	-0.13	0.01	0.14	0.17	-0.02	0.02	1				
Size (TA)	0.05	0.01	0.03	-0.24	-0.17	-0.10	0.02	0.08	-0.22	0.11	-0.24	-0.29	0.07	-0.09	-0.03	0.03	0	1			
Age (years)	-0.06	0.01	0.02	-0.18	-0.02	0.07	0.21	0.11	0.01	0.06	-0.21	-0.18	0	0.1	0.09	-0.09	0.01	0.18	1		
Growth	-0.22	0.17	0.03	0.10	0.02	0.14	0.14	0.19	-0.25	-0.31	0.05	0.06	0.09	0.01	0.10	-0.10	0.08	-0.15	-0.16	1	

## **7.4. Results and Discussion**

### **7.4.1. Descriptive Statistics**

To begin the analysis of whether Islamic or conventional banks were more stable during the economic turmoil of the GFC, a pairwise comparison is conducted to assess the overall performance over the period under investigation (see Table 30). As has been done in the two previous chapters, and to ensure that the variations between Islamic and conventional banks are not driven by increasing the presence of Islamic banks during the later years of the period under investigation, I excluded the period from 2000 to 2004, thus making the sample more balanced. However, the main results do not change significantly, suggesting that the aggregation issue is unlikely to be relevant (see Appendix 2).

The pairwise analysis suggests that, overall, conventional banks were on average significantly more stable, as indicated by Z-score, and that they had a lower probability of default than Islamic banks did over the entire period of the analysis. These findings are in line with those of Beck et al. (2013), but contradict previous evidence of Čihák and Hesse (2010) and Rajhi and Hassairi (2013).

The DD measure does not suggest any statistically significant difference in financial stability between types or sizes of bank. However, when the DD measures are examined more closely, it can be seen that large banks, and especially large conventional banks, are the most stable of all the banks. It is worth noting that large Islamic banks are found to be slightly less stable than small Islamic banks – and in fact, large Islamic banks have the lowest Z-score – whereas small Islamic banks have the highest probability of default. Also, Islamic banks rely more on short-term funding, which might explain their heavy reliance on trade contracts rather than PLS contracts to avoid running the risk of maturity mismatch between deposits on long-term contracts, which can result in bank runs and insolvency (Diamond & Dybvig, 1983).

**Table 30: Descriptive Statistics for Islamic and Conventional Banks, with Significant *t*-values Indicated by Italics**

Variable	<u>All banks</u>			<u>Large banks</u>			<u>Small banks</u>		
	Conventional	Islamic	<i>t</i> -statistic	Conventional	Islamic	<i>t</i> -statistic	Conventional	Islamic	<i>t</i> -statistic
1 Z-score	23.08	19.94	2.26**	24.12	19.69	3.09***	22.2	20.08	0.97
2 E / A	19.87	23.88	-3.10***	12.54	14.57	-4.17***	26.11	29.57	-1.72*
3 CAR	18.96	23.44	-7.61***	17.81	20.69	-4.42***	20.38	26.12	-6.00***
4 ROA	2.31	2.14	0.59	1.93	2.45	-3.51***	2.64	1.95	1.41
5 ROE	14.48	11.37	4.92***	15.53	16.49	-0.93	11.33	5.3	3.43***
6 PM	51.54	43.74	4.61***	51.29	48.4	1.44	51.78	40.49	4.34***
7 NPLs	5.83	5.62	0.42	4.35	4.70	-0.65	7.41	6.51	1.08
8 Loan loss-prov / net-int-rev	19.30	25.32	-2.66**	20.49	16.87	1.44	18.07	32.18	-3.88***
9 CTI	37.77	48.19	-6.41***	34.57	37.66	-2.41**	40.73	54.84	-5.39***
10 Liquid assets / dep	40.14	34.42	1.68*	30.00	28.26	0.88	49.46	38.32	1.95*
11 (Net loans) / assets	53.66	52.95	0.45	57.17	60.22	-2.40**	50.44	48.38	0.82
12 Diversity	0.84	0.84	-0.02	0.66	0.63	1.19	0.99	0.96	0.34
13 DD	3.70	3.57	0.49	3.44	3.95	-1.28	3.90	3.39	1.57
14 PD	4.66%	10.12%	-3.98***	0.05	0.05	-0.17	0.04	0.12	-4.34***
15 Short / total	90.18	97.13	-5.43***	95.16	97.71	-4.33***	86.07	96.77	-5.08***
16 Asset volatility	0.15	0.27	-3.44***	0.12	0.25	-1.99**	0.17	0.29	-2.61**
17 Long / total	9.81	2.86	5.43***	4.83	2.28	4.33***	13.92	3.22	5.08***
18 Size (TA)	\$ 11,900,000	\$ 8,274,181	3.20***	\$ 22,700,000	\$ 18,500,000	1.80*	\$ 3,961,607	\$ 2,722,303	1.96**
19 Age (years)	35.38	22.50	13.44***	38.77	31.28	4.07***	32.9	18.88	13.59***
20 Growth (TA)	18%	26%	-2.3**	16%	23%	-2.40**	19%	27%	-1.34

Key: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

All variables are winsorised at the 5th and 95th percentiles, which shows better handling of outliers but does not eliminate them, confirming the need for using robust regression estimation.

As for the financial indicators, it can be seen that, on average, Islamic banks are less leveraged, less efficient, less liquid, have lower asset quality and are less profitable, with no significant difference in terms of asset quality measured by non-performing loans, and (net loans) / assets and diversity. It can be observed that large Islamic banks have the highest proportion of (net loans) / assets, suggesting Islamic banks are engaged aggressively in lending activity to offset the restrictions on many of the non-compliant asset classes that are available to conventional banks (Čihák & Hesse, 2010); the difference is significant at the 5% level.

Islamic banks' high engagement in lending is reflected in their high return to their total assets as lending is more profitable than most other financial assets. This finding is also reflected in the relatively narrow difference for Islamic banks between their efficiency measure (of cost-to-income (CTI) ratio and leverages) and their lower liquid assets and income diversity. The finding suggests that Islamic banks might be more vulnerable to financial shocks than other groups given the fact that conventional banks have a wider range of risk-mitigation tools (Ahmed, 2009).

On the contrary, small Islamic banks seem to realise their higher operational and credit risk, reflected in their high non-performing loans, loan-loss provisions and higher asset volatility. Therefore, small Islamic banks may be able to offset these risks with higher capital, and to stay more conservative in terms of their lending activity, as reflected in their relatively lower loans-to-assets ratio, higher income diversity ratio, lower returns and profit margins, and higher liquid assets compared with the equivalent measures of large Islamic banks.

To summarise, it can be seen from this comparison that there are essential variations between Islamic and conventional banks as well as between the two different size groups in terms of the banks' stability and operations. However, it is premature to draw any conclusion based on these results alone, as many factors need to be taken into account that might explain

the difference between these types of banking. Therefore, I extend my investigation by implementing the regression analysis methodology I described earlier to investigate the effect of economic turmoil on both types of banks as well as the two different size groups.

#### **7.4.2 Financial Stability of Conventional and Islamic Banks in the Face of Economic Turmoil**

In this section, the financial stability of conventional banks is compared with that of Islamic banks during and post the GFC, to investigate whether the effect of the crisis and the pace of recovery for the two banking systems are significantly different, which is the main objective of this chapter. To make the comparison possible and meaningful, I control for some observable factors, including the internal factors of ownership, size and age, and two macroeconomic factors, GDP and inflation. Furthermore, I control for unobservable factors that vary across time and country by including year-country dummies and using robust estimation for superior handling of outliers.

It can be seen from Table 31 for all models that during the GFC, in 2007 and 2008, there were no significant differences between Islamic and conventional banks in terms of their financial stability, as measured by the Z-score. However, given that the long-run stability score indicates that Islamic banks are significantly less stable than conventional banks, this short-term score can be considered a positive sign for Islamic banks. This result supports the theoretical argument posited by authors such as Ahmed (2009), Chapra (2009), Kayed and Hassan (2011), Khan (2009), Siddiqi (2009) and Wilson (2009), and empirical evidence from Alqahtani et al. (2015) that Islamic banks survived the first phases of the GFC (direct exposure) because they were not exposed to most of the practices and financial instruments that are believed to have been responsible for the crisis.

**Table 31: Regression Results of Z-score for All Groups**

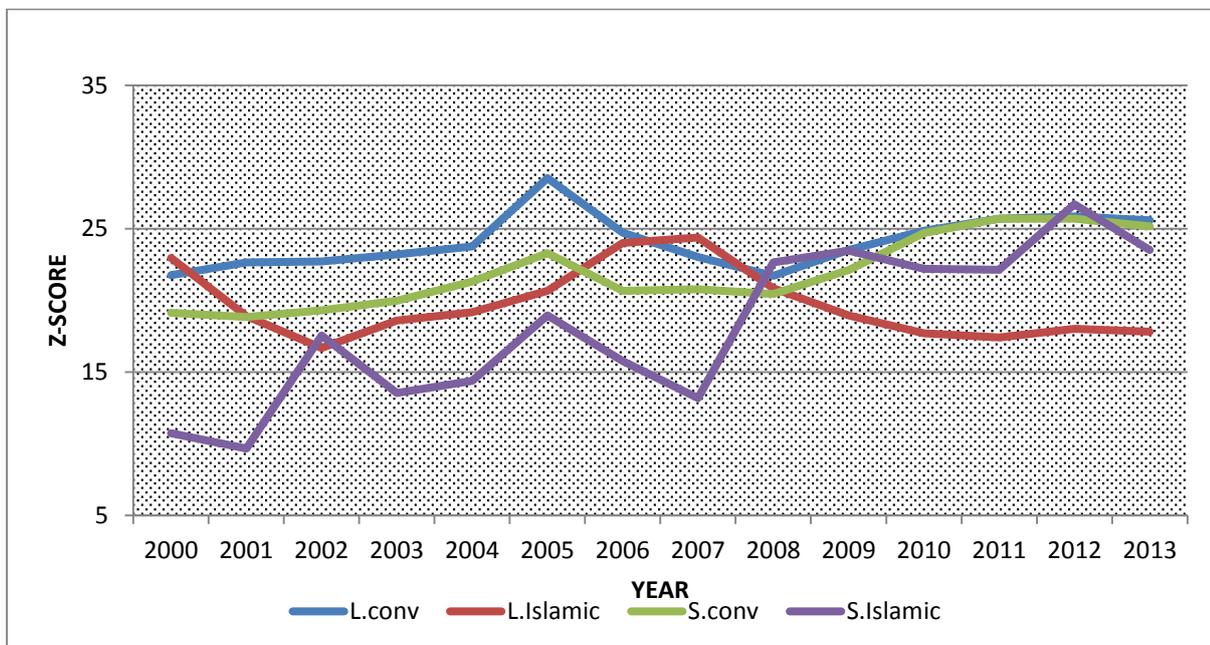
Variables	<u>All banks</u>			<u>Large banks</u>				<u>Small banks</u>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Islam*07	-6.76	-6.39	-6.39	-2.78	-2.78	-2.71	-2.78	-4.83	-4.26	-5.25	-4.36
Islam*08	-4.03	-3.93	-3.91	-3.27	-3.26	-3.17	-3.01	5.07	5.14	2.62	3.47
Islam*09	-6.24*	-6.57*	-6.80*	-6.30*	-6.30*	-6.47**	-6.42**	10.42	10.17	9.25	10.37
Islam*10	-8.75***	-8.58**	-8.92***	-7.60**	-7.59**	-7.58**	-7.24**	9.17	8.73	7.88	8.96
Islam*11	-9.76***	-9.16***	-9.15***	-5.60*	-5.58*	-5.78*	-5.64*	0.44	0.33	-1.96	-0.41
Islam*12	-7.54**	-7.54**	-7.96**	-6.16*	-6.15*	-6.29*	-6.31**	1.04	1.04	1.31	2.41
Islam*13	-7.30**	-7.79**	-8.01**	-9.34***	-9.33***	-9.51***	-9.46***	-1.78	-1.60	-3.05	-2.85
State	5.94***	5.85***	5.85***	2.31*	2.32*	2.19*	2.21*	-2.28	-2.00	-1.57	-1.42
Foreign	2.25	2.30	2.40*	-3.46**	-3.46**	-3.68**	-3.78**	-3.82	-3.86	-4.47	-4.50
GDP	0.00	0.03	0.03	-0.10	-0.10	-0.11	-0.12	0.25	0.22	0.24	0.27
Inflation	0.16	0.21	0.18	0.08	0.08	0.08	0.04	-0.55	-0.58	-0.73**	-0.63*
Oil	-0.14***	-0.13***	-0.13***	0.00	0.00	0.00	0.00	-0.21***	-0.20***	-0.17***	-0.18***
Size	4.15***	4.26***	4.37***	1.99***	2.00***	2.03***	1.98***	7.60***	7.42***	6.26***	6.40***
Age	0.11***	0.11***	0.10***	0.03	0.03	0.03	0.03	-0.01	0.01	0.07	0.05
Diversity	-6.79***	-8.04***	-6.84***	-2.15	-2.13	-1.66	-	-17.28***	-17.45***	-15.09***	-16.89***
(Net loans) / Assets	-0.13*	-0.09	-	0.12	0.12**	0.13**	0.13**	-0.20	-0.21	-0.17	-0.26**
Loan Loss-Prov / Net-Int-Rev	0.06	-	-	0.03	0.03	-	-	0.10	0.10	-	-
NPLs	-0.40***	-0.31***	-0.30***	-0.24	-0.24	-0.22	-0.21	-0.59***	-0.59***	-0.63***	-0.59***
CTI	0.24***	0.23***	0.25***	0.29***	0.29***	0.27***	0.27***	0.16	0.16	0.11	-
Liquid Assets / Dep	-0.25***	-0.26***	-0.22***	-0.00	-	-	-	-0.49***	-0.49***	-0.49***	-0.52***
PM†	0.18***	0.13***	0.14***	0.15**	0.15**	0.12***	0.12***	0.34***	0.33***	0.22***	0.19***
CAR	0.50***	0.58***	0.56***	0.48***	0.48***	0.48***	0.49***	1.08***	0.99***	0.93***	0.90***
E / A	0.64***	0.49***	0.49***	0.48**	0.48**	0.47**	0.45**	-0.13	-	-	-
Constant	-67.03***	-67.34***	-75.94***	-49.39***	-49.54***	-47.93***	-48.01***	-93.83**	-91.64**	-69.57**	-57.10*
	(-4.97)	(-5.06)	(-6.56)	(-3.13)	(-3.49)	(-3.43)	(-3.47)	(-2.58)	(-2.55)	(-2.21)	(-1.87)
Observations	582	590	591	341	341	341	341	255	255	263	263
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	NO	NO	NO	NO	YES	YES	YES	YES
R <sup>2</sup>	0.3048	0.2962	0.2928	0.3159	0.3159	0.3152	0.3148	0.5264	0.5254	0.5046	0.5005
AIC	812.87	821.12	845.02	443.87	441.33	426.08	445.10	345.69	345.93	366.55	373.45
BIC	1,006.60	1,008.97	1,027.51	562.18	555.53	537.46	550.15	509.73	506.07	521.55	523.74

Key: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

†: I decided to use only one proxy for profitability that best fits the data as the three indicators are highly correlated, which might make the presence of multi-collinearity possible.

However, when the financial shock spread to the real economy sectors during the later phases of the GFC (indirect exposure), Islamic banks felt the full impact of the crisis. This is apparent from the highly significant signs of the interaction terms of Islam\*09–Islam\*13 variables, which suggest that the Islamic banks are much less stable in terms of absorbing shocks. This result holds true for the large bank group, supporting the pairwise analysis that shows that large Islamic banks might be less stable than conventional banks as well as less stable than small Islamic banks (see Figure 17). The result can be explained by the fact that large Islamic banks are highly engaged in lending activity and highly leveraged compared with small Islamic banks, making them more vulnerable to financial shocks.

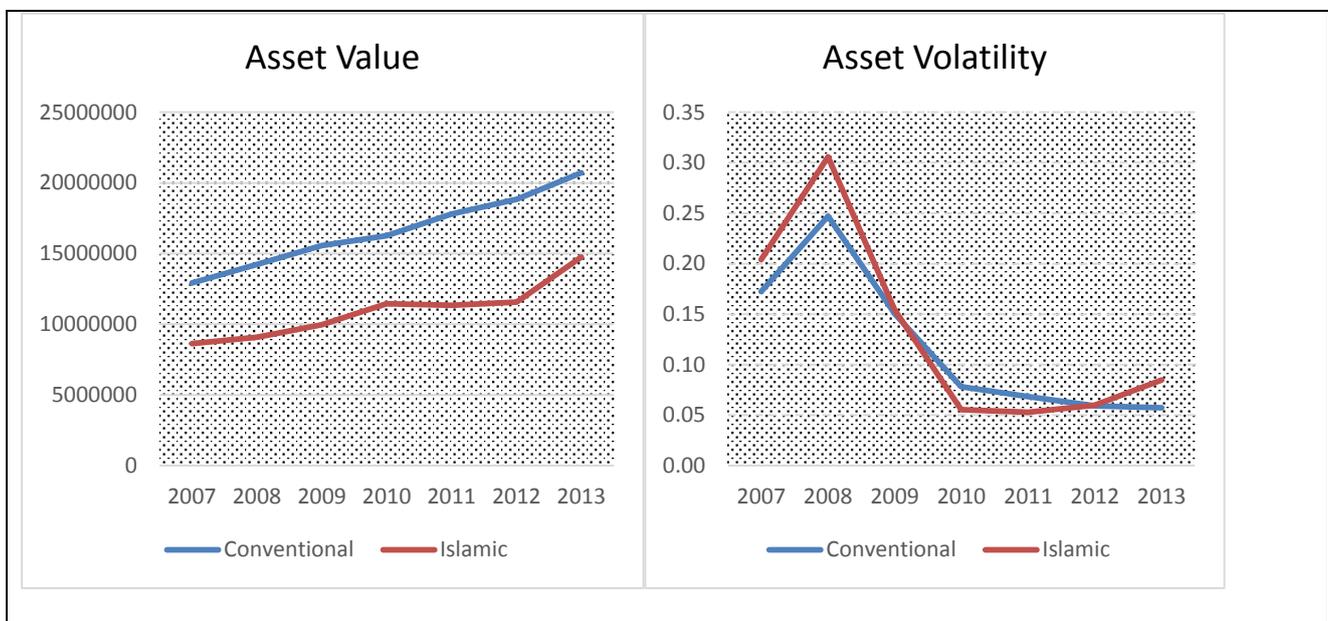
**Figure 17: Z-score Over Time**



However, the picture is different for the small bank group, as can be seen for all models and years: there were no statistically significant differences between small Islamic and small conventional banks, which might be due to the conservative lending strategy practised by small banks. This result confirms the earlier result of Čihák and Hesse (2010), who suggest that Islamic banks are more stable when they operate at a small scale but that they lose this stability when they increase their scale of operations, resulting in adverse selection and moral hazard issues, as well as lack of a sound risk monitoring system.

When analysing the market-based measure of DD, it can be seen from Table 32 that all crisis variables are either not statistically significant or have signs that are not consistent with operating performance or the accounting-based method. This result casts doubts on how efficient stock prices are in reflecting all the information contained in accounting statements (Agarwal & Taffler, 2008). However, this does not appear to be the case here because by plotting the assets value and volatility components (see Figure 18), it can be seen that both components have similar patterns. Moreover, even when I winsorised both components at the 1% and 5% level to eliminate the presence of outliers, the patterns did not change.<sup>25</sup>

**Figure 18: Assets Value and Volatility Components of DD**



Although some control variables in Table 32 are statistically significant, they are not economically significant, which makes me reluctant to try to draw any conclusions based on results of the DD model. A possible explanation for the ambiguity between the results of Z-score and DD model is that the inconsistent results might be due to the difference in the pace of growth. It can be seen from Table 32 that the variable Growth Log(TA) is negatively associated with stability, as

<sup>25</sup> Not reported.

measured by DD, and when the growth of Islamic banking slowed down post 2010,<sup>26</sup> DD scores rose significantly.

In relation to control variables, the Z-scores in Table 31 show that state ownership is associated with higher stability. This finding is consistent with empirical evidence from Beck et al. (2009) that state-owned banks are more stable than privately owned banks due to the potentially reduced risk-taking behaviour of state-owned banks. The result, however, is not statistically significant for the small banks subgroup. The result is not only statistically significant but of economic importance, as can be seen from its large coefficients. For foreign-owned banks, the result confirms the finding of Jeanneau and Micu (2002), who suggest that the stability of foreign banks in developing markets is correlated with the economic conditions in the major developed countries, which might be the case here. The analyses do not provide significant support for the impact of macroeconomic factors.

Size is found to have a highly statistical and economic significance in all groups, which is consistent with a large and growing literature on economies of scale. Age has the expected sign but its effect is statistically significant only for the full sample; it does not hold for subgroups within the sample. As for income diversity, I find strong statistical and economic evidence of its negative impact on financial stability, which is in line with previous research (e.g. Bourkhis & Nabi, 2013; Čihák & Hesse, 2010; Maghyereh & Awartani, 2014) suggesting that this might be owing to the banks' lack of experience in non-traditional activity.

It is worth noting that the small banks in the dataset are more sensitive to the income diversity effect. Most of the CAMEL-type indicators are statistically significant; however, the majority of the indicators are not economically significant, including loan to total assets, CTI, liquid assets to deposits and profit margin. Furthermore, in some cases (CTI and liquid assets to deposits) the indicators do

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<sup>26</sup> The growth rate of Islamic banks dropped by 50% during the period post the GFC.

not have the expected signs. Capital ratios and non-performing loans, as a proxy for asset quality, are found to be statistically significant and play a greater role in stabilising small banks.

**Table 32: Regression Results of DD for All Groups**

Variables	<u>All banks</u>					<u>Large banks</u>				<u>Small banks</u>				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Islam*07	-0.16	-0.19	-0.22	-0.31	-0.22	0.79	0.79	0.81	0.57	0.50	-1.09	-1.14	-1.05	-1.16
Islam*08	0.22	0.12	0.07	0.16	0.10	1.09	1.10	1.09	1.02	0.48	0.90	0.98	0.90	0.72
Islam*09	-0.40	-0.45	-0.63	-0.82	-0.76	0.86	0.86	0.85	0.73	-0.46	-0.40	-0.42	-0.58	-0.77
Islam*10	0.71	0.62	0.50	0.51	0.47	1.03	1.03	1.01	0.97	0.58	0.42	0.79	0.72	0.43
Islam*11	3.56***	3.35***	3.19***	2.93***	3.14***	4.90***	4.89***	4.87***	4.78***	1.91	1.49	1.57	1.39	0.82
Islam*12	0.79	0.74	0.69	0.57	0.62	1.82***	1.62***	1.58***	1.80***	1.73	1.30	1.29	1.14	0.74
Islam*13	-0.13	-0.13	0.20	-0.27	0.13	-0.16	-0.17	-0.19	-0.51	1.10	0.76	0.47	0.21	0.01
State	0.04	0.00	0.00	-0.10	0.00	0.47	0.46	0.45	0.34	0.12	0.19	0.15	0.13	0.07
Foreign	-0.37	-0.38	-0.32	-0.54*	-0.58*	0.47	0.45	0.42	0.42	-1.80**	-1.74**	-1.76**	-1.58**	-1.41**
GDP	-0.07**	-0.07**	-0.07**	-0.07***	-0.07**	-0.04	-0.04	-0.04	-0.03	0.02	0.01	0.02	0.02	0.02
Inflation	-0.03	-0.02	-0.02	-0.03	-0.02	0.02	0.02	0.02	0.02	-0.07	-0.08	-0.07	-0.07	-0.07
Oil	-0.01	-0.00	0.02	0.02	0.02	0.02**	0.03**	0.02**	0.03**	0.02**	0.02**	0.02**	0.02**	0.02**
Size	-0.03	-0.00	0.04	0.02	0.03	0.17	0.17	0.17	0.20	-1.26**	-1.14**	-1.00**	-1.01**	-1.04**
Age	0.01	0.01	0.01	0.01*	0.01	0.00	0.00	0.00	0.00	0.08***	0.08***	0.08***	0.08***	0.08***
Diversity	-1.39***	-1.91***	-1.99***	-1.53***	-1.84***	-1.15*	-1.05*	-1.13*	-1.15*	-2.25**	-1.97*	-1.96*	-1.91***	-1.64***
(Net loans) / assets	-0.04***	-0.04***	-0.03**	-0.02**	-0.02**	-0.02	-0.03*	-0.03*	-0.03*	-0.06	-0.04	-0.04	-0.03	-
Loan loss-prov / net-int-rev	0.00	-	-	-	-	0.01	0.01	0.01	0.01	0.02*	0.03**	0.01**	0.03**	-
NPLs	-0.06*	-0.05*	-0.06**	-0.07***	-	-0.12**	-0.12***	-0.12***	-0.13***	-0.06	-	-	-	-
CTI	-0.05	-0.05*	-0.05*	-0.07***	-0.05**	-0.06***	-0.06***	-0.06***	-0.05***	0.04***	0.04***	0.04***	0.04***	0.04***
Liquid assets/dep	-0.02	-0.02	-	-	-	0.00	0.00	-	-	-0.02	-0.00	-0.00	-	-
ROE	0.02	0.02*	0.02*	0.01	0.01	0.00	-	-	-	0.06*	0.07**	0.07**	0.07**	0.06**
E / A	0.05	0.05	0.05*	0.01	-	-0.07	-0.07	-0.07	-0.09	0.07	0.01	-	-	-
CAR	-0.03	-0.03	-0.02	-	-0.01	-0.05	-0.05	-0.05	-	0.02	0.04	0.05	0.05	-
Growth Log(TA)	-1.44**	-1.32**	-1.34**	-1.26**	-1.22**	-0.87	-0.87	-0.82	-0.91	-1.62*	-1.78**	-1.77**	-1.72**	-1.74**
Constant	9.26***	8.48***	5.52*	5.00*	4.76	4.81	4.86	5.18	4.37	21.89**	15.86*	15.47	13.11*	12.63*
	(2.98)	(2.99)	(1.84)	(1.83)	(1.60)	(1.05)	(1.06)	(1.16)	(0.95)	(2.40)	(1.85)	(1.87)	(1.82)	(1.77)
Observations	401	401	407	448	442	215	215	215	218	189	219	225	239	239
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	NO	NO	YES	YES	YES
R <sup>2</sup>	0.4187	0.4140	0.4167	0.4121	0.4076	0.5197	0.5202	0.5201	0.5093	0.3829	0.3870	0.3869	0.3858	0.3829
AIC	494.95	486.71	499.27	514.46	512.41	346.73	342.58	340.98	355.09	187.03	185.95	179.82	186.49	190.49
BIC	664.63	658.81	665.50	683.27	672.52	494.84	487.30	481.87	489.61	295.56	292.73	283.69	285.67	428.24

Key: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

To ensure that the estimates are robust, I tried a range of specifications, different combinations of variables and different size groups, and found no significant differences. I used a robust regression estimation method to handle the presence of outliers. All time (years) dummies were included only if they were jointly statistically different from zero, implying that controlling for unobserved factors varying across time is necessary in the model, otherwise they were excluded from the model.

As an additional step, the dynamic panel generalised method of moments (system GMM) estimator is used to confirm the results of the robust regression; that is, to ensure endogeneity issues arising from the likelihood of reverse causality between *Z*-score and other bank level factors, because they are both accounting based, have been avoided. This estimator was developed by Arellano and Bover (1995) and Blundell and Bond (1998). It can be seen from Table 33, Model 4 that some of the results of the control variables did change; however, the main results for the interaction terms remained significant, except for 2012 and 2013.

Furthermore, I excluded Oman from the sample because the country has only one newly formed Islamic bank, but the results did not change. I also re-estimated the main regressions using lagged variables, because Čihák and Hesse (2010) suggest that there might be a past effect on the individual risk of banks, but the general results held (see Table 33). Finally, I used the log *Z*-score instead of the level *Z*-score but, again, the results on the relative stability of the banks remained unchanged.

The initial models for DD did not show results in line with the results of *Z*-score as well as the theoretical arguments. Therefore, a sample was reconstructed consisting of 22 carefully matched banks in terms of their size, proxied by their total assets, to provide a better-specified difference-indifference estimator. Furthermore, a shorter time period was used to avoid the issue of aggregation in the unbalanced panel dataset, as during the period under investigation more Islamic banks were formed and consequently included in the sample, which can be a serious issue in small dataset. Again,

the main results (Model 5) did not change, indicating that the aggregation issue does not drive the earlier result for DD.

**Table 33: Additional Robustness Estimations: Model 1, 2 for Lagged Variables, Model 3 for Log(Z)-score, Model 4 using GMM, and Model 5 for Matched Sample of DD**

Variables	Model	(1) Z-lagged	(2) DD-lagged	(3) Log(Z)-score	(4) Z-score GMM	(5) DD matched
Islam*07		-1.18	-0.42	-0.24	-1.01	-0.47
Islam*08		-4.02	0.22	-0.16	-1.01	0.38
Islam*09		-7.76*	-0.17	-0.31*	-2.86**	-0.72
Islam*10		-8.00*	0.64	-0.52***	-2.00**	1.11
Islam*11		-8.18**	3.95***	-0.46***	-2.16**	4.43***
Islam*12		-8.20***	0.50	-0.41***	-0.98	1.72**
Islam*13		-7.19**	-0.01	-0.50***	-0.77	-0.00
State		6.19***	0.44	0.27***	0.84	0.62
Foreign		2.39*	-0.03	0.09	1.63*	-0.19
GDP		-0.06	-0.18	-0.00	-0.01	-0.31
Inflation		-0.14	0.01	0.00	-0.05	0.00
Oil		-0.07***	0.01	0.00***	-0.03***	0.17***
Size		3.44***	0.09	0.23***	0.62**	-0.40
Age		0.11***	0.04	0.01***	0.04*	-0.01
Diversity		-8.11***	-1.34**	-0.26**	0.76	-0.63
(Net loans) / assets		-0.14*	-0.08	-0.00	0.00	-0.05
Loan loss-prov / net-int-rev		0.04	-0.01*	0.00	0.02*	0.01
NPLs		-0.38***	-0.02	-0.02***	-0.06*	0.13**
CTI		0.24***	-0.03	0.01***	0.05**	-0.03
Liquid assets / dep		-0.20***	-0.01	-0.01***	-0.04***	0.02
PM		0.14**	-	0.01***	0.05***	-
ROE		-	-0.02	-	-	0.04
E / A		0.42**	0.08**	0.04***	0.17***	0.08
CAR		0.34***	-0.04	0.01*	0.18**	-0.05
Growth Ln(TA)		-	-1.90***	-	-	-
Constant		-53.07*** (-3.98)	8.97 (0.75)	-1.83*** (-2.94)	-16.47 (-2.87)	-2.31 (-0.27)
Observations		526	379	582	582	162
Wald-test		-	-	-	(40) 3588.78	-
Hansen test ( <i>p</i> -value)		-	-	-	0.45	-
AB test AR(1) ( <i>p</i> -value)		-	-	-	0.00***	-
AB test AR(2) ( <i>p</i> -value)		-	-	-	0.96	-
Country FE		YES	YES	YES	YES	YES
Year FE		NO	YES	YES	YES	YES
R <sup>2</sup>		0.3534	0.3945	0.3664	-	0.5821

Key: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

## 7.5. Summary

In this chapter, I have empirically evaluated and compared the financial stability of Islamic and conventional banks prior to, during and post the GFC. The analysis, using data from 2000 to 2013, was based on a sample of sample of 76 banks across six countries of the GCC region that share similar economic, political and cultural characteristics. I diminished omitted variable biases by controlling

for ownership differences, internal factors, macroeconomic factors and unobserved omitted variables varying across countries and years. I found that market-based DD fails to reflect useful information regarding the financial health of banks in the GCC region whereas the accounting-based *Z*-score is able to reflect banks' financial health, raising concerns about the market efficiency of the region. Based on *Z*-scores, I found that in the long term, conventional banks are more stable than Islamic banks, supporting the second line of argument suggesting that Islamic banks are riskier than conventional banks. The difference remains statistically significant for the large banks subgroup but is not significant for small Islamic banks compared with small conventional banks. Large Islamic banks are slightly less stable than small Islamic banks whereas large conventional banks are more stable than small conventional banks.

The difference in financial stability between the two banking types was statistically insignificant during the economic turmoil of the GFC. However, when the financial shock spread to the real economy sectors during the latter phases of the crisis, Islamic banks suffered statistically and economically higher levels of financial instability than conventional banks. This finding confirms that of Alqahtani et al. (2015) who evaluated the operating performance of both Islamic and conventional banks and found that Islamic banks survived the early phases of the crisis but performed worse later on. The finding suggests that Islamic banks are more fragile and less resilient in absorbing shocks. Again, when the analysis is broken down by bank size, the result holds for large Islamic banks but not for small Islamic banks: small Islamic banks demonstrated a better handling of the economic downturn than did large Islamic banks, supporting the argument of Čihák and Hesse (2010) that Islamic banks are more stable when they operate on a small scale but that they lose this stability when they increase their scale of operations.

## **Chapter 8: Conclusion**

## 8.1. Introduction

The financial crisis of 2007/08 caused catastrophic consequences, shaving an estimated \$US4 trillion from the world economy as direct losses (Seidu, 2009). However, the indirect costs, such as the global economic downturns in both advanced and developing economies, are still hard to comprehend. This has led an armada of experts to label the GFC as the worst financial crisis since the Great Depression (Dymski, 2013). The literature, such as the report of The Financial Crisis Inquiry Commission, proposes that the key reasons of the crisis are discrimination, moral failure, weak governance, easy money policy, imprudent lending, excessive debt and leverage, and regulation and supervision failure. The crisis has not only had severe direct or indirect consequences for the global financial sector but has also spread to the real economic sectors of the global economy.

Despite the crisis, the Islamic banking industry continued its superior growth in comparison with the conventional banking sector. This lead Islamic banking scholars Kayed and Hassan (2011) to claim that Islamic banks survived the first phases of the crisis because most of the causes and practices that led to the crisis are not permissible under Islamic finance principles, including ethical practices, the prohibition of interest (*riba*), and multi-level supervision mechanisms. On the other hand, once some properties of Islamic banking are reviewed and discussed at different micro-levels, it is found that Islamic banks might have been negatively affected by the economic downturn that followed the first round of the crisis, namely, at the sector, operations and contract levels.

The aim of this thesis is to offer an understanding of how the Islamic banking sector performed compared with the conventional banking sector prior to, during and post the GFC, in terms of operating performance, efficiency and financial stability. By comprehensively studying the sector's performance, bankers, policymakers, economists and regulators of Islamic financial institutions may be in a better position to face future financial crises with appropriate policies, practices and theories. This aim is achieved by empirically evaluating and comparing the operating performance, efficiency and financial stability of Islamic and conventional banks prior to, during and post the GFC. The analysis uses comprehensive samples of 101, 80 and 76 banks for the evaluation of operating

performance, efficiency and financial stability, respectively, across six Gulf Cooperation Council (GCC) economies. The time periods differed for each analysis, due to data availability, but all lay within the range of 1998 to 2013.

The analysis attempted to address the following questions:

Research Question 1

Do Profit and Loss Sharing (PLS) principles make the operating performances of the Islamic banking sector more resilient to external shocks than its peer, the conventional banking system, taking the GFC as an example?

Research Question 2

Do Profit and Loss Sharing (PLS) principles make the efficiency of the Islamic banking sector more resilient to external shocks than its peer, the conventional banking system, taking the GFC as an example?

Research Question 3

Did Profit and Loss Sharing (PLS) principles make Islamic banks more or less stable than conventional banks prior to and during the GFC?

To answer these three research questions, I have controlled for ownership differences, internal factors, macroeconomic factors and unobserved omitted variables varying across countries and years. I have also employed in the second stage of each analysis a variety of conventional and more innovative economic techniques including fixed effects, system panel generalised method of moments, robust estimator and Tobit and Truncated models to overcome several potentially serious econometric issues.

These research questions regarding the operating performance, efficiency and financial stability of Islamic banking and the GFC are addressed empirically in Chapters 5, 6 and 7, respectively, and are summarised in the following sections of this chapter. The remainder of this chapter is organised as follows: section 8.2 presents the key finding of the thesis, section 8.3 lists and

discusses the main limitations and challenges that faced the researcher during the conducting of this thesis, section 8.4 presents implications of this thesis, and section 8.5 proposes future research.

## **8.2. Findings**

### **8.2.1. Overall Findings**

It has been found that in the long term and during different economic conditions, Islamic banks are better capitalised, more liquid and have higher intermediation levels than conventional banks.<sup>27</sup> Conversely, conventional banks outperform Islamic banks in management quality, fee income and return to their shareholders' equity, and have slightly better asset quality, as proxied by loan loss provisions. Furthermore, no statistically significant difference was found between the two banking systems in terms of their return on total assets or non-performing loans.

With regard to Research Question 2, it was found that in the long term and during different economic conditions, there was no statistically significant difference between Islamic and conventional banks in terms of cost efficiency. Conversely, conventional banks were found to be more efficient in terms of profit efficiency compared with Islamic banks. However, counterparts had a low level of cost and profit efficiency in comparison with other international evidence.

For financial stability, it was found that market-based DD fails to reflect useful information regarding the financial health of banks in the GCC region, whereas the accounting-based Z-score was able to reflect banks' financial health, raising concerns about the market efficiency of the region.

Based on Z-scores, it was found that in the long term, conventional banks are more stable than Islamic banks, supporting the second line of argument that suggests that Islamic banks are riskier than conventional banks. The difference remains statistically significant for the large banks subgroup but is not significant for small Islamic banks compared with small conventional banks. Large Islamic

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<sup>27</sup> Even though 15 years of data are examined, it is considered long in the literature of young Islamic banking.

banks are slightly less stable than small Islamic banks, whereas large conventional banks are more stable than small conventional banks.

### **8.2.2. The Global Financial Crisis**

Regarding the GFC, the data show strong evidence that Islamic banks outperformed conventional banks in terms of capitalisation, profitability, liquidity and cost efficiency, and narrowed the gap in management quality, profit efficiency and financial stability, with no difference in asset quality. This finding can be considered strong support for the theoretical argument that Islamic banks were less exposed to the GFC owing to their constraints on trading in non-Sharia assets, which were considered one of the main causes for the GFC.

However, when the financial shock spread from within the financial sector into sectors of the real economy, as reflected by commodity and oil prices, which are important in the context of the GCC economies, during the post-GFC period Islamic banks were found to be less resilient in absorbing these financial shocks. This finding suggests that the likely reason why Islamic banks survived the early stages of the crisis is their avoidance of toxic assets rather than their use of PLS contracts. However, once the shocks transmitted to the real economy sectors, Islamic banks were found to be less resilient and suffered even worse than their conventional banking peers did. As a result, Islamic banks lost their superiority in capitalisation, performing poorer than conventional banks in terms of profitability and profit efficiency, and lost the cost efficiency they had gained during the GFC, thus becoming less stable than conventional banks. This finding implies that Islamic banks are more vulnerable to real economic conditions, whereas conventional banks are more vulnerable in times of global financial shock.

### **8.2.3. Ownership**

The data and analysis show that ownership structure plays a significant role in determining the operating performance, efficiency and financial stability of banks in the GCC region. Therefore, ownership structure should be taken into account when researching Islamic banking.

State (co-)owned banks were found to be more profitable, better capitalised, to have higher assets quality and higher intermediation levels, and to be more stable than privately owned banks. However, state (co-)owned banks are less profitable and have higher levels of overheads relative to their earnings with no statistically significant difference in terms of their efficiency when compared with private banks.

Foreign-owned banks were found to be at a great disadvantage compared with local banks. This finding supports the hypothesis of home-field but not global advantage, since local banks outperformed foreign-owned banks in the GCC region. Foreign-owned banks were found to be less capitalised, less profitable, less cost efficient and less stable, especially small foreign-owned banks. However, foreign-owned banks were also found to have superior assets quality and higher generation of fees income than their local counterparts.

Listed banks were found to be more profitable, to have higher intermediation level and assets quality, and to be more profit and cost efficient than unlisted banks. However, listed banks were also found to be less capitalised and liquid than their unlisted counterparts. This finding can be considered evidence for the argument that listed firms are subject to stricter governance, and higher transparency and disclosure standards.

### **8.3. Limitations**

Needless to say, this thesis is not free of limitations. Throughout this thesis, I have faced a variety of challenges.<sup>28</sup> The first limitation is related to the data necessary to accomplish the objectives stated at the beginning of the thesis.

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<sup>28</sup> Some challenges were related to the topic itself. When I started my PhD in July 2012, there were very few (if any) empirical studies investigating the GFC and Islamic banking. Likewise, only a few theoretical papers were available, making this an area of great interest. Because of this intense interest, papers investigating this issue have kept coming out. Some of these papers have been written by high profile scholars such as Asli Demirgüç-Kunt, Director of Research at the World Bank, and Thorsten Beck, from the research department of the World Bank and Tilburg University. This made it difficult for me to make a meaningful contribution to the growing body of literature; however, the challenge encouraged me to try to alter my contributions as much as possible and dig deeper into the issue.

First, although the dataset contains all banks in the GCC region, obtaining data of Islamic banks was one of the main challenges to accomplishing this research. Islamic banks are relatively newer than conventional banks, making the sample size of Islamic banks small; this small sample size, in turn, made modelling and the subsequent inferences a very challenging task.

Second, the unavailability of data regarding the Islamic services windows of conventional banks meant that I was limited to labelling banks in the dataset as either fully fledged Islamic banks or conventional banks.

Third, there is an absence of data on the underlying assets of Islamic banks. If I had had more information about assets, I would have been able to assess how different assets perform during economic turmoil. For example, I could have used this information to investigate whether some classes of assets, such as profit-and-loss sharing (PLS) contracts, make Islamic banks more resilient.

Fourth, outliers in a small dataset can be problematic, especially when investigating an extreme event like the GFC. This issue needed a significant amount of time and effort devoted to it, as well as the employment of a variety of advanced techniques to handle the outliers. The techniques I employed included winsorising at 1%, and in some cases 5%, as well as robust estimators in some cases, to eliminate some observations from the dataset.

Fifth, in many cases endogeneity was most served, such as reverse causality and cross correlation needing special attention and the use of some advanced econometric techniques to overcome these serious issues in econometric modelling. For instance, I used some state-of-the-art techniques to overcome these issues including system GMM, Truncated with bootstrap estimators.

Finally, another limitation of this thesis is that, although it does use some market-based Distance to Default (DD) data, the analysis mainly focuses on accounting-based data. This means it is difficult to generate a conclusive conclusion, because accounting-based data do not take into account market variables.

I also employed some superior proxies for performance and used conventional as well as more innovative econometric techniques, including Truncated with bootstrap for efficiency, as well as system GMM for profitability and stability. These proxies and techniques have not ever been utilised in the literature of Islamic banking.<sup>29</sup>

Furthermore, to make sure the findings were reliable and robust, I employed multiple proxies and econometric techniques in each empirical area of the analysis.

Finally, I included some unique factors that hadn't previously been investigated in reference to the GFC and Islamic banking; for example, ownership effect and oil prices. It was important to control for the impact of oil prices on the GCC banking industry because oil revenues are the main source of income for the six GCC states.

#### **8.4. Implications**

Despite the limitations of this thesis, several general and more specific recommendations can be derived from its findings. In general, bankers at Islamic banks should monitor economic conditions more closely than global financial conditions, as Islamic banks are more linked to the former. Furthermore, Islamic banks should invest more in developing risk-mitigation tools, taking into account the sector's unique needs such as compliance with Sharia principles, as sounder risk-mitigation tools would make the banks' performance more stable and less risky. Moreover, Islamic banks should consider increasing their size to realise the benefits of scale, as the data show that increased size is linked to better operating performance and cost and profit efficiency. This can be done through a merger and acquisition, or by raising more funds from the primary market, and would decrease the gap in size between Islamic and conventional banks. However, the growth in size should be combined with closer monitoring of risk as it is found that Islamic banks lose their stability when they increase their scale of operations.

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<sup>29</sup> Distance to Default (DD), cost / profit efficiency.

In addition, regulators and policymakers should encourage unlisted banks to go public to improve the operating performance and efficiency of the banking sector. This recommendation is especially pertinent for Islamic banks, as there are fewer listed Islamic banks than listed conventional banks.

Furthermore, regulators and policymakers should improve the regulatory environment and good governance, two factors that have been empirically shown to reduce foreign banks' inefficiency levels (Lensink, Meesters, & Naaborg, 2008).

The investigation into the second and third research questions has also generated some more-specific practical recommendations:

- To enhance efficiency, Islamic banks should monitor their levels of capital to avoid being over-capitalised, which was found to negatively affect both cost and profit efficiency.
- To improve stability, Islamic banks should try to resolve the moral hazard inherent in PLS to act as a buffer against losses.
- And finally, based on the size of the bank, large Islamic banks should operate with a larger share of capital, more liquidity and lower engagement in heavy lending activity, while small banks should reduce their engagement in non-lending multiple activities; for example, lending financial services.

## **8.5. Future Research**

Future research should try to resolve the unavailability of data as I notice that this has been one of the major issues in the field of research into Islamic banking. In particular, researchers should try to obtain data regarding the windows of Islamic services of conventional banks as such data could not be obtained for this thesis, and would assess the effects of offering Islamic contracts on the performance and stability of conventional banks.

Further work should also try to collect data on the underlying assets of Islamic banks. Having access to such data would offer more insights into the effects of partnership or trade contracts on the performance, efficiency and stability of Islamic banks.

Furthermore, subsequent research should try to obtain more frequent data; that is, quarterly data. This information would help researchers to assess when the real impact of the turmoil of the GFC hit the Islamic banking industry.

Finally, future studies should investigate the impact of the GFC on the market performance, rather than operating performance, of Islamic banks. I make this recommendation because the market reacts to economic events immediately and can reflect useful information, whereas operating performance requires a relatively longer time to be assessed.

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## Appendix 1: Arabic Terms

Arabic Term	English Definition
<i>Al-ijara thumma al-bai</i>	leasing and subsequent purchase
<i>gharar</i>	excessive uncertainty
<i>halal</i>	legitimate
<i>hamish jiddiyah</i>	security deposit
<i>haram</i>	non-permissible activity or product in accordance to Islamic law
<i>hiyal</i>	legal stratagem
<i>ijara</i>	lease
<i>ijara muntahia bittamlik</i>	lease ending in ownership
<i>maisir</i>	gambling
<i>manfa'a</i>	usufruct
<i>mudaraba</i>	money management
<i>mudarib</i>	the fund manager
<i>musawama</i>	bargaining
<i>musharaka</i>	partnership
<i>musharaka mutanaqisa</i>	diminishing partnership
<i>mustawriq</i>	the buyer of <i>tawarruq</i> contract
<i>qabd</i>	actual delivery, which is an essential condition of valid trading contracts in Islamic finance
<i>Qur'an</i>	the religious text of Islam which Muslims believe to be a revelation from God
<i>rabb al-mal</i>	the provider of fund
<i>riba</i>	usury
<i>sharia</i>	Islamic law
<i>sukuk</i>	Islamic bonds
<i>takaful</i>	cooperative insurance
<i>tawarruq</i>	monetisation



## Appendix 2: The Results of the Period from 2005–2012

GROUP	Proxy	Mean	Islamic	Conventional	t-test
<b>(C)apital</b>	CAR	21.34	19.26	25.4	-9.00
	CAR(LEV)	25.11	36.46	16.79	-13.03***
<b>(A)ssset quality</b>	NPLs	4.51	5.06	4.22	-1.17
	provisions	0.93	1.11	0.84	-2.9***
<b>(M)anagement quality</b>	CTI	41.17	48.72	36.2	-8.59***
<b>(E)arning</b>	ROA	2.23	2.09	2.34	1.27
	ROE	12.11	8.38	14.85	8.02***
<b>(L)iquidity</b>	LTD	104.5	115.34	98.37	-4.25***
	Fee/Income	17.7	15.14	19.22	5.59***
	Liquidity / Deposits	0.37	0.48	0.30	-7.61***
<b>Efficiency (DEA)</b>	Cost	0.46	0.49	0.45	-1.35
	Profit	0.44	0.38	0.46	1.70*
<b>Stability</b>	Z-score	22.11	18.80	26.00	3.62***
	DD	4.07	4.24	3.90	-1.42
<b>SIZE</b>	TA(Millions)	\$12,000	\$6,425	\$16,100	8.07***

Key: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$