Risk Governance, Financial Performance and Financial Stability: Comparative Studies between Conventional and Islamic Banks in the GCC Countries

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Comparative Studies between Conventional and Islamic Banks in the GCC Countries

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By Hajar Raouf

Abstract

The banking institutions confront a wide range of complex risks while carrying out their traditional and innovative business activities. As financial risk management dwells at the heart of their business model, its governance is of crucial importance to achieve their performance targets while maintaining the required level of safety and stability within the national and global financial systems. The governance structures and mechanisms pertaining to the management of all types of risks are therefore of high-level concern for banks and for the regulators, particularly after the global financial crisis (GFC). Since the weaknesses in the risk management practices were identified as key contributor to the GFC, a substantial number of reports, peer-reviews and recommended guidelines published by international bodies such as the OECD, the BCBS and the FSB emphasize the important role of risk governance in ensuring financial health and stability of the financial sector in the post-crisis era. The academic evaluation of the role of risk governance in banks before and after the GFC remains limited despite the established theoretical nexus between bank governance and performance on the one hand and between bank governance and financial stability on the other hand. Given the above, the main aim of this thesis is to contribute to this nascent body of knowledge by examining the soundness of the risk governance frameworks and empirically evaluating their associations with various key indicators of banks' performance and financial stability. To widen the scope of the analysis, the study is carried out on a sample of conventional and Islamic banks with the objective of comparing the results from the two distinct banks' types. The interest to examine the particular case of Islamic banks stems from the results of some research that show their better performance and resilience during the GFC.

The thesis is structured as three essays to evaluate the soundness of the risk governance frameworks, a novel 'Risk Governance Index' (RGI) has been developed that accounts for the most important determinants identified in academic and regulatory literature. The RGI is used in dynamic panel regressions to study the causality effects of risk governance with three key

proxies of financial performance (namely ROAA, ROAE and Cost-to-Income) and bank's stability indicators (namely the *z*-score, the capital adequacy ratio, the ratio of loan loss reserves to gross loans and the ratio of liquid assets to deposits and short-term funding). Dynamic models using the two-step Generalized Method of Moments are estimated to assess the impact of RGI and various bank-specific and macroeconomic variables on the dependent variables. The main findings from the three empirical essays show that the different nature of the two banks' type induces different impacts of RGI on performance and stability. Specifically, conventional banks show better risk governance structures relative to Islamic banks which also enable them to achieve higher operational performance and to improve their stability. Islamic banks, however, need to improve their risk management governance practices as in addition to having weaker structures that impact financial stability adversely, there are limitations to appropriately benefit from the good risks to increase their profitability.

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List of Abbreviations

AAOIFI	Accounting and Auditing Organization for Islamic Financial Institutions
AC	Audit Committee
ALCO	Assets and Liabilities Committee
BCBS	Basel Committee on Banking Supervision
BHC	Bank Holding Company
BOD	Board of Directors
C2I	Cost to Income ratio
CB	Conventional Banks
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CG	Corporate Governance
CRO	Chief Risk Officer
EAD	Exposure at default
EII	Ethical Identity Index
FSB	Financial Stability Board
GCC	Gulf Cooperation Countries
GFC	Global Financial Crisis
GMM	Generalized Method of Moments
IA	Internal Audit
IAH	Investment Account Holders
IB	Islamic Banks
IIFS	Institution offering Islamic Financial Services
ISCU	Internal Shari'ah Compliance Unit
ISRU	Internal Shari'ah Review Unit
IRGC	International Risk Governance Council
LCR	Liquidity Coverage Ratio
NPL	Non-Performing Loans
NSFR	Net Stable Funding Ratio
OECD	Organization for Economic Co-operation and Development
PLS	Profit-and-Loss Sharing
RC	Risk Committee
RGF	Risk Governance Framework
RGI	Risk Governance Index
RGS	Risk Governance Structure
RMC	Risk Management Committee
ROAA	Return on Average Assets
ROAE	Return on Average Equity
ROOE	Return on Operating Equity
SIFI	Systemically Important Financial Institutions
SIB	Systemically Important Banks
SSB	Shari'ah Supervisory Board

Declaration

I hereby declare that this thesis is the result of my individual work and I have produced it without the prohibited assistance of third parties and without making use of aids other than those specified from other sources and which have been identified as such.

This thesis has not been previously submitted for a degree in this or any other institution. The PhD work was conducted from January 2014 to September 2017 under the supervision of Professor Habib Ahmed at Durham University.

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Statement of Copyright

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Dedication

To the one I love unconditionally, the one who brought me up alone, the one who instilled every good in me, *Maman*,

To my two soulmates, the apple of my eyes, my two companions in the route of life, *Hind* and *Alaei*,

To my role model, my inspiration for hard-work, *Taty Najat*,

To the one Allah Blessed me with to accompany every day of my life, the one He Chose to be my mentor, my confidant, my husband, *Amine Badii*.

To you five, I dedicate the highest of my academic achievements and every small or big success, past and forthcoming.

You five are my all.

Chapter One

Introduction

1.1 Introduction and Overview and Research Background

The centrality of risk management in financial institutions broadly and banks particularly has been recognized in research by academics, policy and regulatory bodies as well as industry experts. There has been renewed interest on risk management framework in financial institutions after the global financial crisis (GFC) of 2007-2008. Although banking corporations are in the business of complex financial risk management, it has been recognised that one of the utmost shocks from the last decade's financial markets fiasco dwelled in risk management failures which reflected significantly in the corporate governance practices (FSB, 2013a; OECD, 2009). Examples of such failures include implementation of risk management by products or divisions rather than on a firm-wide basis, the location of risk managers in the organizational skeleton of the bank did not permit the immediate transmission of red flags indicating that they were regarded more as deterrent agents rather than efficient security watchdogs. The need for larger proportions of independent directors within the board and its main committees was worsened by the lack of knowledge of financial risks among the board members, an excessive focus on meeting capital regulatory thresholds and attempting to outperform the expected rates of return on equity to maximize shareholders' value (FSB, 2013a; OECD, 2009).

Risk management is undoubtedly a pillar of the short and long term financial performance for companies operating in all industries as it enables gains from the good risks and reduce losses from the bad risks. Nonetheless, financial intermediaries play an important role in the economic and financial system as they collect deposits and provide credit to the real economy by funnelling savers' funds to companies and households that need to borrow (Bhattacharya and Thakor, 1993). In other words, they perform maturity and liquidity transformation whereby they use short-term liquid funds to issue long-term illiquid loans. While they seek profitability and maximization of value through this business model, their individual financial stability is crucial to the soundness of the entire financial and economic system. A key feature of the banking system is its inter-linkages with the other financial sectors and the economy that can create systemic risks. As experienced in the recent global financial crisis, the insolvency of Bear Stearns in March 2008 followed by the bankruptcy of Lehman Brothers in September 2008 was detrimental to the world-wide financial stability which ensued large social costs at global scale. Becht *et al.* (2011) report that in the case of Belgium, the Netherlands and the United-Kingdom, the total effective state aid that was granted to banks by July 2009 exceeded 20% of GDP. The result was a decrease of GDP per capita by 3 percent on average in the Euro zone countries with Greece, Ireland, Iceland, Italy and Spain being the hardest hit countries

(Otker-Robe and Podpiera, 2013). The authors also report that the income per capita reduced in 95 countries around the world in 2009 at the peak of the financial crisis. An alarming figure in their paper shows that globally 47 to 84 million people are estimated to have fallen in extreme poverty in 2009 because of the global financial crisis (Otker-Robe and Podpiera, 2013, p. 15). Therefore, the crisis transmission channels from the financial system to the social sphere are not only real and large but astoundingly swift.

These socio-economic costs of the GFC motivated the policy-makers and regulators to improve and strengthen the operational norms and review the prudential regulations to prevent similar consequences in the future. The Basel Committee on Banking Supervision (BCBS) issued new Basel III standards to improve the resilience of banks. While Pillar 1 of Basel III increases the capital buffers and holdings of banks, Pillar 2 enhances the supervisory overview role to ensure that banks hold adequate capital to mitigate different types of risks and Pillar 3 promotes market discipline through regulatory disclosure requirements. Other than raising the exigencies in terms of the quality and quantity of capital that improve risk coverage of the capital framework (to better capture on- and off-balance sheet risks and derivatives related exposures) new liquidity standards were also issued (BCBS, 2010a, 2013). The BCBS introduced a leverage ratio[1] that serves as a backstop to the risk-based capital framework (BCBS, 2014), additional capital conservation and countercyclical buffers as well as a global standard to manage liquidity risk (BCBS, 2013). Acknowledging the findings of the OECD (2009), the Basel Committee also recognised the crucial importance of corporate governance in managing banking corporations and safeguarding the interests of all stakeholders beyond the shareholders particularly in retail banks (BCBS, 2015a). Accordingly, it issued a first set of guidelines of Corporate Governance for banks in 2010 drawing mainly from the published principles of the OECD (BCBS, 2010b). Recognizing the weaknesses in the risk management function in financial institutions during the GFC, the (FSB, 2013a) conducted a thematic peer-review on risk governance to assess the progress achieved in implementing the recommendations on enhanced supervision as set out in FSB (2012). The main findings of the peer-review show that national authorities took several initiatives to improve the regulatory and supervisory oversight of risk governance in financial institutions such as raising the supervisory expectations from the risk management function especially with respect to the chief risk officer (CRO) stature and qualifications, requiring the establishment of a risk committee, engaging more frequently with

[1] This leverage ratio divides Tier 1 -as the capital measure- by the sum of the following exposure measures: on-balance sheet exposures, derivatives exposure, securities financing transaction exposure and off-balance sheet items. For detailed regulatory information, please refer to (BCBS, 2014).

the board and management as well as evaluating the accuracy and usefulness of the information provided to the board to enable the effective discharge of their responsibilities (FSB, 2013a, p. 14). Nonetheless, the peer-review also spots areas where more supervision is required to improve risk governance practices. These pertain to the clear definition of the independence status of the directors, the establishment of a stand-alone risk committee that is composed of independent directors, the kind of risk information that the firm should provide in addition to the frequency of risk reporting (FSB, 2013a, p. 15). The (FSB, 2013a) notes the responsibility of the firm above all to identify and manage the risks it faces then of the supervisors to assess whether its risk governance frameworks and processes are adequate, appropriate and effective. BCBS issued an updated version of the Corporate Governance guidelines in 2015 which also takes into account results from the peer-review survey on risk governance carried out by the Financial Stability Board (FSB, 2013a).

These efforts from the OECD, the Basel Committee and the Financial Stability Board portray the importance that regulators allot to the best practices in risk management governance that are expected to rectify mistakes from the pre-crisis period and enhance the soundness of the risk management processes, systems and strategic decisions.

Considering the positive correlation between risk and expected returns, a question that arises is whether improvement of risk governance regime promotes safer risk management decisions in banks or is likely to compromise the institution's financial performance? In addition, is the inclusion of governance mechanisms that are less likely to put maximization of shareholders' interests above other considerations going to achieve better or worse operational performance such as returns on assets and returns on equity? Besides profitability measures, one additional question that needs attention is whether these recommended risk governance practices are effectively associated with enhanced financial stability at the individual bank level contributing thereafter to lower systemic risk likelihood?

As Islamic banks proved better resilience to shocks during the GFC due to their lower leverage and higher solvency (Hasan and Dridi, 2010), this research explores answers to the questions raised above and carries out a comparative study of conventional and Islamic banks to assess if the distinct business model of Islamic banks, which relies on compliance to ethics and Shari'ah such as interest-free transactions, sale and equity modes of financing, speculation-free investments and imposes tighter risk governance practices, can explain to a certain extent their resilience to the external negative shocks as experienced in 2008.

It can be inferred from the above discussion that banking institutions have private incentive structures that are more performance or efficiency oriented while the regulatory authorities are

more concerned about their externalities that can affect the public at large. From the regulators' perspective, the effects of these externalities cannot be ignored hence sound risk governance behaviour must be imposed on banks. Financial authorities have therefore incentive structures that are more socially oriented with a stressed focus on the costs arising from instability.

Despite the crucial importance of risk management in achieving profitability and maintaining solvency in banking institutions, academic research on risk governance remains remarkably scant whether in conventional or in Islamic finance literature. As will be discussed in chapters two, three and four in ampler details, very few academic papers critically evaluate the progress achieved so far by commercial banks or financial intermediaries at large in upgrading their risk management practices to safeguard the depositors' funds and improve market discipline to which many financial institutions sadly did not fairly submit in the past. While the specificities and implications of corporate governance mechanisms in banks have been explored from various angles such as in the works of (Adams and Mehran, 2008; Andres and Vallelado, 2008; Andrieş and Nistor, 2016; Anginer *et al*., 2016; Caprio *et al*., 2007; Ellis *et al*., 2014; Laeven and Levine, 2009; Pathan, 2009; Pathan and Faff, 2013) among many others or in the works of (Abdallah *et al*., 2015; Abu-Tapanjeh, 2009; Chapra and Ahmed, 2002; Elasrag, 2014; Mollah and Zaman, 2015; Safieddine, 2008) in the case of Islamic banks, the focus of research dwells mainly on (i) the attributes of the board of directors such as their size, the proportion of independent or non-executive directors or the meetings' frequency or (ii) the centrality that is the remuneration and/or the power of the CEO when chairing the board as well. The inclusion of determinants pertaining to the risk management function such as the role of the chief risk officer and the internal audit or the attributes of the risk and audit committees started to appear in the literature a few years after the global crisis as in the works of Aebi *et al*. (2012); Battaglia and Gallo (2015); Ellul and Yerramilli (2013); Hines and Peter (2015).

Given the limited literature for a function that can be detrimental to the soundness of the business activities of banks, this research aims to fill this gap and to build-up on the previous corpus by discussing in-depth the pivotal importance of risk governance and explore its linear associations with profitability and stability. Specifically, the thesis empirically investigates the contribution of sound risk governance frameworks to the banks' operational performance and financial stability. To consider the changes in regulatory requirements in terms of the governance of risks after the GFC, the study also accounts for the impact of risk governance regimes in the pre- and post-crisis periods.

1.2 Research Aim and Objectives

As introduced in the previous section, the broad aim of this thesis is to evaluate the strength of the risk governance frameworks in conventional and Islamic banks and examine their associations with financial performance and financial stability. Specifically, it entails three research objectives which constitute the rationale for each of its three empirical essays. In the first essay, the research objective is to explore the concept of risk governance in the academic and regulatory literature and assess its strength in a sample of conventional and Islamic banks in the GCC region. To assess the status of risk governance, a novel metric is developed and used for comparisons between the two bank types and before and after the global financial crisis.

The second essay aims to examine the impact of strong risk governance and financial performance. The metric introduced in the first essay is used in a dynamic econometric model to explore the associations and causality effects with three commonly-used financial performance indicators, namely the return on average assets (ROAA), the return on average equity (ROAE) and the cost-to income ratio (C2I).

The third empirical essay explores the relationship between risk governance and financial stability. The inclusion of four indicators of the bank's health enables a comprehensive analysis on the various possible associations between sound risk governance frameworks and bank's likelihood of insolvency (*z*-score), its capital adequacy (capital adequacy ratio), its assets quality (ratio of loan loss reserves to gross loans) and its liquidity profile (ratio of liquid assets to deposits and short-term funding).

It should be noted that in the second and third essays the econometric analysis starts by presenting the results for the overall sample regardless of the banks' type or time-period. Thereafter, the second section of the econometric analysis focuses on the case of Islamic banks relative to their conventional counterparts in the pre-crisis period. In the third section of the analysis, the emphasis is on the contribution of risk governance to financial performance and to financial stability in the whole sample in the post-crisis period. Lastly, the interest in the fourth section of the econometric analysis is centred on the impact of the risk governance regimes in the specific case of Islamic banks in the post-crisis period.

1.3 Research Questions

The three empirical essays that constitute this thesis attempt to answer various research questions to achieve the research objectives set out in the previous section. The objective in the

first essay is to evaluate the strength of the risk governance frameworks then proceed to several comparisons including between the two bank groups and between the two periods of time of before and after the GFC. Therefore, the first empirical paper explores the following three research questions:

Research Question 1: Is there a significant difference in the risk governance disclosure between conventional and Islamic banks?

Research Question 2: Is there a significant difference in the risk governance disclosure for both types of banks before and after the global financial crisis?

Research Question 3: Is there a significant difference in the risk governance disclosure between conventional and Islamic banks within each GCC country?

Once this first set of research questions is answered, the second empirical paper proceeds to the exploration of the causality effects between risk governance and performance using more sophisticated quantitative research methods. Hence, in chapter three the following research questions will be explored:

Research Question 4: Is there a significant relationship between the extent of risk governance disclosure and the financial performance of banks?

Research Question 5: Is there a significant relationship between the extent of risk governance disclosure and the financial performance of Islamic banks?

Research Question 6: Is there a significant relationship between the extent of risk governance disclosure and the financial performance of both types of banks in the post global financial crisis period?

Research Question 7: Is there a significant relationship between the extent of risk governance disclosure and the financial performance of Islamic banks in the post global financial crisis period?

Following the second set of research questions, the third empirical essay proceeds to the investigation of the potential effects of robust risk governance frameworks on indicators of financial stability. Therefore, chapter four provides answers to the following four research questions:

Research Question 8: Is there a significant relationship between the extent of risk governance disclosure and financial stability of banks?

Research Question 9: Is there a significant relationship between the extent of risk governance disclosure and financial stability of Islamic banks?

Research Question 10: Is there a significant relationship between the extent of risk governance disclosure and financial stability of both types of banks in the post global financial crisis?

Research Question 11: Is there a significant relationship between the extent of risk governance disclosure and financial stability of Islamic banks in the post global financial crisis?

The eleven research questions introduced above will set out the statement of the research hypotheses to be tested later in each related empirical chapter.

1.4 Organisation of the empirical chapters by objectives and research questions

This thesis does not follow a monograph structure with separate literature review and methodology chapters. In contrast, it adopts an essay-based structure where each empirical chapter entails its related literature, methodology and findings discussion. As stated above, the broad aim of this thesis is to evaluate the strength of the risk governance frameworks in conventional and Islamic banks and examine their associations with financial performance and financial stability. To reach this broad aim, the empirical chapters are organised as follows.

1.4.1 Essay One

In the first empirical chapter, the objective is to investigate the concept of risk governance in the academic and regulatory literature then proceed to the evaluation of its frameworks in each bank included in the sample. To achieve this objective, the following research questions are answers:

Research Question 1: Is there a significant difference in the risk governance disclosure between conventional and Islamic banks?

Research Question 2: Is there a significant difference in the risk governance disclosure for both types of banks before and after the global financial crisis?

Research Question 3: Is there a significant difference in the risk governance disclosure between conventional and Islamic banks within each GCC country?

1.4.2 Essay Two

In the second empirical chapter, the objective is to examine the effect of risk governance disclosure on three proxies of the banks' financial performance. The analysis starts by an exploration on the overall sample regardless of the banks' types and periods of time then proceeds to the specific case of Islamic banks overall and after the GFC. In that sense, the following research questions are answered:

Research Question 4: Is there a significant relationship between the extent of risk governance disclosure and the financial performance of banks?

Research Question 5: Is there a significant relationship between the extent of risk governance disclosure and the financial performance of Islamic banks?

Research Question 6: Is there a significant relationship between the extent of risk governance disclosure and the financial performance of both types of banks in the post global financial crisis period?

Research Question 7: Is there a significant relationship between the extent of risk governance disclosure and the financial performance of Islamic banks in the post global financial crisis period?

1.4.3 Essay Three

In the third empirical chapter, the objective is to examine the effect of risk governance disclosure on the banks' financial stability. Similar to the previous chapter, the analysis starts by an exploration on the overall sample regardless of the banks' types and periods of time then proceeds to the specific case of Islamic banks overall and after the GFC. To reach this essay's main objective, the following research questions are answered:

Research Question 8: Is there a significant relationship between the extent of risk governance disclosure and financial stability of banks?

Research Question 9: Is there a significant relationship between the extent of risk governance disclosure and financial stability of Islamic banks?

Research Question 10: Is there a significant relationship between the extent of risk governance disclosure and financial stability of both types of banks in the post global financial crisis?

Research Question 11: Is there a significant relationship between the extent of risk governance disclosure and financial stability of Islamic banks in the post global financial crisis?

1.5 Research Methodology

This research is essay-based, hence each empirical paper (chapters two, three and four) entails its related methodology section that describes the processes of data collection, statistical tests and econometric estimations and data analysis. Nonetheless, the objective in this section is to provide a brief overview on the methodology followed to construct the 'Risk Governance Index' (RGI) and discuss the theoretical motivations for the choice of the Generalized Method of Moments (GMM) that was used to estimate the panel data in chapters three and four.

1.4.1 Risk Governance Index: Rationale and Structure

The very few empirical studies that look at corporate governance (including risk governance) estimate each attribute by a separate variable that is later used in a static or dynamic regression[2]. For instance, the number of directors (sometimes transformed to natural logarithm) is used as a separate variable to capture the board size (Aebi *et al.*, 2012; Andres and Vallelado, 2008; Andrieş and Nistor, 2016; Anginer *et al.*, 2016; Pathan, 2009; Pathan and Faff, 2013). The percentage of independent, outside or non-executive directors out of the total number of directors will also be included as a distinct independent variable to convey the level of the board independence (Aebi *et al.*, 2012; Andres and Vallelado, 2008; Andrieş and Nistor, 2016; Anginer *et al.*, 2016). To measure the existence or absence of a committee at board level or the fulfilment of a threshold of required number of meetings for instance, a natural option is to use binary variables with values of 1 or 0. While these methods of quantifying corporate governance features have been extensively used in empirical literature, there are two issues that cast doubt about the general inferences that might be drawn post-estimation. One is theoretical and the second is technical. On the theoretical side, the link has long been established between bank governance and risk-taking behaviour[3] by using concepts from agency problems, property rights and separation of ownership and control that naturally affect bank profitability and its business soundness in fine (Fama and Jensen, 1983; Jensen and Meckling, 1976). Nonetheless, when it comes to exploring the implications of theory in practice, researchers are compelled to a series of constraining interrogations when quantifying bank governance characteristics which are then used in cause-effect or predictive models. If we consider the case of financial performance as one example, conceptually the measures of profitability are mainly affected by a combination of bank level variables such as the size, operating costs, income diversification, quality of assets, and the market share among other drivers. The governance structure and composition also contribute to achieving profitability as the risk appetite is defined at the strategic firm level. Nonetheless, if the regression equation that examines profitability (as the dependent variable) includes more corporate governance variables than the main drivers of return, this is likely to affect the regression weights of the predictor variables hence signify that the governance variables are the main predictors of bank's performance. A relevant question

[2] Econometric methods used in previous literature vary between (i) the fixed and random effects followed by additional two or three stage least squares to correct for endogeneity (such as in (Adams and Mehran, 2012; Mollah and Zaman, 2015) or (ii) the generalized method of moments (such as in Andres and Vallelado, 2008; Pathan and Faff, 2013)

[3] More discussion on the established theoretical nexus will follow in the introduction and literature review sections of chapters three and four.

arises therefore for how many of these bank governance characteristics are directly associated with the selected performance indicators and cannot be ignored when constructing the econometric model? In fact, what is the theoretical relevance in attributing a linear association and causal effect of say, the meeting frequency of the board or of the audit committee with returns on assets or the Tobin's Q? Or how sound is it to infer the impact of the number of board members on higher or lower ratios of capital adequacy or the loan loss reserves to gross loans for instance? And what about the effect of the direct or indirect reporting line of the CRO to the banks' CEO on for example the returns on equity? These conceptual questions ensue the second technical concern mentioned earlier as a researcher would then wonder about which and how many of these governance traits should be inputted in an econometric model? While the research interest might dwell in capturing the maximum possible effect of governance features on a specific performance proxy, one technical issue could be to fall in the over-specification trap if too many variables are included in the model or on the contrary to face the omitted variable bias if too few variables are accounted for. As is commonly known, these two issues in financial econometrics theory[4] engender inflated standard errors in the former case and biased and inconsistent estimators in the latter and cannot be used to ascribe the influence of a predictor on a response variable (Antonakis *et al*., 2010; Wooldridge, 2009). The root cause of inflated standard errors can sometimes reside in a problem as common as multicollinearity which is very probable when including measures of certain governance attributes that are likely to be highly correlated with each other. An example is using the number of independent directors in the board together with the level of independence of the audit or risk committee. Furthermore, including too many variables on the right-hand side of the regression equations is likely to influence the explanatory power of the constructed model (Wooldridge, 2009).

The academic papers to which this thesis adds up do not converge together in terms of the number of governance measures that were implemented as predictors as there is no theory on the subject that can guide the empirical researchers on the variable selection process when constructing the adequate econometric models to explore their associations with performance or stability indicators. For instance, Andres and Vallelado (2008) use only three determinants (namely the board size, the proportion of outsiders among the board members and the number of meetings held per year) to study the role of the board of directors in the banks' corporate

[4] For a theoretical in-depth discussion on the danger of making causal claims in the presence of econometric issues such as: the omitted variable, omitted selection, simultaneity, measurement error and common method variance, please refer to the comprehensive and instructive work of (Antonakis *et al.*, 2010)

governance structure. In Aebi *et al*. (2012) fourteen governance variables relating to corporate and risk management governance are examined. In Adams and Mehran (2012) twenty-four characteristics relating to the board (and its changes) composition, size and other governance features are explored. In their seminal paper, Ellul and Yerramilli (2013) use seven risk management governance characteristics and eight proxies for board, ownership and CEO power's attributes. Battaglia and Gallo (2015) account for only three corporate and two risk governance features in the model.

In contrast with these studies, this thesis opts for a different method to look at the role of risk governance as part of the overall corporate governance structure in banks. To overcome the misspecification constraints discussed above and in order to draw sound inferences whilst observing the theoretical and conceptual groundwork for the most important drivers of banks' financial performance and financial stability, a composite risk governance indicator has been constructed to operate as one explanatory variable along with other bank level control variables and macroeconomic factors that are likely to influence the selected set of performance and financial stability indicators. The composite indicator named as 'Risk Governance Index' (RGI) entails a total of nineteen items. These relate to three important characteristics of the board that are derived from the corporate governance literature and sixteen key attributes of strategic risk management mechanisms. The characteristics in the RGI include the roles of the risk and audit committees, the role of the CRO and of the internal audit function. This approach reduces the risk of under -or over-specifying the dynamic linear model and at the same time reflects comprehensively the soundness level of the risk governance structures through the scores that are achieved by each bank in the sample during the chosen time interval. Also, one additional advantage of constructing the RGI dwells in the possibility to use it by national and international regulators to assess the level of conformity and progress accomplished by banks on the crucial regulatory requirement of maintaining healthy governance practices.

To construct the index, the method of Haniffa and Hudaib (2007) is followed only in the way they construct their *Ethical Identity Index* from broad dimensions to specific items but no in the way they calculate its scores. In short, firstly a checklist of items is developed based on an in-depth coverage of the academic and financial regulatory literature. This extensive reading phase enabled the identification of the most important roles and functions that lead, oversee, implement and control the risk management mechanisms in banks. After identifying the key features in the first step, it became necessary to distinguish between two categories of characteristics in structuring the RGI. This was done mainly to differentiate between the two strategic levels that are responsible for oversight of risk management functions, namely the

board of directors and the senior management. Thereafter, each category has been broken down into dimensions under which the most relevant attributes of the board members, the audit and risk committees, the CRO and the internal audit were inputted. Similar to Haniffa and Hudaib (2007), the items were allocated a score of one every time the condition for sound practice is fulfilled and zero otherwise. The final score of the RGI for each bank-year observation was derived as the sum of the total scores recorded for each of the nineteen items.

1.4.2 Data Collection, Data Structure and Estimation Method

As the composite measure is self-developed, the primary data of the elements of RGI had to be collected manually from the annual reports, the financial statements and the corporate governance reports whenever available. For the three empirical essays, I used a sample of 26 commercial Islamic banks and 27 commercial conventional banks from five GCC countries[5] for the years 2006 to 2012 giving a total of 371 firm-year observations. Note that the time period includes both before and after the GFC. To collect the maximum number of data, the annual reports and every available financial document including the notes sections in both English and Arabic were thoroughly read to fairly allocate the scores and to reduce chances of omitting a key statement or disclosure. As some banks were established after 2006 and as not all annual reports were available in the banks' websites[6], the panel data structure is unbalanced.

The dependent and bank level explanatory variables were extracted from the BankScope Bureau Van Dijk database and the macroeconomic indicators were downloaded from the World Bank database. The dependent variables that are used to measure financial performance in chapter three are: return on average assets (ROAA), return on average equity (ROAE) and the cost-to-income (C2I) ratio. By using these three distinct financial ratios, the exploration approaches the impact of risk governance analysis on three different aspects of a bank's performance that matter to the external investors (ROAA), the bank's managers (ROAA and C2I) and the shareholders (ROAE). Furthermore, by carrying out the impact analysis on three outcome variables, the results ensure multiple robustness that provide reliable and thorough inferences. The dependent variables that are used to measure the financial stability in the third essay are the *z*-score, the capital adequacy ratio, the ratio of loan loss reserves to gross loans and the ratio of liquid assets to deposits and short-term funding. By using these four variables, various

[5] Further details on the motivations behind the choice of the GCC region will follow in section 6 that tackles the "Scope of the Study".

[6] I attempted several times to directly contact banks via email to enquire their missing annual reports. I received an automatic acknowledgment of receipt from Commercial Bank of Qatar (CBQ) and a personalized response from the Acting Head of Investor Relations at Qatar National Bank (QNB) however without the enquired reports. The other banks never replied.

aspects of financial stability at individual bank level are explored. Specifically, the *z*-score proxies the risk of banks insolvency by looking at the volatility of returns on assets with respect to the ratio of equity-to-assets. The capital adequacy ratio is the well-known and the most important regulatory requirement when measuring the banks' capital quality and soundness. The ratio of loan loss reserves to gross loans reflects the preponderance of the bad loans and the probabilities of customers default in the banks' assets portfolio. Lastly, the ratio of liquid assets to deposits and short-term funding, which is also called the deposit run-off ratio, is a salient measure of how much cash-convertible assets are available to the bank in case depositors unexpectedly need to withdraw their funds.

The determinants for each of these dependent variables used in the regressions are a combination of several bank-level, including the newly developed risk governance index as a focus explanatory variable, and other key macroeconomic factors that will be introduced and explained in the methodology section of each related essay.

As the data structure is both time series and cross-sectional, the relationship between the dependent and independent variables must be estimated through a panel data model. The pooled OLS estimator however cannot be used as it does not consider the unobservable and constant heterogeneity of the banks in the cross-country sample. Also, the pooled OLS estimator does not account for the endogeneity of some of the independent variables. The panel data analysis through static or dynamic panel models is therefore the most efficient tool to conduct the econometric investigation. In this research, the generalized method of moments (GMM) is chosen for several theoretical reasons that makes it the most efficient estimator.

First of all, following Blundell and Bond (1998) and Bond (2002), GMM is appropriate for panels with a large number of cross-section units and smaller time periods. Effectively, the sample size of this empirical research consists of data from fifty-three firms that are observed for seven years. Second, considering the nature of the relationships that this research aims to explore, the achievements in terms of performance and stability are very likely to follow the same trend from their previous year's performances. While the direction of influence cannot be assumed a priori, especially that the period of study covers about two years before the GFC and five years after it, there are autoregressive dynamics from the values of year *t-1* of the dependent variables that cannot be ignored although their coefficients are not of direct interest in the interpretation of the results and for the implications of the study.

The choice of GMM is further confirmed by the existence of explanatory variables that are not strictly exogenous (Bond, 2002). For the case of this research and by using the GMM method, it is possible to build instruments for the variables that are potentially endogenous. A dynamic

panel model at first-order is therefore the most appropriate to construct despite its substantial complications[7] in contrast with the fixed and random effects models (Greene, 2011, p. 307). It is also worth-noting that the reliability of the GMM estimates in essays two and three are verified using the Arellano and Bond (1991) test for serial correlation in the error components as well as the Hansen test for the validity of instruments.

1.6 Significance of the Research

As discussed in the introduction section above, this thesis seeks to fill a gap in the academic literature that explores risk governance practices in banks and their associations with levels of profitability and financial stability. As far as this research is concerned, there are not yet any empirical papers that comprehensively include more than ten determinants related to the risk management function and investigate their linkage with various indicators of financial performance and / or financial stability. Specifically, the first empirical papers that tackled the concept of risk management governance in financial institutions and to which this thesis extensively refers are Aebi *et al.* (2012) Battaglia and Gallo (2015), Ellul and Yerramilli (2013) and Hines and Peter (2015). In these papers, the number of attributes of risk governance vary between two in Battaglia and Gallo (2015) and six in (Ellul and Yerramilli, 2013). In *Aebi et al.* (2012), the authors use five risk governance variables while in Hines and Peter (2015), the only risk governance variable is the outcome binary variable that refers to the voluntary risk committee formation. Details of the variables used in each paper will be discussed in the subsequent empirical chapters accordingly.

In fact, three out of the four papers that tackled the concept of risk governance (Aebi *et al*., 2012; Battaglia and Gallo, 2015; Ellul and Yerramilli, 2013) explore its nexus with several measures of operational and market-based indicators of bank performance and none has considered the potential ties with bank stability. The fourth paper by Hines and Peter (2015) is somewhat different as it looks at the determinants and consequences of voluntary risk management committee formation. Therefore, the outcome variable that the authors estimate in a probit regression model stands for the presence/absence of a risk management committee which is function of several firm characteristics and risk measures. Furthermore, these four pieces of research are on commercial banks and saving institutions in North America *(Aebi et al.,* 2012), bank holding companies in the U.S (Ellul and Yerramilli, 2013), listed commercial banks, cooperative banks, bank holdings and holding companies in China and India (Battaglia

[7] A detailed and powerful theoretical mathematical proof is provided in Chapter 13 on GMM Estimation of Dynamic Panel Data Models in (Greene, 2011, pp. 307–334).

and Gallo, 2015) and on financial institutions in the U.S (Hines and Peter, 2015). Hence, this thesis extends the line of research on the importance of risk governance mechanisms in promoting banks' profitability and adds to it by exploring its role in safeguarding banks stability yet in a different geographical region that is the Gulf Cooperation Countries. It should be noted that none of the cited papers include Islamic banks in their selected samples. Hence research carried out in this thesis[8] is non-existent in the Islamic finance literature. Furthermore, while Islamic banks are present in more than sixty countries, they have become systemically important in fourteen jurisdictions (IMF, 2017) among which the GCC region accounts for the fastest growing Islamic financial sector (The Banker, 2016). Therefore, an exploration of the concept and implications in their case as well is fundamental.

Additionally, there are two more contributions of this thesis. First, it comes up with a new indicator to evaluate the strength of the risk management governance architectures by capturing together nineteen determinants of healthy risk governance practices as informed by academic and regulatory literature. This method differs from the one used in the above-mentioned papers where separate governance variables are used as explanatory variables in the econometric equations. Second, while corporate governance data are sufficiently available in corporations headquartered in the U.S and Europe[9], it is widely acknowledged that this is not the case in the GCC, MENA or Southeast-Asia regions. Therefore, several studies on corporate governance in countries of these regions are compelled to manually collect data from annual reports and financial statements or corporate governance reports if available (such as Abdullah et al., 2015; Al-Maghzom et al., 2016; Al-Malkawi et al., 2014). More details about this limitation of data unavailability will be discussed in the conclusion chapter (Chapter five). Hence, an important contribution of this thesis dwells also in the manual construction of a tailored database of nineteen governance determinants among which sixteen are specific to risk governance and three relate to attributes of the board of directors. As indicated, the constructed database covers data from 27 conventional commercial banks and 26 commercial Islamic banks from the GCC countries and required more than eight months to painstakingly read and thoroughly validate information available in more than three hundred annual reports, financial statements (as well as their "Notes" sections) and corporate governance separate reports whenever available.

[8] Meaning risk management governance specifically and not corporate governance at large which counts several published papers such as (Abdallah *et al*., 2015; Chapra and Ahmed, 2002; Elasrag, 2014; Mollah *et al*., 2016; Mollah and Zaman, 2015) among many others.

[9] Corporate governance data for these countries are available in the following databases: CompuStat and Risk Metrics are widely used for U.S companies in addition to BoardEx, Thomson Reuters Datastream, Bloomberg for America, Europe and a few countries in other regions, yet availability and length of the historical is a significant issue for the GCC companies and banks as is commonly known in the academia.

Finally, the essays' findings from the applied quantitative research methods are of key importance to international financial regulators, national authorities such as central banks and capital markets authorities and financial institutions likewise. In fact, the results from the three essays show that (1) the risk governance structures significantly improved after the global financial crisis, but Islamic banks are required to increase efforts in adopting better risk management practices as results from their conventional counterparts are significantly better. In terms of financial performance, it is found that (2) the more robust the risk governance composition, the higher the profitability in conventional banks but the lower in Islamic banks. In fact, the differences in the two banks' type induce different impacts of sound risk governance on the three key performance indicators. In terms of financial stability, it is found that (3) strong and healthy risk governance frameworks plays a significant role in improving various indicators of bank-level stability including insolvency likelihood and capital adequacy among others and this is specifically true in the case of conventional banks but not in Islamic banks where key stability measures are not directly associated with stringent risk management mechanisms.

1.7 Scope of the Study

Considering the greater share and expansion of Islamic banks in the global financial industry, especially in some specific geographic regions such as the GCC and Southeast Asia, as well as their distinctive operating model where *Shari'ah* principles underpin their risk-taking behaviour, one of the objectives of this research as well as its main contributions to the body of knowledge dwells in including them in its sample and accounting for their distinctiveness in the econometric estimations. The empirical research is carried out for the GCC region where a sufficient number of Islamic banks compete with a higher number of conventional banks.

While it would have been enriching to include Islamic banks from different jurisdictions where the *Shari'ah* governance models differ between a decentralised model in the GCC and a centralised model in countries like Malaysia (Hamza, 2013), the hand collection of data under strict deadlines is one first and important limitation to this possibility and therefore homogeneity of the *Shari'ah* governance model in this cross-country study is preferred.

Out of the six Gulf Council Cooperation countries, only Oman is excluded from the sample because it launched its first Islamic banks in 2013. The remaining five countries included are: Saudi Arabia, Kuwait, Qatar, Bahrain and the United Arab Emirates. It should be noted that all and only full-fledged Islamic banks in these countries, that is 26 Islamic banks, have been included in the sample. Considering the fastidious hand-collection process of corporate and risk management governance data, 27 conventional banks have been added to their Islamic

counterparts making together a sample of 53 banks. The data and information for these banks were collected for the period 2006 to 2012 to enable the comparison of results between the overall, pre- and post-crisis periods as will follow in larger details. The rationale behind the choice of the period of study is mainly motivated by the constraint dwelling from the year of establishment of the Islamic banks in the GCC region. The unavailability of annual reports dated before 2006 for many banks, especially the Islamic ones, raised the necessity to investigate their year of establishment.

As can be found in Table 1.1, there are 11 Islamic banks out of the 26 full-fledged[10] ones operating in the selected countries that were established after 2006 while 8 were incorporated before the year 2000 and only 7 were established between years of 2000 and 2005. Therefore, an ensuing effect is to set the threshold for the starting date of the study based on the most common year of establishment of the banks in the sample. Furthermore, when considering the most common year of establishment of banks, the severity of missing data is reduced as a larger number of annual reports and financial statements -which are the primary source of data for the present study- becomes available. In the conventional banking side, there is only one conventional bank in the United Arab Emirates that was incorporated in November 2007. The remaining 26 conventional banks counted 19 that were market players since the 1970s or earlier, four were established in the 1980s, two were established in the year 2004 and only one in the year 2000. Consequently, the starting date of the study is set for 2006 and considering the objectives of the study which target effects of risk governance post-GFC, the time interval is extended to year 2012 in a way that accounts for a sufficient number of years after the onset of the crisis.

In addition to the arguments above, the choice of the time interval is further supported by the main empirical literature on which the present study builds. Without similar constraints, Aebi et al. (2012) who also look at the risk management-related corporate governance mechanisms in North American banks, restrict the pre-crisis period to the year 2006. Their study aims at examining these mechanisms during the financial crisis, a period they delimit as of July 2007 to December 2008. Also, in the seminal study of Ellul and Yerramilli (2013) which was the first to develop an index for the organizational structures of the risk management functions, the authors use data between years 1994 and 2010 and specify the years 2009 and 2010 as the period following the crisis. In Battaglia and Gallo (2015), the time interval is set between 2007

[10] It is worth reiterating that all and only full-fledged Islamic banks are included in this study. In fact, the sample selection started by first identifying all of these first before adding to them with their local conventional counterparts.

and 2011 to look at risk governance in Chinese and Indian banks over the financial crisis. While their interest does not dwell in the pre-crisis period, the authors imply that the selected years demarcates the financial crisis period.

Hence, as the interest of this thesis resides in an exploration of risk governance over the entire time interval then in the changes occurring to their statuses after the onset of the crisis in addition to the sampling constraints discussed earlier, this study delimits the starting period to year 2006 and extends it to 2012 building up on the literature introduced above. It is important to note also that the substantial effort involved in the manual data collection through the meticulous reading of the annual reports and financial statements presents a consequential constraint, hence a fair and manageable number of years had to be designated in a way which permits the fulfilment of the thesis' objectives and therefore the selection of a time interval that encompasses data from the pre-crisis period and data following the onset of the financial turmoil. This constraint and therefore limitation is acknowledged in section 5.4 of Chapter Five.

Table 1.1: Years of Establishment of Conventional and Islamic Banks in the Sample

GCC Country	Bank's Name	Bank's Code	Bank's type	Date of Establishment
Saudi Arabia (8 Banks)	National Commercial Bank	NCB	Conventional	1953
	Bank Saudi Fransi	BSF	Conventional	1977
	Saudi British Bank	SABB	Conventional	1978
	Arab National Bank	ANB	Conventional	1979
	Al Rajhi	RJH	Islamic	1957
	Al INMA	INM	Islamic	2008
	Bank Al Jazira	BAJ	Islamic	2007
	Bank Al Bilad	BAB	Islamic	2004
Kuwait (10 Banks)	National Bank of Kuwait	NBK	Conventional	1952
	Burgan Bank	BURG	Conventional	1977
	Gulf Bank	GlfB	Conventional	1960
	Commercial Bank of Kuwait	CBK	Conventional	1960
	Al Ahli Bank of Kuwait	ABK	Conventional	1967

	Kuwait Finance House	KFH	Islamic	1977
	WARBA Bank	WARBA	Islamic	2010
	Kuwait International Bank	KIB	Islamic	1973-Islamic since 2007
	Boubyan Bank	BOUB	Islamic	2004
	Al Ahli United Bank	AUBK	Islamic	1941-Islamic since 2010
Bahrain (12 Banks)	Al Ahli Bank Bahrain	AUB	Conventional	2000
	Arab Banking Corporation	ABC	Conventional	1979
	Bank of Bahrain and Kuwait	BBK	Conventional	1971
	Bank Muscat International	BMI	Conventional	2004
	Future Bank	FBB	Conventional	2004
	Gulf International Bank	GIB	Conventional	1977
	Al Baraka Islamic Bank – Bahrain	BRK	Islamic	1984
	Al Salam Bank Bahrain	SLM	Islamic	2006
	Bahrain Islamic Bank	BISB	Islamic	1979
	ITHMAAR Bank	ITH	Islamic	2003
	Khaleeji Commercial Bank	KHL	Islamic	2003
	Kuwait Finance House - Bahrain	KWFH	Islamic	2002
Qatar (8 Banks)	Al Ahli Bank – Qatar	AhliQ	Conventional	1984

	Qatar National Bank	QNB	Conventional	1964
	Commercial Bank of Qatar	CBQ	Conventional	1975
	Doha Bank	Doha	Conventional	1979
	Barwa Bank	Barwa	Islamic	2009
	Masraf Al Rayan	Rayan	Islamic	2006
	Qatar International Islamic Bank	QIIB	Islamic	1991
	Qatar Islamic Bank	QIB	Islamic	1993
UAE (15 Banks)	Emirates NBD	EM-NBD	Conventional	November 2007
	National Bank of Abu Dhabi	NBAD	Conventional	1968
	Abu Dhabi Commercial Bank	ADCB	Conventional	1985
	First Gulf Bank	FGlf	Conventional	1984
	Mashreq Bank	Mash	Conventional	1967
	National Bank of Dubai	NBD	Conventional	1969
	National Bank of Ras Al Khaimah	NBRK	Conventional	1976
	Union National Bank	UNB	Conventional	1982
	Abu Dhabi Islamic Bank	ADIB	Islamic	1997
	Ajman Bank	AJMAN	Islamic	2007
	Al Hilal Bank	AlHilal	Islamic	June 2008
	Dubai Islamic Bank	DIB	Islamic	1975
	Emirates Islamic Bank (formerly Middle East Bank)	EIB	Islamic	2004 (that it became full-fledged IB, established in 1975 as CB)

	Noor Islamic Bank	NIB	Islamic	March 2007
	Sharjah Islamic Bank	SIB	Islamic	June 2002 (that it became full-fledged IB, established in 1975 as CB)

For a thorough comparison between the two types of banking groups, the checklist constructed to evaluate the robustness of the risk governance compositions is applied to each group equally. An important assumption suggests that because Islamic banking activities orientate from the Islamic moral economy principles (Asutay, 2010, 2012) and because of their obligation to comply with *Shari'ah* "in all aspects of their products, instruments, operations, practices and management which will be achieved by the establishment of a proper *Shari'ah* governance framework" (Elasrag, 2014, p. 68), they are more likely to preserve the interests of the stakeholders rather than focus on enhancing the shareholders' benefits through profit maximization regardless of engaging in excessive risks. In fact, Chapra and Ahmed (2002) note that corporate governance is of even greater importance in the Islamic financial institutions because of the additional risks that depositors, hence the investment account holders (IAH), are exposed to as a result of risk-sharing. Consequently, these ethics[11] are expected to be reflected in many aspects of their strategic risk management mechanisms particularly in the quality of their risk oversight.

Following the assessment of the status of risk governance strength through the risk governance index 'RGI', the investigation of the associations and causality effects between risk governance and indicators of operational performance and financial stability is performed in four different analysis stages as briefly set out earlier. The starting point of interest is to look at the linkage in the overall sample regardless of the banks' type to explore the effectiveness of risk governance on a maximum number of data points. The specific case of risk governance in Islamic banks in the pre-crisis period then follows. The third stage of the analysis focuses on risk governance results during the post-crisis period yet again on the overall sample first then in the specific case of Islamic banks. This methodological strategy enables to capture whether the banks'

[11] Chapra and Ahmed (2002, pp. 35–42) provide an in-depth exploration of corporate governance distinctive features in Islamic finance and discuss its peculiarities in avoiding conflicts of interests and in the principal / agent problem. The authors also discuss the issue in an illustrative example of the *Mudaraba* contract and explain how market discipline is imposed thereafter.

business model and / or the effect of the crisis effectively drive the causality results of RGI on the seven dependent variables (three performance variables in chapter three and four stability variables in chapter four). The four-stage analysis also operates as a strong robustness test to validate the statistical inferences.

Although this study is the first of its kind to consider the impact of risk governance on operations of Islamic and conventional banks in the GCC, there are still many ways it can be improved surely. While the possible development of this research will be discussed in the last chapter (chapter five), it can be noted here that one important way in which the study could have improved is by increasing the sample size. As explained earlier, the main hindrance to choosing a larger sample is the need to collect data manually. Nonetheless, under less constraints of time and budget, a collaborative work between more researchers can permit the collection of more data from more banks in the GCC countries and in other regions where Islamic banks operate and possess substantial market shares such as in Malaysia, Indonesia, Iran, Egypt, Jordan, Sudan and further countries in the Asian and MENA regions. With a larger and longer dataset, the statistical estimations are likely to bring about more appealing research findings and enlarge the scope for policy implications.

1.8 Outline and Structure of Research

This thesis is essay-based hence it follows a structure where the core of the research is structured in three journal-style essays. The thesis consists of five chapters in total with this introductory chapter followed by three distinct empirical papers. In the next chapter, the regulatory and academic literature on the subject of risk governance is studied then adequately utilized to develop the novel metric 'RGI' which is used to assess the risk management structures in banks. As part of a comprehensive analysis, results from this index are split into two time periods, one before and the other after the GFC to statistically test for the existence of any differences in means in the two sub-samples. Results from the same metric are also analysed for the two banking groups to distinguish between the scores performed by Islamic and non-Islamic banks. Therefore, the empirical work in chapter two mainly comprehends descriptive and inferential statistics on RGI. In contrast, chapter three uses more complex quantitative techniques to explore the associations and causality effects between the risk governance indicator and a set of financial performance measures. Details on the econometric method were provided in section 1.4.2 of this chapter. Following the same structure of chapter three, in chapter four the objective will be to study the nexus between risk governance and financial stability. In contrast with

several previous empirical studies on financial stability, the chapter examines various aspects of banks' financial stability and goes beyond the commonly-used variable of *z*-score which proxies the distance from insolvency. In particular, it adds capital adequacy, the quality of the loan portfolio and the level of liquid assets to withstand a bank run shock. By accounting for these four measures together, the aim is to provide an analysis on the stability of a financial system that is as comprehensive as possible. Chapter five concludes the thesis by bringing together the results discussions from the three empirical essays. It synthesizes their main inferences and draws policy implications from their empirical findings. The last chapter also discusses the limitations to the thesis and identifies future areas for research development.

Chapter Two

Risk Governance: An Exploration of the Concept and Assessment of its Strength

2.1 Introduction

A review of the evolution of the financial theory shows that the researchers debate on the "Irrelevance Theorem of Modigliani and Miller's Capital Structure Theorem (Modigliani and Miller, 1958) reveals many issues arising from the financial markets characteristics that do matter in funding decisions such as taxation, transaction costs and costs of default. Also, as markets became more complex, so has become the interplay between shareholders, creditors and firms' managers that is commonly examined in the academia under the "Agency Theory". The impetus that deregulation and liberalisation has brought afterwards to the world of finance along with the multiplicity of financial products have centred the focus of market players onto efficiently managing risks and striving to halt the increasing uncertainty. Nonetheless, it seems that all attempts to achieve this last target went bust as the markets collapsed in 2008 after a series of financial scandals until the most recent global financial crisis (GFC).

Yet, when considering these milestones in the evolution of the financial theory and of the tendencies in the financial markets from the late 1950s to the early twenty-first century as applied specifically to banking corporations, the importance of corporate governance overall - and of risk governance more recently- can be traced at each phase along the changes that shook then shaped financial markets as we know them today (Saito et al, 2013). Effectively, between the 1960s and the 1970s, remedies to the Capital Structure Theorem outlined the importance of funding decisions, an onus on managers as finding the optimal combination of equity and debt does affect the firm's value hence the interests of shareholders. Creditors are also concerned by such decisions when managers for instance choose to raise more debt than equity increasing likewise the riskiness of the corporation. Such unaligned targets between principals and agents are thoroughly discussed under the agency theory (Eisenhardt, 1989a). In addition to being opposite and in conflict, these relationships also prove the divergent risk tolerance levels between the two parties. While the principal invests their capital into the corporation's equity, their interest dwells in the short-term profitability. Furthermore, in worse case scenarios, principals are aware that they should bear the financial losses as opposed to managers.

To narrow down the gap between the parties' risk appetite and smoothen the divergences, corporate governance emerged as a set of rules that defines well the roles and practices of managers at all levels of the organization, considers the rights of shareholders and investors and promotes better disclosures and transparency to lower asymmetries of information.

Although from a theoretical perspective, corporate governance seems to have brought about a turning point in business practices and ethics, one would agree that it took long to see it fully embedded into the business sphere. Also, one would even agree more that its comprehensive

and diligent embeddedness was and remains even more acutely required in the banking sector above all others in a post crisis period. This is mainly and naturally explained by the financial intermediation role that banks play in economies. From collecting deposits and issuing loans to finance different segments of the economy, banks have in less than half a century shifted into overleveraged financial corporations putting their liabilities from economic agents at stake as was apparent in the last global financial crisis.

Four main flaws believed to having significantly contributed to ensuing the debacle in the financial sector are identified by the former Chairman of the BCBS Nout Wellink as follows : (1) too much leverage, (2) inadequate liquidity buffers, (3) poor governance and risk management and (4) inadequate incentive structures especially related to compensation (Wellink, 2010). These statements have been widely supported by academics and international institutions alike (Adams and Mehran, 2012; FSB, 2013a; OECD, 2009). These distinct factors at a micro level in a few banks (notably Lehman Brothers and Bear Stearns) ended up impacting the macro / global scale through a swift domino effect.

When investigating the roots of the four causes identified above, one would argue that a common source dwells in what is stated as a distinct flaw: poor governance and risk management. Determining the leverage in the capital structure, setting sufficient liquidity cushions and deciding on the compensation incentives are all matters of strategic corporate governance decisions. Guidance on capital adequacy and liquidity management should unarguably emanate from regulatory bodies yet when the corporation is considered to bear a systematically important risk hence the responsibilities lay more sharply at the institutional level. The role of the Basel Committee on Banking Supervision, the Financial Stability Board and the regional financial authorities is indispensable at the international level more than ever before and their guidelines provide a framework for national regulatory bodies to institute specific rules that can be enforced at micro bank level.

Acknowledging the pivotal role of corporate governance along with risk management, the objective of this essay is to examine risk governance more closely and come up with a methodology to evaluate the strength of their structures as proposed by the FSB, the BCBS and the academic research in the post crisis period. To widen the span of the study, both conventional and Islamic banks in one geographical region are included for comparative and comprehensive analyses. The inclusion of Islamic banks is of substantial importance as they were found to have better resilience during agitated times and relative resistance to liquidity penuries (Hasan and Dridi, 2010). Therefore, an appealing research question would be to probe whether risk governance practices in these banks differ considerably or are similar to their

mainstream counterparts. Based on an understanding of their business model, one could expect stronger and more robust risk governance structures in Islamic banks as they follow stricter ethical rules hence put depositors and stakeholders interest above all others.

The remainder of this chapter is organized as follows. Section 2 presents a detailed review of the literature on the concept of risk governance. Section 3 introduces the research questions and hypotheses. Section 4 discusses the methodology followed to construct a novel metric for Risk Governance. The same section explains how data was collected and provides a comprehensive analysis of the results obtained in Islamic and conventional banks overall then at each country level. Finally, Section 5 discusses the implications of the study and concludes.

2.2 Literature Review

2.2.1 Risk Governance: Emergence of the Concept

Risk governance as a concept was first initiated through the establishment of the International Risk Governance Council (IRGC) in June 2003 in Geneva. IRGC[12] is a private independent foundation that aims at playing the role of a "catalyst" to design and implement improved and effective risk governance strategies. IRGC states that: "risk governance includes the totality of actors, rules, conventions, processes and mechanisms concerned with how relevant risk information is collected, analysed and communicated and management decisions are taken encompassing the combined risk-relevant decisions and actions of both governmental and private actors" (IRGC, 2005, p. 2). Renn et al. (2011) explain that risk governance translates the core principles of governance to the context of risk-related policy making. They assert that it "denotes both the institutional structure and the policy progress that guide and restrain collective activities of a group, society or international community to regulate, reduce or control risk problems" (Renn et al., 2011, p. 231). Hence, the concept is treated by the organization at a macro / global level to assist key policy makers in addressing systemic risks which might affect negatively the health and safety of the human beings, their living environment, economies and societies. This has been operationalized by the suggestion of two risk governance frameworks one in 2005 and an ameliorated version in 2008 which both inspired researchers to discuss the concept at large, build on their format and propose further adjustments (Asselt and Renn, 2011; Boholm et al., 2012; Klinke and Renn, 2012; Renn et al., 2011).

[12] The IRGC is "an independent non-profit organization which aims to help improve the understanding and management of risks and opportunities by providing insight into systemic risks that have impacts on human health and safety, on the environment, on the economy and on society at large" (IRGC, 2005, p. 5)

Yet, since risk governance is perceived as a broad concept encompassing multi-actors and multi-processes bringing together various instances for better risk-related decision-making, these frameworks as well as their supporting academic publications cannot be adapted to or incorporated at a micro / firm level irrespective of the nature of its business, size or sector.

2.2.2 Risk Governance in Banking and Finance: International Initiatives

In finance, risk governance was first mentioned in Kielholz and Nebel (2005) while studying the regulatory impact on the management function of financial firms. The paper is dated January 2005 that is about two years and half before the inception of the subprime credit crisis. Kielholz and Nebel (2005) showed the rationale behind the changes in the regulatory environments and their economic impact and influence on the management function. They explained how regulation *is* moving toward a "more risk sensitive capital adequacy system and stronger risk governance" (Kielholz and Nebel, 2005, p. 34). They further maintain that the implementation of the Basel II capital adequacy and risk governance rules *will lead* financial firms to improve their processes for assessing risk and pricing capital. Unsurprisingly, the concept gained more attention from regulators after GFC in 2008-09.

Considering the crucial role that banks play in the economy of safekeeping and intermediating funds from depositors and investors to entrepreneurs and fund seekers, their safety and soundness is vital to the financial stability. The notion of corporate governance fully embodies this responsibility as it "determines the allocation of authority and responsibilities by which the business and affairs of a bank are carried out by its board and senior management" (BCBS, 2015b, p. 1). This includes the setting of the bank's strategy and objectives, operating the bank's business on a day-to-day basis, striving to align the corporate activities with the protection of the depositors' interest, meeting shareholders' obligations, considering the interests of other stakeholders and establishing control functions all with integrity and in compliance with the laws and regulations (BCBS, 2015b). In terms of developing international regulatory standards, the OECD launched its first set of "Principles of Corporate Governance" as early as May 1999 and a revised version in 2004. In the latest version, the OECD summarize the basics for a well-functioning corporate governance system as one that corroborates high transparency level, accountability, board oversight, respects shareholders' rights and acknowledges the role of key stakeholders (OECD, 2015). The principles of (OECD, 2004) served the Basel Committee to issue its guidelines for banking corporate governance rules in September 1999 then provide a revised version in February 2006 (BCBS, 2006, 1999).

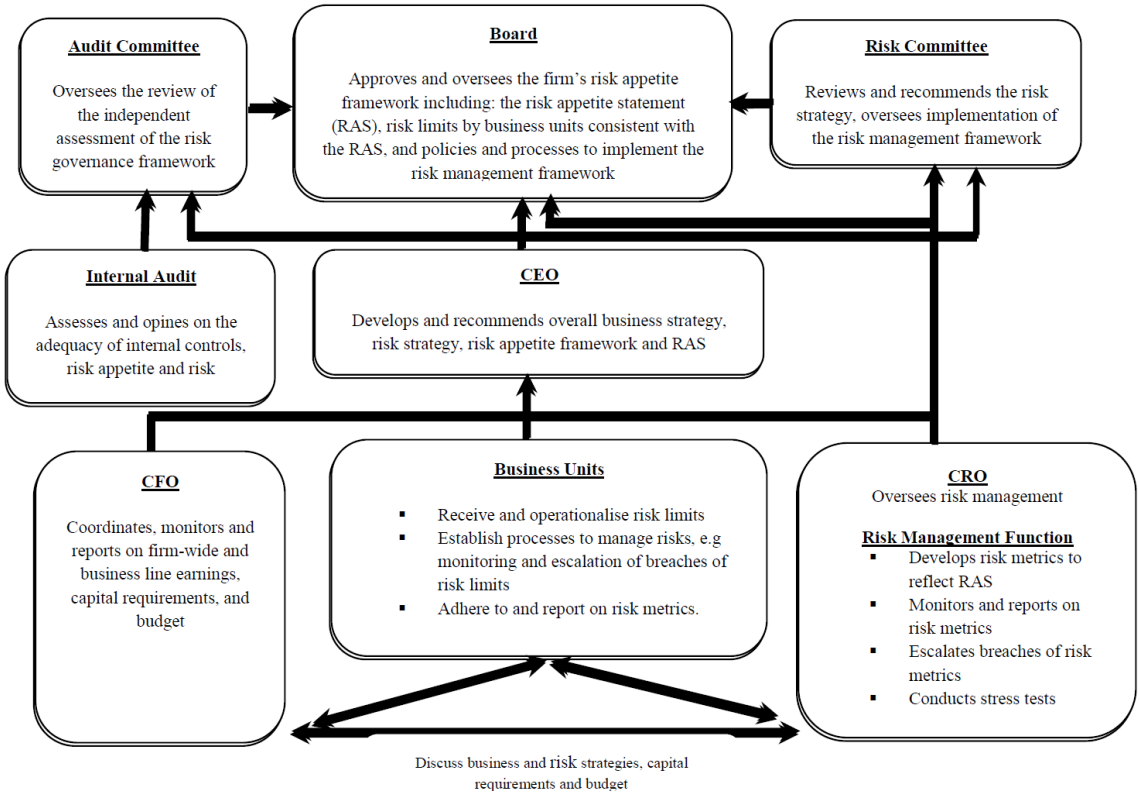
Following the GFC, these multinational authorities reviewed their consultative documents on corporate governance matters several times advocating more focus towards the risk governance part of the overall structure. Referring to the OECD (2004) and the BCBS (2010b), the *Financial Stability Board* – which was created in 2009- also issued their first policy measures addressing risks to the global financial system specifically for Systematically Important Financial Institutions (SIFI). The policy measures features a call for "more intensive and effective supervision through stronger supervisory mandates, and higher supervisory expectations for risk management functions, risk data aggregation capabilities, risk governance and internal controls" (FSB, 2011a, p. 1). Furthermore, in October 2011, the FSB conducted a peer review entirely dedicated to the assessment of general frameworks and practices of risk governance in financial institutions (including Systematically Important Banks or SIB). The survey tackled seven areas where supervisors needed to evaluate: the firms' approach toward risk governance, the defined responsibilities for the board, the defined responsibilities for the risk committee, the governance of the board and risk committee, the information provided to the board and risk committee, the risk management function and the independent assessment of the risk management function.

For the purpose of this peer review survey, the FSB suggested a template for a risk governance framework which comprises key risk governance functions at three hierarchy levels.

These are: the board and its audit and risk committees, the Chief Executive Officer (CEO) and Internal Audit and the firm-wide CFO, and CRO and business units.

The structure for risk governance that the Basel Committee (BCBS, 2015a) suggests does not differ much from the one put forth by the FSB. The BCBS asserts that an effective risk governance framework (RGF) includes a strong oversight of the board in addition to clearly defined risk management organizational responsibilities. These concern: the business line, the risk management function and an independent compliance function as well as an internal audit function that is also independent from the previous hierarchy levels (BCBS 2015). Determinants for each of the cited above functions will be expounded more thoroughly in the methodology section when discussing the construction of the metric.

Figure 2.1: Risk Governance Framework



Source: (FSB, 2013a, p. 6)

2.2.3 Corporate governance in Banking: Conceptual framework and Empirical Literature

Building up on one of the main concerns for corporate governance at large, Macey and O'hara (2003) refer to the limits of the fiduciary duties of a company's directors as perceived differently in the Anglo-American and the Franco-German corporate governance models and centre their analysis on the application of these in the case of banks. In the Anglo-American model, corporate governance is the set of mechanisms that would essentially enable the maximization of shareholders' value. This understanding contrasts with the Franco-German model which exhorts directors and officers to consider the long-term interests of all the stakeholders as much as ones of the shareholders (Macey and O'hara, 2003, p. 91). Considering the particular case of banks in the U.S, Macey and O'hara (2003) assert that the public role banks play, the latter model should be better applied to them for a number of reasons. First, the capital structure of banks is constituted of very little equity and about 90 percent of deposits and debts (Macey and O'hara, 2003, p. 97) making them highly leveraged firms. Second, banks collect deposits that must remain available to depositors on the one hand, and issue loans of

longer maturities to their customers on the other hand. Failure to efficiently manage the liquidity mismatch, pay back debts and handle unexpected bank runs can lead banks to insolvency and disrupt the stability of the financial system. Hence, the authors argue that the board's decisions and actions on the bank's leverage, risk and balance sheet solvency found the rationale to impose broader duties on bank directors which should encompass equity as well as fixed claimants (shareholders and stakeholders respectively).

Additionally, Levine (2004) explains that sound corporate governance is operationalized in banking institutions mainly through the efficient allocation of capital, the exertion of effective corporate governance over firms they fund and by taking into same account the interests of shareholders as well as debt holders. He further argues that the opaqueness of banks stemming from information asymmetries between controlling owners and debt holders with opposite interests in addition to the governments' interventions on the controlling ownership of the banks' capital are two mean features that render corporate governance more complex as compared to the case in non-financial firms. To promote more effective governance in banking, Levine argues that governmental regulations (on acquiring substantial share of a bank's stocks) should be reduced in favour of more incentives to private investors to assume the monitoring of banks and permit better and more effective competition (Levine, 2004, p. 11).

2.2.4 Corporate Governance in Islamic Banks: The Islamic Finance Perspective

The business model of Islamic banks is different than one of the conventional banks (CB) particularly as they must comply with an additional legal and ethical framework that is based on Islamic Law or *Shari'ah*. Hence, they collect deposits, offer interest-free funding alternatives and intermediate resources to foster economic growth. The balance sheet of an Islamic bank aggregates several financial contracts that shape their assets and liabilities structure. Table 2.1 displays the main Islamic financial contracts offered by Islamic banks based on functionality (Greuning and Iqbal, 2008; IFSB, 2011; Visser, 2009). Table A2.1 in the Appendix summarizes definitions of the main Islamic Financial Contracts.

Table 2.1: Basic Structure of an Islamic Bank's Balance Sheet

Assets	Liabilities
Cash and Short-Term funds (Cash Balances)	Deposits Demand Deposits (Qard Al Hassan) Investments Accounts Mudaraba (Restricted and Unrestricted)
Financing Assets: • Murabaha (sale based on cost-plus margin) • Ijara Leasing • Salam • Istisnâa	Special Investment Accounts: • Mudaraba • Musharaka
Investment Assets: • Mudaraba • Musharaka • Sukuk (Islamic bonds)	Other Liabilities
Fee-based Transactions: • Ju'alah • Kafala (guarantee) • Sarf (foreign currency exchange)	Shareholders' Equity
Other Assets / Non-banking Assets	Reserves

Source: (Greuning and Iqbal, 2008, p. 69)

The dissimilarities between corporate governance principles and practices in conventional and Islamic banking are essentially the resultant of *Shari'ah* supervision that imposes a number of boundaries on the Islamic banking activities (Al-Suhaibani and Naifar, 2014). *Shari'ah* governance ensures the compliance of the Islamic bank's operations, products and management conducts with the Islamic law principles (Elasrag, 2014). The international regulatory and standard-setting bodies for institutions offering Islamic financial services such as the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) and the Islamic Financial Services Board (IFSB) encourage Islamic banks to comply with the rulings and supervision of the *Shari'ah* boards to preserve the credibility of the industry. The IFSB (2009) defines the *Shari'ah* Governance System as the 'set of institutional and organisational arrangements through which an Institution offering Islamic Financial Services (IIFS) ensures that there is effective independent oversight of *Shari'ah* compliance over each of the following structures and processes: (a) the issuance of relevant *Shari'ah* pronouncements/ resolutions, (b) the dissemination of information on such *Shari'ah* pronouncements/resolutions to the operative personnel of the IIFS who monitor the day-to-day compliance with the *Shari'ah* pronouncements/resolutions vis-à-vis every level of operations and each transaction, (c) an

internal *Shari'ah* compliance review/audit for verifying that *Shari'ah* compliance has been satisfied, (d) an annual *Shari'ah* compliance review/audit for verifying that the internal *Shari'ah* compliance review/audit has been appropriately carried out and its findings have been duly noted by the *Shari'ah* board. The governance, control and compliance structures within Islamic banks will therefore be complemented by the *Shari'ah* Governance System defined above such as at the governance level the *Shari'ah* board supplements the board of directors, the control function including the internal and external auditors is complemented by both the Internal *Shari'ah* Review Unit (ISRU) and an external *Shari'ah* review then the regulatory and compliance units are supported by an Internal *Shari'ah* Compliance Unit (ISCU) (IFSB, 2009).

Hence, the main role of the *Shari'ah* board dwells in setting the *Shari'ah* related rules and principles and overseeing the compliance with its verdict (Chapra and Ahmed, 2002). More specifically, the *Shari'ah* Supervisory Board (SSB) has in principle five dues including: the certification of permissible financial instruments through fatwas, the verification of the transactions' compliance with the issued fatwas, the calculation and payment of Zakat, the disposal of non-*Shari'ah* compliant earnings and advice on the distribution of income or expenses among the bank's shareholders and investment account holders (Grais and Pellegrini, 2006). At an operational yet independent level, Islamic banks establish a *Shari'ah* audit unit that ensures the adherence to the Islamic law principles in the bank's operations including the safeguarding of the depositors' rights as per the acquisition and the use of funds by the Islamic bank (Chapra and Ahmed, 2002).

While the above discussion presents the main distinctive feature between conventional and Islamic corporate governance structures that is the roles and duties of the SSB, a more informative examination of the distinctiveness of Islamic corporate governance principles has been provided by Shibani and De Fuentes (2017) who analyse them based on four paradigms of social theory. Shibani and De Fuentes (2017) argue that under the functionalist paradigm it is the religious governance element of the presence of the SSB that plays the most significant distinguishing role in its multi-level governance structure and whereby the reduction of agency problems and the protection of the interests of all the bank's stakeholders are guaranteed. Under the interpretive paradigm which sees corporate governance as a social construct, Islamic corporate governance's characteristic dwells in its social commitments to the ethical norms that are set out by the religion of Islam. Therefore, the values of justice, honesty and fairness are not to be compromised to parties in any economic or financial transactions and business must be conducted in accordance with the *Shari'ah* rules (Abu-Tapanjeh, 2009). Under the radical

humanist paradigm which refers to the democratic and fair process that defines corporate governance models, the principle of '*Shura*' or consultation with the Islamic bank's stakeholders defines the Islamic corporate governance model. Finally, under the radical structuralist paradigm which demonstrates that the corporate governance model founds its basics in social classes, the Islamic corporate governance model is portrayed most importantly in their proposition of non-*riba* or non-interest bearing financial solutions to people in the society for whom the application of Islamic law is fundamental.

Implications of the analysis of the Islamic corporate governance principles include the responsibility of Islamic banks to carry business operations that are *Shari'ah* compliant and that go beyond the protection of only the shareholders' interests to the safeguarding of the rights of all the Islamic bank's stakeholders including its debtholders, depositors, the managers and employees as well as the wider community (Abu-Tapanjeh, 2009). In that sense, the mechanisms of corporate governance in place can translate the approach to strategic decision-making at the board of directors' level where the *Shari'ah* Supervisory Board sits and contributes to the achievement of the financial institution's objectives. Therefore, with the responsibility widened to the social community, the safeguarding of the financial stability of the Islamic bank along with the achievement of the profitability targets from *halal* non-*riba* sources mean that the SSB is actively involved in (1) the delimitation of the risk appetite, (2) the demarcation of the *gharar* boundaries in income-generating products as well as its presence as potential asymmetric information in the financial contracts with their customers and (3) in the definition of the high-level risk management strategies which collectively form the essence of strategic risk governance as discussed in the previous section 2.2.2.

On the academic investigation side, research papers studying the concept of corporate governance in Islamic finance tackle issues such as the variations of the agency theory in the context of Islamic banks (Ahmed, 2013; Safieddine, 2008), the implications of risk-sharing principles for corporate governance (Al-Suhaibani and Naifar, 2014), the special attributes of corporate and *Shari'ah* governance (Chapra and Ahmed, 2002; Elasrag, 2014) as well as the links between corporate governance and some issues raising in the particular case of unrestricted investment account holders (Magalhães and Al-Saad, 2013). As explained by Ahmed (2011), Islamic banks face two types of risks. Specifically, they incur risks that are similar to ones faced by the conventional financial intermediaries as well as others that are specific to them arising due to compliance with *Shari'ah* rules. Moreover, not all classic risk mitigation techniques such as insurance and derivatives are allowed by *Shari'ah* (Ahmed,

2011). Therefore, it becomes manifest that risk management in Islamic banks introduces additional issues and legal constraints that add to the responsibilities and expectations from sound corporate governance frameworks put in place.

In summary, assuming the necessity of complying with an additional ethical framework as outlined by *Shari'ah*, it can be hypothesized that Islamic banks would have stronger risk governance structures as there are religious boundaries that (1) prohibit the involvement in activities where *gharar* (excessive risk) is high, (2) introduce limits on industries for *Shari'ah* Compliant Investments and (3) make sure they tie banking to the real economy hence exclude intangible or virtual assets from their portfolios. Answers to the hypotheses are provided in the subsequent sections.

2.3 Research Objective and Hypotheses

The objective of this chapter is twofold. First, and as a main contribution it aims at developing a measure to assess the quality of the risk governance structures in banks in line with recommendations from academic research and regulatory guidelines. This novel measure will enable evaluation of risk governance status in a financial institution at two periods of time. Second, this chapter aims to examine the evolution of the statuses of risk governance over time and compare between Islamic and conventional banks considering the differences of their business models.

To meet these aims, the study postulates the following hypotheses:

H_{01}: There is no difference between risk governance structures in Islamic and Conventional banks

H_{02}: There is no difference between risk governance structures before and after the global financial crisis

H_{03}: There is no difference between risk governance structures in Islamic and Conventional banks within each GCC country.

2.4 Methodology

2.4.1 Evaluating Risk Governance: An Exploration of the Empirical Literature

Considering the nascent interest on risk governance, exploration of academic literature on the theme led to the identification of only four relevant papers tackling the concept. Aebi et al. (2012) examine the associations between some risk management related corporate governance mechanisms and banks' financial performance during the financial crisis of 2007/2008. The

authors proxy risk management related corporate governance by using the presence of the CRO in a bank's executive board, the reporting line of the CRO (whether to the CEO or directly to the board of directors) and the presence of a dedicated risk committee that monitors and manages the risk management within the bank. In addition, they add other corporate governance variables such as the board size (natural logarithm of the number of directors in board), the board independence (percentage of independent outside directors) and the percentage of the directors with experience in banking or insurance industries as executive officers. Their major finding suggests that banks where the CRO reports directly to the board of directors and not the CEO or any other corporate department show higher stock returns and higher return on equity during the financial crisis. They do not find any impact of the standard corporate governance variables on returns.

Ellul and Yerramilli (2013) introduce a measure for risk management to explore whether it curtails tail risk exposures of U.S Bank Holding Companies. The Risk Management Index (RMI) that the authors develop encompasses determinants for two main functions of risk management, namely the role of the CRO and the Risk Committee. For the first function, the authors use binary variables for the presence of the CRO, whether s/he is an executive officer of the U.S bank holding companies, if their pay is amongst the top five highest paid executives and finally the authors measure the centrality of the CRO by comparing their total compensation over the CEO's. The second category of "risk committee" is proxied by using a dummy variable that measures if at least one of the independent directors has experience in banking and finance. They use another dummy variable that measures whether the frequency of the risk committee meetings exceeds the average computed for the sample. Interestingly, Ellul and Yerramilli (2013) find that before the inception of the GFC, banks with higher RMI had lower tail risk, lower non-performing loans and better operating and market return performance. Similarly, after the crisis banks with higher RMI are found to have lower tail risk and higher returns on assets. This finding suggests that strong and independent risk management functions restrain exposures to tail risks.

Hines and Peter (2015) examine the determinants and consequences for voluntary risk management committee (RMC) formation in financial institutions and study if the latter has any effects on short-term risk outcomes and profitability. Using a sample of 47 financial institutions that form a RMC at board level between 1994 and 2008, the authors use firm characteristics and risk measures as potential determinants for RMC formation. Specifically, they use a Probit model with non-performing assets, loan charge-offs and risk-adjusted capital ratio as risk measures. The firm level characteristics include: the presence of a CRO, the

existence of an Assets and Liabilities Committee (ALCO), whether the CEO chairs the board of directors or not, the CEO turnover that accounts for any structural changes that occurred in the board's governance during the fiscal year, the board size as well as the percentage of independent directors in the board among other explanatory variables such as total notional amount of hedging derivatives, total notional amount of trading derivatives, leverage and whether the financial institution conducts international banking or not. Hines and Peter (2015) find that highly leveraged financial institutions that conduct international banking activities, and have larger and more independent boards (among other determinants) are more likely to form a risk management committee. However, with respect to the changes in risk outcomes and in profitability, the authors find that RMC formation constitutes only a symbolic governance practice through which the financial institutions transmit a signal of taking responsible risk management actions even if these are not necessarily embodied and put in real practice.

Finally, Battaglia and Gallo (2015) study the associations between risk governance and financial performance using a match-paired sample of 36 Chinese and Indian banks during the global financial crisis year of 2007/2008. Specifically, they select three board governance characteristics namely the board size, the number of independent directors and the number of board meetings held during the year 2007. To proxy for risk governance, they use two variables only that is the size of the risk committee and the number of risk committee meetings during the year 2007. Results show a positive relationship between the size of the risk committee and the profitability measures ROA and ROE but opposite association with the market valuation (Tobin's Q) and expected market growth (Price to Earnings Ratio). They also find that market valuation is positively associated with the frequency of the risk committee's meetings. The authors find the standard corporate governance determinants to be irrelevant when risk committee characteristics are incorporated in the estimated model.

The scarce theoretical and empirical literature on this new and important notion of risk governance constitutes an important incentive to develop a comprehensive and richer proxy to measure its status. Furthermore, the determinants of risk governance in financial institutions as used in the empirical papers discussed above appear to be small and limited when compared to the regulatory requirements of a robust risk governance structure in banks, particularly for banks that are systemically important financial institutions with potentials of affecting the stability of the financial system. Essentially, as supervisory and regulatory bodies have acknowledged the need for an efficient risk governance structure within the overall banking corporate governance frameworks ((BCBS, 2015a; FSB, 2013b), there are several key determinants that need to be accounted for in addition to the ones used in the above studies.

2.4.2 The Risk Governance Index "RGI"

Building up on the previous studies, this empirical chapter focuses on the development of a novel and comprehensive measure that takes account of the major determinants for a robust risk governance structure as recommended by the BCBS (2015a) and the FSB (2013b) in addition to academic literature. The references for each determinant included to develop the index are detailed in Table 2.2.

To build the "Risk Governance Index" (hereafter RGI), the methodology used by Haniffa and Hudaib (2007) is followed only in the way they structure and construct their Ethical Identity Index (EII) however not in their calculation approach. Further references for constructing similar indicators based on disclosures include Akhigbe and Martin (2008, 2006) and Mollah and Liljeblom (2016). Haniffa and Hudaib (2007) developed the EII to measure the incongruity between the communicated (through the disclosures of information in the annual reports) and ideal (information on the Islamic ethical business framework) ethical identities of seven Islamic banks in four GCC countries between 2002 and 2004. Using content analysis, Haniffa and Hudaib (2007) design a checklist of items drawn from substantive Islamic literature, the Islamic perspective on the social responsibility framework as well as disclosures required by the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI). The checklist is composed of five themes that portray the ideal ethical identity. Each theme consists of several items that the authors score using a binary scale of one or zero. Every item that is communicated in the annual report is allocated a score of one otherwise it is given zero. In Akhigbe and Martin (2006), the aim is to evaluate the valuation effects of the Sarbanes-Oxley based on the disclosures and governance features in the annual statements of the financial firms. The authors measure the level of involvement of the CEO by constructing an index named 'CEOINVOLV'. The index counts the number of high profile roles held by the CEO as a proxy for their level of involvement. The roles considered are chairman of the board and memberships on the compensation, nominating, and/or audit committee. In a subsequent study, Akhigbe and Martin (2008) aim to explore the impact of disclosure and governance on the variations in the capital markets measures of risk following the passage of the Sarbanes-Oxley on U.S financial institutions based. The authors construct four composite indicators to proxy for Disclosure, board monitoring, ownership and the level of CEO involvement. Each of these four variables are the sum of several governance characteristics. Disclosure is the sum of characteristics relating to the independence of the audit committee, the existence of an independent financial expert in the audit committee and the degree of disclosure through financial footnotes. Board monitoring is the sum of the following characteristics: the degree of independence of the board

nominating committee and compensation committee. Ownership counts two determinants that refer to the percentage of the shares owned by the officers and directors as well the percentage of shares owned by the institutional investors. Finally, CEO involvement is the sum of the high-profile roles that the CEO holds.

In a more recent paper, Mollah et al. (2016) constructed a Corporate Governance Index (CGI) based on 12 board of directors' characteristics. Specifically, the authors include the board size, the independence of the board, the existence of female directors, the frequency of the board meetings, the attendance of the board members to these meetings, the number of board committees, the chairman's independence, the CEO's split from role of chairman, if the CEO is internally recruited, the CEO's qualifications, the CEO's banking experience and the CEO's tenure. Mollah et al. (2016) hand-collected the corporate governance data of 104 conventional banks and 52 Islamic banks from 14 countries for the period 2005 to 2013. The authors established a list of conditions for each of the 12 items whereby each item is assigned a value of 1 when the condition is fulfilled or 0 otherwise.

As the purpose of this study is to gauge the risk governance practices in banks in a more comprehensive fashion, an appealing method is to come up with a composite measure that entails items from previous academic studies in addition to the financial regulatory literature, chiefly the recommended guidelines for robust risk and corporate governance frameworks in banks. Following the construction method of Haniffa and Hudaib (2007) and by referring to the risk governance framework suggested by FSB (2013), two broad categories related to governance hierarchy levels in charge of the banks' risk management strategies and implementations are identified as the Board of Directors (BOD) and the Senior Management. The board of directors' category in turn has three dimensions that stand for the characteristics of the board as well as its committees. Specifically, in the first dimension of BOD the three following board characteristics are included: the board size, the board chair and the board independence. The second and third dimension relate to risk and audit committees respectively and comprises the following five determinants each: the risk / audit committee existence, the risk / audit committee authority, the risk / audit committee activity, the risk / audit committee chair and the risk / audit committee composition. Both the risk and audit committees have the same determinants since they constitute two main board-level committees that steer risk management strategies and ensure the auditing and control over their relevance and soundness of their implementation.

The senior management's category consists of two dimensions that stand for the attributes of the chief risk officer and the internal audit function. Therefore, in the fourth dimension of the index the following three determinants are included: the CRO presence, the CRO stature and the CRO independence. Finally, the fifth and last dimension comprises the internal audit's presence, the internal audit's stature and the internal audit chair. Figure 2.2 shows the items relating to each of the five dimensions of RGI.

To summarize, the RGI includes two broad categories, five dimensions and nineteen specific items as can be seen in Figure 2.2. Using a binary scoring for each item, the composite measure the RGI would show the status of risk governance in a quantitative manner. The relevant references from literature supporting the inclusion of each item included in RGI are listed in Table 2.2.

Also, the checklist that comprehensively explains the set of conditions to fulfil for each item is provided in Table 2.4 as will follow later in section 2.4.4 where the scoring method will be thoroughly presented.

Figure 2.2: The Risk Governance Index (Author's Contribution)

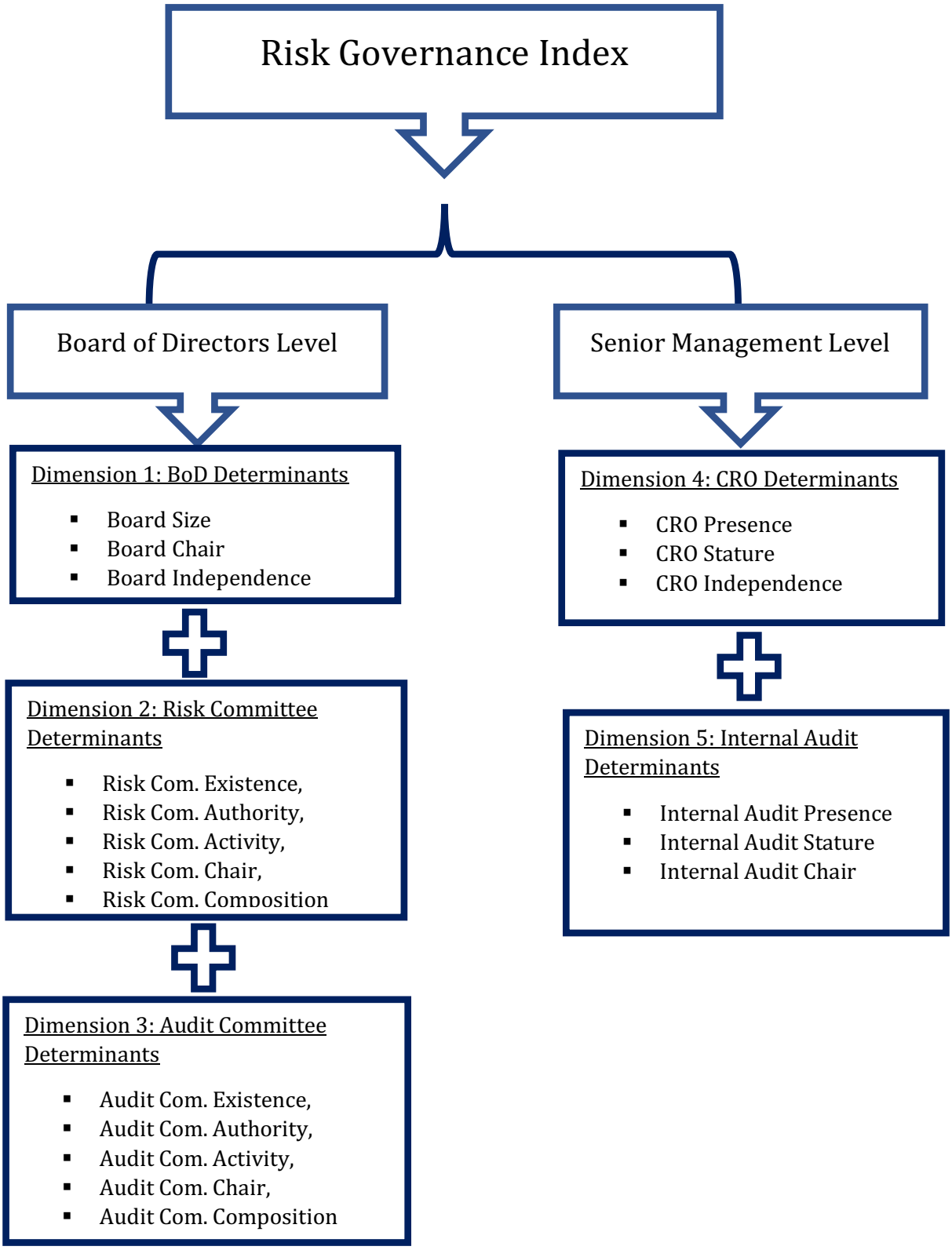


Table 2.2: Summary of key references of items in the Risk Governance Index

	Index Category	Index Dimensions	Index Items	Key References in Literature
Risk Governance Index	Category 1: Board of Directors Level	Board of Directors Determinants	Board Size	(Jensen, 1993; Lipton and Lorsch, 1992)
			Board Chair	(BCBS, 2015b; FSB, 2013a; Hines and Peter, 2015)
			Board Independence	(BCBS, 2015b; FSB, 2013a)
		Risk Committee Determinants	Risk Committee Existence	(Aebi et al., 2012; BCBS, 2015b; Ellul and Yerramilli, 2013; FSB, 2013a)
			Risk Committee Activity	(Battaglia and Gallo, 2015; Ellul and Yerramilli, 2013)
			Risk Committee Authority	(Battaglia and Gallo, 2015; BCBS, 2015b; FSB, 2013a)
			Risk Committee Chair	(BCBS, 2015b)
			Risk Committee Composition	(BCBS, 2015b)
		Audit Committee Determinants	Audit Committee Existence	(BCBS, 2015b; FSB, 2013a)
			Audit Committee Activity	(Ellul and Yerramilli, 2013)
			Audit Committee Authority	(BCBS, 2015b; FSB, 2013a)
			Audit Committee Chair	(BCBS, 2015b; FSB, 2013a)
			Audit Committee Composition	(BCBS, 2015b)
	Category 2: Senior Management Level	Chief Risk Officer (CRO) Determinants	CRO Presence	(Aebi et al., 2012; BCBS, 2015b; Ellul and Yerramilli, 2013; FSB, 2013a; Hines and Peter, 2015)
			CRO Stature	(Aebi et al., 2012; BCBS, 2015b; FSB, 2013a)
			CRO Independence	(BCBS, 2015b; FSB, 2013a)
		Internal Audit Determinants	Internal Audit Presence	(BCBS, 2015b; FSB, 2013a)
			Internal Audit Stature	(BCBS, 2015b; FSB, 2013a)
			Internal Audit Independence	(BCBS, 2015b; FSB, 2013a)

2.4.3 Sample and Data collection

The sample of the empirical study comprises 53 banks from five GCC countries: Saudi Arabia, Kuwait, Qatar, Bahrain and the United Arab Emirates. Data and information for these banks were collected for the period 2006 to 2012. Table 2.3 provides the distribution of the number of banks from each country and Table A2.2 in the appendix lists the banks' names. Oman is excluded from the sample as it launched its first Islamic banks only in 2013. The GCC was chosen for the study as most countries have adequate number of Islamic banks compared to their conventional counterparts. Furthermore, the GCC region counts the highest number of Islamic financial institutions that experienced the largest asset growth[13] in the decade between 2006 and 2016 as reported in The Banker Magazine's top ten movers by asset growth (The Banker, 2016).

Only full-fledged Islamic banks were included and Islamic windows of conventional banks were excluded due to conceptual and technical reasons. Conceptually, as the study attempts to assess risk governance frameworks at a strategic organizational level, Islamic windows of conventional banks being subsidiaries, are governed by the board of directors, audit and risk committees that are the same as ones of the parent company. Thus, the risk governance architecture in place in the Islamic windows would be the same as the conventional parent company and the information will not be able to capture the idiosyncrasies of Islamic banking business model that include unique financial products and the prohibitions of some activities and management tools such as derivatives. Furthermore, if the conventional parent company operates in one of the five countries from which the sample is drawn, then there is a high chance that it is already included in the conventional banking sub-sample. Hence, there would be a possibility of assessing same risk governance structure twice.

To collect data for the 19 items in the RGI, information was manually collected from the annual reports, financial statements (including the notes sections) and corporate governance reports where available. Annual reports published in both English and Arabic were included in the data collection process and their entire contents were thoroughly read in order to lessen the probability of omitting the disclosure of an item hence reducing the actual score merited by a bank. The hand-collection of data is a fastidious exercise particularly when accuracy and strict attention to details is required to enhance precision. Therefore, where ambiguity was noticed with respect to one or more statement misleading information was reported in a separate document and the item given a null score.

[13] In the Top Ten, the GCC region alone counts five institutions, two in Iran then the remaining three in Asia. (The Banker, 2016)

Table 2.3: Sample Distribution

Country	Islamic Banks	Conventional Banks	Full Sample	Observations
Saudi Arabia	4	4	8	56
Kuwait	5	5	10	70
Qatar	4	4	8	56
Bahrain	6	6	12	84
United Arab Emirates	7	8	15	105
Total	**26**	**27**	**53**	**371**

2.4.4 Scoring the Risk Governance Index

As this paper is the first to measure most of the risk-related functions of risk governance in banking institutions all together, the approach to scoring is more in favour of an unweighted index as all items are considered equally important. This argument is inferred mainly from the detailed recommendations of the FSB (2013), BCBS (2015) and BCBS (2014). In these regulatory documents, it is clearly stated and widely reiterated that the Basel Committee stresses the importance of risk governance as part of the overall corporate governance framework "which promotes strong boards and strong board committees **together with** effective control functions" (BCBS, 2015a). In their analysis of the risk management issues in the Islamic finance industry, Khan and Ahmed (2001) also highlight that good governance that contributes to market discipline needs to be promoted through an appropriate structure and set of responsibilities for the board of directors as well as the senior management. Furthermore, as the focus of this research does not target one specific group of banks annual reports users, there is no need to allocate weights. As explained in (Cooke, 1989; Hossain et al., 1995), when different weights are assigned then one class of users will assign a specific but different weight than another class of corporate annual reports users. In academic literature, Cooke (1989), Hossain et al (1995), Haniffa and Hudaib (2007) opted for unweighted indices in their empirical studies as discussed earlier.

The scoring method hence allocates a score of 1 when the condition for an item of sound risk governance practice is present (as reported in the checklist in Table 2.4), or a value of 0 is assigned when it is absent. To obtain the total RGI score the method is additive as expressed in Equation (2.1).

$$\text{RGI}_{i,t} = \sum_{n=1}^{19} X_{i,t} \quad (2.1)$$

Where:

- $RGI_{i,t}$: the risk governance index score for bank $_i$ in year $_t$
- n: the items in the index (from item 1 to 19)
- $X_{i,t}$: the disclosed item in bank $_i$ in year $_t$.

Table 2.4 provides the checklist of the criteria followed to score each item in the RGI.

Besides the choice of an equally weighted index, the calculation method described above follows the methods of Akhigbe and Martin (2008, 2006) and of Mollah and Liljeblom (2016) As discussed earlier in section 2.4.2, Akhigbe and Martin (2006) construct an index to evaluate the level of involvement of the CEO by counting the number of high-profile roles they hold. The high-profiles roles considered are the chairman of the board and the memberships on the compensation, nominating, and/or audit committee. In a subsequent study, Akhigbe and Martin (2008) where they examine the associations of disclosure and governance with the variations in the capital markets measures of risk following the passage of the Sarbanes-Oxley on U.S financial institutions based, the authors construct four composite indicators to proxy for Disclosure, board monitoring, ownership and the level of CEO involvement. Each of these four variables are the sum of several governance characteristics as will follow. Disclosure is the sum of characteristics relating to the independence of the audit committee, the existence of an independent financial expert in the audit committee and the degree of disclosure through financial footnotes. Board monitoring is the sum of the following characteristics: the degree of independence of the board nominating committee and compensation committee. Ownership is the sum of two determinants that refer to the percentage of the shares owned by the officers and directors as well the percentage of shares owned by the institutional investors. Finally, CEO involvement is the sum of the high-profile roles that the CEO holds. To measure the CEO power, Mollah and Liljeblom (2016) construct an index formed of six characteristics which are scored as binary variables. When the condition is satisfied, the item is scored one or zero otherwise. The CEO power is therefore the sum of the following six dummy variables: the CEO-chair duality, if the CEO is internally recruited, if the CEO's age is above the median age, if the CEO's tenure is greater than the median tenure, if the CEO's banking experience is greater than the median experience and if the CEO's qualifications surpass the median qualifications.

Table 2.4: Checklist of criteria used for Risk Governance Index Items

RISK GOVERNANCE INDICATOR
Category 1: Board of Directors Level of Risk Governance
Dimension 1: BOD determinants: • *Board Size*: number of directors on a bank's board should be ≤ 8[14]), scored 1 if so or 0 otherwise • *BOD_Chair:* Chair of BOD is not chair of AC and/or RC and is not the CEO (non-executive), scored 1 if so or 0 otherwise • *BOD_Independence*: Majority of BOD members should be independent, scored 1 if so or 0 otherwise. ***Dimension 2: Risk Committee (RC) determinants:*** • *RC_existence:* if a risk committee exists in bank this is scored 1 or 0 otherwise • *RC_Activity*: if the bank's board risk committee met more frequently during the year compared to other banks on average this is scored 1 or 0 otherwise • *RC_Authority:* if the *R*C is at board level and not at the management level this is scored 1 or 0 otherwise • *RC_Chair*: if the chair of the RC is independent, this is scored 1 or 0 otherwise • *RC_Independence*: if most of the RC members are independent directors this is scored 1 or 0 otherwise. ***Dimension 3: Audit Committee (AC) determinants:*** • *AC_existence:* if an audit committee exists in bank this is scored 1 or 0 otherwise • *AC_Activity*: if the bank's board audit committee met more frequently during the year compared to other banks on average this is scored 1 or 0 otherwise. • *AC_Authority:* if the AC reports directly to BOD i.e. is at board level this is scored 1 or 0 otherwise • *AC_Chair*: if the chair of the AC is independent, this is scored 1 or 0 otherwise • *AC_Independence*: if most of the AC members are independent directors this is scored 1 or 0 otherwise.
Category 2: Senior Management Level of Risk Governance
Dimension 4: Chief Risk Officer (CRO) Determinants: • *CRO_Present:* if the CRO is present in the bank, this is scored 1 or 0 otherwise • *CRO_Stature*: if CRO reports to BOD, this is scored 1 or 0 otherwise • *CRO_Independence*: if CRO has an independent function (no dual-hatting), this is scored 1 or 0 otherwise ***Dimension 5: Internal Audit (IA) determinants:*** • *IA_Existence:* if the IA function is present in the bank, this is scored 1 or 0 otherwise • *IA_Stature:* if IA reports to AC this is scored 1, if it reports to the CEO this is scored 0 • *IA_Chair:* if the person who leads the IA (Chief Audit Executive/ Head of or Chief IA) is named this is scored 1 or 0 otherwise.

[14] Following theory Jensen (1993), Lipton and Lorsch (1992)

2.5 Results and Analysis

2.5.1 Univariate Analysis and Descriptive Statistics

As can be seen in Table 2.5, the 53 banks' balance sheets show total assets of 19440164.37 Million USD on average with Islamic banks showing an average of total assets of 10654151.04 Million USD while conventional banks show an average of 26053292.68 Million USD. Regarding equity, the entire sample average is of 2580085.93 thousand USD with 1714850.39 thousand in Islamic banks and 3231338.49 thousand in conventional banks. The deposits and short-term funding show an average of 15169059.62 thousand USD out of which an average of 12609834.90 thousand USD comes from the total customers' deposits. In Islamic banks, the average of deposits and short-term is of 8150677.80 thousand and of 20451712.60 thousand in conventional banks. Also, data from the 53 banks' income statements show an average of net income of 342602.41 thousand USD out of which an average of 513641.64 thousand USD is estimated on the net interest revenue. The average score of RGI on the entire sample shows an average of 9. Nonetheless, the average RGI in conventional banks is of 9.17 which is higher than the average of RGI in Islamic banks which is of 8.

In Table 2.6, the objective is to start the univariate descriptive analysis of RGI by looking at the evolution of the RGI scores' frequency over the years of the study. This is particularly useful as it intends to reflect the raising importance that banks assign to their risk governance structures and mechanisms which is in turn translated by reporting more information about its features in their annual reports and financial statements. As can be seen in the first column of Table 2.6, the aggregate RGI scores for all banks in the sample (regardless of their type) over the selected time period display values ranging from 0 to 17 which also signifies that no bank disclosed or fulfilled the conditions of the nineteen items that compose the risk governance measure. In the last column of the table, it is shown that the mode -which represents the most frequent value of the RGI across the sample- is 10 with a frequency of 14.15%. The largest RGI scores of 16 and 17 were scored only three times each but together they represent less than 2% of the frequencies scored by the whole sample (Table 2.6). It is useful to note that these occur in 2009 onwards which means right after the global financial crisis (GFC). The RGI values below the overall mean of 8.69 constitute 56% of the obtained scores on the entire sample and throughout 2006 to 2012 (Tables 2.6 and 2.12). These results indicate the relatively low level of overall disclosures related to risk governance functions in the 53 banks of the sample.

Table 2.5: Sample Descriptive Information

Bank Financial Information	Sample Average	Islamic Banks' Average	Conventional Banks' Average
Total Assets (million USD)	19,440,164.37	10,654,151.04	26,053,292.68
Total Customers Deposits (thousand USD)	12,609,834.90	7,332,143.37	16,466,609.49
Deposits and Short-term Funding[15] (thousand USD)	151,69,059.62	8,150,677.80	20,451,712.60
Equity (thousand USD)	2,580,085.93	1,714,850.39	3,231,338.49
Net Income (thousand USD)	342,602.41	213,450.99	439,813.16
Net Interest Revenue (thousand USD)	513,641.64	343,590.87	637,979.84
Risk Governance Index 'RGI'	9	8	9.17

[15] The BankScope Database defines "Deposits and Short-term Funding" as the total of customers' deposits (including the current, saving and term) and the short-term funding (including commercial paper and short-term part of debt securities, (i) at amortised costs, (ii) at fair value, (iii) in issue).

Table 2.6: Overall RGI Score and Frequencies

	Year								
Risk Governance Index Scores	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**Frequency**	**Frequency in %**
0	1	0	0	0	0	0	0	1	0.31
1	3	2	1	0	0	0	0	6	1.85
2	6	1	1	1	0	0	0	9	2.77
3	2	1	1	0	1	2	1	8	2.46
4	2	5	4	4	5	2	4	26	8.00
5	5	3	1	1	2	2	0	14	4.31
6	1	6	6	3	3	2	2	23	7.08
7	3	5	4	6	4	4	4	30	9.23
8	7	4	4	7	3	2	4	31	9.54
9	4	7	4	6	5	5	3	34	10.46
10	1	4	11	8	6	5	11	46	14.15
11	2	2	3	4	3	8	4	26	8.00
12	1	2	3	3	4	5	4	22	6.77
13	0	1	2	2	4	6	5	20	6.15
14	0	0	0	1	4	3	6	14	4.31
15	0	0	0	0	3	2	4	9	2.77
16	0	0	0	1	0	1	1	3	0.92
17	0	0	0	1	1	1	0	3	0.92
Total	38	43	45	48	48	50	53	325	100.00

2.5.1.1 Descriptive results of RGI by country and by dimension

In this section, the interest dwells in looking at the evolution of the total RGI scores as well as its two main dimensions namely the board of directors and the senior management at each country level and over the entire period of study. To proceed, the average for each dimension is calculated for both the Islamic and conventional banks in each country from 2006 to 2012. The results are reported in columns 2 and 3 in Tables 2.7, 2.8, 2.9, 2.10 and 2.11. To recall, the board of directors' dimensions includes three categories where the role of the board, the risk

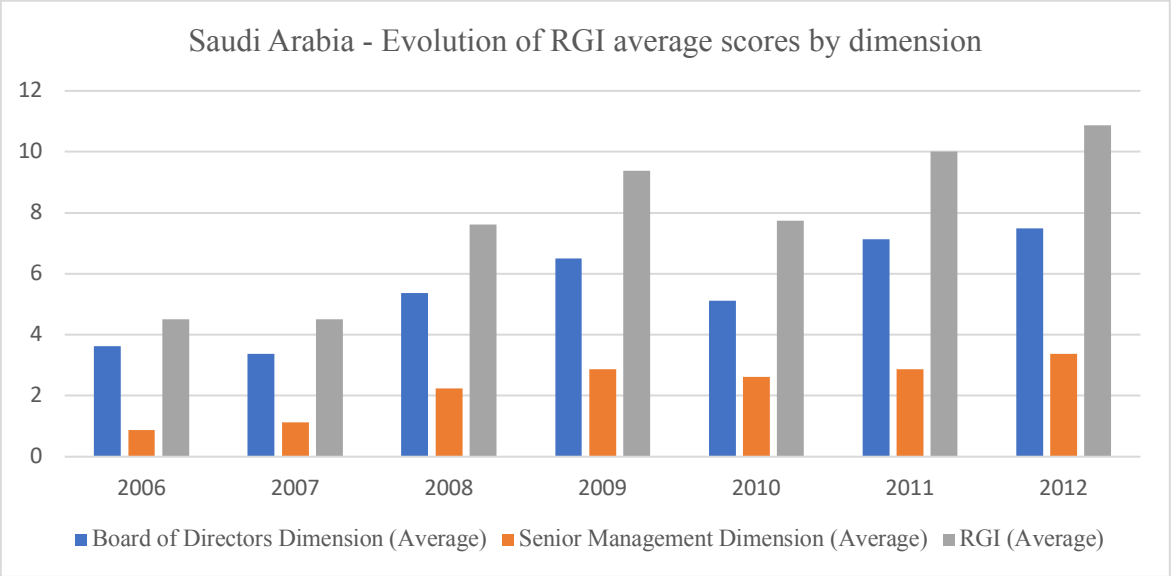
and audit committees are assessed. The senior management' dimension includes two categories where the role of the chief risk officer and the internal audit are identified. Also, the average for RGI for all the banks in each country for each year is reported in the last columns of the same tables. The results from these tables are then transformed into histograms to visually assess the development and trends of the dimensions as well as the RGI averages over the period of the study in each country (Figures 2.3, 2.4, 2.5, 2.6 and 2.7).

In Saudi Arabia for instance, the average score of the board of directors' dimension shows an evolutive trend between 2006 and 2012 (Table 2.7 and Figure 2.3). If all the conditions are satisfied for each item in this category, the highest result that can be scored by each bank is thirteen as there are thirteen items in the three categories. However, the average for the board's dimension -although improving overall during the period- does not exceed 7.5. In fact, it almost doubles from 3.62 in 2006 to 7.5 in 2012. For the senior management's dimension, if all the conditions are satisfied for each item in this category, the highest result that can be scored by each bank is six as there are three items in the CRO category and three items in the internal audit category. Similar to the board of directors' category, it is noticed that the scores are improving. The average evolves from 0.87 in 2006 to 3.37 in 2012. With respect to the aggregate RGI, the average improves from 4.5 in 2006 to 10.87 in 2012.

Table 2.7 Evolution of RGI average scores by dimensions in Saudi Arabia

Years	Board of Directors Dimension (Average)	Senior Management Dimension (Average)	RGI (Average)
2006	3.62	0.87	4.5
2007	3.37	1.12	4.5
2008	5.37	2.25	7.62
2009	6.5	2.87	9.37
2010	5.12	2.62	7.75
2011	7.12	2.87	10
2012	7.5	3.37	10.87

Figure 2.3: Evolution of RGI average scores by dimensions in Saudi Arabia

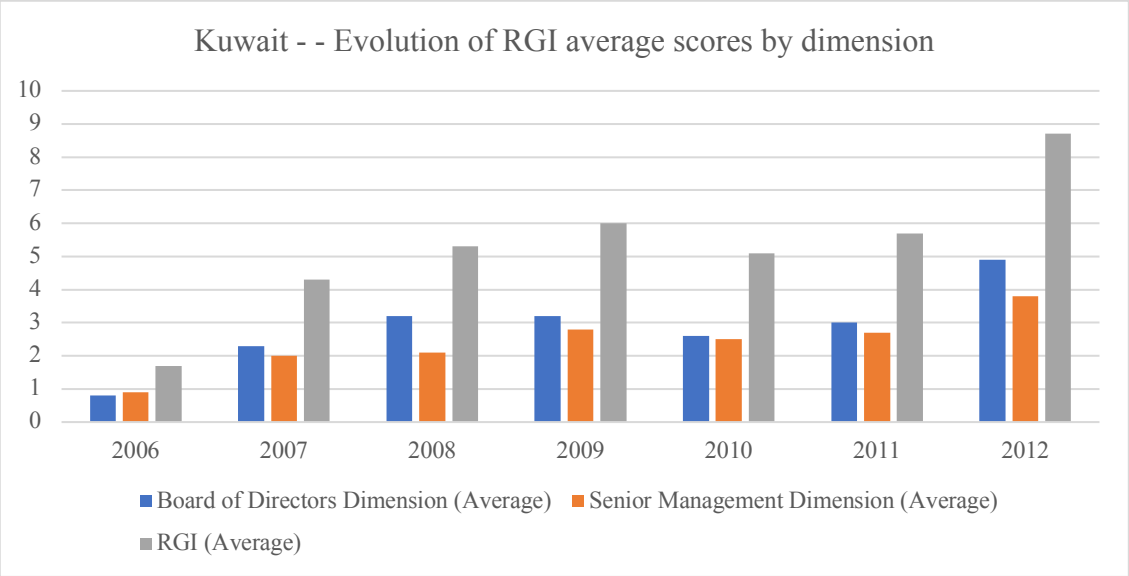


In Kuwait, it is noticed that the scores of the two dimensions are lower than the ones in Saudi Arabia but improve along the time interval (Figure 2.4). In fact, the average score for the board of directors' dimension varies between 0.8 in 2006 and 4.9 in 2012 as can be found in Table 2.8. The senior management's dimension also shows an improving average from 0.9 in 2006 to 3.8 in 2012. As a consequence, the RGI average scores show a similar evolving trend with averages improving from 1.7 in 2006 to 8.7 in 2012 (Table 2.8).

Table 2.8 Evolution of RGI average scores by dimensions in Kuwait

Years	Board of Directors Dimension (Average)	Senior Management Dimension (Average)	RGI (Average)
2006	0.8	0.9	1.7
2007	2.3	2	4.3
2008	3.2	2.1	5.3
2009	3.2	2.8	6
2010	2.6	2.5	5.1
2011	3	2.7	5.7
2012	4.9	3.8	8.7

Figure 2.4: Evolution of RGI average scores by dimensions in Kuwait

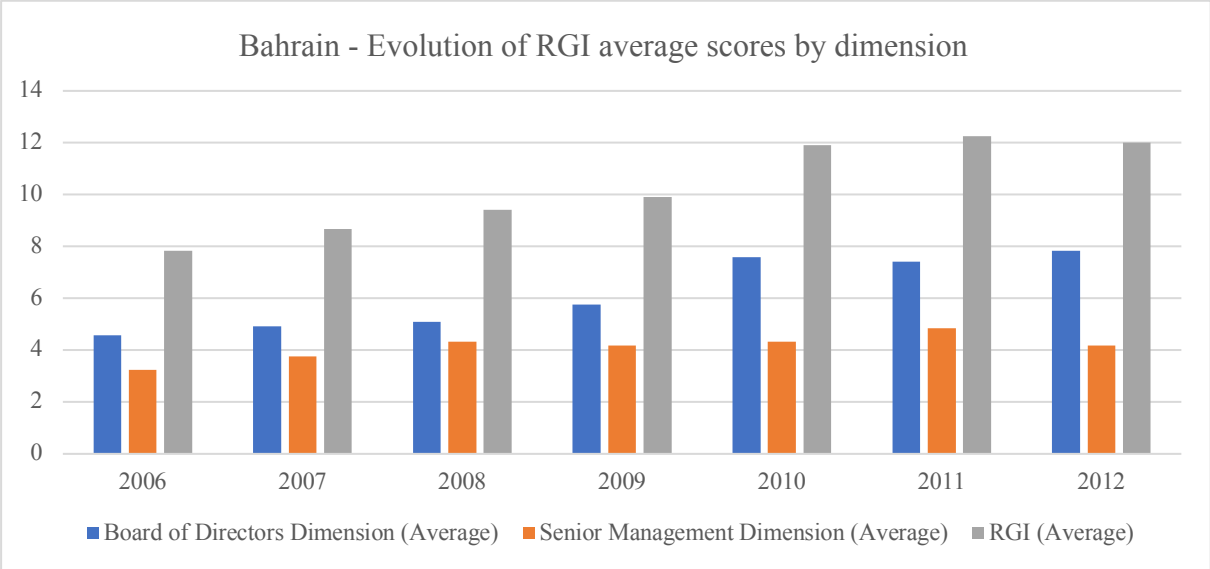


In Bahrain, it is noticed that the average scores for the two dimensions as well as the aggregate RGI average scores are higher than the ones scored by banks in Saudi Arabia and Kuwait but similarly shows and improving trend (Figure 2.5). Effectively, the average scores for the board of directors' dimension evolves from 4.6 in 2006 to 7.8 in 2012 and the average scores for the senior management's dimension improves from 3.3 in 2006 to 4.8 in 2012. The aggregate RGI scores show averages improving from 7.8 in 2006 to 12.3 in 2011 and 12 in 2012 (Table 2.9).

Table 2.9 Evolution of RGI average scores by dimensions in Bahrain

Years	Board of Directors Dimension (Average)	Senior Management Dimension (Average)	RGI (Average)
2006	4.6	3.3	7.8
2007	4.9	3.8	8.7
2008	5.1	4.3	9.4
2009	5.8	4.2	9.9
2010	7.6	4.3	11.9
2011	7.4	4.8	12.3
2012	7.8	4.2	12

Figure 2.5: Evolution of RGI average scores by dimensions in Bahrain

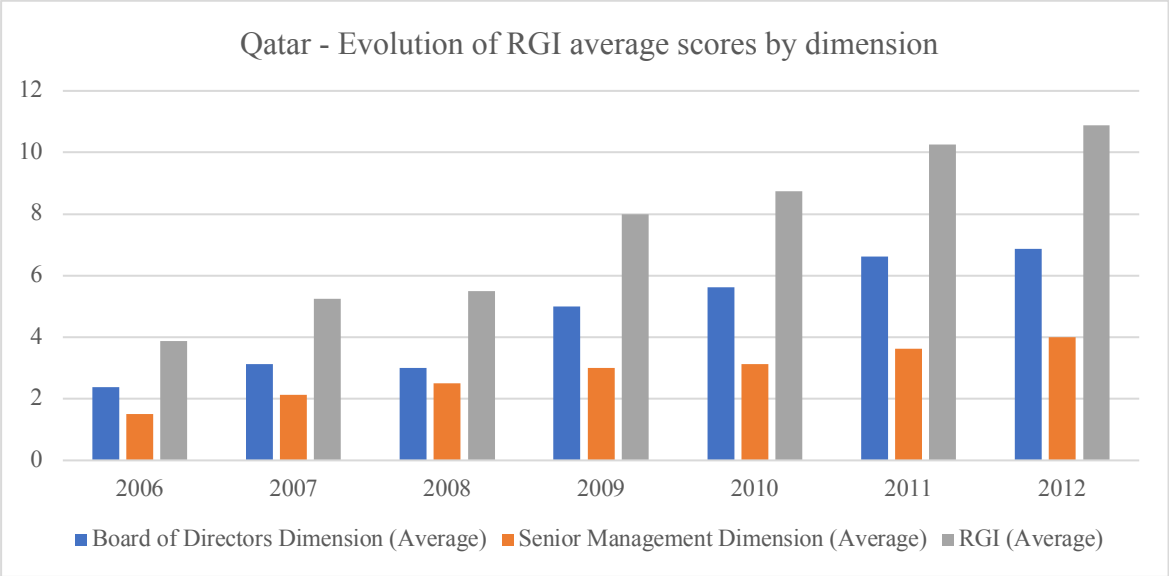


In Table 2.10, results from Qatari banks also show an evolutive trend between 2006 and 2012 (Figure 2.6). For the board of directors' dimension, the average score improves from 2.4 in 2006 to 6.9 in 2012. For the senior management's dimension, the average scores evolve from 1.5 in 2006 to 4 in 2012. The RGI aggregate score also improves gradually from 3.9 in 2006 to 10.9 in 2012.

Table 2.10 Evolution of RGI average scores by dimensions in Qatar

Years	Board of Directors Dimension (Average)	Senior Management Dimension (Average)	RGI (Average)
2006	2.4	1.5	3.9
2007	3.1	2.1	5.3
2008	3	2.5	5.5
2009	5	3	8
2010	5.6	3.1	8.8
2011	6.6	3.6	10.3
2012	6.9	4	10.9

Figure 2.6: Evolution of RGI average scores by dimensions in Qatar

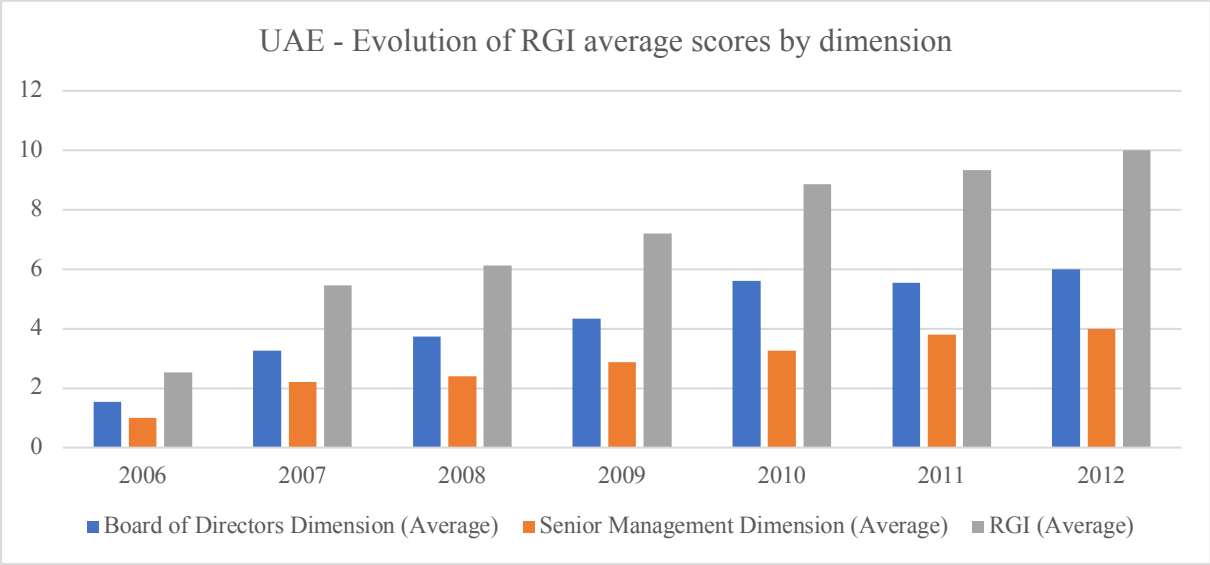


Finally, in the United Arab Emirates it is also noticed that the trend develops positively throughout the sample period for the three variables (Figure 2.7). The board of directors' dimension shows an average that improves from 1.5 to 6 in 2006 and 2012 respectively while the senior management's dimension has an average that evolves from 1 in 2006 to 4 in 2012. The aggregate RGI shows an average that improves from 2.5 in 2006 to 10 in 2012.

Table 2.11 Evolution of RGI average scores by dimensions in UAE

Years	Board of Directors Dimension (Average)	Senior Management Dimension (Average)	RGI (Average)
2006	1.5	1	2.5
2007	3.3	2.2	5.5
2008	3.7	2.4	6.1
2009	4.3	2.9	7.2
2010	5.6	3.3	8.9
2011	5.5	3.8	9.3
2012	6	4	10

Figure 2.7: Evolution of RGI average scores by dimensions in United Arab Emirates



Overall and from the figures 2.3 to 2.7 and their related tables (Table 2.7 to 2.11), it can be deduced that while the disclosures on the risk governance structures in the banks considered in this study are relatively low, there is a positive and evolutive trend from the banks in reporting the relevant aspects that convey the structure and quality of their risk governance frameworks.

2.5.1.2 Comparison between RGI results in Islamic and Conventional Banks

In the previous sections, the interest was to explore the results of RGI in terms of frequency by year as reported in Table 2.6 then to visually assess the trends and developments of each of its dimensions as well as its aggregate scores over the entire period of time however at each country level as reported in Figures 2.3 to 2.7 and Tables 2.7 to 2.11 above. In this sub-section, the interest is to introduce the comparison between the RGI scores of Islamic and non-Islamic banks by comparing the frequency for each RGI result scored by the 53 banks in the sample. As mentioned earlier, the scores of RGI varied between 0 and 17. In Table 2.12, each calculated RGI value is reported with the number of conventional and Islamic banks that scored it. For instance, the aggregate RGI score of 7 reported in the first column of Table 2.12 has been scored 11 times by conventional banks and 19 times by Islamic banks which together sum up to 30 times in the last column of Table 2.12. One main motivation for this table of results dwells in showing which of the two bank types scored the highest RGI aggregate value and which type of banks scored the lowest. As can be seen in Table 2.12, the highest value of RGI, that is 17, has been scored three times by conventional banks while the lowest value of 0 has been scored once and by an Islamic bank.

Also, it appears that conventional banks have an average RGI of 9.17 which is higher than the average of RGI in Islamic banks (8.10). The standard deviation however is almost equal for the two banks' types, 3.45 and 3.58 for conventional and Islamic banks respectively.

Table 2.12: Risk Governance Index: Comparison of Scores between Islamic and Conventional banks

Risk Governance Index	Conventional	Islamic	Total
0	0	1	1
1	2	4	6
2	4	5	9
3	6	2	8
4	10	16	26
5	7	7	14
6	10	13	23
7	11	19	30
8	15	16	31
9	25	9	34
10	31	15	46
11	12	14	26
12	13	9	22
13	13	7	20
14	11	3	14
15	4	5	9
16	1	2	3
17	3	0	3
Mean	**9.174**	**8.102**	**8.689**
Std Dev.	**3.452**	**3.582**	**3.546**
Total Observations	**178**	**147**	**325**

2.5.2 Risk Governance Variations between Islamic and Conventional Banks

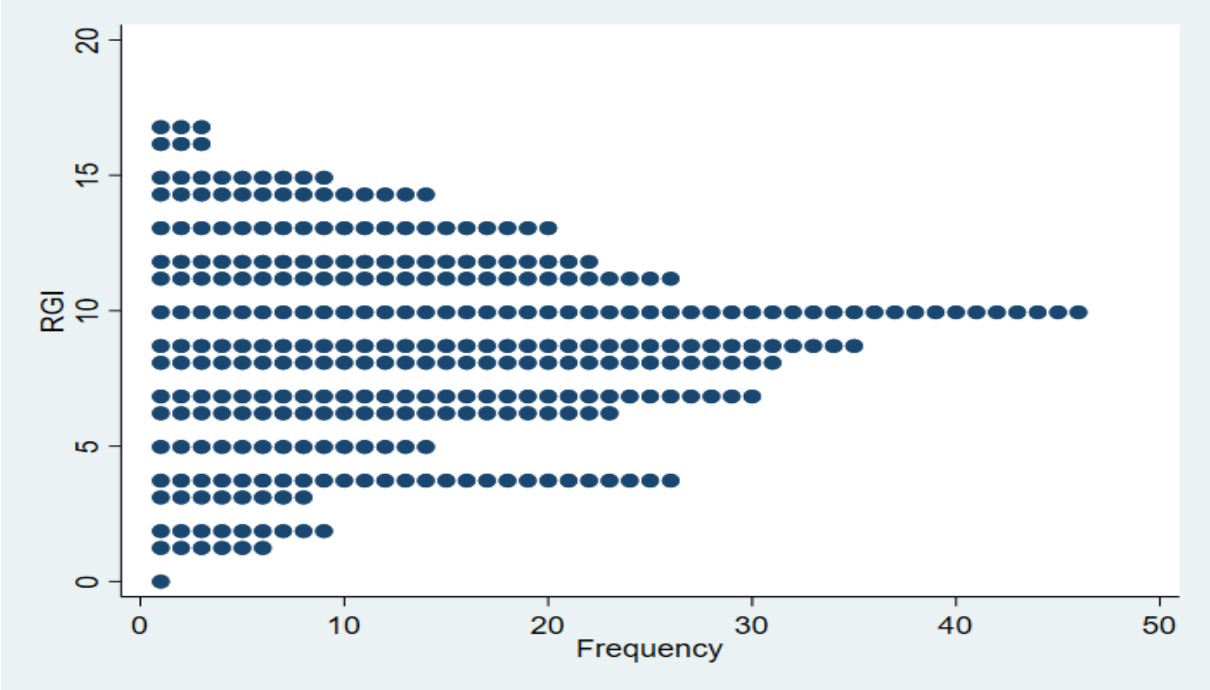
To test the stated null hypotheses in section 2.3 above, two-tailed inferential statistics are used to explore whether the means of the two bank types are statistically different from each other.

In this study, parametric tests are possible to use as the data for RGI follows a normal distribution. Normality has been tested for both numerically through the skewness and kurtosis tests and graphically through the box-plot command on STATA as is shown in Table 2.13 and Figure 2.8. Specifically, we fail to reject the null hypothesis that posits that the variable is normally distributed as the p-value (0.068) is not statistically significant. Graphically, the distribution of the RGI data displays a bell-shape as can be seen in Figure 2.8.

Table 2.13 Normality / Skewness and Kurtosis Tests for RGI

Variable	Observations	Pr (Skewness)	Pr (Kurtosis)	Adj chi² (2)	Prob>Chi²
RGI	325	0.4473	0.0292	5.36	0.0687

Figure 2.8 Graphical Test for Normality of RGI – BOX-PLOT (STATA Output)



First hypothesis tests whether there exists any statistical difference between the risk governance structures in Islamic and Conventional banks regardless of the countries over the entire period. A t-test is run to test H_{01}, the results are reported in Table 2.14.

H_{01}: There is no difference between risk governance structures (RGS) in Islamic and Conventional banks throughout the sample period.

Table 2.14: RGI Variation between Islamic and Conventional Banks –T-test results

	RGI - CB	*RGI - IB*
Mean	9.174	8.102
Variance	11.918	12.831
Observations	178	147
Hypothesized Mean Difference	0	
df	307	
t-Stat	2.729	
P(T<=t) one-tail	0.003	
t-Critical one-tail	1.649	
P(T<=t) two-tail	0.006	
t-Critical two-tail	1.967	

The t-Stat of 2.72 is significant at 1% level (p-value is equal to 0.006). Hence, the first null hypothesis H_{01} is rejected acknowledging that significant differences of risk governance structures between Islamic and mainstream banks exist with the former (8.10) being lower than the latter (9.17). As Siraj and Pillai (2012) explain, in contrast with Islamic banks and because of their age, conventional counterparts have a longer experience in dealing with regulatory issues pertaining to Pillar 1, 2 and 3 of the Basel frameworks which is also likely to explicate the above findings. Conventional banks are therefore better prepared to implement the enhancements proposed by the regulators on various aspects of the risks assessment and management. Similarly, they are more familiar with the processes of risk management related to their loan-based products and to their business operations (from risks identification to risk control and continuous monitoring) and possess a stronger knowledge on how to curb them. Nonetheless, while their counterparts seem to have a significant competitive advantage of longer experience, Islamic banks (IB) should normally capitalize on its distinctive supplementary supervisory framework that is based on Islamic law. In fact, IB must achieve the *Shari'ah* principles in all aspects of their business including their products, operations, practices and management (Elasrag, 2014). For instance, one aspect of compliance with *Shari'ah* that is required from the strategic management is to establish and maintain the best risk governance frameworks that can guarantee the protection and interests of depositors and investment account holders and avoid putting at stake their savings. Thereafter, an ensuing aspect of compliance with *Shari'ah* dwells in being as transparent as possible regarding all matters of the Islamic banking business and most importantly on the matters pertaining to

setting risk tolerance levels, risk identification processes and options for risk management. It is worth noting also that Pillar 3 of the Basel II framework is centred on the disclosure requirements among which specifications relating to capital adequacy, risk weighted assets, risk exposures and risk assessments are put on the top list of concerns for regulators, the market and the public as a means to enhance market discipline (BCBS, 2009).

2.5.3 Risk Governance Variations before and after the GFC

To explore whether risk governance structures varied before and after the global financial crisis regardless of the banks' type and the countries, a t-test is run to test the second null hypothesis H_{02}. The period before the GFC comprehends the years 2006 and 2007 while years 2008 to 2012 cover the post-GFC period. Results are reported in Table 2.15.

H_{02}: There is no difference in the risk governance structures before and after the global financial crisis regardless of the banks' type.

Table 2.15: RGI Variation after the GFC – T-test results

	RGI - Ante	***RGI - Post***
Mean	5.584	9.150
Variance	16.231	16.156
Observations	159	213
Hypothesized Mean Difference	0	
df	340	
t-Stat	-8.452	
P(T<=t) one-tail	4.25E-16	
t-Critical one-tail	1.649	
P(T<=t) two-tail	8.505E-16	
t-Critical two-tail	1.966965734	

As the p-value of the t-Stat (8.45) is extremely small (8.50905E-16) and highly significant at 1% level, the second null hypothesis H_{02} can be rejected confirming that Risk Governance Structures did vary significantly after the GFC as compared to before the financial turmoil. As weaknesses in the risk management systems were spotted among the root causes of the GFC (OECD 2009) and international financial authorities reacted to them by issuing guidelines for better corporate governance practices (BCBS 2014, BCBS 2015, FSB 2013) it is expected that banks have reviewed their approaches to the governance and management of their risk

management entities, systems and human resources. Also, this positive variation for banks in the Gulf region could also be explained by the growing role that the HAWKAMAH Institute for Corporate Governance –which was established in 2006 by renowned international institutions such as the OECD, the IFC, the World Bank, the Union of Arab Banks and the Dubai International Financial Centre Authority. Not only did HAWKAMAH raise more awareness on corporate governance, it also started to provide financial institutions and companies in the region with practical tools to ameliorate their corporate governance manoeuvres based on the results of their conducted surveys, case studies and research reports[16].

2.5.4 Risk Governance Variations within each banks' type before and after the GFC

To supplement the results of Table 2.15 with in-depth analysis, further statistical examinations are conducted to explore the differences between the means of RGI before and after the crisis however within each type of banks. Therefore, using the t-test the inferential analysis is run first for conventional banks with RGI scores sorted before and after the crisis (using the financial crisis dummy variable). The method is applied identically for Islamic banks afterward. Results are reported in Table 2.16.

Table 2.16: RGI Variation before and after the GFC in the two bank types

	Conventional Banks			Islamic Banks		
Group	**Obs**	**Mean**	**Std. Dev**	**Obs**	**Mean**	**Std. Dev**
Pre-GFC	51	8.941	3.956	40	7.65	3.984
Post-GFC	127	9.267	3.240	106	8.273	3.440
Combined	178	9.174	3.452	146	8.102	3.594
t-statistic			-0.569			-0.934
p-value			0.569			0.351

From the above table, it is noted even though the RGI for both bank types improve, the differences are not statistically significant differences between means of their RGI scores before and after the financial debacle. For conventional banks for instance, the mean of the risk governance index was 8.94 before the GFC and increased to 9.26 in the years 2008 to 2012.

[16] One of the first surveys on the practices of corporate governance in the region was published by HAWKAMAH and the Institute of International Finance in September 2006 where it listed preliminary steps to improve the investment environment in the GCC (for more information, please refer to (Hawkamah and IIF, 2006))

However, the mean difference is not statistically significant as the t-stat is equal to 0.56 in absolute value. Likewise, the index score in Islamic banks was on average 7.65 before the GFC and improved to 8.27 after it. As the t-statistic also shows a p-value that is higher than 10%, it can be concluded that the difference in means is not statistically significant in Islamic banks too.

2.5.5 An exploration of the Risk Governance Status in Islamic and Conventional Banks at Country Levels

Additional detailed investigation on the differences between the two types of banks in different countries of the GCC is carried out in this section. For this purpose, the sample is split into banks in the five countries accordingly then further descriptive and inferential statistics are performed. Results are reported in Tables 2.17 to 2.21.

H_{03}: There is no difference between risk governance structures in Islamic and Conventional banks within each GCC country.

First in Saudi Arabia, there is no statistically significant difference between risk governance structures as measured in its local conventional and Islamic banks (Table 2.17). Interestingly, the mean RGI of Islamic banks (10.11) is greater than that of their conventional counterparts (9.44). However, the t-statistic of -0.647 indicates that the difference is not significant (p-value is 0.52).

Table 2.17: RGI Variations between Islamic and Conventional Banks in Saudi Arabia

	CB	*IB*
Mean	9.444	10.117
Variance	4.564	15.485
Observations	27	17
Hypothesized Mean Difference	0	
df	22	
t-Stat	-0.647	
P(T<=t) one-tail	0.261	
t-Critical one-tail	1.717	
P(T<=t) two-tail	0.523	
t-Critical two-tail	2.073	

In Kuwait also, there is no statistically significant difference between risk governance structures as measured in its local mainstream and conventional banks (Table 2.18). The means of RGI are respectively of 6.93 and 5.71. The t-statistic (1.60) is not significant (p-value is 0.11). The

results suggest that the observed difference between the two sub-sample means does not permit to reject H_{03} which posits that RGI scores differ significantly between Islamic and non-Islamic banks in Kuwait.

Table 2.18: RGI Variations between Islamic and Conventional Banks in Kuwait

	CB	*IB*
Mean	6.933	5.714
Variance	11.305	5.544
Observations	30	28
Hypothesized Mean Difference	0	
df	52	
t-Stat	1.607	
P(T<=t) one-tail	0.056	
t-Critical one-tail	1.674	
P(T<=t) two-tail	0.113	
t-Critical two-tail	2.006	

In contrast in Qatar, the RGI mean in conventional banks is of 9.72 and 7.41 for Qatari Islamic banks. The t-statistic of 2.27 is statistically significant at 5% significance level (p-value is 0.02). This result suggests that there is a significant difference between risk governance structures between the two types of banks (Table 2.19).

Table 2.19: RGI Variations between Islamic and Conventional Banks in Qatar

	CB	*IB*
Mean	9.72	7.416
Variance	16.96	8.427
Observations	25	24
Hypothesized Mean Difference	0	
df	43	
t-Stat	2.270	
P(T<=t) one-tail	0.014	
t-Critical one-tail	1.681	
P(T<=t) two-tail	0.028	
t-Critical two-tail	2.016	

The RGI Scores in Bahrain are the highest in the GCC region where Islamic banks show a mean score of 10 slightly lower than conventional banks with 10.59. Unsurprisingly, based on the observed difference between the sample means, there is no statistically significant difference between risk governance structures as measured in Bahraini local mainstream and conventional banks (Table 2.20) as the t-statistic is 0.95 but not significant (p-value is 0.34).

Table 2.20: RGI Variations between Islamic and Conventional Banks in Bahrain

	CB	*IB*
Mean	10.595	10
Variance	8.441	7.902
Observations	42	42
Hypothesized Mean Difference	0	
df	82	
t-Stat	0.954	
P(T<=t) one-tail	0.171	
t-Critical one-tail	1.663	
P(T<=t) two-tail	0.342	
t-Critical two-tail	1.989	

Finally, conventional banks in the United Arab Emirates display RGI scores of 8.92 on average which is higher than the average RGI in Islamic banks which is of 7.25. With a positive and significant t-statistic of 2.06, it can be inferred that there exists a statistically significant difference at 5 percent between the two banks' types in the UAE. Results are reported in Table 2.21.

Table 2.21: RGI Variations between Islamic and Conventional Banks in United Arab Emirates

	CB	*IB*
Mean	8.925	7.25
Variance	12.484	15.45
Observations	54	36
Hypothesized Mean Difference	0	
df	70	
t-Stat	2.062	
P(T<=t) one-tail	0.021	
t-Critical one-tail	1.666	
P(T<=t) two-tail	0.042	
t-Critical two-tail	1.994	

2.6 Implications of the Study & Conclusions

Improving risk governance has become part of the core recommendations that international financial authorities came out with in a post global financial crisis era. The first empirical chapter of the thesis discussed the importance and necessity of developing efficient risk governance mechanisms within the overall corporate governance frameworks in banks. Referring to the most recent publications on risk governance in the banking industry from the regulatory and supervisory bodies in addition to the available academic literature, a novel and comprehensive metric named the *Risk Governance Index* (RGI) has been developed to assess

and evaluate the robustness of the risk governance structures in GCC banks since 2006 and until 2012. In contrast with previous academic papers on corporate governance and the scarce research on risk governance particularly, the measure incorporates nineteen determinants under two dimensions that lay out the centrality of risk management key functions in banks at board of directors and senior management's levels.

The RGI enabled an assessment of the frameworks' solidity within a sample of 27 mainstream banks and 26 Islamic banks in five Gulf Cooperation Council countries. As the timeframe covered years before and after the last global financial crisis, one of the main research objectives is to examine the evolution and / or variation of the practices in terms of risk management governance throughout this critical period where flaws in these have been attributed among the causes of the turmoil. The statistical exploration (both descriptive and inferential) indicates a positive evolution in the implementation of healthier risk governance practices in the two types of banks. The difference in RGI means for the whole sample regardless of the banks' type, before and after the GFC is also statistically significant which indicates the strengthening of the strategic organizational mechanisms in line with the recommendations of the financial regulatory authorities. Also, a subsequent t-test shows that there is a statistically significant difference between risk governance practices in bank types with the conventional banks recording on average better RGI results than their Islamic counterparts. These results could be explained by the bigger size, the larger market shares and the longer experience that conventional banks have in dealing with risk management and regulatory issues which is in contrast with the nascent Islamic banking industry.

There are two implications of the present study. First, as a comprehensive metric RGI can be used continuously to monitor the development of risk governance structures in any bank. It can be used internally to enable banks to ameliorate their risk governance practices but most importantly it can be used by supervisory bodies and regulators to assess, monitor, control and compare them at national, regional and global levels. Authorities and regulators such as Central Banks, Capital Markets and Stock Exchange regulators can refer to it to track weak practices and promote more efficient risk management and governance architectures. RGI can also be further enriched by more desirable attributes for healthy risk management mechanisms, functions and practices. A second implication of the study dwells in the need to use RGI as a proxy for robust risk governance structures in the subsequent empirical chapters of this thesis. While this chapter introduced the methodology of construction of the index and preliminary statistical analysis of the results, the following chapters will be looking at the impacts of sound

risk governance on the banks' profitability then on their financial stability. The genesis for these two next studies stems from the essential need to find out whether robust risk management strategic mechanisms compromise (or not) the profitability levels and enhance (or not) the financial stability of banks.

Chapter Three

What Do Risk Governance Frameworks Tell Us About Banks' Financial Performance? A Comparative Study between Islamic and Conventional Banks in the GCC

3.1 Introduction

The banking industry is inherently unstable as it confronts a multiplicity of risks. They perform important functions of liquidity and maturity transformation by collecting deposits and issuing loans. In addition to their risks arising in their banking book, they are exposed to the dynamics of contemporary financial markets that expose them to continuous fluctuations in market prices such as exchange and interest rates that affect their trading books (Scholtens and van Wensveen, 2000; Schroeck, 2002). Risk management is hence a function that is at the heart of the overall banking business.

The 2008-09 Global Financial Crisis (GFC) revealed the weaknesses in the risk management function and highlighted the gaps in the governance structures related to risk oversight and management (Adam and Mehran 2011, FSB 2013). OECD (2009) acknowledges that the failures in risk management were one of the key factors contributing to the GFC, highlighting that in a number of cases boards were ignorant of the risks faced by the banks (OECD 2009, p.8). Drawing on the key lessons following the GFC, the Basel Committee for Banking Supervision (BCBS) published "Principles for enhancing corporate governance" in October 2010 that provides guidelines to enhance corporate governance both at bank and supervisory levels. Furthermore, BCBS published "Corporate governance principles for banks" in 2015 that includes guidelines to strengthen risk governance regimes. Among others, the specific issues identified include board's role in ascertaining risk appetite, management and control and defining the responsibilities of risk committee, CRO and internal audit to promote the long-term soundness of banks.

In addition to these BCBS's guidelines, the Financial Stability Board (FSB) also led a peer review dedicated to Risk Governance frameworks and practices in financial institutions and presented its results in February 2013. The FSB shed light on some of the flaws in governance practices associated with risk related functions. The lack of sound financial industry experience by board members, the massive volume and complexity of information provided to the directors in addition to insufficient checks and balances were also found to be behind their inability to fulfil their responsibilities. They identified a key component of risk governance framework to be a dedicated independent risk committee at board level that would provide consequential insight on the bank's exposures and challenge the management proposals and decisions. At senior management level weaknesses included lack of authority, stature and independence of Chief Risk Officers (CRO) and internal audit functions were found to impede efficient monitoring and settlement of identified weaknesses by the internal auditing and controls.

The FSB peer-review results suggested improvements in various aspects of risk governance by taking a more holistic approach to risk governance instead of looking at each feature singly (FSB 2013). A key recommendation was to further enhance the authority and independence of CROs and national authorities to strengthen "their ability to assess the effectiveness of a bank's risk governance and its risk culture" (FSB 2013, p.5). It advised them as well to "engage more frequently with the board and its risk and audit committees" (FSB 2013, p.5). The Basel Committee has highlighted the importance of the supervisory oversight being central to enhancing risk governance and the proper functioning of the banking sector. The main developments identified by BCBS includes effective board oversight, rigorous risk management, strong internal controls, establishment of standalone risk committees, creation and elevation of the CROs role and integration of discussions between board audit and risk committees (BCBS 2014, p.3-4).

As was discussed in the previous chapter, academic literature exploring the role of risk governance in banks is meagre principally because it is a subject of relatively new interest. Nonetheless, as a nexus has been already established in literature between the centrality of corporate governance in financial institutions and the multiple recent financial scandals that revealed shortcomings in controls, transparency and above all public responsibility (Copeland *et al*., 2013; Saito *et al*, 2013), the peculiar stance of risk management governance in a post GFC period necessitates exploration by academicians and regulators alike.

Research on corporate governance in both conventional and Islamic banking systems mainly focuses on the concept, its status, role and structure of the board of directors (Abu-Tapanjeh, 2009; Adams and Mehran, 2008, 2012; Ahmed, 2013; Al-Suhaibani and Naifar, 2014; Caprio et al., 2007; Levine, 2004; Macey and O'hara, 2003; Safieddine, 2008). Other studies look at the association between some or only a few bank governance attributes on the corporate performance (Aebi *et al.*, 2012; Andres and Vallelado, 2008; Caprio *et al*., 2007; Mollah *et al.*, 2016; Mollah and Liljeblom, 2016; Mollah and Zaman, 2015; Pathan, 2009; Pathan and Faff, 2013) or evaluate the effectiveness of its disclosures in annual reports (such as corporate risk disclosures in Abdallah *et al.* (2015); Linsley and Shrives (2006). Academic studies on risk governance in banking are even scant. Only Aebi *et al.* (2012), Battaglia and Gallo (2015), Ellul and Yerramilli (2013) and Hines and Peter (2015) use risk management and risk governance determinants in their studies.

The aim of this chapter is to contribute to the literature related to banking risk governance and study its impact on three widely used financial performance indicators namely ROAA, ROAE and Cost-to-income for banks in the GCC region. The present chapter uses the previously developed holistic risk governance index (RGI) as the focus variable in the econometric estimations.

The remainder of this paper is organized as follows. The next section reviews the relevant literature on risk governance and financial performance Section 3.3 develops the research context, overall objective and hypotheses. After presenting the methods used to collect and analyse data, Section 3.4 discusses the empirical findings. Section 3.5 concludes the chapter.

3.2 Literature Review

3.2.1 Corporate Governance and Financial Performance in Conventional Banking

A plethora of academic research examines the relationship between corporate governance and financial performance. These papers apply various proxies for corporate governance that they use in causality studies. For instance, using a sample of 35 banks holding companies (BHC) from 1959 to 1999 the empirical study led by Adam and Mehran (2005) focus on the board structure -including its size and composition- and how it relates to their performance. They find that the proportion of outsiders on the board is not significantly related to the bank's performance as measured by Tobin's Q. Yet the natural logarithm for board's size does have a significant positive relationship with Tobin's Q. One possible explanation they give to this finding that contrasts with previous literature is the increase of mergers and acquisitions which subsequently led to an increase in the board size. Using the same sample, Adam and Mehran (2011) put forth more evidence on how adding more directors who also sit in subsidiaries to the board adds more value to the banks compared to other industries (Adam and Mehran 2011, p.5). They point out that bank governance has some specific features that need to be considered when elaborating reforms referring importantly to the difficulty of measuring the independence of the bank's board. This is of particular interest to them as they investigate the relationship between the board's independence and the bank's size as well as its effect on the bank's performance (Adam and Mehran 2011, p.10-13).

Caprio *et al* (2004) used a sample of 244 banks in 44 countries to assess the implications of ownership, shareholders' protection laws and bank supervisory and regulatory policies -as proxies for corporate governance mechanisms- on bank valuations. They find that larger cash-flow rights boost valuations while weak shareholders protection laws lower them. Using a total

620 bank-year observations from a sample of 69 banks in 6 OECD countries, Andres and Vallelado (2008) examine the influence of corporate governance mechanisms to monitor managers' behaviour and to advise them on strategy identification and implementation, on the bank's performance. Their main hypothesis maintains that the size, composition and functioning of the board of directors reflect its motivation and abilities in its supervisory and advisory duties.

Andres and Vallelado (2008) use Tobin's Q, return on assets (ROA) and annual shareholder market return as measurements of bank performance and size and composition of the board (proxied by the proportion of non-executive directors in the board) and the functioning of the board of directors (BOD) (measured by the number of meetings held per year). Their results challenge the idea that smaller boards are more efficient. In fact, they find that there is a trade-off related to board size with the advantages of more monitoring being able to deal with problems and disadvantages being control and coordination problems. They estimate the optimum limit for a board to efficiently coordinate, control and make proper decisions to be around 19 directors. Their results also show that the executive directors should be represented optimally with non-executive directors as the former group bring their knowledge of the bank that is as essential to the advisory function of the latter but additionally enables the lessening of conflicts of interest.

In line with the results from the above studies, Salim *et al.* (2016) explore the effects of the corporate governance reforms introduced in 2003 on the performance of 11 Australian banks between years 1999 and 2013. Using two-stage double bootstrap Data Envelopment Analysis (DEA), they find a positive and significant association between board size and committee meetings with bank efficiency, no significant impact of the number of independent board members, the board meetings and large shareholdings on the banks' technical performance.

In the MENA region, Ghosh (2018) examine the categories of corporate governance disclosures that influence the performance and stability of 102 banks from 12 countries between years 2000 and 2012. The author's main finding suggests that disclosures related to the board independence and the assessment of potential risk factors are the two major categories that improve the banks' profitability measured by ROA. Interestingly, the magnitude of this positive influence is almost similar in the two cases enabling an increase of profitability by roughly 0.4%. With regards to stability proxied by the *z*-score, it is found that the disclosures relating to the executive's compensation lowers the banks' stability whereas those that relate to risks and ethics enhance it.

From the above empirical papers, the general pattern that emerges from the literature induces overall a positive contribution of the corporate governance mechanisms as well as their disclosures to the achievement of higher bank profitability levels. Although it is acknowledged that the corporate governance reforms in countries such in the MENA region are not as effective as ones in more developed countries such as the United States or Australia (Ghosh, 2018), evidence shows that some aspects of corporate governance augment financial performance regardless of the level of development of the country under study. It can be therefore inferred that similar trends in the relationships between some corporate governance mechanisms mainly ones referring to the board of directors, and common performance indicators (such as the ratio of returns on assets) can be expected in different samples from different geographical regions.

3.2.2 Corporate Governance and Financial Performance in Islamic banking

As far as it could be ascertained, the only empirical study that explored the associations between corporate governance and performance in Islamic banks is by Mollah and Zaman (2015) who provide evidence of the impact of *Shari'ah* supervision, and corporate governance on bank performance. They use a match-paired sample of 86 Islamic banks and 86 conventional banks across 25 countries from 2005 till 2011 to explore the impact of SSB and corporate governance (CG) on their performance. Using the *Shari'ah* board size as the measurement of SSB, board size (log number of members on the BOD), independence of the BOD (proportion of independent non-executives in the board), duality of the CEO (when chairing the BOD as well) and internal recruitment of the CEO as variables for CG, they apply random-effect GLS technique to assess the effect of *Shari'ah* Supervision, board structure and CEO power on bank performance. Proxies of the dependent variables measuring bank performance were ROIAE (operating profit divided by average equity), ROIAA (operating profit divided by total assets), ROAE (net income divided by average total equity), ROAA (net income divided by average total assets) and Tobin's Q. Their study shows that SSB impacts IB's performance positively when they achieve a supervisory role rather than a mere advisory function. CG variables in contrast do not seem to impact their financial performance. However, they find a negative relationship between the board size and performance implying that large boards are less efficient which is inconsistent with Andres and Vallelado (2008). From a comparative standpoint, Mollah and Zaman (2015) find that Islamic banks have more independent boards than their conventional counterparts and are less likely to recruit CEOs internally. They also find a significant link between SSB and CG practices where *Shari'ah* boards play an important role in protecting shareholders' interests.

Using a sample of 6 Islamic banks operating in the UAE, Ahmed (2017) explored the impact of the Corporate Governance Index on their financial performance between years 2011 and 2016. Specifically, they used responses to interviews with the top management in each of these 6 banks to construct a corporate governance index that entails the following categories: the board size, the presence of female members in the board, the duality of the CEO, the presence of block 30 holders, the existence of a *Shari'ah* committee and its size. To proxy financial performance, the author uses ROA, ROE and earnings per share. Results from the regression models show that there is a direct positive relationship between the corporate governance index and ROE and between the corporate governance index and the earnings per share. Nonetheless, the author finds no significant association between the corporate governance index and ROA.

Prior to these studies, Ghayad (2008) examined the elements that determine the operational performance of Islamic banks in Bahrain. In addition to financial inputs, the author finds that managerial variables also impact the performance of Islamic banks with, in particular, a hampering influence of the *Shari'ah* board on the banks' directors. The author explains that such obstruction is due to directors and members of the *Shari'ah* board not speaking the same language and having little knowledge about finance and commerce to ensure a clearer understanding of the banks' business operations as well as a better quality of supervision.

One of the objectives of Farag *et al.* (2017) in their empirical paper (and that pertain to this section) is to examine the relationship between the Islamic banks' board structures and their financial performance as well as the nature of the association between the size of the *Shari'ah* Supervisory Board (SSB) and the financial performance of Islamic banks. They use data of 90 Islamic banks from 13 countries between years 2006 to 2014. Interestingly, the authors find that there is a significant positive relationship between the Islamic banks' board size and return on operating equity (ROOE) and return on equity (ROE) as two proxies for financial performance. Precisely, results from two models out of the four-estimated show that a 1% change in the board of directors' size is likely to lead to a change of 0.27% and 0.23% of financial performance respectively. Also, the authors find out that a 1% change in the size of the SSB may lead to a change of 0.133% and 0.145% in financial performance measured by ROOE and ROE respectively. In other words, the authors infer that the greater the size of the *Shari'ah* Supervisory Board the better the financial performance of the Islamic bank. The study of Farag *et al.* (2017) brings empirical evidence about the importance of the role of the SSB in certifying and issuing the *Shari'ah* compliance of the new Islamic financial products that enable Islamic banks to meet the growing demands of the industry in terms of Islamic micro-finance products and Islamic financial derivatives.

3.2.3 Risk Governance and Financial Performance

While empirical research on corporate governance examine some specific aspects related to the board size, composition and independence only a few studies include risk governance variables. Aebi *et al* (2012) explore whether the presence of a CRO and their reporting line (to the CEO or directly to the boards of directors) were associated with better returns. They find that effectively when a CRO reports directly to the BOD and not to other corporate entities, the bank displays higher buy-and-hold stock returns and ROE during GFC. Using a sample of 72 U.S bank holding companies, Ellul and Yerramilli (2013) develop "RMI" (Risk Management Index) to assess the strength and independence of risk management function. The RMI integrates two set of variables related to risk-related functions. The first set aims to measure the importance of the CRO in the banking holding company (BHC) through its presence, quality as an executive officer of the firm, compensation and their centrality. The second set of variables include experience level of the risk committee members in banking and finance and the number of meetings held during the year relative to the average of other BHCs. Results of their study reveal that banks with high RMI before GFC (i.e. in 2006) had lower tail risk, less nonperforming loans, higher operating performance and higher annual returns during the years of the financial crisis (i.e. 2007 and 2008). Ellul and Yerramilli (2013) further use their sample to compute RMI from 1994 to 2009 and find that while BHCs scoring high RMI have also high stock returns during crisis years, there is no relationship between them in normal years. Such relevant findings imply that when a bank has a strong and independent risk management function, it better succeeds in sheltering itself from large losses and are profitable.

A study by Hines and Peter (2015) investigates whether financial institutions that have voluntary risk management committees (RMC) witness any effect on their short-term: risk outcomes, hedging and trading derivative structures and profitability. Based on a sample of 47 financial institutions in the U.S, they elucidate that ones that have international banking activity, higher leverage, larger and more independent board, a Big N auditor, merger and acquisition activity and lower financial reporting quality are more likely to form a risk management committee. They also find that RMC has a symbolic effect of governance practice on short-term changes in risk outcomes, notional values of hedging and trading derivatives as well as on profitability.

Battaglia and Gallo (2015) use 15 Chinese banks and 21 Indian banks over the period 2007-2011 to investigate the effect of risk governance on their performance. They select board size, independence of directors and frequency of BOD's meetings as determinants for the effectiveness of a BOD to monitor and advise managers. They also consider two features of

risk committees namely the number of directors sitting in them and the number of meetings they held.

They conclude that over the period of 2007-2011, risk committee's size is positively related to the banks' ROE and ROA, the larger the risk committee the higher the profitability. In terms of market valuation however and expected market growth, it is found that banks with smaller risk committees tend to have higher Tobin's Q and price-earning-ratios. The corporate governance measure of number of meetings has limited impact on Tobin's Q with no evidence that small size and independence of BOD affect the banks' profitability. Notwithstanding, one limitation of the paper is that it uses one bank-year observation (specifically 2007) for boards and risk committees' variables on the full period of investigation from 2007 to 2011. As explained by the authors, such decision is motivated by the need to overcome any endogeneity concern relating to board structure variables as has been also done by Pathan and Faff (2013). Therefore, they assume that the strength of governance mechanism incorporated in 2007 is reflected in the bank's overall performance. While they rationalize this assumption on previous literature (Battaglia and Gallo 2015, p.9), it can be argued that as there was more attention given to risk governance following the GFC, it is very likely that boards and risk committees' determinants could have changed as also acknowledged by Hines and Peters (2015)[17].

3.3 Research Context, Objective and Hypotheses

The new understanding on risk governance as advanced by international multilateral financial authorities (FSB and BCBS) entails broader aspects and additional functions that existing empirical literature, including the most recent ones have not covered. The aim of this paper is to contribute to this relatively new area on risk governance by looking at the existing associations between risk governance frameworks and banks' performance. As Islamic banks showed more resilience during and after the GFC (Beck et al., 2013b; Hasan and Dridi, 2010; Mirakhor and Krichene, 2009; Parashar, 2010), an appealing angle of research is to compare whether their risk governance and management mechanisms carry a different impact on profitability than the one carried by their conventional counterparts.

As operations and management of Islamic banks are subject to more stringent legal requirements of *Shari'ah* compliance, a preliminary assumption presupposes that significant differences between risk governance architectures in Islamic and non-Islamic banks are likely to affect differently the sources of banks' income hence their profitability. This assumption is

[17] For specific elucidation, see (Hines and Peters 2015, p.22).

formed on the basis that Islamic banks observe stricter rules regarding (i) the religiously permissible types of investments (that is to say the involvement in ethical, *Shari'ah* compliant and socially responsible investments only) and (ii) the risk management practices. The implications of risk governance and management on returns, however cannot be presumed a-priori.

Building up on the discussion above, the objectives of the present chapter are twofold: first is to examine the overall effect of strong risk governance frameworks on the banks' profitability and second is to explore the variations occurring in a post-financial crisis period. For both cases, the exploration is achieved on the overall sample and then by distinguishing between the two banks' type to examine whether any existing differences similar / different results.

To reach the above listed objectives, the following hypotheses are postulated:

H_{01}: There is no relationship between risk governance and banks performance.

H_{02}: There is no relationship between risk governance and the performance of Islamic banks.

H_{03}: There is no relationship between risk governance and banks' performance in the post-GFC period.

H_{04}: There is no relationship between risk governance and the Islamic banks' performance in the post-GFC period.

3.4 Methodology

3.4.1 Sample, data and explanatory variables

Being a comparative study, it uses a sample of 27 conventional banks and 26 full-fledged Islamic banks in five GCC countries, namely Saudi Arabia, Kuwait, Qatar, Bahrain and the United Arab Emirates for the period 2006 to 2012 as listed in Tables 2.4 and 2.5 in the previous chapter. Oman is excluded from the study as it launched its first Islamic banks in 2013. The GCC was chosen for the study as most countries have adequate number of Islamic banks compared to their conventional counterparts. Furthermore, the GCC region counts the highest number of Islamic financial institutions that experienced the largest asset growth[18] in the decade between 2006 and 2016 as reported in The Banker Magazine's top ten movers by asset growth (The Banker, 2016). Only full-fledged Islamic banks were included, and Islamic windows of conventional banks were excluded due to conceptual and technical reasons specifically for the

[18] In the Top Ten, the GCC region alone counts five institutions, two in Iran then the remaining three in Asia. (The Banker, 2016)

focus variable that is the RGI as explained in detail in section 2.4.3 of the previous chapter.

As the aim of the chapter is to examine the impact of risk governance on performance of banks, the Risk Governance Index (RGI) previously developed is used as a proxy. To recall, the higher the score of RGI the more robust and the better the risk governance mechanisms. While the information needed to score the RGI was hand-collected from annual reports, financial statements and corporate governance reports as introduced earlier, the remaining variables (dependent and explanatory) used in the econometric models were downloaded from BankScope Bureau Van Dijk and the World Bank databases. A description of the data used in the empirical model and the sources are given in Table 3.1.

3.4.2 The Empirical Model and Estimation Method

To test the null hypotheses posited above, the following dynamic model is constructed:

$$FPI_{i,t} = \alpha_0 + \beta_1 FPI_{i,t-1} + \delta RGI_{i,t} + \gamma X_{i,t} + \zeta BK_{i,t} + \theta Z_{i,t} + \beta_2 Islamic\_Dummy + \beta_3 Crisis\_Dummy + \varepsilon_{i,t} \quad (3.1)$$

Where:

$FPI_{i,t}$ stands for the Financial Performance Indicator (measured by ROAA, ROAE and Cost-to-Income) of bank *i* at time *t*, $FPI_{i,t-1}$ is the lagged value of the financial performance indicator, $RGI_{i,t}$ is the Risk Governance Index for bank *i* at time *t*, $X_{i,t}$ is a matrix of bank accounting explanatory variables, $BK_{i,t}$ is a matrix of bank specific control variables, $Z_{i,t}$ is a matrix of macroeconomic variables. *Islamic_Dummy* is the dummy variable that permits to account for the distinctiveness of the Islamic banks' business model compared to their conventional counterparts in the four equations as will follow[19]. *Crisis_Dummy* is the dummy variable that permits to distinguish between the years before the inception of the crisis (that is 2006 and 2007) and the period following the inception of the crisis (that is from 2008 to 2012). α_0 is the constant, β_1, δ, γ, ζ, θ, β_2 and β_3 are the vectors of parameter estimates for their respective matrices and ε is the error term.

[19] Please note that in Models 2 and 4, where the focus is on the case of RGI in Islamic banks, an interaction term is incorporated in the models whereby the RGI scores in Islamic banks only acts as an additional variable from which an inference of the effect on every financial performance indicator is drawn.

Table 3.1: Description of Variables Used in the Study

Variables	Definition, Coding and Data Source
Panel A: Dependent Variables	
ROAA	Return on Average Assets as equal to the ratio of Net Income on Average Assets (Source: BankScope)
ROAE	Return on Average Equity as equal to the ratio of Net Income on Average Equity (Source: BankScope)
C2I	Cost to Income Ratio as equal to Operating Expenses divided by Operating Income (Source: BankScope)
Panel B: Explanatory Variables	
RGI	Risk Governance Index developed by author (Source: Annual Reports and corporate governance reports)
Islamic Dummy	Dummy variable that takes the value of 1 when the bank is Islamic and 0 otherwise
Crisis Dummy	Dummy variable that takes the value of 1 when the year of the observation is during and post crisis (that is 2008 to 2012) and 0 otherwise
TEA	Total Earning Assets concern assets that generate interest or dividends. It includes stocks, bonds, income from rental property, certificates of deposit and other interest or dividend earning accounts or instruments. (Source: BankScope)
NL	Net Loans defined as interest-earning balances with central banks and loans and advances to banks net of impairment value including loans pledged to banks as collateral, incl. reverse repos with banks (Source: BankScope)
Op_Inc	Operating Income that is income gained from the operating activities (Source: BankScope)
Ovh_C	Overhead Costs which refer to all the costs in the income statement including accounting fees, insurance, rent, repairs among others (Source: BankScope)
Bank Level Control Variables	
LnTA	Natural Logarithm of total assets (Source: BankScope). Total assets include: cash and due from banks, foreclosed real estate, fixed assets, goodwill, other intangibles, current tax assets, deferred tax, discontinued operations, other assets
DSTF	Total deposits and short-term funding (Source: BankScope)
Eq_TA	Leverage ratio as equal to Equity divided by Total Assets (Source: BankScope)
NL_TA	Ratio of Net Loans to Total Assets (Source: BankScope)
LLR_GL	Ratio of Loan Loss Reserves to Gross Loans (Source: BankScope)
IRS	Interest Rate Spread as equal to lending rate minus deposit rate in % (Source: World Bank Database)
Macroeconomic Control Variables	
lnGDP_Grw	Natural Logarithm of Gross Domestic Product Growth Rate (Source: World Bank Database)
Infl	Inflation rate (Source: World Bank Database)
Pol_Stab	Political stability is defined by the World Bank as a measure of the "perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism". Estimates ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance. (Source: World Bank Database)
Gov_eff	Government efficiency is defined by the World Bank as reflecting the "perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political

Reg_Qual	pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies". Estimates ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance. (Source: World Bank Database) Regulatory quality is defined by the World Bank as reflecting the "perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development". Estimates ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance. (Source: World Bank Database)

The econometric model is estimated using twostep generalized methods of moments (GMM) with instrumental variables. Therefore, the first-differences of the dependent variables are used to remove the unobserved time-invariant country-specific effects and the explanatory variables are instrumented in these first differences equations by using levels of their series lagged two periods (Blundell and Bond, 1998). Theoretically, GMM suits the study for various reasons. First, the sample size entails more cross-sectional variables than time periods (Blundell and Bond 1998, Roodman 2008). As the number of time periods is relatively small, a straightforward fixed effects model is unlikely to handle the potential dynamic panel bias[20] where the lagged value of the dependent variable is correlated with the fixed effects in the error term (Nickell, 1981). Second, the financial performance is very likely to be dynamic as the realizations of the ROAA, ROAE and Cost-to-income at time *t* are influenced by their past realizations, i.e. at *t-1*. Also, as demonstrated by Caselli et al (1996) and Bond et al (2001), GMM dynamic panel estimation enables correction for frequent severe econometric issues such as: unobserved heterogeneity, omitted variable bias and measurement error that loom when modelling panel data. Also, when heteroscedasticity is present, GMM is more efficient in dealing with endogeneity as compared to the use of simple instrumental variables estimator. Indeed, the suspected endogenous variables, i.e. ones that might be correlated with the error term, are specified in the dynamic model and their lags are used as instruments.

Therefore, heteroscedasticity is controlled for in the three econometric models and the second lag of the following variables is defined (defined in Table 3.1) as endogenous regressors: RGI IS_DV lnTA TEA NL Op_Inc Ovh_Cost EQ_TA and NL_TA for models where ROAA and ROAE are the dependent variables and the following RGI IS_DV Op_Inc Ovh_Cost NL IRS LLR_GL lnTA EQ_TA NL_TA for the model with Cost-to-Income (C2I) as the dependent variable. With regards to the exogenous variables, the following are used as instruments in the

[20] For a comprehensive discussion on overcoming the dynamic panel bias, see Roodman (2008) pages 20-23.

STATA command in the three models: Crisis_DV DSTF Pol_Stab Gov_eff Reg_Qual lnGDP_Grw and Infl.

3.4.3 Descriptive Statistics

As reported in Table 3.2, the focus variable RGI has 325 observations with a mean of 8.68 across the sample and standard deviation of 3.54. The financial performance indicators ROAA, ROAE and C2I used as dependent variables have means of 2.10, 11.80 and 41.88 respectively. The explanatory variables TEA, NL, Op_Inc and Ovh_C have means of USD 17.1 million, USD 15 million, 749,416.5 and 253,213.4 respectively. The IRS, which measures the margin between the cost of mobilizing liabilities and the earnings on assets, is on average 4.07% varying between a minimum of 2.57% and a maximum of 6.57% throughout the sample time period.

The bank-level control variables lnTA, DSTF, Eq_TA, NL_TA and LLR_GL have means of respectively 16.21, USD 15 million, 16.27, 56.70 and 3.50.

To account for country specific effects, the macroeconomic control variables selected are economic growth (lnGDP_Grw) and the inflation rate (Infl). Additionally, three macro-level governance indicators from the World Bank Database are incorporated in the model as it is expected to find an influence of the differences in the political stability, government efficiency and regulatory quality despite the sociocultural and institutional similarities that are known between the GCC countries (Abdallah *et al*., 2015). As can be seen in Table 3.2, lnGDP_Grw and Inflation rate show averages of 1.74% and 4.74% respectively. The World Bank Development Indicators have a scale that ranges from -2.5 standing for weakest governance to +2.5 for strongest governance. The results show that the average of political stability for the GCC countries is 0.29, while it is 0.50 and 0.45 for government efficiency and regulatory quality respectively.

3.4.4 Effect of Risk Governance on Banks' Financial Performance: Overall Results

First, the interest dwells in looking at the overall impact of risk governance on the three financial performance indicators. To do so, the following variables are included in the first model: RGI, the dummy for bank's type and the dummy for the post-crisis year in addition to the previously listed matrices of explanatory bank and country-level control variables. Results of the twostep GMM estimations are reported in Columns 1, 2 and 3 in Table 3.3.

As can be seen, RGI shows a negative impact on ROAA, ROAE and C2I. The coefficients -

0.11 and -0.92 for respectively ROAA and ROAE are statistically significant at 99% confidence level and the coefficient for C2I -2.22 is significant at 90% confidence level. At this stage, it can be hypothetically deduced that strong risk governance compromises general levels of bank profitability but increases operational efficiency. A potential explanation could be that, among other, sound governance determinants such as tight monitoring from the board of directors and senior management due to the presence of higher proportion of independent directors, direct reporting lines of the CRO and internal audit to the board (reflecting less conflicts between management and shareholders) constrain the allocation of loans based on tighter credit scoring methodologies, limits the investment in riskier trading book activities and restricts financing through excessive leverage. Aebi et al. (2012) also found a negative and statistically significant influence of the presence of the risk committee on the ROE while the reporting line of the CRO to the board rather than to the CEO has a positive influence on ROE. Hines and Peter (2015) also find a negative yet insignificant association of the presence of risk committee on the change of Risk Adjusted ROA as a measure of profitability. They further argue that the formation of a risk management committee does not necessarily improve financial performance, nor does it produce substantive short-term risk adjustments on the change in non-performing assets, the change in loan charge-offs and derivative trading. Nonetheless, Ellul and Yerramilli (2013) find that strong risk management function, which they measure by developing a Risk Management Index, drives better operating performance and lowers non-performing loans before the GFC and increases the returns after the crisis.

The results for the cost-to-income model produces a negative coefficient (-2.22) signifying tight risk monitoring does not lead to higher expenses related to risk management but in contrast it helps reduce the operational costs to improve the banks' operational efficiency.

Table 3.2 – Descriptive Statistics of all Variables

VARIABLES	N	Mean	Std. Dev.	Min	Max
ROAA	355	2.10	5.19	-7.17	90.62
ROAE	355	11.81	17.26	-136.0	174.2
C2I	351	41.88	29.21	0.22	394.0
IS_DV	371	0.49	0.50	0	1
Crisis_DV	370	0.71	0.45	0	1
RGI	325	8.68	3.54	0	17
TEA	325	1.716e+07	1.728e+07	208.47	9.419e+07
NL	324	1.152e+07	1.220e+07	31.11	6.866e+07
Op_Inc	325	749.41	775.77	11.09	3.678e+06
Ovh_Cost	325	253.21	255.54	5.58	1.393e+06
IRS	210	4.07	1.28	2.57	6.57
TA	325	1.922e+07	1.944e+07	255.984	1.008e+08
lnTA	325	16.21	1.17	12.45	18.43
DSTF	325	1.497e+07	1.552e+07	26.291	8.035e+07
EQ_TA	320	16.27	10.25	0.76	98.93
NL_TA	324	56.71	13.81	6.42	87.09
LLR_GL	310	3.50	2.60	0	14.69
lnGDP_Grw	336	1.74	0.67	0.49	3.26
Infl	371	4.74	4.37	-4.86	15.0
Pol_Stab	371	0.29	0.67	-1.14	1.21
Gov_eff	371	0.50	0.41	-0.32	1.15
Reg_Qual	371	0.45	0.26	-0.06	0.81

ROAA is return on average assets, ROAE is return on average equity, C2I is cost-to-income ratio, IS_DV is the Islamic bank dummy, Crisis_DV is the crisis dummy, RGI is the risk governance index, TEA is total earning assets, NL is net loans, Op_Inc is operating income, Ovh_Cost is overhead costs, IRS is Interest Rate Spread, TA is total assets, LnTA is natural logarithm of TA, DSTF are deposits and short-term funding, EQ_TA is the ratio of equity to total assets, NL_TA is the ratio of net loans to total assets, LLR_GL is the ratio of loan loss reserves to gross loans, LnGDP_Grw is the natural logarithm of GDP growth, Infl is inflation, Pol_Stab is the indicator for political stability, Gov_eff is the indicator for government efficieny and Reg_Qual is the indicator for the regulatory quality.

With regards to the remaining explanatory variables, TEA is found to have a relatively small negative and significant association with ROAA and ROAE. As expected, positive operating income as part of the banks' net income increases both return on average assets and return on average equity and reduces cost-to-income ratio. The overhead costs do not seem to influence

ROAA but slightly reduce ROAE and increase C2I. Also, the three profitability measures are found to be negatively impacted by the bank size similar to the result of Beck et al. (2013b) on cost-to-income and of Pathan (2009) on assets return risk[21] as their used proxy for profitability. Deposits and short-term funding are not significantly impacting ROAA as anticipated but they positively influence ROAE as higher leverage naturally increases return on equity. Aebi et al., (2012) find in contrast a negative yet insignificant influence of the ratio of deposits to total assets on ROE. With regards to the ratio of equity-to-assets, that is the inverse of leverage ratio, it is found to have a statistically significant negative association with ROAA and ROAE. The coefficients are -0.029 for ROAA significant at 90% confidence level and -0.324 for ROAE significant at 95% confidence level. In literature, Mollah and Zaman (2015) find a negative but insignificant coefficient of Eq_TA on ROAA and a positive but insignificant coefficient of the ratio on ROAE. Beck et al. (2013b) find too a negative but insignificant coefficient of Eq_TA on stock market performance, their proxy for profitability.

Logically, the result on ROAA is explained as a relatively higher ratio reflecting a larger proportion of assets that are financed by and tied up to the banks' shareholders rather than financed by debt. Therefore, profitability from total assets is expected to be lower. With respect to ROAE, it is expected to find opposite relationship with equity-to-assets ratio since when the latter is high, the profitability from equity will be lower. The negative coefficient on cost-to-income ratio -0.09 is insignificant. Additionally, we notice a negative impact of the ratio of net loans to total assets on the three dependent variables. Also, referred to as the liquidity ratio, NL_TA represents the percentage of assets that are tied up in loans. Obviously, a lower ratio is considered as a positive signal of the banks' liquidity profile. Hence, its negative coefficient on ROAA -0.04 which is significant at 99% confidence level demonstrates that when a high quantity of loans out of the banks' total assets is issued, exposure to insolvency is likely to increase if the quantity is accompanied by higher proportion of bad loans and therefore the banks need to set aside more loan loss provisions which in turn reduce the net income generated from total assets that is ROAA. Consistent with Aebi et al. (2012), I find a negative yet insignificant relationship between NL_TA and ROAE. Mollah and Zaman (2015) in contrast find a positive yet insignificant impact of NL_TA on both ROAA and ROAE. The negative estimate -0.8 for C2I is significant at 99% confidence level. This result can be explained by the fact that when the ratio NL_TA increases, so does the likelihood of shrinking liquidity and net income as explained earlier. Under such circumstances, it is expected that the bank reduces its

[21] Pathan (2009) defines Assets Return Risk as the standard deviation of the daily stock returns *times* the ratio of market value of equity to market value of total assets *times* square-root of 250.

operational expenses due to increasing returns to scale. The ratio of LLR_GL (1.974) is positive and statistically significant at 99% confidence level showing that potential loan losses reverberate in a reduction of the banks' cash and increased costs (legal, human and IT resources and administrative) to manage the customers' defaults through the renegotiation of the loans' terms or the setting off of the pledged collaterals among other credit risk management related instruments.

With respect to macroeconomic control variables, the indicator of political stability has obviously a negative and highly significant impact on ROAA and ROAE. The coefficients -1.007 and -6.16 respectively are significant at 99% confidence level. Under circumstances of high likelihood of political turmoil, the banking sector similar to all economic sectors is very likely to be adversely affected in terms of issuance volume and settlements of loans, and severely increasing the credit and liquidity risk exposures. The parameter estimate on C2I is positive but insignificant. The indicator of government effectiveness that reflects the perceptions of the quality of public services, the quality of policy formulation and implementation show negative yet insignificant associations with ROAA (-0.99) and ROAE (-0.42). It is positive yet insignificant (23.72) on cost-to-income ratio. In terms of regulatory quality, the effect of the ability of the government to formulate and implement sound policies and regulations that promote the private sector development does not show a statistically significant association with any of the three financial performance indicators. The parameter estimates for ROAA, ROAE and C2I are 0.7, 4.35 and -17.95 respectively.

Economic growth as captured by the natural logarithm of GDP growth shows the expected signs for the dependent variables. Hence, the impact is positive on ROAA and ROAE where the two coefficients are respectively 0.46 and 2.75 and significant at 99% confidence level. In times of political stability and sound economic growth policies, the private and public sectors engage in multiple projects (infrastructure, equipment, working capital, etc.) for which they demand financing from financial intermediaries. Naturally, economic dynamism enhances the banks' profitability. On cost-to-income, lnGDP_Grw's estimate is negative (-3.63) and statistically significant at 95% confidence level which indicates that under sound economic conditions, the proportion of operating costs out of the operating income decreases particularly when exposures to customers' insolvency is relatively low and does not require extra monitoring costs as discussed above. The inflation rate seems to significantly impact ROAE only. The negative coefficient -0.16 is significant at 90% confidence level and could be explained by the increase of lending interest rates as a result of higher inflation which in turn reduces the proportion of net income that is derived from little equity but higher debt.

Table 3.3: Dynamic Panel Two-Step GMM Estimations – Models 1 and 2

VARIABLES	ROAA (Model1)	ROAE (Model 1)	Cost-to-Income (Model 1)	ROAA (Model 2)	ROAE (Model 2)	Cost-to-Income (Model 2)
L.ROAA	0.273***			0.197***		
	(0.0301)			(0.0341)		
L.ROAE		0.106***			0.0589	
		(0.0354)			(0.0458)	
L.C2I			0.0743			0.0139
			(0.259)			(0.322)
RGI	-0.118***	-0.922***	-2.222*	0.221***	0.777**	-1.979
	(0.0324)	(0.231)	(1.103)	(0.0529)	(0.374)	(1.358)
IS_DV	0	0	-6.119	0	0	0.806
	(0)	(0)	(8.411)	(0)	(0)	(29.92)
Crisis_DV	-0.235*	0.403	0.751	-0.0110	-0.122	-0.0388
	(0.121)	(0.887)	(3.007)	(0.182)	(1.027)	(2.850)
RGI*IS_DV				-0.527***	-2.674***	-0.0610
				(0.0803)	(0.722)	(3.140)
TEA	-1.21e-07**	-1.17e-06***		-1.18e-07*	-7.49e-07	
	(4.77e-08)	(4.29e-07)		(6.27e-08)	(6.19e-07)	
NL	7.74e-08	-2.04e-06***	1.16e-06*	3.65e-08	-1.89e-06**	1.11e-06*
	(8.41e-08)	(7.38e-07)	(6.10e-07)	(1.17e-07)	(8.41e-07)	(5.45e-07)
Op_Inc	4.26e-06***	5.45e-05***	-4.14e-05**	2.64e-06**	5.15e-05***	-4.71e-05***
	(8.59e-07)	(1.12e-05)	(1.70e-05)	(1.31e-06)	(1.13e-05)	(1.61e-05)
Ovh_Cost	-1.72e-06	-4.21e-05***	8.25e-05**	-4.58e-06*	-5.44e-05***	0.000117**
	(1.89e-06)	(1.12e-05)	(3.60e-05)	(2.56e-06)	(1.88e-05)	(4.49e-05)
lnTA	-1.317***	-8.752**	-3.072	-2.452***	-10.15***	-3.122
	(0.360)	(3.918)	(6.751)	(0.316)	(3.457)	(7.050)
DSTF	-5.17e-08	1.46e-06**		8.29e-08	1.17e-06	
	(5.45e-08)	(5.57e-07)		(6.54e-08)	(7.34e-07)	

EQ_TA	-0.0295*	-0.324**	-0.0989	-0.0504**	-0.560***	-0.169
	(0.0165)	(0.127)	(0.613)	(0.0225)	(0.132)	(0.634)
NL_TA	-0.0410***	-0.0668	-0.801***	-0.0275**	-0.00186	-0.764***
	(0.00934)	(0.0881)	(0.195)	(0.0106)	(0.0541)	(0.194)
LLR_GL			1.974***			1.841*
			(0.622)			(0.921)
IRS			1.247			1.086
			(0.816)			(0.974)
lnGDP_Grw	0.461***	2.752***	-3.636**	0.430***	3.301***	-2.967*
	(0.0685)	(0.372)	(1.658)	(0.0669)	(0.563)	(1.649)
Infl	0.00569	-0.162*	0.0353	0.0437***	0.150	0.143
	(0.0146)	(0.0814)	(0.291)	(0.0131)	(0.107)	(0.295)
Pol_Stab	-1.007***	-6.163***	1.200	-1.254***	-5.428**	1.814
	(0.170)	(1.284)	(4.995)	(0.285)	(2.325)	(5.113)
Gov_eff	-0.994	-0.420	23.72	-0.859	0.284	21.23
	(0.637)	(5.220)	(16.91)	(0.915)	(6.036)	(15.96)
Reg_Qual	0.700	4.350	-17.95	0.997	0.341	-17.03
	(0.501)	(7.546)	(15.35)	(0.988)	(8.015)	(11.61)
Constant			141.3			136.8
			(106.9)			(110.2)
Arellano-Bond test for AR(1)	0.948	0.329	0.101	0.404	0.294	0.25
Arellano-Bond test for AR(2)	0.149	0.299	0.627	0.817	0.506	0.629
Hansen J-Statistic	0.814	0.657	0.945	0.809	0.971	0.581
Observations	144	144	109	144	144	109
Number of Bank_ID	45	45	28	45	45	28

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

3.4.5 Risk Governance and Financial Performance: The specific case for Islamic Banks

In a second model, an interaction term between risk governance and the Islamic dummy variable is included in the base equation (3.1) to explore whether any idiosyncrasies exist in the case of Islamic banks. This is further motivated as the previous t-test in Table 2.10 (in Chapter 2) showed differences between RGI in the two types of banks. The equation developed to estimate the second model is as follows:

$$FPI_{i,t} = \alpha_0 + \beta_1 FPI_{i,t-1} + \delta RGI_{i,t} + \lambda \text{RGI*IS\_DV}_{i,t} + \gamma X_{i,t} + \zeta BK_{i,t} + \theta Z_{i,t} + \beta_2 Islamic\_Dummy + \beta_3 Crisis\_Dummy + \varepsilon_{i,t} \quad (3.2)$$

The results of the GMM estimations from Model 2 in Table 3.3 show clear differences in this specific case. First, it is noticed that the index RGI now has positive and highly significant coefficient 0.22 and 0.77 in the regressions where ROAA and ROAE are respectively the dependent variables (Columns 4 and 5 in Table 3.3). Interestingly, when interacted with the Islamic dummy the RGI shows a negative highly significant parameter estimate -0.52 on ROAA and -2.67 on ROAE which are both significant at 99% confidence level.

The key result that can be deduced is that the preliminary findings from the previous estimations in section 3.4.4 were mainly driven by the negative result of Islamic banks. In other terms, the positive parameter estimates for RGI on both ROAA and ROAE in conventional banks reflect their tighter risk governance structures, i.e. one that comply with the regulators and academicians' exigencies, succeed in generating higher profitability for both average total assets and for shareholders' average equity. Specifically, tighter risk governance that observes a majority of independent directors in the board and in the risk and audit committees, privileges independent chairs for the board and in each of the two committees in addition to direct reporting lines of the CRO and internal audit to the board rather than to the CEO, among other determinants as detailed in Chapter 2, enables the attainment of balanced risk-return choices.

On the contrary, the negative and highly significant statistic estimates of the interaction term RGI*IS_DV for the same regressions indicate that the determinants for sound risk governance structures in Islamic banks, which reflect the strategic organizational functions in charge of the risk management of their business, possibly fail to properly adjust the riskiness of their financial products to increase their profitability. In fact, this could be an indication that the peculiarities of some profit-and-loss sharing Islamic financial contracts such as *Mudaraba* and *Musharaka* that are by nature riskier for the banks and can be side-lined to the detriment of higher profitability. In contrast with conventional banks, Islamic banks are not allowed to invest in

derivatives and debt trading because of *Shari'ah* compliance restrictions, the involvement in riskier activities in the case of Islamic banks can be therefore represented to some extent by the proportion of investment in *Mudaraba* and *Musharaka* partnerships where the Islamic banks operate as the *Rabu-Al-Mal*[22] or capital provider. To support this argument it is worth referring to the findings of an interesting study by Alandejani and Asutay (2017). In 2011, Alandejani and Asutay (2017) find that the proportion of the profit-and-loss sharing instruments in the total Islamic financing modes does not exceed 0.6% in Saudi Arabia, 9.9% in the UAE, 6.2% in Bahrain and 2.3% in Qatar. In their empirical paper, the authors also explore the bank-level and country-level determining factors of the non-performing loans in Islamic banks in the GCC countries. Results from GMM econometric estimations show that despite being perceived as high-risk financial instruments an increase of the profit-and-loss sharing contracts could lead to a decrease in the NPL while the fixed income debt instruments are likely to increase them. This result has important implications to the common practice of Islamic bankers that tend to favour fixed income debt instruments such as *Murabaha* on the basis of their lower levels risks. Therefore, taken together results from Alandejani and Asutay (2017) and the present study provide some evidence that the valuation of the Islamic financial instruments offered by Islamic banks could be inappropriate as it does not permit their levels of profitability to grow on the one hand and is likely to cause their NPL to increase. An investigation of the proportion of revenue that is generated through trading book operations and its contribution to the overall ROAA and ROAE is likely to enrich the inferences of the present study for Islamic and non-Islamic banks alike, nonetheless the conception is hampered by the unavailability of relevant data. As per the remaining parameters in the same equations (columns 4 and 5), the magnitudes, signs and significance levels remain almost identical to the results from the first set of estimations (see section 3.4.4).

With respect to cost-to-income, the results (reported in column 6 of Table 3.3) show that the association of the RGI and the operational efficiency ratio is still negative however insignificant when the interaction term RGI*IS_DV is included in the model. The coefficient of the interaction term also shows a negative yet statistically insignificant coefficient (-0.06). As found in ROAA and ROAE estimations, the remaining parameters explaining the cost-to-income in Model 2 do not change much in magnitudes, signs and significance levels.

[22] Please refer to Table A2.1 in Appendix for definition of Mudaraba contract.

3.4.6 Risk Governance and Financial Performance: A Post-Crisis Analysis

In a second set of estimations, the interest lies on observing the changes occurring immediately after the inception of the global financial crisis, that is from year 2008 to 2012. The base equation (3.1) is modified as follows:

$$FPI_{i,t} = \alpha_0 + \beta_1 FPI_{i,t-1} + \delta RGI_{i,t} + \lambda \text{RGI*Crisis\_DV}_{i,t} + \gamma X_{i,t} + \zeta BK_{i,t} + \theta Z_{i,t} + \beta_2 Islamic\_Dummy + \beta_3 Crisis\_Dummy + \varepsilon_{i,t} \quad (3.3)$$

At first, the interest is on RGI alone and the state of RGI after the GFC. Results of the twostep GMM estimations (Model 3) are reported in columns 1, 2 and 3 of Table 3.4. In accordance with the Model 1 estimations (Table 3.3), RGI shows a negative impact on the three profitability ratios with coefficients of respectively -0.21, -1.71 and -2.96 for ROAA, ROAE and C2I. However only the ones on ROAA and ROAE are significant at 99% confidence level while the coefficient on C2I is not statistically significant. Similar to Model 1, the possible interpretation of this result could indicate that the more stringent risk governance structures become, the less returns it generates through its invested assets and its shareholders' equity. An explanation could be that tight monitoring increases risk aversion and significantly reduces partaking in trade on risky securities and investment in highly leveraged transactions. In the same model, the interaction between RGI and the crisis dummy does not show any particular impact of the strength of the risk governance structures in a post crisis era. The coefficients 0.07, 0.5 and 0.83 for ROAA, ROAE and C2I correspondingly are all positive but insignificant.

Proceeding to the remaining explanatory variables, it appears that when comparing results of Model 1 (columns 1, 2 and 3 in Table 3.3) and Model 3 (columns 1, 2 and 3 in Table 3.4), there are only a few parameters whose estimates slightly change. In particular, on the ROAA equation the ratio of equity to total assets on ROAA equation maintains an almost equal magnitude but it becomes insignificant while it was significant at 90% confidence level in Model 1. This result is in line with (Mollah and Zaman, 2015) but contradicts Beck et al. (2013) who find a positive and significant parameter estimate during the crisis. Also, the government efficiency indicator turns to be lower (-1.56 in Model 3 compared to -0.99 in Model 1) but significant at 95% confidence level.

On ROAE likewise, a change is noticed in the coefficient of net loans (NL) that decreases to -8.08e-07 from prior -2.04e-06 and becomes insignificant. However, the ratio of NL_TA although it decreases in magnitude from -0.06 to -0.2, it becomes significant at 95% confidence level. This shows that there is also a contributing impact of the liquidity ratio (less liquidity when the ratio is high) to the profitability from equity as when the bank gets less liquid, i.e. when NL_TA is high, the net income as the numerator of ROAE decreases as a result of more

provisions that need to be spared. On cost-to-income, we notice the change on the coefficient of NL mainly. While it was relatively small (1.16e-06) and significant at 90% confidence level, it lost in magnitude and statistical significance (8.18e-07).

Table 3.4: Dynamic Panel Two-Step GMM Estimations – Models 3 and 4

VARIABLES	ROAA (Model 3)	ROAE (Model 3)	Cost-to-Income (Model 3)	ROAA (Model 4)	ROAE (Model 4)	Cost-to-Income (Model 4)
L.ROAA	0.303***			0.269***		
	(0.0266)			(0.0291)		
L.ROAE		0.00924			0.0692	
		(0.0348)			(0.0498)	
L.C2I			0.0805			-0.0581
			(0.252)			(0.238)
RGI	-0.218***	-1.715***	-2.966	0.0640*	0.372	-2.102**
	(0.0753)	(0.515)	(2.806)	(0.0377)	(0.229)	(0.994)
IS_DV	0	0	-6.608	0	0	1.197
	(0)	(0)	(9.377)	(0)	(0)	(11.58)
Crisis_DV	-0.867	-4.369	-7.080			
	(0.603)	(6.099)	(24.41)			
RGI*Crisis_DV	0.0732	0.506	0.837			
	(0.0590)	(0.599)	(2.381)			
RGI*IS_DV*Crisis_DV				-0.138***	-0.854***	-0.0434
				(0.0152)	(0.128)	(0.929)
TEA	-2.29e-07***	-1.98e-06***		-2.73e-08	-1.14e-06*	
	(6.97e-08)	(4.72e-07)		(6.00e-08)	(5.91e-07)	
NL	1.29e-07	-8.08e-07	8.18e-07	-5.15e-09	-2.33e-06***	1.04e-06**
	(7.78e-08)	(5.79e-07)	(5.62e-07)	(8.96e-08)	(6.31e-07)	(4.71e-07)
Op_Inc	4.65e-06***	5.07e-05***	-3.74e-05**	5.12e-06***	5.38e-05***	-4.23e-05***
	(7.72e-07)	(9.59e-06)	(1.56e-05)	(8.28e-07)	(1.22e-05)	(1.46e-05)
Ovh_Cost	-1.79e-06	-5.87e-05***	9.34e-05**	-5.34e-06***	-4.37e-05**	9.96e-05**
	(2.36e-06)	(8.65e-06)	(3.58e-05)	(1.76e-06)	(1.65e-05)	(3.91e-05)
lnTA	-1.277***	-5.829*	-2.645	-3.664***	-16.56***	-2.484
	(0.347)	(2.934)	(6.689)	(0.406)	(4.816)	(6.258)

DSTF	9.44e-09	1.47e-06***		6.90e-09	1.76e-06***	
	(4.94e-08)	(5.45e-07)		(5.29e-08)	(5.03e-07)	
EQ_TA	-0.0228	-0.283*	0.00421	-0.0704***	-0.540***	-0.204
	(0.0175)	(0.152)	(0.509)	(0.0137)	(0.115)	(0.548)
LLR_GL			2.069***			2.194***
			(0.584)			(0.505)
IRS			1.227			1.255
			(0.764)			(0.767)
NL_TA	-0.0618***	-0.201**	-0.777***	-0.0508***	-0.126	-0.786***
	(0.0120)	(0.0873)	(0.205)	(0.0156)	(0.103)	(0.198)
Pol_Stab	-1.212***	-7.612***	2.168	-0.943***	-5.054***	0.470
	(0.175)	(1.534)	(5.079)	(0.244)	(1.408)	(4.886)
Gov_eff	-1.568**	-4.194	20.56	-0.360	1.556	19.77
	(0.595)	(5.432)	(17.42)	(0.760)	(4.737)	(13.12)
Reg_Qual	0.845	11.67	-11.05	0.355	-4.087	-13.53
	(0.860)	(8.125)	(12.18)	(0.728)	(5.887)	(10.24)
lnGDP_Grw	0.467***	2.816***	-3.503**	0.561***	2.626***	-2.832
	(0.0819)	(0.421)	(1.603)	(0.0690)	(0.482)	(2.029)
Infl	-0.00979	-0.223**	-0.0252	0.0330**	0.0297	0.0741
	(0.0131)	(0.0872)	(0.302)	(0.0141)	(0.0878)	(0.213)
Constant			134.9			129.7
			(116.3)			(94.51)
Arellano-Bond test for AR(1)	0.757	0.329	0.161	0.474	0.359	0.203
Arellano-Bond test for AR(2)	0.342	0.451	0.676	0.396	0.607	0.433
Hansen J-Statistic	0.81	0.652	0.943	0.615	0.894	0.878
Observations	144	144	109	144	144	109
Number of Bank_ID	45	45	28	45	45	28

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

3.4.7 Risk Governance and Financial Performance: A post-crisis analysis in Islamic Banks:

To look at the specific case of Islamic banks, I start first by looking at how well they performed financially after the global financial crisis and whether their performance impacted in one way or another the estimates of RGI as used in Model 3. To do that, an interaction variable between the Islamic and the post-crisis dummy is included in each of the equations where ROAA, ROAE and C2I are the outcome variables recursively. The results are reported in Table 3.5.

The findings show that Islamic banks performed worse than conventional banks in years 2008 to 2012, that is after the GFC. The estimated coefficients for the interaction between IS_DV and Crisis_DV are all negative -0.85, -4.67 and -5.5 for ROAA, ROAE, C2I respectively. However, they are only significant at the highest confidence level for ROAA and ROAE. In fact, when comparing the two estimates for IS_DV*Crisis_DV, it can be noticed that the effect of the crisis on the Islamic banks' shareholders' returns was forcefully chaotic as it represents more than five times its effect on returns generated from average total assets. It is noticed in Table 3.5 that estimated coefficients of RGI are -0.06, -0.44 and -2.35 for ROAA, ROAE and C2I respectively and are all negative and statistically significant at 90% confidence level in the ROAA model while they are at 95% confidence level in the ROAE and C2I models. These results serve as a robustness check for the Model 3 findings as they confirm the robustness of the sign, magnitudes and statistical significance for each parameter estimate and motivate the need to investigate the specific impact of risk governance on generating less returns as found in Model 3.

Table 3.5: Dynamic Panel Two-Step GMM Estimations – Post-Crisis Financial Performance in Islamic Banks

VARIABLES	ROAA	ROAE	Cost-to-Income
L.ROAA	0.298***		
	(0.0212)		
L.ROAE		0.108***	
		(0.0335)	
L.C2I			-0.00263
			(0.219)
RGI	-0.0613*	-0.444**	-2.350**
	(0.0330)	(0.200)	(0.996)
IS_DV*Crisis_DV	-0.852***	-4.678***	-5.508
	(0.0752)	(1.024)	(6.561)
TEA	-1.06e-07**	-1.20e-06**	
	(4.51e-08)	(4.88e-07)	
Loa	7.93e-08	-2.56e-06***	1.22e-06**
	(8.75e-08)	(5.27e-07)	(5.20e-07)
Op_Inc	3.22e-06***	5.72e-05***	-4.13e-05***
	(7.80e-07)	(6.46e-06)	(1.47e-05)
Ovh_Cost	-1.98e-06	-4.19e-05***	8.95e-05**
	(1.87e-06)	(1.18e-05)	(3.43e-05)
lnTA	-2.618***	-10.07**	-4.962
	(0.325)	(4.208)	(7.452)
DSTF	1.29e-08	1.81e-06***	
	(4.89e-08)	(4.70e-07)	
EQ_TA	-0.0501***	-0.499***	-0.317
	(0.0124)	(0.106)	(0.472)
Lev_Rat1	-0.0491***	-0.156*	-0.811***
	(0.0123)	(0.0801)	(0.205)
Pol_Stab	-1.118***	-5.288***	0.365
	(0.190)	(1.259)	(4.888)
Gov_eff	-0.504	2.645	26.20*
	(0.571)	(3.782)	(13.33)
Reg_Qual	0.413	-4.621	-18.71
	(0.687)	(5.489)	(11.37)
lnGDP_Grw	0.471***	2.637***	-3.131*
	(0.0647)	(0.386)	(1.806)
Infl	0.0196	-0.00674	0.0702
	(0.0136)	(0.0938)	(0.268)
LLR_GL			1.881**
			(0.686)
IRS			1.505**
			(0.703)
Constant			175.0
			(112.5)
Arellano-Bond test for AR(1)	0.779	0.348	0.078
Arellano-Bond test for AR(2)	0.231	0.371	0.459
Hansen J-Statistic	0.697	0.882	0.983
Observations	144	144	109
Number of Bank_ID	45	45	28

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Referring back to Table 3.4, the results in Model 3 do not show any significant impact of risk governance immediately after the inception of the crisis, it is suspected that results might be driven differently by the variations in Islamic banks as was the case in the former estimations (Model 1 and Model 2) and as lower financial performance was found post-crisis in Islamic banks particularly. Furthermore, it could also be argued that the impact of the crisis can hardly be ignored theoretically as the GFC was acknowledged to be a crisis of poor risk management (OECD, 2009).

Therefore, another model is constructed whereby specificities of risk governance in Islamic banks in the post crisis period are measured apart. In Model 4, RGI is considered together with the interaction term RGI*IS_DV*Crisis_DV as well as the matrices of bank and country control variables. Equation (3.4) is constructed to estimate Model 4.

$$FPI_{i,t} = \alpha_0 + \beta_1 FPI_{i,t-1} + \delta RGI_{i,t} + \lambda \text{RGI*IS\_DV*Crisis\_DV}_{i,t} + \gamma X_{i,t} + \zeta BK_{i,t} + \theta Z_{i,t} + \beta_2 Islamic\_Dummy + \beta_3 Crisis\_Dummy + \varepsilon_{i,t} \quad (3.4)$$

The results are reported in columns 4, 5 and 6 in Table 3.4. In the ROAA equation, RGI's estimate increases in magnitude from -0.21 to 0.06 and becomes significant only at 90% confidence level. It also increases from -1.71 to 0.37 in the ROAE equation but it changes to statistically insignificant. In Cost-to-Income estimation as well, we notice that RGI coefficient changes from -2.96 to -2.1 and becomes significant at 95% confidence level while it was not in Model 3. Consequently, it is noticed that the inclusion of the interaction term RGI*IS_DV*Crisis_DV brings about more elucidations which distinguish clearly between the distinct impacts of risk governance on the profitability of mainstream and Islamic banks. The results of RGI on ROAA and C2I are consistent with Ellul and Yerramilli (2013) who find that their developed Risk Management Index contributes to the generation of higher returns during the GFC and better operating performance until the crisis.

Looking at the particular case of Islamic banks, the interaction term RGI*IS_DV*Crisis_DV seems to have a highly significant negative influence on the return on average assets and the return on average equity. The coefficients -0.13 and -0.85 for ROAA and ROAE respectively are significant at 99% confidence level. In line with the previous results from Model 2, it can be argued that although the risk governance structures in Islamic banks complied more with the recommended rules for sound governance of the risk management practices, they are still unable to promote more profitability from potentially lucrative business lines and overcome probably the higher risk aversion. Nonetheless, it is worth noting that the changes in magnitude between

results of Model 2 and Model 4 might translate an improvement in the efficiency of strategic risk management decisions at board and senior management levels.

Effectively, for ROAA the severity of the coefficient of RGI*IS_DV changed from a highly significant -0.52 to -0.13 post-crisis (RGI*IS_DV*Crisis_DV). This improvement can be an indicator for more efficient risk management techniques to tackle currency exchange fluctuations, the volatility of *Shari'ah* compliant securities as well as the transmission effect of the markets' interest rates changes on the Islamic banks' portfolios and assets. Likewise, for ROAE an important change from -2.67 to -0.85 both significant at 99% confidence level is noticed. The reduced impact of RGI after the crisis is likely to translate the inclination of Islamic banks to possibly generate relatively more revenues from the pool that is invested in assets rather than shareholders' equity.

In the C2I regression, the coefficient of RGI*IS_DV*Crisis_DV -0.04 is found to be negative however insignificant. Hence, the result from Model 2 (-0.06) did not vary much post crisis neither did the statistical significance. It could be potentially inferred that operational efficiency is not associated directly with risk governance practices in Islamic banks.

The remaining explanatory variables show merely a few changes between estimations in Model 3 and Model 4. For instance, in the ROAA equation the TEA's parameter estimate decreases and loses the statistical significance while it is expected to increase ROAA and ROAE. TEA concerns the assets that generate interest or dividends such as stocks, bonds, income from rental property, certificates of deposits and other interest or dividend earning accounts or instruments. Hence, a negative coefficient signifies that the assets falling under this category failed to generate the expected returns probably as a consequence of the contagion effect from lower interest rates and increasing credit risk during and after the crisis. The overhead costs reduce the net income naturally therefore the coefficients in both ROAA and ROAE equations are negative and highly significant with respectively -5.34e-06 significant at 99% confidence level for ROAA and -4.37e-05 significant at 95% confidence level for ROAE. The inverse of the leverage ratio EQ_TA holds a negative and statistically significant coefficient in the ROAA (-0.07) and in the ROAE (-0.54) equations. Normally, the higher EQ_TA the better as the less leveraged the bank is. Less leverage also signifies a larger proportion of assets that is financed through equity. As the cost of equity is higher than debt, the coefficients hold hence the expected sign negatively influencing the returns. Beck et al. (2013) find a positive and significant parameter estimate on stock market performance during the crisis while Mollah and Zaman (2015) find a negative and insignificant coefficient on ROAA and a positive but

insignificant coefficient on ROAE. We also notice that the ratio of NL_TA only changes much in ROAE becoming negative and insignificant (-0.126) similar to Aebi et al. (2012).

3.4.8 Additional Robustness Analysis

To check the robustness of the results, several tests were run mainly to check for the autocorrelation in residuals and the validity of the instruments used in each of the five GMM estimations.

The aim of estimating equation 3.1 is to examine the effect of the "Risk Governance Index" (as an independent variable) on three financial performance indicators namely ROAA, ROAE and Cost-to-Income ratio as dependent variables.

First, in each of the five model estimations (in Tables 3.3, 3.4 and 3.5) were carried out using the first lag of the endogenous variables. Although the results produced significant parameter estimates with the expected signs, one problem that rises with the first lag is that it is often correlated with the error term while the second lag is not (Roodman, 2009). As the sample counts a relatively small number of countries, it is advised to include the second lag of the covariates in levels in the first differenced equations (Roodman, 2009). Opting for higher number of lags, that is higher than two, introduces an additional constraint of decreasing the sample size. Therefore, after several tests two lags are used in the final two-step estimations.

The autocorrelation tests of the Arellano-Bond AR (1) tests in the five models (Table 3.3, Table 3.4 and Table 3.5) show probabilities that are high enough to fail to reject the null hypothesis of no autocorrelation in the differenced residuals. The Arellano-Bond AR (2) tests in first differences also do not detect autocorrelation in levels as the p-values exceed the 5% significance level.

Additionally, I incorporated the sub-option *collapse* to the models looking at the effect of risk governance on cost-to-income to reduce the number of instruments with respect to the number of groups in the estimation. Finally, I also test for the validity of the specifications and the over-identified restrictions through the Hansen statistical test which is more robust than the Sargan test. The p-values for the Hansen J's statistics for each model are reported under their appropriate columns in Table 3.3, Table 3.4 and Table 3.5. The high p-values for the Hansen J statistics in each of the five models fail to reject the Hansen test's null hypothesis which posits that instruments as a group are exogenous. Therefore, as all of the p-values are greater than 5% significance level, it is inferred that the instruments used are valid and that the models are correctly specified.

3.5 Conclusion

As weak risk management was considered a key factor contributing to the GFC, different global standard setting bodies and national regulatory authorities have taken steps to enhance risk governance in banks. While the academic literature is also paying attention to risk governance issues, the research on the theme is scattered and meagre. After developing a risk governance index based on contemporary academic and regulatory literature, this chapter examines the impact of risk governance on performance on mainstream and Islamic banks in the GCC region. The results from a dynamic panel two-step GMM model show that robust risk governance structures enable the mainstream banks to adequately identify, measure and monitor the plethora of risks they face to generate higher returns (measured by ROAA and ROAE) while maintaining satisfactory operational efficiency (measured by cost-to-income). The reverse results found in the case of Islamic banks suggest that although risk governance architectures improved over time, they failed to achieve the objectives of increasing the banks' profitability. Negative and statistically significant estimates were found for RGI in Islamic banks in all estimations. Nonetheless, in the post crisis period an amelioration of the effect of RGI on return on average assets and on return on average equity in Islamic banks -although negative- could translate an effective positive change in strategic risk management that enables better yields from riskier equity-based financial products and more efficient management of the currency exchange fluctuations, the volatility of *Shari'ah* compliant securities as well as the transmission effect of the markets' interest rates changes on the Islamic banks' portfolios and assets.

The findings of this chapter shed more light on the risk management governance and practices in two banking models that are theoretically different. The contrasting results between the conventional and Islamic banks indicate that risk aversion is likely to be higher in Islamic banks as it is found that tight risk governance generates less returns and / or the risk management strategies and instruments applied are not germane to the multiple idiosyncrasies of their financial contracts and their business model.

Chapter Four

Does Risk Governance Contribute to Banks' Financial Stability? A Comparative Study between Islamic and Conventional Banks in the GCC

4.1Introduction

The large and visible costs of financial instability constitute a policy priority for Central Banks, supervisory authorities and policymakers (Allen and Gale, 2004) as default of only one bank has the potential to spill over affecting other financial institutions and ultimately trigger economy-wide systemic risk (Ellis *et al.*, 2014; Greenwood *et al*., 2015). Therefore, it is their foremost duty to ensure that banks maintain sufficient capital and liquidity cushions to avert their failure in providing the customary financial services to depositors and investors. The micro-prudential regulation aims at guaranteeing the financial stability of financial institutions at their individual level to limit their insolvency likelihood (Creel *et al*., 2015; Dewatripont and Tirole, 1994).

The recent global financial crisis (GFC) illustrated the contagion effect that one or two banks' bankruptcies[23] can swiftly transmit to an interconnected financial system. The crisis exposed the faults and flaws in the modern banking business model where excessive leverage and trade in risky securities, such as debt securities and derivatives, constitute the main sources of banks' profitability (Brunnermeier, 2009; Leung *et al*., 2015). As a consequence, the aftermath of that financial debacle induced a major change in the banking regulation through mainly the revision of the Basel Committee on Banking Supervision (BCBS) accords requiring banks to hold more capital buffers in addition to the minimum capital requirements to cover the risks they run (BCBS, 2010a; Blundell-Wignall et al., 2014). While Pillar 1 of Basel III increased the capital buffers and holdings of banks, Pillar 2 enhanced the supervisory overview role to ensure that banks hold adequate capital to mitigate different types of risks. The revised Basel III also comes up with micro-prudential regulation to mitigate banks' exposure to severe liquidity shortages under stressed market conditions. Two liquidity standards, namely the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR), were designed to reduce the probability of the hostile event occurring and to limit the damage when it does (BCBS, 2010a; Hong *et al*., 2014).

The multiplicity and complexity of risks that banks face in performing their traditional and innovative business activities can expose them to a distress when they are not adequately managed, controlled and supervised. For instance, the aftershock of the global financial collapse shed light on the incomplete financial reforms which substantially contributed to the systemic risk and disruption of the financial markets (Ellis *et al*., 2014). The Basel Committee on

[23] Lehman Brothers and Bear Stearns are two main examples, but a detailed sequence of financial institutions' failure is provided in (Becht *et al*., 2011, p. 439) and in (Brunnermeier, 2009, pp. 88–90)

Banking Supervision, the International Monetary Fund as well as the Financial Stability Board reacted post crisis by identifying new strategies and measures to tackle systemic risk through both macro and micro-prudential policies (BCBS, 2010a, 2013, FSB, 2011a, 2011b; IMF, 2009). Nonetheless, Ellis *et al* (2014) argue that while an extensive literature covers relationship of systemic risk -and financial instability-with bank competition, resolution policies, supervisory, auditing and valuation policies, very few studies examine the role of bank governance in contributing to the global financial stability despite the strong relationship between governance and risk-taking. More specifically, the recent financial crisis exposed several bank governance failures such as: "managers failing to control risk-takers, boards failing to control managers and investors failing to discipline either managers or boards" (Ellis *et al*., 2014, p. 176). Prior to their study, such association has been empirically tested in Laeven and Levine (2009), Beltratti and Stulz (2009), Dewatripont *et al* (2010), Becht *et al.* (2011) and others as will follow in larger details in section 4.2.

Considering this significant gap, the aim of this chapter is to contribute to the scarce empirical literature by examining the extent of the impact of banks risk governance on their financial stability. Specifically, it uses the previously developed metric of Risk Governance Index (RGI) as a focus variable and examines its association and the nature of its causality with several indicators of the financial soundness of banks. The analysis starts by assessing the impact of risk governance on the overall financial stability of banks by using the commonly-used proxy of *z*-score and then examining its impact on three core variables of capital adequacy, asset quality and liquidity levels.

The remainder of this chapter is structured as follows: the next section reviews the literature on the relationship of bank corporate governance and financial stability. Section three introduces the research hypotheses and develops the methodological approach used in the study. The section outlines how data was collected and analysed. Subsequently, the empirical results are presented in section 4.4 which also includes a separate discussion on the robustness tests. Section 4.5 concludes the paper.

4.2Literature Review

4.2.1 Nexus between bank governance and financial stability

The nature of banks' business activities have systemic importance due to their size, interconnectedness, complexity and lack of substitutability (BCBS, 2013; Ellis *et al*., 2014). The risk-taking behaviour of banks is associated with financial insecurity and economic

frailness as asserted by Bernanke (1983) and Keeley (1990). The question about how risk-taking is shaped within banks has interested more researchers, experts and regulators coinciding with the growing number of financial and economic crises since the late 1980s until the most disrupting turmoil of 2007-2008. The exploration inevitably leads to the concept of corporate governance whereby organizations define how the corporate decisions are made, the way authority and responsibility are allocated and the methods of attaining the corporation's objectives (BCBS, 2015b). Or as Stulz (2014) asserts, governance enables the distinction between the good risks that have an ex ante private reward for the bank on a standalone basis and maximizes the shareholders wealth, and the bad risks which do not yield such reward. Therefore, the role of risk management cannot be dissociated from the corporate governance structure and mechanisms in the specific case of banks as failures in setting sensible risk appetite echelons and mishandling the methods and processes to increase the institution's value are very likely to engender severe consequences at macro levels. An illustration of this is provided by the OECD (2009) which finds that failures in risk management were one of the greatest underlying causes of the financial crisis. OECD (2009) asserts that the requirement for financial institutions and particularly for banks to cautiously manage risks is more stringent as the volatility of their risks tend to be greater due to maturity transformation and the potential systemic risk it can induce.

Acknowledging the impairments and weaknesses of the risk management functions that contributed to the systemic risks of 2008, several international multilateral bodies such as the Basel Committee for Banking Supervision, the Financial Stability Board (FSB), the OECD and the IMF published a rich corpus of principles and guidelines to improve the practices in bank corporate governance in general (BCBS, 2015a, 2015b; IMF, 2009; OECD, 2009, 2015) and in risk governance in particular (FSB, 2013a).

Academic literature on the impact of corporate governance on bank's risk-taking as well as financial stability has similarly emerged with renewed interest following the global financial turmoil. Laeven and Levine (2009) for instance were first to empirically assess the governance theories pertaining to risk-taking by banks. The authors looked at the potential conflicts between the bank managers and the shareholders over risk-taking and whether risk-taking varies with the comparative power of equity holders. They also examined whether the national regulations and bank risks depend on ownership structure. Their main findings suggest that banks with large and powerful owners with substantial cash-flow rights tend to engage in higher risk in line with theory. They also find that banks with powerful equity holders respond to stricter capital

regulations and activity restrictions by taking greater risk as a way of compensation for the utility loss stemming from these two bank regulations' proxies. The same type of owners is also prone to tolerate more risk when the country has formal deposit insurance compared to those without explicit deposit insurance.

A review of the theory of bank governance has been done by Becht *et al* (2011) who also investigated the latent correlation between the banks' failure during the crisis and their organizational forms shaped by their corporate governance structures. The authors surveyed the post-crisis empirical literature on the core failures in governance specifically related to board independence, ownership and control as well as executive compensation and internal controls. Becht *et al* (2011) argue that overall bank corporate governance should be broadened to appropriately consider the interests of other constituencies in addition to ones of the shareholders, all of which are at risk from banks' activities. In fact more than a decade before the GFC, Dewatripont and Tirole (1994) recommended in their "representation hypothesis" that corporate governance features of non-financial corporations should be similarly applied to banks as well as insurance companies and pension funds. This signifies that corporate governance in these financial firms should represent and target the protection of the debtholders besides the shareholders' interests. Likewise, Becht *et al* (2011) maintain that this can be achieved by empowering the depositors and other creditors, transaction counterparties and, taxpayers by their adequate representation within the board of directors. In terms of remuneration reform, they assert that it must be adjusted for risk and directly aligned with debt holders rather than with shareholders.

Similarly, Dewatripont *et al* (2010) highlight from their extended diagnosis of the financial meltdown that key prudential reforms should include some corporate governance reforms**.** For instance, they argue that to restrain the risk-taking incentives of the managers, it is necessary to implement adequate internal governance measures and risk management systems along with some control over the senior management's remuneration. The authors estimate that regrettably these issues that monitor risk-taking behaviour remained vague and were not given the required importance in Pillar 2 of the Basel II accords. Yet regrettably, even with Basel III reforms and enhancement of Pillar 2 little headway has been made as argued by Ellis *et al.* (2014). In a detailed exploration of the nexus between bank governance systemic risk and financial stability, Ellis *et al.* (2014) discuss three important risk-taking incentives by managers which are anchored in bank corporate governance mechanisms. These are shaped in three distinct "principal-agent" problems. The first principal-agent problem arises through the payoff

asymmetry between the shareholders and the debtholders. In fact, equity-holders perceive their payoffs as an out of money call option on the bank's assets with a strike price given by its debt liabilities. When the level of debt liabilities (deposits and wholesale funding) is high combined with thin capital base and exceeds the total assets, the bank is likely to become balance sheet insolvent in the case large amounts of loans default and capital is depleted to cover the unexpected losses (Farag *et al*., 2013). Therefore, to boost the equity payoffs, the authors assert that they opt for either more investment in riskier assets or by leveraging them. Either alternative causes the risk exposure to increase disfavouring the debt-holders. The second principal-agent problem is the well-known divergence of interests of the shareholders and the managers. However, this issue has long been overcome by aligning the compensation of the latter with the objectives of the former. As banks' managers are heavily rewarded by equity, they have increased incentives to engage in riskier activities and for risk-shifting in stressed times. The last principal-agent problem arises between the debtholders and the society. Since governments pursue bail-out policies, the debtholders are inclined to exercise less disciplinary measures on banks' managers who are continually incentivised to take on more risk as explained earlier. If the state offers explicit insurance to depositors and implicit insurance to investors, the expected corrective effect from the investors on the banks' managers is totally dismissed (Merton, 1977). Consequently, the state and hence the taxpayers bear the ensuing repercussions. For Ellis *et al*. (2014), some solutions to these risk-taking incentives that exist in the bank governance entail: increasing regulatory capital to reduce the risk exposure of debtholders, shifting the compensation packages of managers from equity to debt through deferred or clawed-back rewards and substituting the bail-out state policies by bailing-in the creditors. Although the authors acknowledge that most of these solutions have been already proposed in Basel III reforms and by the Financial Stability Board and in a few jurisdictions they are being implemented (Ellis *et al*., 2014, p. 180), their consistency on how well they can efficiently curb the risk-taking incentives are controversial. One last suggestion they put forward is to amend the structure of the company law in a way that broadens the control rights to the banks' stakeholders instead of the shareholders solely.

4.2.2 Bank Governance and Financial Stability: Empirical Explorations

Although theoretical and conceptual academic literature has established a direct linkage between bank governance and financial stability[24], the empirical literature on the subject is still scant. While the associations between bank governance and financial performance has been well documented both before (Adams and Mehran, 2008; Andres and Vallelado, 2008; Caprio *et al*., 2003, 2007) and after the GFC (Aebi *et al*., 2012; Beltratti and Stulz, 2009, 2012; Mollah and Zaman, 2015) little has been accomplished so far to empirically test the possible associations and causality effects of sound governance on the insolvency probability of banks mainly in cross-country studies.

One of the first studies that empirically investigated governance and disclosure characteristics' influence on risk shifting in the financial industry before the GFC is by Akhigbe and Martin (2008) who studied changes in the risk shifting behaviour of financial firms after the enactment of the Sarbanes-Oxley law in the US. They used a sample of 768 US financial services firms including banks, savings institutions, insurance companies and securities firms and examine how risk shifted between periods before and after the Sarbanes-Oxley law enactment. They compute the changes in the total risk (that is the variance of stock returns), the unsystematic risk (through the variance of residuals) and the systematic risk (as measured by an OLS estimation of an augmented market model[25]) in the short-term (100 days pre-SOX and post-SOX) and long-term (36 months pre-SOX and post-SOX). The disclosure variables used in their study are the degree of independence of the audit committee, the existence of an independent financial expert in the audit committee and the degree of disclosure through financial footnotes (that is the number of footnote pages scaled by the total number of pages in the 2002 annual report). For governance characteristics, they consider aspects related to the board composition, CEO involvement, board independence, the independence of the nomination committee and the independence of the compensation committee. They also add the proportion of the board members who own stock in the firm as this can signify higher incentives towards investments in riskier activities. Finally, they account for the credibility of the board by looking at the percentage of the board that holds seats on other boards as this feature indicates extensive experience that makes these members to be sought after.

For the CEO characteristics, they construct an index that measures the power of the CEO by summing up the number of high profile roles that the CEO holds such as: being a chairman of

[24] As is also known, such linkage is established from the early papers on agency theory as in (Eisenhardt, 1989b; Jensen and Meckling, 1976).

[25] Details of this model can be found in (Akhigbe and Martin, 2008, p. 2127)

the board, a member in each of the nomination, compensation and audit committees. Akhigbe and Martin (2008) also capture the status of internal and external monitoring by gathering data related to the percentage of managerial and institutional ownership in the firm's capital. Their results show that disclosure and governance are inversely related to the risk shifts: financial institutions with stronger governance and stronger disclosure experience small increases in the short-term risk measures of total risk, systematic and unsystematic risks. Likewise, in the long-term, financial firms with stronger governance and stronger disclosure observe larger decreases in the total and unsystematic risk measures.

Pathan (2009) examines the board and CEO characteristics of 212 US large bank holding companies (BHC) and finds that between 1997 and 2004, strong boards positively affect risk-taking and CEO power negatively affects it in line with theory. While the results are in contrast with Akhigbe and Martin (2008) whose study is limited to year 2002, Pathan (2009) uses the same measures as Akhigbe and Martin (2008) for the three risk variables, however at level instead of in changes. He considers size, independence and less restrictive shareholders as the board characteristics and the CEO power is measured by a dummy for whether s/he chairs the board and if internally hired. Pathan (2009) also adds the percentage of the CEO's shareholding in the BHC as an indication of the alignment of their risk-taking incentives with ones of the shareholders.

Aebi *et al.* (2012) were the first to include the role of risk management in the banks' corporate governance structure to investigate their potential relationship with the banks' performance. They use a sample of 573 banks in North America for which they manually collect most of the corporate governance data for the year 2006 only. Specifically, their risk governance variables are: the presence of a chief risk officer (CRO) in the executive board, their reporting line (whether to the board or the CEO) and the presence of a risk committee at board level. Under risk committee attributes, they look at the number of its meetings during 2006, the number of its directors and the percentage of independent directors. Besides, they use the following as corporate governance variables: the board size, board independence and the percentage of directors with finance expertise. The authors also add attributes for each of these broad corporate governance variables following the methodology of the G-Index developed by Gompers *et al*. (2003). The study is limited to the financial crisis year (set between July 2007 and December 2008) during which the authors find that the reporting line of the CRO, that is when they report directly to the board, plays an important role in enhancing the performance of the bank during the financial crisis. Nonetheless, they do not find any positive association or significant result with respect to the other corporate governance mechanisms on the banks'

performance as measured by the buy-and-hold returns, return on equity (ROE) and return on assets (ROA).

By using bank capitalization as a proxy for the probability of a bank failure at its individual bank level and at the systemic level, Anginer *et al*. (2016) show that banks with shareholder-friendly corporate governance structures tend to be less capitalized than banks who serve less the interests of the shareholders. For the period between 2003 and 2011, the authors use four accounting measures of capitalization, namely Tier 1 capital, total capital (including Tier 1 and Tier 2 divided by risk-weighted assets), common equity and tangible capital ratio and one market-based measure[26].

On corporate governance, Anginer *et al*. (2016) shortlist the following variables: board independence, intermediate board size[27], the separation of roles between the CEO and the chairman, and anti-takeover provisions which is a dummy that equals one if the bank is incorporated in a state (for U.S banks) or country (for non-U. S banks) that permits anti-takeover provisions and if the bank did implement them. The separation of roles between the CEO and the board chairman in addition to the intermediate board size and the absence of anti-takeover provisions are found to be negatively associated with the accounting capitalization proxies. The authors explain that the results could be an indication that when the corporate governance structures favour the interests of the shareholders, the banks maintain low capitalization levels, which implies that they shift their risk exposure to the creditors or to the financial safety net.

In a more recent study, Mollah and Liljeblom (2016) examine the power of the CEO over the bank's risk, profitability and asset quality during the last credit crisis and the subsequent sovereign debt crisis. Using information of 378 banks between 2007 and 2011, the authors assess the CEO power through a set of six dummy variables that they sum up to construct a single metric[28]. The authors find that powerful CEOs enabled banks to perform better during the sovereign debt crisis although they accepted higher insolvency risk (measured by the

[26] Anginer et al., (2016) compute it as follows: the ratio of the market value of the bank's common equity divided by the sum of the book value of total assets and the market value of common equity minus the book value of common equity.

[27] The authors allocate scores between 1 and 3 to this variable, where the highest score 3 is given to a board with an intermediate number of members ranging between 9 and 12.

[28] In their study, the criteria used for the dummy variables are as follows: the CEO-chair duality, if the CEO is internally recruited, the age of the CEO if it is greater than the median age, the CEO's tenure if it is greater than the median tenure, the CEO banking experience if it is greater than the median of the sample and finally the CEO's qualifications if they exceed the median number of qualifications. Additionally, they account for two main board characteristics namely the board size and its share of independent directors.

reciprocal of *z*-score). However, they do not seem to find any effect of strong CEOs on the bank performance (measured by ROA). In addition, they find that board independence enhances both bank performance and solvency.

4.2.3 Islamic Bank Governance and Financial Stability: Empirical Explorations

Empirical research on the assessment of the role of corporate governance in general and of risk governance in particular in promoting the financial stability of Islamic banks is scant. This is despite the high growth rates of this niche industry during the last decade and some evidence showing its resilience to the shocks during the last global financial turmoil. Effectively, figures from The Banker (2016) on the latest global Islamic finance industry size and trends show an impressive growth of the total global *Shari'ah*-compliant assets from $386bn in 2006 to $1440bn in 2016. Data from the same source shows an increase in total assets by 13.7% in 2016 after a first-time drop by 8.48% one year earlier. The total profits of standalone banks increased to $13.68bn in 2016 while they reached $12.53bn in 2015.

Hasan and Dridi (2010) showed that the financial shocks during the GFC did not adversely impact the profitability of Islamic banks in 2008 although their profit levels were higher during the pre-crisis period between 2005 and 2007 and not driven by fierce risk-taking strategies. They contend that the business model peculiar to Islamic banks as well as their adherence to *Shari'ah* principles sheltered them from chaotic losses as they are not allowed to invest in or finance products that harmed significantly their counterparts. Furthermore, they found that the credit and asset growth in Islamic banks were at least twice higher than that in mainstream banks. In terms of external rating by credit ranking agencies, Islamic banks were generally better assessed than conventional banks. While exploring how the differences between the business models of the two banks' types affect the banks' efficiency, asset quality and stability, Beck *et al*. (2013b) find that within countries and years[29], Islamic banks have higher loan-deposit ratios, higher cost-to-income ratios, higher overhead costs but lower non-performing loans and higher capital-asset ratios. In other terms, their findings indicate that Islamic banks have higher intermediation efficiency, lower cost-efficiency and higher capitalization.

In a cross-country empirical study covering a pre-crisis time interval between 1993 and 2004, Čihák and Hesse (2010) were first to explore the role of Islamic banks in financial stability.

[29] (Beck et al., 2013b) use a sample of 510 banks, out of which 88 are Islamic, in 22 countries over the period 1995 to 2009. They add data of 209 listed banks from 21 countries covering the period 2005-2009 to investigate the shocks of the GFC on their market performance.

They use a sample of 77 Islamic banks and 397 commercial banks from 20 countries where both types of banks operate. The authors split their sample into large and small banks to look at any significant differences due to the banks' size. Interestingly, they find that on average Islamic banks' *z*-scores (as a proxy for financial stability) are higher than those of commercial banks suggesting that overall the former is more stable than the latter. Nonetheless, when accounting for size they find that small Islamic banks are more stable than large Islamic banks and that large commercial banks are more stable than large Islamic banks. Čihák and Hesse (2010) explain these findings by the credit risk exposure that increases together with the growing size of the Islamic banks as they start to operate on a larger scale. In other words, the credit risk exposure is not sufficiently accompanied by the adequate risk management tools that consider the idiosyncrasies of Islamic financial products that make them different and more complex to manage. As argued by Abedifar *et al.* (2013) and Aggarwal and Yousef (2000) even debt based Islamic financial contracts are not as straightforward as conventional loan contracts. Furthermore, greater credit risk might stem from the complexity of Islamic loan contracts, limited default penalties and moral hazard induced by profit-and-loss sharing (PLS) contracts (Abedifar *et al.*, 2013). For instance, Islamic banks are not allowed to transfer the ownership of the commodity underlying sale contracts such as *Murabaha* and *Salam* or leasing (*Ijara)* contract, hence they are exposed to both credit and commodity price risks.

Unlike their mainstream counterparts, Islamic banks are restricted from hedging their exposure using derivatives as well as through different types of collateral as part of their compliance with *Shari'ah* principles (Khan and Ahmed, 2001).

Although banking corporate governance features have not been considered in Abedifar *et al*. (2013)'s study, it is worth noting that they examined comparative stability of Islamic and conventional banks. Similar to Čihák and Hesse (2010) they also use the *z*-score to proxy insolvency risk, and in line with their results they find that small Islamic banks are more capitalized and exhibit greater stability than conventional banks. However, they do not find a significant difference in the overall *z*-score difference in mean test between the two types of banks. Abedifar *et al*. (2013) use a large sample of 118 Islamic commercial banks, 81 commercial banks with Islamic windows and 354 conventional commercial banks. The data retrieved covers 24 countries over the period 1999 to 2009. Also, Abedifar *et al*. (2013) empirically find that Islamic banks have lower credit risk than conventional banks which contradicts the conceptual explanation of Čihák and Hesse (2010) as discussed above. In addition, they find that the loan quality, the (implicit) interest income and (implicit) interest expense of Islamic banks are less sensitive to domestic interest rates.

Mollah *et al*. (2016) appears to be the only paper so far that empirically investigates the influence of the governance structure on the risk-taking and performance of both Islamic and conventional banks. Using a sample of 52 Islamic banks and 104 conventional banks in 14 countries throughout 2005 to 2013, the authors construct a composite corporate governance indicator (CGI) based on 12 governance variables, of which seven concern the board characteristics and five address the CEO's determinants. Specifically, they consider the following for the former: the board size, board independence, number of female directors, number of meetings per year, board attendance, number of board committees and the independence of the chairperson. As for the latter, they include the CEO's role duality, if the CEO is internally recruited, the CEO's qualifications, their banking experience and tenure. The dependent variables approximating risk-taking is measured by the log *z*-score and financial performance through return on assets (ROA). The findings suggest that the governance structures in Islamic banks -which reflect their peculiarity in including *Shari'ah*-supervision in addition to the traditional corporate governance mechanisms- tend to be less risk-averse than conventional banks. However, this does not signify that they undergo a higher insolvency exposure as the coefficients of the Islamic dummy variable on the one side and of the CGI on the other side both indicate a positive effect on the log *z*-score although the former is not statistically significant. It is the interaction term between the Islamic dummy and the CGI that is negative and significant at 5% level. The authors explain that such result is not unexpected and is supported by the magnitude and signs of some controlling factors such as the capital adequacy, the deposit insurance, profit volatility, the country-level bank supervision and the inflation rate.

4.3Research Hypotheses & Methodology

4.3.1 Theoretical Background and Research Hypotheses

As has been introduced in Chapter 2, the underlying theories for these studies start from the implications of the capital structure theorem of Modigliani and Miller (1958) and the agency theory Eisenhardt (1989b) on the specific case of banking institutions as financial intermediaries following the contemporary banking theory of Bhattacharya and Thakor (1993). In Modigliani and Miller (1958), the decisions over the proportions of debt and equity in the firm's capital structure are profoundly examined considering the implications these proportions have on the value of the firm and consequently on the returns on equity to shareholders. Specifically, an increasing level of debt through the issuance of corporate bonds for instance is likely to increase the riskiness of the corporation for which shareholders will demand higher

risk premiums. Nonetheless, for managers the hardship dwells in reaching the optimal capital structure where having recourse to debt ensues tax benefits and lowers the weighted average cost of capital (WACC). On the other hand, a larger equity proportion, which is likely to reduce the risk profile of the corporation and therefore increase its credit worthiness, does not offer such advantage as dividends payments are not tax deductible. These implications of the optimal capital structure evoke the divergences between the shareholders as owners of the firm and the executive managers as its agents which form the foundations of the agency theory (Eisenhardt, 1989b). Under agency theory, the differences between the risk preferences of the principals and agents are inspected. Particularly, the principal-agent relationships, which should reflect an efficient organization of the information and the risk-bearing costs, in fact ensues contracting agency problem of moral hazard and adverse selection and risk sharing problems between the shareholders and the firm managers due to their opposite goals. Divergences will therefore reside in compensation packages, leadership and regulation among others. Unsurprisingly, an approach to overcoming such problems suggested the coalignment of incentives between ones of the owners and those of the agents which proved to be an efficient solving mechanism. In the case of financial intermediaries all of the above concerns apply. Nonetheless, in the specific case of deposit-takers more concerns are raised as their funding streams include in addition to the proportions of equity and debt cash deposits and savings from households and corporations. The implications of the assets and liabilities' structure and management are broadened to further economic agents. Specifically, the qualitative asset transformation which bankers use in the management of their assets and liabilities processes risk by altering the attributes of the claims being transacted (Bhattacharya and Thakor, 1993). Two key questions that are consequently explored by Bhattacharya and Thakor (1993) wonder about how banks should be financed considering the riskiness of the liquidity transformation process and how should the regulators address the moral hazard arising from the system of protection to the banks' customers known as the public safety net? Building up on one another, these theoretical explorations ensued propositions from academics and regulators whereby the safety of banks as sensitive financial intermediaries is approached from different angles including: the agency problems that are very specific to their business (Ellis *et al.*, 2014) as well as their funding streams, valuations and risk management mechanisms.

Given the discussion in the previous sections, multiple motivations drive carrying out the present study. First, the linkage between governance and risk-taking behaviour has long been established by the theory (Dewatripont and Tirole, 1994; Fama and Jensen, 1983; Jensen and

Meckling, 1976). Second, the matter is of acute importance in the banking industry where banks act as financial intermediaries, hold public funds and are highly leveraged institutions (Becht *et al*., 2011; Brunnermeier, 2009; Dewatripont *et al*., 2010; Dewatripont and Tirole, 1994; Ellis *et al*., 2014). Third, although prudential recommendations were constantly updated and strived to restrain the risk-taking tendencies of bankers (senior managers and shareholding investors) they proved to be insufficient to prevent the last financial crisis that disrupted the economies globally. Finally, to test the theoretical assertions in addition to the need of accompanying prudential and regulatory authorities in ensuring financial stability, there is a need to enrich the empirical literature that model and test the relationship between the bank-level corporate governance, risk-taking behaviour and banks' exposure to instability that can result in fine in a systemic risk.

With the rationale of these four research interests, this chapter carries out comparative study of Islamic and mainstream banks to explore and compare the results for two distinct banking business models since earlier studies found the former to be more stable and resilient to shocks (Abedifar *et al.*, 2013; Čihák and Hesse, 2010; Hasan and Dridi, 2010; Mollah *et al.*, 2016). As the GFC enabled the detection of the weaknesses in the risk management function, the study will also compare the variations between the pre-and post-crisis periods to assess the contribution of risk governance in promoting financial stability at bank level.

Finally, in contrast with previous studies, this chapter does not limit the measure of financial stability to one proxy. While literature on the subject extensively employs the log *z*-score as a measure of bank insolvency risk (such as Abedifar *et al.*, 2013; Beck *et al*., 2013b; Beltratti and Stulz, 2012; Čihák and Hesse, 2010; Mollah *et al.*, 2016), this study includes three additional indicators of a bank's soundness. Explicitly, after discussing the results from regressions where the *z*-score is the dependent variable, the following regressands are also included: the capital adequacy ratio, the ratio of loan loss reserves to gross loans as well as the ratio of liquid assets to deposits and short-term funding. These three additional indicators are used as proxies for the banks' capital adequacy, the asset quality and liquidity through the deposit run-off ratio respectively.

To fulfil this research aim, the research develops the following hypotheses:

H_{01}: Overall there is no relationship between risk governance and banks financial stability regardless of the banks type.

H_{02}: There is no relationship between risk governance and Islamic banks' financial stability.

H_{03}: There is no relationship between risk governance and banks financial stability in the post-GFC period.

H_{04}: There is no change in the effect of risk governance in Islamic banks on their resilience to shocks, liquidity penuries and higher capitalization after the crisis.

The econometric model set out in equation (4.1) will be used to test H_{01}.

$$FSI_{i,t} = \alpha_0 + \beta_1 FSI_{i,t-1} + \delta RGI_{i,t} + \gamma X_{i,t} + \zeta BK_{i,t} + \theta Z_{i,t} + \beta_2 Islamic\_Dummy + \beta_3 Crisis\_Dummy + \varepsilon_{i,t} \quad (4.1)$$

Where:

$FSI_{i,t}$ stands for the Financial Stability Indicator of bank *i* at time *t*, (four models of FSI used are LnZScore, CAR, LLR_GL and LiqA_DSTF), $FSI_{i,t-1}$ is the first lag value of the financial stability indicator, $RGI_{i,t}$ is the Risk Governance Index for bank *i* at time *t*, $X_{i,t}$ is a matrix of explanatory variables, $BK_{i,t}$ is a matrix of bank specific control variables, $Z_{i,t}$ is a matrix of macroeconomic variables. *Islamic_Dummy* is the dummy variable that permits to account for the distinctiveness of the Islamic banks' business model compared to their conventional counterparts in the four equations as will follow[30]. *Crisis_Dummy* is the dummy variable that permits to distinguish between the years before the inception of the crisis (that is 2006 and 2007) and the period following the inception of the crisis (that is from 2008 to 2012). Finally, α_0 is the constant, $\beta_1, \delta, \gamma, \zeta, \theta, \beta_2$ and β_3 are the vectors of parameter estimates for their respective matrices and ε is the residual term.

Variations of equation (4.1) that are used to test the null hypotheses H_{02} to H_{04} will be introduced further in the results' analysis in section 4.4.

4.3.2 Sample, Data and Explanatory Variables

The same sample introduced in the two previous chapters is used for this empirical study. Specifically, the sample entails 27 conventional banks and 26 full-fledged Islamic banks from the GCC countries excluding Oman since it launched its first Islamic banks until 2013. Data for the period 2006 to 2012 were collected for Saudi Arabia, Kuwait, Qatar, Bahrain and the United Arab Emirates**.** The motivations behind the choice of only full-fledged Islamic banks and not Islamic windows of conventional banks as well as the choice of the GCC region were previously detailed in section 2.4.3 in chapter two.

[30] Please note that in Models 2 and 4, where the focus is on the case of RGI in Islamic banks, an interaction term is incorporated in the models whereby the RGI scores in Islamic banks only acts as an additional variable from which an inference of the effect on every financial performance indicator is drawn.

While data to construct RGI required manual collection from the annual reports, financial statements (including the notes sections) and corporate governance reports, the remaining dependent and explanatory variables used in the econometric models were extracted from BankScope Bureau Van Dijk and the World Bank databases. A description of the data used in the empirical model and the sources are given in Table 4.1.

Table 4.1: Description of Variables used in the Empirical Models

Variables	Definition, Coding and Data Source
Panel A: Dependent Variables	
LnZScore	Natural Logarithm of the *z*-score following the method of (Lepetit and Strobel, 2013)[31] (Data Source: BankScope & Author's Calculations)
CAR	Capital Adequacy Ratio as equal to (Tier1 + Tier 2) divided by Risk Weighted Assets and Off-Balance Sheet risks (Source: BankScope)
LLR_GL	Ratio of Loan Loss Reserves to Gross Loans (Source: BankScope)
LiqA_DSTF	Deposit Run-Off Ratio equal to Liquid Assets divided by Total deposits and short-term funding (Source: BankScope)
Panel B: Explanatory Variables	
RGI	Risk Governance Index developed by author (Source: Annual Reports and corporate governance reports)
Islamic Dummy	Dummy variable that takes the value of 1 when the bank is Islamic and 0 otherwise
Crisis Dummy	Dummy variable that takes the value of 1 when the year of the observation is from the post crisis period (that is 2008 to 2012) and 0 otherwise
Tier1_K	Tier 1 Capital entails shareholder funds plus perpetual non-cumulative preference shares plus disclosed reserves. Financial Data are in USD (Source: BankScope)
C2I	Cost-to-Income Ratio as equal to Operating Expenses divided by Operating Income (Source: BankScope)
NL_TA	Ratio of Net Loans to Total Assets (Source: BankScope)
TEA	Total Earning Assets. concern assets that generate interest or dividends. It includes stocks, bonds, income from rental property, certificates of deposit and other interest or dividend earning accounts or instruments. Financial Data are in USD (Source: BankScope)
Net_Inc	Net Income defined as profit after income taxes and profit/loss from discontinued operations (Source: BankScope)
LnTA	Natural Logarithm of total assets (Source: BankScope)
NIR	Net Interest Revenue (Source: BankScope)
Eq_TA	Leverage ratio as equal to Equity divided by Total Assets (Source: BankScope)
NPL_GL	Non-Performing Loans to Gross Loans (Source: BankScope)
Macroeconomic Control Variables	
lnGDP_Grw	Natural Logarithm of Gross Domestic Product Growth Rate (Source: World Bank Database)
Infl	Inflation rate (Source: World Bank Database)

[31] The method of (Lepetit and Strobel, 2013) is explained in the section

Pol_Stab	Defined by the World Bank as a measure of the "perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism". Estimates ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance. (Source: World Bank Database)
Gov_Eff	Defined by the World Bank as reflecting the "perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies". Estimates ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance. (Source: World Bank Database)
Reg_Qual	Defined by the World Bank as reflecting the "perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development". Estimates ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance. (Source: World Bank Database)

4.3.3 Evaluating the Bank Level Financial Stability

The selection of the four bank-level stability indicators (dependent variables in Table 4.1) is not new and all have been widely used in empirical financial literature. For instance, the *z*-score has been used, among others, in the studies of (Beck *et al.*, 2013a; Creel *et al*., 2015; Laeven and Levine, 2009; Mohsni and Otchere, 2014; Pathan, 2009; Tabak *et al*., n.d.) in conventional finance and in the studies of (Abedifar *et al*., 2013; Ashraf *et al*., 2016; Beck *et al*., 2013b; Mollah *et al*., 2016) in Islamic finance. The *z*-score is a widely used measure for a bank's soundness as it reflects its probability of insolvency. A bank will be insolvent if the numerator (Capital-to-Assets Ratio + ROA) ≤ 0 in the formula:

$$Z \equiv \frac{capital-to-assets\ ratio+\mu ROA}{\sigma ROA} \quad (4.2)$$

Where: μ_{ROA} and σ_{ROA} stand for respectively the mean and the volatility of the ratio of return to assets.

As discussed in Lepetit and Strobel (2013), there are various approaches to calculating the time-varying *z*-score by either using the moving mean and standard deviation on a window width of generally three time periods for each period t $\epsilon\{1,2,\ldots T\}$ or combine the current values of capital-to-assets ratio and of ROA with estimates of the standard deviation of ROA computed over the full sample among other methods. Nonetheless, the alternative approach developed by Lepetit and Strobel (2013) is followed in this chapter. In this method, the mean and standard deviation of the returns on assets are calculated over the full sample then combined to the current values of the capital-to-assets ratio. When tested on a panel of 14658 commercial,

cooperatives and savings banks from the G20 countries over the period 1992 to 2009, Lepetit and Strobel (2013) find that this method showed low levels of intertemporal volatility at each bank's individual level hence eliminates the introduction of spurious volatility in the computation of the *z*-score.

The second dependent variable to use in equation (4.1), introduced in section 4.3.1 above, is the capital adequacy ratio (CAR). CAR is amongst the most important bank regulatory requirements that expresses the amount of capital that deposit-takers hold as a percentage of their risk-weighted assets (BCBS, 2010a). Capital adequacy determines "the degree of robustness of financial institutions to withstand shocks to their balance sheets" (IMF, 2006). It has also been extensively used in empirical literature as a fundamental explanatory variable in financial stability studies such as in (Beck *et al.*, 2013a; Konishi and Yasuda, 2004; Ng and Roychowdhury, 2014; Souza, 2016) or as an outcome variable as in Anginer *et al*.(2016).

The third dependent variable used in equation (4.1) reflects the bank's asset quality. The loan loss reserve to gross loans (LLR_GL) is a ratio that indicates the quality of the entire loan portfolio[32] as assessed by the bank's managers. From an accounting perspective, loan loss reserves reflect predicted cash-flow losses on the loan portfolio (Ng and Roychowdhury, 2014). Therefore, the higher the ratio of loan loss reserves to gross loans, the poorer the quality of the loan portfolio hence the greater the exposure to risk of bank's failure during recession as the value of the bank's assets deteriorates. In their seminal work on the risk and stability of Islamic banks, Abedifar *et al.* (2013) used the ratio of LLR_GL as a proxy for credit risk for a large sample of conventional and Islamic banks (553 banks in total) across 24 countries between 1999 and 2009. In another noteworthy study, Ng and Roychowdhury (2014) explored the influence of loan loss reserves on the risk of bank failure during the recent crisis. More specifically, the authors wanted to find out whether the loan loss reserves serve as a capital buffer against insolvency risk therefore whether they would enhance the capital's quality.

The fourth and final dependent variable to input in equation (4.1) is the ratio of liquid assets to deposits and short-term funds (LiqA_DSTF). This ratio captures the liquidity mismatch between assets and liabilities. It is also called the deposit run-off ratio as it indicates the extent to which deposit-takers can meet the short-term withdrawal of funds without facing liquidity difficulties (IMF, 2006). Effectively, in a stress scenario depositors and savers are very likely to run to banks fearing an early closure of the bank and the sale of illiquid assets. The crucial importance of having sufficient liquidity has been outlined in the reforms of the Basel III

[32] The loan portfolio that includes performing and non-performing loans (Abedifar *et al*., 2013)

accords by the elaboration of the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR) to ensure respectively the availability of a portfolio of contingent liquid assets. The former measures liquidity to cover cash outflows lasting 30 days in a tense context and the later assesses portfolio of permanent assets to finance stable funds including off-balance sheets commitments over a one-year horizon (BCBS, 2010). Similar to Beck *et al.* (2013b), the ratio LiqA_DSTF is used as an additional indicator of bank stability.

4.3.4 The Estimation Method

The econometric model that is set out in section 4.3.1 above is estimated using two-step generalized methods of moments (GMM) with instrumental variables for several reasons. Firstly, considering the nature of the four dependent variables and their interactions with the selected explanatory variables, there is a high probability that past realizations (especially ones at time *t-1*) of the equity to assets ratio and the return on assets that both compose the *z*-score in addition to the past realizations of the CAR, LLR_GL and LiqA_DSTF will influence their values at time *t*. Therefore, the panel data model bears an autoregressive dynamic that needs to be allowed for even if the coefficient of the lagged dependent variable is not of direct interest (Bond, 2002). Secondly, considering the sample size (53 conventional and Islamic banks, 371 maximum bank-year observations) and time interval (seven years) it appears that the context of the study falls within the "large N, small T" which poses a few econometric issues if estimated through static panel models. In fact, Nickell (1981) explains that one problem that arises with one-way fixed effects model concerns the bias in the estimate of the coefficient of the lagged dependent variable. Effectively, the process where the individual's mean value of y and each independent variable X is subtracted from the respective variable is likely to produce correlation between the regressors and the error component. Likewise, in the one-way random effects model, the u_i error component will join every value of y_{it} hence the lagged dependent variable cannot be independent of the composite error term. One solution to this problem is to use first differences transformation of the original model to eliminate the potential bias that arises from time-invariant unobserved heterogeneity.

Thirdly, our model of interest contains predetermined explanatory variables among which some are endogenous, and others are exogenous. Hence, there will be a need to tackle endogeneity by using some variables as instruments (IV-Style).

Given the above issues, it can be deduced that the generalized method of moments (GMM) fits well our process of interest and will enable the obtainment of robust estimators under fewer

assumptions. The Arellano-bond system estimator specifies a system of equations (the original and the transformed) that also allow the introduction of more instruments and increase efficiency. Following Wintoki et al. (2012), I similarly use the system two-step GMM estimator and control for time-invariant unobserved heterogeneity and the dynamic relationship between current values of the explanatory variables and the past values of the dependent variable.

4.4 Results

4.4.1 Descriptive Statistics

Table 4.2 reports the descriptive statistics for all the variables included in the statistical and econometric analysis. The focus variable RGI has 325 observations with a mean of 8.68 across the sample and a standard deviation of 3.54. The financial stability indicators LnZScore, CAR, LLR_GL and LiqA_DSTF used as dependent variables have means of 2.52, 21.08, 3.50 and 36.68 respectively. The explanatory variables, Tier1_K and TEA have means of USD 2.27 million and USD 17.1 million respectively while the Total Assets are on average USD 19.22 million. The ratio of operating expenses as a percentage of operating income (C2I) shows an average of 41.88. The ratio of net loans to total assets -which indicates the proportion of the banks' assets that are tied up in loans- varies between 6.42 and 87.09 and displays an average of 56.71. The NIR is on average 507.71. Also, one of the major indicators of protection in case of a bank's distress is the ratio of equity to total assets (EQ_TA). Ideally, the higher the ratio the better and more protected the bank. The data from our sample shows an average of 16.27. With respect to the ratio of non-performing loans to gross loans (NPL_GL), it can be noted that on average NPL_GL is not very high (4.565) compared to its minimum and maximum values ranging from 0 to 33.28%.

To account for country specific effects, the macroeconomic control variables selected are economic growth (lnGDP_Grw) and the inflation rate (Infl). Table 4.2 shows lnGDP_Grw and Infl have averages of 1.74 and 4.74 respectively. Additionally, three macro-level governance indicators from the World Bank Database are incorporated in the models to account for further differences that may exist among the GCC countries despite the sociocultural and institutional similarities (Abdallah et al., 2015). These stand for the differences in the political stability, government efficiency and regulatory quality The World Bank Indicators have a scale that ranges from -2.5 standing for weakest governance to +2.5 for strongest governance. The results show that the average of political stability for the GCC countries is 0.29, while it is 0.50 and 0.45 for government efficiency and regulatory quality respectively.

Table 4.2: Descriptive Statistics of all Variables

VARIABLES	N	Mean	Std. dev.	Min	Max
z-score	371	20.94	20.06	-2.63	118.5
LnZScore	361	2.52	1.28	-1.61	4.77
CAR	296	21.08	16.34	0.65	204.4
LLR_GL	310	3.50	2.60	0	14.69
LiqA_DSTF	319	36.68	61.91	2.46	944.0
IS_DV	371	0.49	0.50	0	1
Crisis_DV	370	0.71	0.45	0	1
RGI	325	8.68	3.54	0	17
Tier1_K	282	2.27e+06	2.04e+06	42.76	9.44e+06
C2I	351	41.88	29.21	0.22	394.0
TA	325	1.92e+07	1.94e+07	255.98	1.008e+08
lnTA	325	16.21	1.17	12.45	18.43
Net_Inc	325	338.23	459.47	-1.30e+06	2.31e+06
NL_TA	324	56.71	13.81	6.42	87.09
NIR	321	507.71	556.91	-11.17	2.53e+06
EQ_TA	320	16.27	10.25	0.76	98.93
NPL_GL	291	4.56	5.30	0	33.28
TEA	325	1.71e+07	1.72e+07	208.47	9.41e+07
lnGDP_Grw	336	1.74	0.67	0.49	3.26
Infl	371	4.74	4.37	-4.86	15.05
Pol_Stab	371	0.29	0.67	-1.14	1.21
Gov_eff	371	0.50	0.41	-0.320	1.150
Reg_Qual	371	0.45	0.26	-0.060	0.810

LnZScore is the natural logarithm for z-score, CAR is the capital adequacy ratio, LLR_GL is the ratio of loan loss reserves to gross loans, LiqA_DSTF is the ratio of liquid assets to deposits and short-term funding, IS_DV is the Islamic bank dummy variable, Crisis_DV is the crisis period dummy variable, RGI is the risk governance indicator, Tier1_K is Tier 1 capital, C2I is the cost-to-income ratio, TA is total assets, LnTA is the natural logarithm for TA, Net_Inc is net income, NL_TA is the ratio of net loans to total assets, NIR is the net interest revenue, EQ_TA is the ratio of equity to total assets, NPL_GL is the ratio of non-performing loans to gross loans, TEA is total earning assets, LnGDP_Grw is the natural logarithm of GDP growth, Infl is inflation, Pol_Stab is the indicator for political stability, Gov_eff is the indicator for government efficieny and Reg_Qual is the indicator for the regulatory quality.

4.4.2 Risk Governance and Financial Stability: Overall Results and Analysis

As introduced in section 4.3 above, the analysis of the associations between risk governance and financial stability will be carried out for pre-and post-crisis periods and by examining the

role that sound risk governance frameworks might play in enhancing the four indicators of banks' stability.

In this section, the first and second null hypotheses are tested. Technically, the dynamic panel model set out in equation (4.1) is constructed to assess the association between the financial stability indicators, the RGI and the explanatory variables on the overall sample. A second modified model investigates null hypothesis H_{02} (see equation 4.2).

As introduced earlier and to test null hypothesis H_{01}, equation (4.1) is run recursively on LnZScore, CAR, LLR_GL and LiqA_DSTF. The results of the dynamic regression are reported in Table 4.6.

H_{01}: Overall there is no relationship between risk governance and banks financial stability regardless of the banks type.

The statistical results relating to H_{01} for the four measures of stability are reported under Model 1a in Table 4.6. For LnZScore, RGI bears a small yet positive and highly significant effect which signifies that the stronger the risk governance structure in place the lower the probability of insolvency. Specifically, for each unit increase in the RGI, the bank's probability of insolvency declines by 0.018. Mollah et al. (2016) also find a positive coefficient although significant at only 10% level for their corporate governance index on the logarithm of the *z*-score. Nonetheless, the Islamic dummy variable in Model 1a shows a negative coefficient of -0.186 significant at 1% significance level. The negative coefficient clearly shows that bank soundness is relatively lower in Islamic banks compared to their mainstream counterparts. In fact, when conducting a two-sample t-test with equal variance, indeed significant differences between the means of raw *z*-score as well as of LnZScore are found in the two types of banks where more stability is found in the case of conventional ones (see Tables 4.3 and 4.4). This result is similar to Mollah et al. (2016) who also find that conventional banks are more stable than Islamic banks. Nonetheless, Čihák and Hesse (2010) find that the large mainstream banks are financially stronger than the large Islamic banks whereas the small commercial banks are less stable than the small Islamic banks. Beck et al. (2013b) do not find any significant difference in *z*-score results between the two types of banks neither during normal times nor during the GFC.

Table 4.3: Two-sample t-test with equal variance between *z*-score in Conventional & Islamic Banks

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interv.]	
Conv. Banks	189	29.193	1.493	20.525	26.248	32.138
Islamic Banks	182	12.36746	1.149	15.503	10.099	14.635
Combined	371	20.93922	1.041	20.064	18.890	22.987
t-statistic	8.884					
Pr(|T| > |t|)	0.000					

Table 4.4: Two-sample t-test with equal variance LnZScore between Conventional & Islamic Banks

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interv.]	
Conv. Banks	187	3.087	.0651	.891	2.958	3.215
Islamic Banks	174	1.915	.102	1.356	1.712	2.118
Combined	361	2.522	.067	1.280	2.389	2.654
t-statistic	9.767					
Pr(|T|>|t|)	0.000					

The regression on capital adequacy (Model 1b, Table 4.6) also shows the coefficient of RGI (0.238) to be positive and significant at 5% significance level. Therefore, it can be inferred that when the strength of the risk governance structures in place ameliorates Tier 1 and Tier 2 capital and reduce their assets' exposure to credit, market and operational risks. It is worth noting that the crisis dummy variable is negative with a magnitude of -1.885 and is highly significant. This indicates that the crisis caused the depletion of the capital most likely to cover the losses resulting from the GFC. Most of the other statistically significant explanatory variables bear the expected signs such as Tier1_K, C2I and EQ_TA with coefficients of 5.89e-07, -0.0468 and 0.609 respectively.

The effect of RGI on the ratio of LLR_GL (Model 1c, Table 4.6) is negative (-0.0289) but not statistically significant. The Islamic dummy shows a negative and statistically significant parameter estimate of -0.574 indicating that in Islamic banks the quality of the loan portfolio is likely to be better than one of their mainstream counterparts. The effect of the crisis improves the loan portfolio as the coefficient of the dummy variable (-0.514) is significant at 1% level. A possible explanation could be that the inception of the crisis and the resulting instability modified the banks' managers' behaviour to be more cautious in the issuance of loans and being more stringent on delivering these to customers with low credit ratings. The ratio of NL_TA is naturally positive and significant at 5% (0.0169) as a high ratio is a sign of higher exposure to

default which should require more loan loss reserves. Note that the ratio of Eq_TA -0.0384 is significant at 1% level. When the equity ratio increases and is apparently used to finance parts of the assets, managers are likely to be more cautious to safeguard the shareholders' investments by maintaining a satisfactory quality of the bank's loan portfolio hence decreasing the institution's exposure to default from doubtful counterparties. As expected, the ratio of NPL_GL is positive and highly significant. Such situation inevitably necessitates more reserves to cover the expected losses.

The last financial soundness indicator estimated LiqA_DSTF. Ideally, this liquidity ratio needs to be as high as possible to cover liabilities from depositors particularly in the case of a sudden bank run. Model 1d, Table 4.6 shows that overall RGI positively and significantly improves this ratio. Available liquid assets to deposits and short-term funding are likely to increase by 1.27 when the RGI increases by one unit. Nevertheless, the coefficients of two dummy variables IS_DV and Crisis_DV are negative and highly significant. The t-test results from the mean comparison in Table 4.5 shows a statistically significant difference between LiqA_DSTF in Islamic and non-Islamic banks where the mean of the former (47.56) is substantially higher than the latter's (28.37) although Beck et al. (2013b) found no statistically significant difference between means of the ratio in the two bank types. Previous literature suggested that Islamic banks had excess liquidity, at least until the recent crisis, and had more stable funds as they rely heavily on retail deposits (Hasan and Dridi 2010). As for the coefficient of the Crisis_DV, a negative highly significant coefficient signifies that liquid assets are depleted to meet the banks' commitments to their counterparties during the stressed times following the markets turmoil.

In summary, results from the estimations of Model 1 for the overall sample (without distinguishing between the status of RGI in the two banks' types or between pre- and post-crisis periods) indicate that robust risk governance structures promote various aspects of banks' financial stability such as their distance from insolvency, capital adequacy and liquidity profile. The effect of risk governance does not appear to improve the asset quality in this initial model. Nonetheless, the preliminary set of estimations indicate that the effects of the banks business models as well as the crisis cannot be ignored as their estimated coefficients were statistically significant in almost all of the regressions.

Table 4.5: Two-sample t-test with equal variance LiqA_DSTF between Conventional & Islamic Banks

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interv]	
Conv Banks	181	28.375	1.241	16.702	25.926	30.825
Islamic Banks	138	47.565	7.764	91.210	32.212	62.919
combined	319	36.677	3.466	61.908	29.857	43.497
t-statistic	-2.771					
Pr(|T| > |t|)	0.005					

4.4.3 Risk Governance and Financial Stability: Specific Case of Islamic banks

As noted in the previous section, the Islamic dummy variable is statistically significant in the four estimations of Model 1. As some previous literature suggests, Islamic banks showed better resilience to shocks during 2008. Hasan and Dridi (2010) explain that the business model of Islamic banks enabled them to safeguard their profitability and maintain higher credit and asset growth than ones performed by their conventional counterparts. Interestingly, the authors point out that weaknesses in the risk management function in Islamic banks engendered a decline in their profitability later in 2009. Therefore, the interest in this section, as laid out in H_{02}, is to explore the interaction between the risk governance frameworks in place in Islamic banks and examine whether these bore a different impact on the stability indicators. This is done by modifying equation (4.1) by including an interaction term between the RGI and the Islamic dummy variable while keeping all other explanatory variables in the model. The new equation estimated is set out:

$$FSI_{i,t} = \alpha_0 + \beta_1 FSI_{i,t-1} + \delta RGI_{i,t} + \lambda \text{RGI*IS\_DV}_{i,t} + \gamma X_{i,t} + \zeta BK_{i,t} + \theta Z_{i,t} + \beta_2 Islamic\_Dummy + \beta_3 Crisis\_Dummy + \varepsilon_{i,t} \quad (4.2)$$

Table 4.6: Dynamic Panel Two-Step GMM Estimations – Overall Results and Specific Case of Islamic Banks

VARIABLES	**LnZScore** (Model 1a)	**CAR** (Model 1b)	**LLR_GL** (Model 1c)	**LiqA_DSTF** (Model 1d)	**LnZScore** (Model 2a)	**CAR** (Model 2b)	**LLR_GL** (Model 2c)	**LiqA_DSTF** (Model 2d)
L.lnZScore	0.862***				0.868***			
	(0.0218)				(0.0302)			
L.CAR		0.186***				0.186***		
		(0.0219)				(0.0228)		
L.LLR_GL			0.664***				0.640***	
			(0.0357)				(0.0378)	
L.LiqA_DSTF				0.0443***				0.0526***
				(0.00620)				(0.00534)
RGI	0.0181***	0.238**	-0.0289	1.267***	0.0205***	0.377***	-0.0652	1.431***
	(0.00379)	(0.100)	(0.0367)	(0.255)	(0.00436)	(0.122)	(0.0533)	(0.421)
IS_DV	-0.186***	-2.069*	-0.574**	-12.72***	-0.0506	2.057	-0.809*	5.972
	(0.0206)	(1.029)	(0.281)	(2.602)	(0.0933)	(2.562)	(0.444)	(6.562)
Crisis_DV	0.0522	-1.885***	-0.514***	-8.202***	0.0377	-1.743***	-0.612***	-5.885***
	(0.0350)	(0.644)	(0.175)	(1.461)	(0.0393)	(0.574)	(0.152)	(1.757)
RGI*IS_DV					-0.0128	-0.244	0.00285	-1.427**
					(0.0101)	(0.228)	(0.0490)	(0.657)
Tier1_K	-1.44e-08	5.89e-07***			-7.09e-09	5.21e-07***		
	(9.50e-09)	(1.43e-07)			(8.49e-09)	(1.63e-07)		
C2I	-0.364	-0.0468**	0.00759	0.188***	-1.084	-0.0321	0.0120**	0.252***
	(0.874)	(0.0200)	(0.00555)	(0.0443)	(0.992)	(0.0210)	(0.00462)	(0.0665)
NL_TA	0.00415***	-0.000500	0.0169**	-0.406***	0.00320***	-0.0290	0.00257	-0.237**
	(0.000779)	(0.0289)	(0.00805)	(0.0935)	(0.000592)	(0.0364)	(0.0113)	(0.111)
TEA	1.04e-08***			2.64e-07**	7.72e-09***			2.36e-07**
	(1.44e-09)			(1.16e-07)	(1.48e-09)			(1.13e-07)
EQ_TA		0.609***	-0.0384***	0.110		0.599***	-0.0292**	-0.221**
		(0.0670)	(0.0141)	(0.117)		(0.0856)	(0.0123)	(0.0993)
Net_Inc		-2.93e-06***		1.56e-06		-2.78e-06***		5.75e-06**
		(5.86e-07)		(2.37e-06)		(9.54e-07)		(2.72e-06)
LLR_GL		-0.146				-0.0410		
		(0.169)				(0.137)		

NPL_GL		0.156**	0.148***			0.172*	0.171***	
		(0.0721)	(0.0141)			(0.0900)	(0.0114)	
NIR			4.23e-07*				7.55e-07**	
			(2.28e-07)				(3.41e-07)	
lnTA	-0.159***	-0.0387	-0.553***	-12.51***	-0.120***	0.757	-0.714**	-13.50***
	(0.0223)	(0.397)	(0.195)	(2.123)	(0.0198)	(0.512)	(0.269)	(2.465)
Pol_Stab	0.110***	-1.090	-0.217	6.442***	0.114***	0.433	-0.315	4.268**
	(0.0289)	(0.745)	(0.207)	(1.661)	(0.0248)	(0.962)	(0.248)	(1.771)
Gov_eff	-0.0827	3.181**	0.231	-6.695*	-0.0643	0.00295	0.812*	-10.98***
	(0.0567)	(1.561)	(0.364)	(3.490)	(0.0528)	(1.965)	(0.463)	(3.644)
Reg_Qual	0.0727	-2.487	-0.151	6.865	0.0296	1.345	-1.292	19.09**
	(0.0748)	(2.511)	(0.627)	(5.453)	(0.0544)	(3.067)	(0.907)	(7.777)
lnGDP_Grw	-0.0480***	-0.278	-0.242***	0.393	-0.0459***	-0.471**	-0.195***	0.774
	(0.00747)	(0.189)	(0.0603)	(0.622)	(0.00776)	(0.202)	(0.0716)	(0.545)
Infl	0.00189*	0.0382	-0.0522***	0.0584	0.00388***	-0.0129	-0.0395***	-0.0883
	(0.000965)	(0.0432)	(0.0129)	(0.0515)	(0.000827)	(0.0429)	(0.0108)	(0.0724)
Constant	2.509***	8.800	10.45***	237.8***	1.933***	-5.767	14.02***	237.2***
	(0.361)	(7.449)	(3.227)	(31.53)	(0.291)	(9.337)	(4.382)	(36.94)
Arellano-Bond test for (AR1)	0.299	0.006	0.430	0.974	0.307	0.012	0.541	0.601
Arellano-Bond test for (AR2)	0.077	0.713	0.100	0.977	0.082	0.660	0.138	0.669
Hansen J-Statistic	0.992	1.000	1.000	0.997	0.998	1.000	1.000	1.000
Observations	189	177	184	216	189	177	184	216
Number of Bank_ID	48	47	45	51	48	47	45	51

The results from this second set of estimations are reported under Model 2 of Table 4.6. First, it is noticed that the coefficients of RGI in the regressions for LnZScore, CAR, LLR_GL and LiqA_DSTF in Model 2 have similar signs and magnitudes and identical significance levels as in Model 1. This serves as a robustness test of the influence of risk governance on the stability indicators and it is possible to conclude that increase in RGI promotes better protection from insolvency, stronger capital buffers and more liquidity to tackle more efficiently unexpected withdrawals from depositors. The interaction term of RGI*IS_DV in Model 2 however shows that RGI status in Islamic banks does not seem to impact the variations of the LnZScore, CAR, or LLR_GL. The only coefficient that is statistically significant is of RGI*IS_DV on the ratio of LiqA_DSTF. Although the study of Mollah et al. (2016) is on corporate governance rather than risk governance, they find a negative association between the interaction of the Islamic dummy and their corporate governance index and the logarithm of the *z*-score.

From these results, it could be then inferred that the financial instability of Islamic banks is not particularly associated with the strength level of the key risk management mechanisms but could be due to other factors. Specifically, RGI does not play a significant role in maintaining low probability of insolvency as the coefficient -0.0128 is insignificant.

Although previous research show that Islamic banks are more capitalized than conventional banks (Abedifar et al., 2013; Beck et al., 2013b) as well as the present research (see Table A4.2 in Appendix)[33], healthy risk governance practices are not found to be direct causes of their higher capitalization. The coefficient of RGI*IS_DV although negative (-0.244) is insignificant in Model 2b. The estimate of coefficient of the interaction term in the LLR_GL regression (Model 2c) is 0.0028 but not statistically significant indicating that RGI does not affect the asset loan portfolio quality of Islamic banks. Finally, RGI's coefficient on the ratio of LiqA_DSTF is negative (-1.427) and significant at 5% level. While Islamic banks are found to be more liquid than their counterparts (see Table 4.5), this result might indicate that their boards and senior management's decisions with respect to maintaining ample liquidity buffers against run-off risk were not effective translating probably their confidence in the available liquidity levels or the depletion of the liquid assets for other business purposes.

With respect to other independent variables, first it is noticed that the crisis dummy shows a coefficient that is negative and highly significant in models where CAR, LLR_GL and

[33] Table A4.2 in the Appendix shows the results from the t-test mean comparison of CAR between conventional and Islamic banks. The highly significant t-statistic indicates that Islamic banks are more capitalized than their conventional counterparts.

LiqA_DSTF are the outcome variables. The effect of the crisis is expected to cause the depletion of capital to cover unexpected losses. Also, loan loss reserves must have been used to cover the increase in customers defaults and bad loans as a result of the financial panic. The proportion of available liquid assets out of the total deposits and short-term funding was also expected to drop as a result of their conversion to cash to meet the banks' short-term liabilities. The crisis dummy 's coefficient is positive yet statistically insignificant in the LnZScore equation. The ratio of equity to assets shows a positive and highly significant coefficient (0.599) on CAR which translates the anticipated positive association between low leverage and higher capital adequacy which is formed of ordinary shares in Tier 1 capital. The coefficient of EQ_TA is negative and significant on LLR_GL (-0.0292) and on LiqA_DSTF (-0.221).

Similar to Model 1 results, a higher ratio signifies that a larger proportion of assets is not leveraged hence is owned by the bank and its shareholders rather than debtholders. Managers taking such decision are likely to privilege safety of the bank which is also translated in their safe credit loans allocation to maintain healthy asset portfolio with lower exposure to potential defaults from customers. An inverse relationship is noticed between banks' size, that is LnTA, and LnZScore, LLR_GL and LiqA_DSTF. The coefficients are -0.12, -0.71 and -13.5 respectively. Similar to the finding of Čihák and Hesse (2010) an assumption could be that banks in the GCC region get higher exposure to instability with their growing size particularly as it gets more complex to adequately manage their credit risk monitoring system. It is also worth recalling that Laeven et al. (2016) find strong evidence that systemic risk increases with banks' size.

In summary, results from the estimations of Model 2 build-up on the previous analysis by showing that the positive results of RGI promoting more financial stability are more driven by figures of conventional banks rather than Islamic banks. While solid risk governance frameworks and practices are found to be positively associated with the four stability indicators, evidence is not found for this is the case for Islamic banks. Therefore, their distance from insolvency, higher capitalization, asset quality and higher liquidity buffers are due to other factors rather than the risk management and governance mechanisms.

4.4.4 Risk Governance and Financial Stability: A Post-Crisis Analysis on the Overall Sample

In this section, the objective is to test H_{03} whereby the interaction between the risk governance index and the crisis dummy variable represents the focus variable. This is done by including an interaction term between RGI and the crisis dummy and by keeping identical matrices of explanatory variables in the base equation (4.1). Results from the econometric estimations of the modified equation (4.3) are reported in Model 3 of Table 4.7.

$$FSI_{i,t} = \alpha_0 + \beta_1 FSI_{i,t-1} + \delta RGI_{i,t} + \lambda \text{RGI*Crisis\_DV}_{i,t} + \gamma X_{i,t} + \zeta BK_{i,t} + \theta Z_{i,t} + \beta_2 Islamic\_Dummy + \beta_3 Crisis\_Dummy + \varepsilon_{i,t} \quad (4.3)$$

Several differences can be noticed in the Model 3 estimations. First, improvements of RGI in the post-crisis period (RGI*Crisis_DV) are noted to still contribute to the banks' solvency (LnZScore) however to a lower extent as the coefficient 0.027 is positive yet significant at only 10%. It is then inferred that while risk governance plays a substantial role in maintaining a low probability of insolvency (as found in Model 1 and 2), in the years following the crisis its contribution to financial stability remained positive although with a lower magnitude. While standalone RGI shows a positive sign (0.935) and is highly significant in the CAR regression (Model 3b), the interaction between RGI and the crisis dummy variable bears a negative coefficient significant at 10% (-0.799).

The estimations in Model 1 and 2 showed that the crisis dummy had a highly significant negative impact on the total capital ratio which was earlier explained by the depletion of the core capital to cover the unexpected losses from the financial turmoil. As a result of the interaction with RGI, it is noticed that the crisis dummy becomes positive and loses its statistical significance. Similarly, in Model 3c on LLR_GL the coefficient of standalone RGI is negative (-0.118) and highly significant. This result signifies that better risk governance mechanisms enabled the improvement of the loan portfolio quality.

Table 4.7: Dynamic Panel Two-Step GMM Estimations – Post Crisis Analysis

	LnZScore	CAR	LLR_GL	LiqA_DSTF	LnZScore	CAR	LLR_GL	LiqA_DSTF
VARIABLES	(Model 3a)	(Model 3b)	(Model 3c)	(Model 3d)	(Model 4a)	(Model 4b)	(Model 4c)	(Model 4d)
L.lnZScore	0.902***				0.846***			
	(0.0283)				(0.0279)			
L.CAR		0.135***				0.176***		
		(0.0258)				(0.0250)		
L.LLR_GL			0.666***				0.651***	
			(0.0356)				(0.0371)	
L.LiqA_DSTF				0.0558***				0.0331***
				(0.00702)				(0.00731)
RGI	-0.00835	0.935**	-0.118***	0.875	0.0213***	0.253**	-0.0793**	0.997***
	(0.0128)	(0.399)	(0.0391)	(0.650)	(0.00413)	(0.104)	(0.0339)	(0.346)
IS_DV	-0.176***	-1.008	-0.589**	-11.42***	-0.196***	-0.517	-1.028**	-1.159
	(0.0284)	(1.310)	(0.251)	(2.666)	(0.0438)	(1.713)	(0.403)	(3.366)
Crisis_DV	-0.216	6.498	-1.574***	-11.12	0.0479	-2.134***	-0.658***	-7.475***
	(0.145)	(4.582)	(0.546)	(6.893)	(0.0421)	(0.700)	(0.184)	(2.128)
RGI*Crisis_DV	0.0273*	-0.799*	0.0991*	0.417				
	(0.0138)	(0.445)	(0.0500)	(0.642)				
RGI*IS_DV*Crisis_DV					0.00150	0.0150	0.0557	-0.426
					(0.00444)	(0.126)	(0.0361)	(0.311)
Tier1_K	-2.58e-08**	6.26e-07***			-1.04e-08	5.59e-07***		
	(1.12e-08)	(2.13e-07)			(8.60e-09)	(1.37e-07)		
C2I	-1.529**	-0.0455**	0.00896*	0.203***	-0.215	-0.0343*	0.00235	0.260***
	(0.733)	(0.0182)	(0.00493)	(0.0343)	(1.069)	(0.0196)	(0.00624)	(0.0520)
NL_TA	0.00560***	-0.0790**	0.0168**	-0.262**	0.00312***	-0.0372	0.00970	-0.513***
	(0.000881)	(0.0302)	(0.00807)	(0.106)	(0.000836)	(0.0332)	(0.0116)	(0.118)
TEA	8.72e-09***			1.82e-07	8.54e-09***			1.65e-07
	(1.61e-09)			(1.14e-07)	(1.36e-09)			(1.36e-07)
EQ_TA		0.710***	-0.0440***	0.0163		0.618***	-0.0284**	-0.222*
		(0.0810)	(0.00840)	(0.113)		(0.0841)	(0.0117)	(0.114)
Net_Inc		-2.48e-06***		2.53e-06		-2.73e-06***		7.41e-06***
		(5.87e-07)		(2.35e-06)		(6.25e-07)		(2.42e-06)
LLR_GL		-0.00441				-0.0764		

		(0.155)				(0.114)		
NPL_GL		0.175**	0.151***			0.217***	0.155***	
		(0.0714)	(0.0167)			(0.0615)	(0.0167)	
NIR			4.13e-07				3.99e-07	
			(2.49e-07)				(2.66e-07)	
lnTA	-0.106***	-0.135	-0.469**	-11.60***	-0.134***	0.519	-0.485**	-10.08***
	(0.0300)	(0.835)	(0.218)	(2.088)	(0.0166)	(0.577)	(0.216)	(2.242)
Pol_Stab	0.112***	-0.769	-0.317	5.589***	0.107***	-0.0354	-0.397	4.118***
	(0.0336)	(0.871)	(0.289)	(1.731)	(0.0298)	(0.977)	(0.355)	(1.382)
Gov_eff	-0.124*	3.472*	0.428	-6.967*	-0.0292	0.864	0.621	-6.441**
	(0.0619)	(1.902)	(0.548)	(3.524)	(0.0742)	(2.106)	(0.583)	(2.977)
Reg_Qual	0.164**	-3.524	0.0582	12.62**	-0.00919	0.610	-0.510	10.13
	(0.0759)	(2.854)	(0.817)	(5.319)	(0.0868)	(3.079)	(0.894)	(6.059)
lnGDP_Grw	-0.0517***	-0.0162	-0.199**	0.486	-0.0481***	-0.276	-0.232***	0.854
	(0.00856)	(0.255)	(0.0974)	(0.609)	(0.00740)	(0.240)	(0.0857)	(0.520)
Infl	0.00171	0.00561	-0.0460***	0.00851	0.00381***	-0.0166	-0.0526***	-0.0342
	(0.00119)	(0.0426)	(0.0127)	(0.0675)	(0.00135)	(0.0329)	(0.0125)	(0.0681)
Constant	1.777***	5.655	9.761***	216.5***	2.199***	-0.283	10.40***	204.4***
	(0.538)	(11.52)	(3.552)	(30.75)	(0.295)	(10.92)	(3.455)	(37.01)
Arellano-Bond test for (AR1)	0.313	0.021	0.217	0.987	0.297	0.009	0.490	0.587
Arellano-Bond test for (AR2)	0.103	0.864	0.111	0.920	0.048	0.729	0.106	0.491
Hansen J-Statistic	0.995	1.000	1.000	1.000	0.998	1.000	1.000	1.000
Observations	189	177	184	216	189	177	184	216
Number of Bank_ID	48	47	45	51	48	47	45	51

Nonetheless, while the crisis dummy shows a negative and highly significant coefficient (-1.574), the coefficient of risk governance index in a post-crisis period (RGI*Crisis_DV) is positive (0.099) and significant at 10% level. This result is contrary to the initial expectation that immediately after the crisis, better risk governance frameworks would have improved the banks' asset quality as managers became more prudent and cautious on credit ratings and getting more exposed to default risk especially that the crisis dummy was negative and highly significant in all the previous estimations and RGI also was negative although insignificant. Nonetheless, despite the use of two lags for the endogenous variables incorporated in the GMM models, it should be recognized that as the study of risk governance is based on disclosure analysis the effects of the change in policies and strategies reported through disclosures are likely to take time to ensue the expected outcomes in practice.
In Model 3d on the liquidity ratio LiqA_DSTF, both RGI and RGI*Crisis_DV have positive parameter estimates however both are statistically insignificant. While results from Model 1 and 2 showed that the better the risk governance structure the more liquidity the bank holds for unexpected withdrawals, it appears from Model 3 that RGI in a post crisis period did not contribute directly to the reinforcement of the liquidity cushions.

With respect to other explanatory variables, the coefficient of Tier 1 capital holds similar sign, positive and highly significant, and approximate magnitudes on CAR as compared to the results from the previous Models 1 and 2. It is not expected to witness a change on this variable as Tier 1 is a component of the capital ratio's numerator. The equity to assets ratio also enhances capital adequacy through lower leverage, its coefficient (0.71) is positive and significant. The coefficient for bank size (lnTA) is negative and significant in the models where LnZScore, LLR_GL and LiqA_DSTF are the dependent variables but insignificant in the equation of CAR. As has been discussed earlier, previous literature has also found opposite associations between size and various stability measures indicating greater risk of exposure to instability because of growing size (Abedifar et al., 2013; Čihák and Hesse, 2010; Laeven et al., 2016; Mollah et al., 2016). The World Bank political stability proxy shows positive and significant coefficients on LnZScore and LiqA_DSTF (0.112 and 5.589 respectively) indicating that the favourable macro-conditions bear a positive effect on the stability of banks by lowering their probability of insolvency and enabling them to comfortably spare cash convertible assets for future unexpected cash withdrawals. In these two equations similar results are found for improvements in the regulatory quality with coefficients 0.164 and 12.62 being positive and statistically significant in Models 3a and 3d respectively.

4.4.5 Risk Governance and Financial Stability: A Post-Crisis Analysis of Islamic Banks

In this last section, the objective is to test null hypothesis H_{04} whereby it is assumed to find no change in the impact of RGI in Islamic banks immediately after the crisis inception as previous literature demonstrated their higher capitalization, better asset quality and better resilience to liquidity penuries. Nonetheless, considering the statistical significance of the positive relationship between risk governance and financial stability from Models 1, 2 and 3, there is a need to investigate whether the case is similarly valid for Islamic banks. To test H_{04}, the base equation (4.1) is modified by including an interaction term between RGI, the Islamic and the crisis dummy variables. The updated equation is set out:

$$FSI_{i,t} = \alpha_0 + \beta_1 FSI_{i,t-1} + \delta RGI_{i,t} + \lambda \text{RGI*IS\_DV*Crisis\_DV}_{i,t} + \gamma X_{i,t} + \zeta BK_{i,t} + \theta Z_{i,t} + \beta_2 Islamic\_Dummy + \beta_3 Crisis\_Dummy + \varepsilon_{i,t} \quad (4.4)$$

The results from estimations of equation (4.4) are reported under Model 4 in the last four columns of Table 4.7. As a robustness check for standalone RGI, the parameter estimates hold the expected signs and their magnitudes do not vary much compared to the ones from earlier models. Hence, in Model 4a on LnZScore, the risk governance index is found to contribute positively to the banks financial solvency with a coefficient of 0.0213 significant at 1% level. Also, a unit increase in RGI significantly reinforces total capital ratio by 0.253. The coefficient of RGI in Model 4b with CAR (0.253) is positive and significant as was the case in earlier models showing the robustness of the results. Similar to Model 3, the coefficient of RGI on LLR_GL is significantly negative (-0.079) indicating the amelioration of the asset portfolio quality thanks to the inclusion of better risk management governance practices. The last robustness check of the regression of LiqA_DSTF (Model 4d) shows similar results from Model 1 and 2 with a positive and significant RGI coefficient at 1% significance level. Therefore, an enhancement of RGI enables the augmentation of the fraction of reserve assets that can easily be converted to cash to compensate unforeseen withdrawals from depositors.

Nevertheless, the focus variable in this last model that is RGI*IS_DV*Crisis_DV has coefficients that are not statistically significant in the four equations. The estimates 0.001, 0.015, 0.055 and -0.426 do not seem to affect LnZScore, CAR, LLR_GL and LiqA_DSTF respectively. Hence, null hypothesis H_{04} cannot be rejected implying that the changes in RGI in Islamic banks in a post-crisis period are not directly associated with higher financial stability. In fact, and in addition to the positive effect of standalone RGI, LnZScore is more affected by

its past value (one lag of LnZScore), the total earning assets (TEA), the ratio of net loans to total assets (NL_TA) and the country's political stability (Pol_Stab). Capital adequacy ratio is associated naturally with its lag value (L.CAR) and higher Tier 1 capital (Tier 1_K), higher equity to total assets ratio (EQ_TA), lower cost-to-income ratio (C2I), lower net income (Net_Inc). The ratio of LLR_GL is impacted by its levels from previous year and importantly by the ratio of NPL_GL as expected as the higher the non-performing loans the more provisions and reserves are required to cover the expected losses. As found in the previous models too, the crisis had certainly prompted more prudence in the loan issuance policy as the negative and significant coefficient of Crisis_DV (-0.658) indicates lower LLR_GL hence better loan portfolio quality. In terms of liquidity, LiqA_DSTF is tied up positively to its past value in addition to standalone RGI as mentioned above. As expected, NL_TA is negatively associated with LiqA_DSTF as the higher the proportion of assets tied up in loans, the less liquid is the bank and the higher is its exposure to default.

4.4.6 Summary of the Results

The relationship between risk governance and financial stability through the above extended analysis can be summarized as follows. The index translating the strength of the risk management governance mechanisms and practices (RGI) is found to be positively associated with lnZScore indicating higher probability of financial solvency. In the four estimations also, RGI's parameters are always found positive and statistically significant at least at 5% level on CAR translating a good contribution to raising core capital above the minimum regulatory requirements. For asset quality proxied by LLR_GL, the coefficient of RGI is found negative in the four estimations however significant in the last two models at 5% level at least. Finally, RGI is also found to enhance liquidity cushions by holding more of the cash-convertible assets to cover unforeseen withdrawals as its estimates are positive and highly significant in three out of the four estimations above.

While it was expected to find significant contribution of RGI in Islamic banks to improve financial stability as Islamic law sets the limits of risk-taking and the Islamic financial contracts are entrenched in the real economy, evidence suggests that this is not the case. Likewise, in the post-crisis period results do not show any statistical significance of the impact of better risk governance frameworks on any of the four financial stability indicators.

Additionally, in the four models discussed earlier it is noted that the bank size is negatively associated with almost all the financial stability indicators. Effectively, LnTA shows negative

coefficients at 5% significance level (at least) on the models where LnZScore, LLR_GL and LiqA_DSTF are the dependent variables. This finding is consistent with Mollah et al. (2016) although Abedifar et al. (2013) and Beck et al. (2013b) find negative but insignificant estimates of LnTA on the natural logarithm of *z*-score. The opposite relationship supports the substantial analysis of Laeven et al. (2016) who find strong evidence that systemic risk increases along with bank size. As for the country specific effects, the proxy for political stability is positive and significant at 1% level on all the estimations where LnZScore and LiqA_DSTF are the outcome variables. In models with CAR and LLR_GL, its coefficient is never statistically significant. Pol_Stab has values that vary between -2.5 and 2.5 where the higher bound signifies lower probability of political instability. Country-level political stability enables banks to operate in a safer environment where disruptions and shocks from external sources are minimal. It is therefore expected to find positive associations between higher values of Pol_Stab and lower probability of banks' insolvency as well as more liquidity available for withdrawals from depositors. Among other country-specific control variables, LnGDP_Grw is found to be negative whenever statistically significant. Specifically, the natural logarithm of economic growth is negatively associated with LnZScore and LLR_GL in models 1 and 3 while it is with LnZScore, CAR and LLR_GL in Model 2 and again only with LnZScore and LLR_GL in model 4. This can be explained by the need for more credit and loans in times of economic expansion which also ensues a higher probability of default. Abedifar et al. (2013) and Ghosh (2015) also find statistically significant negative relationship between GDP per capita and logarithm of *z*-score on the one hand and real GDP and non-performing loans the other hand.

4.4.7 Robustness Tests

The encouraging results of RGI on the selected financial soundness proxies have been supported throughout the four stages of the analysis as explained in the results summary section hence are robust in the four estimations. Also, and as part of the postestimation analysis, the Arellano-Bond tests for the first and second order serial autocorrelation in the first-differenced residuals are reported. The residuals of the differenced equation should possess serial correlation, however considering that the original errors are serially independent, the test on the differenced residuals will not exhibit significant AR (2) behaviour. The AR (2) result is of substantial importance to us as failing to reject its null hypothesis of no serial autocorrelation will indicate that the second lags of the endogenous variables are appropriate instruments for their current values (Baum, 2010). With the exception of LnZScore in Model 4, where the p-

value is close to 5% (0.048), the Arellano-Bond test for AR (2) all other equations show p-values that are higher than the 5% threshold hence the appropriateness of the second lags of our endogenous variables used as instruments effectively holds.

A further diagnostic test concerns the validity of the overidentifying restrictions in the two-step GMM model. The Hansen J-statistic is favoured to Sargan test of overidentified restrictions because the latter is not robust although not weakened by many instruments while the former is robust although weakened by many instruments. Furthermore, and as is known when implementing instrumental variables, having an overidentified model is not an undesirable econometric issue as much as would be the case of an under-identified model. Finally, the Hansen J-Statistic is a postestimation test of special interest to two-step GMM estimations as it is only valid when the weighting matrix is optimal, which means that it equals the inverse of the covariance matrix of the moment conditions (Hall, 2005). As all this chapter's equations are estimated through two-step GMM method, results of the Hansen J-Statistic for each equation are reported immediately after AR (2). In the eight columns of results in Table 4.6 and the eight columns of results in Table 4.7, the p-value for the J-statistic is usually above 0.99 hence never significant. Consequently, I fail to reject the null hypothesis of the Hansen test which posits that the over-identifying restrictions are valid.

4.5 Conclusion

Considering the penury of empirical explorations on the substantial role that risk management governance might play in promoting banks' financial stability, the objective of this chapter is to contribute to the scarce literature by using the newly developed risk governance index 'RGI' to evaluate the possible associations between sound risk governance and bank's financial health. In contrast with many academic papers, this research does not limit financial soundness to one indicator however extends the investigation to further key features of banks' status. In addition to the log *z*-score which conveys the distance from insolvency, capital adequacy, asset quality and deposits run-off ratio are used recursively as proxies for financial stability.

Furthermore, the analysis was enriched by using a sample encompassing data from 53 conventional and Islamic banks in five GCC countries. The robust estimations from two-step system GMM suggest that risk governance significantly contributes to the enhancement of key financial stability measures. Specifically, improvements in the scores of RGI engender lower risk of insolvency, higher capital adequacy ratios, better loan portfolio quality and higher proportion of liquid assets to deposits and short-term funding to cover unanticipated bank runs. In the post-crisis period, results indicate that better risk governance frameworks lower the

probability of bank insolvency. As for Islamic banks, RGI is not found to significantly affect their financial stability neither before nor after the global financial crisis. It is important to note though that these results are subject to the peculiarities of the oil-exporting countries of the GCC region where until 2006, the corporate governance reforms were recognized by Hawkamah and IIF (2006) to be far from meeting the expectations of international investors. Factors such as globalization and sharp corrections of some of the GCC stock markets happening in the beginning of year 2006 are thought to have created a more favourable environment to implement changes in the corporate governance frameworks and practices. Furthermore, the legislation on corporate governance has essentially centred on the improvement of practices and behaviour, integrating the management of business with the cultural tenets of the region as well as the commitment of the board and the senior management to the success of the organization (Ghosh, 2018).

Chapter Five

Conclusion

Risk governance in banking institutions has gained importance after financial authorities and international regulatory bodies uncovered the weaknesses that contributed to the massive losses during the global financial crisis of 2007-2008. The Basel Committee on Banking Supervision and the national regulators now consider corporate governance as whole and risk governance in particular as a key factor that can contribute to the prevention of excessive risk-taking behaviour of bank managers to enhance the profitability of the shareholders and theirs as well[34]. As Stulz (2014) puts it, from the equity holders' perspective 'better risk management' cannot mean risk management that reduces exposure to risk since reducing risk would also mean avoiding valuable investments. Consequently, banks have private incentive structures that are more performance and cost-benefit oriented. In contrast, regulatory authorities are more concerned about the stability and soundness of individual financial institutions and the overall financial sector that are both crucial to protect the interests of all stakeholders including depositors and bondholders. Financial authorities are very much concerned about systemic risks whereby shocks from the financial sphere spread to the economy at large as experienced in 2008. Regulators have therefore incentive structures that are more public and socially oriented. The main aim of this thesis was to explore whether and how the governance of risks in banks contributes to performance and stability. This last chapter synthesizes the results and answers to the research questions that were set out in the introduction chapter and that were examined in three empirical essays. It discusses how this research contributes to the existing body of knowledge and provides reflections on the policy implications of the three studies. The chapter concludes by presenting the limitations of the research and suggestions for future research development.

5.1Synthesis of Results

The objective of the first empirical essay was first to come out with a metric that can facilitate the assessment of the risk governance architectures in each bank in the sample and then to use this metric, namely the risk governance index 'RGI', to compare the robustness of these risk governance frameworks between Islamic and conventional banks and evolution from the pre- to post-GFC periods. Therefore, the answers to the first and second research questions confirm the postulated assumptions that the risk management governance mechanisms were strengthened after the GFC and that significant differences existed between the two banks' type.

[34] This refers to the alignment of the managers' compensation with the interests of the shareholders to overcome the known agency conflicts (Ellis *et al.*, 2014).

In fact, Islamic banks were found to have lower RGI scores with means that were significantly lower than those of conventional banks.

In the second essay, the main objective was to look at whether there is any effect of risk governance on the banks financial performance. The preliminary results (for research question 4) for the overall sample showed that as RGI increases, returns on average assets and returns on average equity decreased. The operational efficiency nevertheless improved with higher RGI. At this initial stage of the analysis, it could have been assumed that better risk governance frameworks induce lower risk tolerance hence lower inclination towards excessively risky investments and more constraining loan allocation policies to limit customers' defaults. Nonetheless, when looking at the particular case of Islamic banks through the interaction between RGI and the Islamic dummy, it appears that the preliminary findings (negative impact of RGI on ROAA and ROAE) are driven by the Islamic banks data because RGI shows a different relationship with the performance of conventional banks (positive impact of RGI on ROAA and ROAE as shown in Table 3.3). The contrasting results now clearly indicate that the more the conventional banks comply with the regulators and the academics recommendations in improving their risk management and governance practices the more profitable they become. In Islamic banks however there seems to be a failure from the risk governance mechanisms in place to properly adjust the riskiness of their specific financial products to increase their profitability. In fact, this could be an indication that the peculiarities of some Islamic financial contracts that are by nature riskier for the banks, such as *Mudaraba* and *Musharaka* partnership contracts, are side-lined to the detriment of higher profitability. As is commonly known by Islamic bankers and Islamic banking academics, the proportion of profit-and-loss sharing contracts is meagre in the total financing offered by Islamic banks. As reported by Alandejani and Asutay (2017) in 2011 the percentage of PLS instruments in the total Islamic financing varies between 0.6% in Saudi Arabia and 9.9% in the UAE. While these equity products are riskier, they are nonetheless expected to generate higher returns for Islamic banks and boost their financial performance. A reluctance in engaging in them more aggressively is likely to translate their weak risk management function. Such assumption is also based on the conclusions reached by Hasan and Dridi (2010) when comparing the effects of the GFC on the performance of conventional and Islamic banks.

As per the GFC effect on RGI, knowing that risk governance structures significantly improved after the crisis, they do not hold any statistically significant influence neither on the two

profitability measures nor on the operational efficiency proxy (research question 6). In the specific case of Islamic banks and after the GFC, the improvement in RGI is noticed to ameliorate the returns on average assets as well as the operational efficiency which is measured by the cost-to-income ratio (research question 7).

In the third essay, the main objective was to look at whether there is any effect of risk governance on various aspects of the banks' individual financial stability. The preliminary results that concern the overall sample show that enhanced risk governance permit (i) a reduction in the exposure to insolvency which was proxied by the commonly used *z*-score, (ii) an improvement of the capital adequacy ratio and (iii) an enhancement of the liquidity profile by the provision of higher levels of cash-convertible assets to withstand unexpected bank runs (research question 8). Nonetheless, while these results are true for conventional banks, it is found that the structure of risk governance in Islamic banks does not play a significant role in promoting more of their stability (research questions 9 and 11). This finding is in contrast with the postulated expectation that there will likely be a significant contribution of RGI in Islamic banks to improve financial stability as Islamic law sets the limits of risk-taking and the Islamic financial contracts are entrenched in the real economy.

5.2 Contribution of the thesis to the existing body of knowledge

This thesis builds up on the scarce empirical academic literature that investigated the relationship between features related to risk management governance and banks' financial performance which is limited to the works of Aebi et al. (2012); Battaglia and Gallo (2015); Ellul and Yerramilli (2013). In addition, this research is the first to explore the relationship between risk governance and financial stability regardless of the banks' type. While the nexus between bank governance and risk-taking behaviour has been established by the theory (Fama and Jensen, 1983; Jensen and Meckling, 1976), the empirical explorations are richer when it comes to discussing the banks' performance with features of corporate governance such as the role of the board of directors, the importance of the board committees and the CEO power through their remuneration schemes among others. Considering the critical importance of sound risk management decisions and their implementation to the soundness of the financial system and the prevention of a systemic risk, it is of a pressing need from the academia and the financial regulators to identify, explore ex-ante and continuously monitor ex-post the robustness of the risk management mechanisms that enable banks to achieve their essential role in the economy as financial intermediaries first and contribute to the growth of the real economy without compromising their individual stability and business objectives.

In addition to filling this gap, this thesis contributes to the body of knowledge by exploring the link between risk governance and performance in a different geographical area that is the GCC region, hence building on the previous studies performed on banks in North America (Aebi et al., 2012), bank holding companies in the U.S (Ellul and Yerramilli, 2013) and Chinese and Indian markets (Battaglia and Gallo, 2015). A convergence is found between the results from these three first studies on risk management governance and ones of the present thesis. Specifically, for conventional banks in the GCC better risk governance structures are found to increase return on average assets and improve operational efficiency. In the North American market, Aebi et al. (2012) find that one proxy of sound risk governance that is the direct reporting line of the CRO to the BOD induces higher ROE and higher buy-and-hold stock returns. In the U.S market, Ellul and Yerramilli (2013) find that bank holding companies that display stronger risk management index (RMI) have higher returns on assets and lower tail risks. This study is the only one that tackles the relationship between risk management organizational frameworks and both financial performance and financial stability indicators. Hence, results from the empirical work in Chapter 4 also relate to the findings of Ellul and Yerramilli (2013). Lastly, in the Chinese and Indian markets, Battaglia and Gallo, (2015) find that the risk governance proxy of the size of risk committee is positively related to the returns on assets and the returns on equity.

Furthermore, the three essays that compose this thesis are the first to include Islamic banks in their empirical and comparative investigations on the subject of risk governance. While studies on corporate governance in Islamic banks exist, the exploration of the status of risk governance within their overall governance architectures has not been performed yet. The inclusion of Islamic banks in a comparative study with conventional counterparts operating in the same region is motivated by (i) the need to probe whether the boundaries that are set out by *Shari'ah* to monitor the risk-taking behaviour, through the presence of a *Shari'ah* Supervisory Board, either in partnership investments or in consumer financing result in stronger and healthier risk management practices and whether these promote higher financial performance and enhanced stability. Note that the compliance with *Shari'ah* and hence the presence of a *Shari'ah* Supervisory Board is the main feature that distinguishes Islamic from conventional banking business models and that it is therefore what produces differences in the assets and liabilities structure and risk management of their balance sheets. As they follow Islamic moral principles, Islamic banks are also expected to widen the scope of their responsibility to encompass the observance of the interests of stakeholders and not only ones of the shareholders. These moral

principles are reflected in the Islamic corporate governance through the principles that govern business ethics, the motivations for transparency and disclosures from a religious perspective as well the guidance on the process of elaboration of decision-making and the importance of accountability in Islam (Abu-Tapanjeh, 2009). The role of the SSB is also expected to substantiate the corporate governance frameworks in Islamic banks by these Islamic corporate governance norms. Nonetheless, results from the empirical work led in this thesis do not valid these assumptions. Despite the importance of risk or the concept of *gharar* in Islamic financial and commercial transactions for which the *Shari'ah* scholars that sit in the SSB are expected to set the boundaries between the permissible and prohibited to allow Islamic banks to serve their communities and likewise generate profitability, it appears that their strategic organizational structures -which include the SSB- do not foster robust risk management mechanisms that can enable the achievement of these targets. In addition, the inclusion of Islamic banks in this thesis is also motivated by (ii) the need to explore whether the choice and establishment of sound risk management governance structures contributed to their higher stability as the study of Hasan and Dridi (2010) was first to demonstrate in the troubled times that followed the GFC. The results from Chapters 2 and 4 show that first risk governance structures in Islamic banks are weaker than the conventional counterparts that operate in the same jurisdictions and second that there is no association between their risk governance frameworks and the financial stability measures of insolvency likelihood, capital adequacy, asset quality and liquidity profile. It is important to note as well that the GCC region counts the highest number of Islamic financial institutions that experienced the largest asset growth in the decade between 2006 and 2016 (The Banker, 2016) and is one of the 14 jurisdictions where Islamic banks are considered as systemically important financial institutions. This further explains the rationale behind choosing the GCC as the geographical region for this empirical research.

From a theoretical perspective, the contributions of this thesis dwell in the exploration of the bank governance mechanisms that enable them to operate under the unique challenges of their position as financial intermediaries. Maturity transformation, liquidity risks and balance sheets opacity together pose a concern for the banks' shareholders, depositors, debtholders and taxpayers at large (Becht et al., 2011). These concerns portray the implications on corporate governance and considering the post-crisis conjuncture the implications are essentially on the governance of risk management within the overall corporate governance frameworks and at the highest organizational levels. By using advanced econometric methods through the application of the two-step system generalized method of moments, the linkages between the governance

of risk and financial performance on the one hand and the governance of risk and bank-level financial stability have been explored with various robustness tests. On the side of practice, the contributions of this research add to the previous empirical literature that has shown evidence for the positive effects that sound corporate and risk governance mechanisms can have on enhancing the performance of banking corporations and contribute to their individual level financial stability. These mechanisms pertain mainly to adequate size of the banks' board of directors, higher degrees of its independence, higher degrees of independence of the audit and risk committees, frequent committee meetings, direct reporting lines of the CRO to the board and of the internal audit to the audit committee, enhanced awareness about the stature of the CRO and of the internal audit function among a few others.

5.3Reflections on the Policy Implications of the Research

The findings of this research bear important policy implications for the international and national regulatory authorities and also for the banking institutions. For the international standard setting organizations such as Basel Committee on Banking Supervision, Islamic Financial Services Board, the Financial Stability Board and the Organization for Economic Co-operation and Development, this research provides with results from empirical investigations on the application of their recommendations and guidelines to establish and maintain risk management governance structures that are expected to better contain the excessive risk-taking for the sake of higher profitability. This research provides evidence that the inclusion of more independent directors in the board and its audit and risk committees, maintaining a sufficient number of board and committee meetings to report and discuss internal risk management issues, the separation of roles between the CEO and the chairman, empowering the CRO through a direct reporting line to the board and separating their role from the CFO's in addition to other attributes for the internal audit function prove to bring about more financial stability in the financial institutions and also enable more profitability. Furthermore, this research also provides these international bodies with a composite indicator that they can use to evaluate the strength of the risk governance frameworks in all jurisdictions and issue specific recommendations to under-performing banks in order to take proactive actions and avoid weaknesses that can lead to severe consequences. These policy implications concern the national regulatory authorities for the banking sector and the capital markets.

For banking institutions, the analyses of results from the regressions shed light on the scepticism that some bank managers and shareholders might have with respect to complying with the above-mentioned governance rules and that do not seem at first sight to be shareholder-friendly.

In conventional banks, the results showed a positive association between strengthened risk governance frameworks and higher return on average equity and higher return on average assets. Therefore, putting in place sound risk governance mechanisms signifies elaborating a better risk identification strategy and performing a better evaluation of risks underlying the trading and banking book activities without necessarily increasing the banks' exposure to default, insolvency or liquidity penuries that engender severely negative consequences in the long run.

In Islamic banks however, there are different policy implications as the econometric estimations showed different results in both the financial performance and financial stability studies. Firstly, Islamic banks need to increase efforts to improve their risk management functions and governance mechanisms as their risk governance structures showed lower scores compared to their conventional counterparts. This recommendation is similar to that of Khan and Ahmed (2001) in their comprehensive analysis of the risk management issues and challenges that are specific to Islamic banks. The same recommendation has been reiterated by Hasan and Dridi (2010) almost two years after the GFC. Managing risks in Islamic banks is known to be cumbersome and complex as they face in addition to 'common risks' similarly incurred by their conventional counterparts a few more 'specific risks' that are due to their unique business model and the idiosyncrasies of their assets and liabilities structure (Khan and Ahmed, 2001). Risk management in Islamic banking institutions is also more challenging as they are faced with two additional boundaries from Islamic law that avert them from using conventional hedging products and completely transferring risks to third parties.

Despite these multiple difficulties, Islamic banks cannot ignore the importance of improving their risk management systems to the exigencies of a post-crisis era. In fact, as the results from the second and third essays show, risk management structures in Islamic banks fail to enable them to achieve higher profitability from their distinctive business model and do not seem to directly contribute to their stability which is normally expected. As mentioned above (and in larger details in chapter three), the inability of sound risk management to yield higher profitability could be an indication that the peculiarities of some Islamic financial contracts that are by nature riskier for the banks, such as *Mudaraba* and *Musharaka* partnership contracts, are side-lined probably due to a higher risk aversion from the strategic decision-makers such as shareholders or senior bank managers. These profit and loss sharing partnerships are sadly benched to the detriment of potentially higher profitability and the fulfilment of the genuine moral principles underpinning Islamic banking (Asutay, 2010).

One brief and last implication for Islamic banks concerns the quality of their disclosures. Throughout the data collection process that involved thorough reading of the annual reports and financial statements, it was noticed that conventional banks produce reports that are richer with more detailed information about, *inter alia*, their strategic management, compliance with national and international regulations and a section dedicated to risk management policies, and internal methodologies. As part of the compliance with Pillar 3 of the Basel accords which compliments Pillars I and II (BCBS, 2009), Islamic banks need to improve the quality of their disclosures on risk exposures and risk assessment processes. Furthermore, as part of the compliance with the spirit of *Shari'ah* that underpins its business model, Islamic banks need to be more transparent about how they carry their financial intermediation business and how they protect the interests of direct and indirect stakeholders. The ethics of being transparent and accountable include but are not limited to how they manage their relationship with their depositors (investment account holders), how they set their risk tolerance levels, how they manage all types of risks and the safety plans they elaborate to withstand external shocks.

5.4Limitations of the Study and Scope for Future Research Development

The contributions of this research and its significance introduced in chapter one come along with some limitations that leave some leeway to future developments. One important limitation to the empirical studies is the nonexistence of a database that provides corporate and risk governance data for the GCC market. Unlike the U.S or Europe for which governance data is available on RiskMetrics, CompuStat, SEC Edgar, DataStream and Bloomberg among other databases, the principal hindrance to performing empirical work in the GCC market using advanced econometric methods dwells essentially on the data unavailability. Furthermore, even when primary sources exist (such as accessibility to all required annual reports and financial statements) then the length of the historical data is unlikely to be long enough as the required information will need to be manually collected. The fastidious data collection used in this research consisted of a thorough reading and detailed information extraction from 325 annual reports and financial statements. This process of constructing a database tailored to the needs of this research lasted eight months. As a way of comparison with the invested effort in previous studies on the same topic, Aebi et al. (2012) consider a time scope limited to the crisis years of 2007 and 2008. Using the SEC Edgar's database, they hand-collect five corporate governance variables for the years 2006 and 2007 only and five risk governance variables for 86 banks for which the G-index of Gompers et al. (2003) is available (Aebi et al., 2012, pp. 3216–3217). Nonetheless, on the number of risk committee meetings they gather data for year 2006 only. As

their study covers North American banks, they also use corporate governance data from other available databases. Ellul and Yerramilli (2013) acknowledge the arduous effort in hand-collecting data, they therefore use risk management governance variables from 72 U.S largest banks out of the 5000 BHCs that existed by the end of 2007 between years 1995 and 2009 as only publicly-listed BHCs file the 10-K annual statements with the SEC (Ellul and Yerramilli, 2013, pp. 1764–1765). In Hines and Peter (2015), the focus variable that is the existence or the formation of the 'risk management committee' is binary. The authors collected the remaining data for their analysis from 47 financial institutions between years 1994 and 2008. Finally, Battaglia and Gallo (2015) limit the time frame of their study to the years 2007 to 2011 for all the publicly listed Chinese and Indian banks, that is 15 and 21 banking institutions respectively. The authors manually collect corporate governance data however for year 2007 only which means that a total of 36 reports were required.

If the hindrance of the unavailability of a dedicated database to corporate and risk governance data is overcome, not only more bank-year observations can be included but a wider geographical area can also be covered. In the context of this research, Southeast Asian countries where dual banking systems coexist could have been added to increase the sample size and provide a larger cross-country analysis. Countries like Malaysia, Indonesia or Brunei Darussalam have legislation infrastructures that are more proactive in supporting and developing the Islamic finance industry since the 1980s (Grais and Pellegrini, 2006; Wardhany and Arshad, 2012). In contrast with the GCC countries, Malaysia has for instance a centralised *Shari'ah* governance model where the *Shari'ah* supervision operates at a macro level within the Central Bank or the regulatory bodies and with the objective of harmonizing the standardization of legal opinions (fatwas) (Hamza, 2013). Therefore, if the difficulty of manual data collection under strict deadlines was not an issue, a further contribution could have been the examination of the impact of different regulative environment and public policy on the performance and financial stability of Islamic banks in different jurisdictions.

It is worth noting that extending the time frame to very recent dates, 2016 data for instance, is likely to bring new insights on the developments made so far in enhancing the corporate and risk governance frameworks in banks inside and outside the GCC region as banks should have gained more awareness on the necessity of complying with the guidelines set out by the national and international regulators. It should be acknowledged that while most GCC banks mandated their Central Banks to comply with the Basel I and II requirements (and the representatives of the majority of these Central Banks confirmed the compliance of their banks with the Basel II

requirements on corporate governance (Hawkamah and IIF, 2006)), there are some realities of the GCC economies that impeded a faster development and embeddedness of corporate governance in the common practice. For instance, the ample liquidity due to the high oil prices in the region had an adverse influence on the development of corporate governance practices within listed companies as required from international investors. Furthermore, the easy access to capital relieved the need for public offerings in the equity market where valuation of the companies presupposes transparency, greater disclosure and increased regulation (Hawkamah and IIF, 2006). Also, the high reliance on bank-financing in the GCC economies combined with the abundant liquidity conjuncture ensued aggressive competition between banks in these markets whereby they alleviated stringent lending conditions to increase their market shares. It should be noted also that there is also a culture in the GCC whereby banks allocate loans to state-owned companies or to several important companies because they are owned by prominent families with political ties (Hawkamah and IIF, 2006). Such conduct impeded therefore the emergence and development of the culture of sound corporate governance practices in the financial markets. It is then acknowledged that these cultural aspects present a limitation to the study in the sense that their corporate governance culture is not entrenched to a sufficiently mature level where its impact and contributions to financial performance and financial stability can be explored. Nonetheless, one of the most important and impactful objectives of academic research is to perform investigations and explorations accompanied by robust statistical analyses to document, orientate, inform and raise the awareness of policy-makers and regulators on topics of high importance to the stability of their financial system and to the development of the economies they govern.

A second limitation of this research dwells in the unbalanced structure of the dataset. For certain years, the data category for either RGI or some other bank level control variables were randomly missing. For the variable RGI, these missing observations were at some occasions due to the unavailability of the entire annual report or financial statement or sometimes because the bank was established after 2006 such as Emirates NBD Bank, AJMAN Bank and Al Hilal Bank in the United Arab Emirates, Al INMA Bank and Al Jazira Bank in Saudi Arabia, WARBA Bank in Kuwait and BARWA Bank in Qatar. For some other secondary data, there were also random missing values in the data source BankScope Van Dijk. While the statistical software used, namely STATA, has procedures to handle the missing values in longitudinal panels, from an econometrics perspective it is preferable to make estimations from balanced panels to avoid any loss of efficiency. Therefore, if all banks in the GCC countries make their annual reports

available to the public and share complete historical datasets of their financial and accounting ratios with data providers such as BankScope, DataStream, Zawya or Bloomberg, this limitation can be overcome.

Another limitation of this research which can further improve the RGI is to consider more risk governance attributes. For the purpose of this thesis, the choice of the items that compose the index was drawn from previous academic and financial regulatory literature. The selection of items was therefore driven by how the literature evaluates and explains the key importance of each determinant. As all of these items required manual extraction to constitute the database, the number of items had to remain fairly manageable and the items very likely to be found in the annual statements of banks. For instance, the expertise in the financial services measured through the educational degrees and/or the number of years gained through practical experience is a valuable determinant that can be included in the composition of RGI. Although it features in the financial regulators guidelines (BCBS, 2015a; FSB, 2013a), this information is very hard to get in the reports of banks from the GCC countries. For instance, while reading the banks' financial documents to collect corporate and risk governance data, the educational background and exact number of years gained in financial professional experience was seldom mentioned for board members and, never stated for the chief risk officer and / or the head of internal audit. Therefore, including such items would not have been meaningful as most of the observations will be missing and there will be very little, if any, variation throughout the study's time interval. The composition of RGI can also be further enriched by the inclusion of information related to the senior managers' compensation schemes especially when it indicates their alignment with ones of the shareholders. Examples of possible data include but are not limited to the range or changes in the base salary, the existence or absence of short-term remuneration, and overcompensation. This can provide indications on the risk-taking behaviour of the banks when their shareholders permit remuneration policies for senior management that converge towards their private interests. This type of data is also not available for banks in the selected GCC countries between the years of the study that is 2006 to 2012 neither on their annual reports nor in a dedicated database.

Also, for Islamic banks more particularly, the risk governance indicator can be enhanced by the inclusion of determinants that are specific to the *Shari'ah* Supervisory Board (SSB), the Internal *Shari'ah* Compliance Units (ISCU) and the Internal *Shari'ah* Review Units (ISRU) all of which ensure that the Islamic banks' operations, financial instruments and risk management instruments do not contain forbidden elements of *riba*, excessive *gharar*, and that they are

compliant with Islamic law. For the SSB for instance, attributes such as their size, the number of Islamic banks' boards where they sit to measure their credibility (such as the higher this number the higher their credibility as it indicates that these scholars are sought after), the number of years of experience they have, their level of education, their presence in the risk and audit committees can be included among others. For both the ISRU and the ISCU, it will be interesting to look at their reporting line, their level of independence from other business units, the stature of their chairs and the presence of their chairs in risk and audit committees at the board level.

Appendices

Table A2.1: Islamic financial contracts Definitions

Islamic Financial Contract	Definition
Qard Al-Hassan	A benevolent loan of funds (or fungible commodities) without any real interest (or excess in quality or quantity). It is the only risk-free asset in Islam (Ebrahim, 1999).
Murabaha	Instrument used for financing consumer durables, real estate and in the industry for purchasing raw materials, machinery or equipment through cost-plus (Ebrahim, 1999; Siddiqui, 2008)
Mudaraba	Mode of financing where the Rab Al-Mal (the capital provider) and the Mudarib (provider of labor) both share profits and in the case of loss, the Rab Al-Mal bears the financial losses alone (Usmani, 2012)
Musharaka	Mode of financing where the partners (two or more) to a joint-venture share the profits according to a specific ratio and suffer the losses to the extent of each partner's contribution (Usmani, 2012)
Salam	Sale of commodity whose delivery will be in a future date for cash price paid in advance (Siddiqui, 2008).
Istisnâa	Similar to a Salam contract, Istisnâa is used for manufactured goods. Instalment payments are set according to the actual progress made in producing the goods (Vogel and Hayes, 1998).
Ijara	Leasing contract used for sale of vehicles, equipment or property for conducting business (Ebrahim, 1999; Siddiqui, 2008)
Ju'alah	A contract of commission between the "Ja'il" who offers work or task and the "Ju'el" or "Amil" as the worker who will achieve a predetermined task (Hassan et al., 2013)

Table A2.2: List of Banks included in the Sample

GCC Country	Islamic Banks	Conventional Banks	Country Code
Saudi Arabia	1. Al Rajhi Bank 2. Alinma Bank 3. Bank Aljazira 4. Bank Albilad	5. National Commercial Bank 6. Banque Saudi Fransi JSC 7. Saudi British Bank 8. Arab National Bank	**SA**
Kuwait	9. Kuwait Finance House 10. Warba Bank 11. Kuwait International Bank 12. Boubyan Bank 13. Ahli United bank (Islamic since 2010)	14. National Bank of Kuwait SAK 15. Burgan Bank 16. Gulf Bank SAK 17. Commercial Bank of Kuwait SAK 18. Al Ahli Bank of Kuwait	**KW**
Bahrain	19. Al Salam Bank Bahrain 20. Bahrain Islamic Bank 21. Al Baraka Islamic Bank 22. Khaleeji Commercial Bank 23. Kuwait Finance House Bahrain 24. Ithmaar bank	25. Ahli United Bank 26. Arab Banking Corporation 27. Gulf International Bank 28. BBK BSC 29. Awal Bank 30. National Bank of Bahrain	**BH**
Qatar	31. Qatar Islamic Bank 32. Qatar International Islamic Bank 33. Masraf Al Rayan 34. Barwa Bank	35. Qatar National Bank 36. Commercial Bank of Qatar 37. Doha Bank 38. Al Khalij Commercial Bank	**QA**
UAE	39. Dubai Islamic Bank 40. Abu Dhabi Islamic Bank 41. Emirates Islamic Bank 42. Sharjah Islamic Bank 43. Noor Islamic Bank	46. National Bank of Abu Dhabi 47. Emirates NBD PJSC 48. First Gulf bank 49. Abu Dhabi Commercial Bank 50. MashreqbankPSC	**AE**

	44. Al Hilal Bank 45. Ajman Bank	51. Union National Bank 52. Commercial Bank of Dubai 53. National Bank of Ras Al-Khaimah	
TOTAL	**26 IB**	**27 CB**	

Table A4.1: Two-sample t-test with equal variance of CAR between periods pre- and post-GFC

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]
Before GFC	64	19.483	0.921	7.373	17.641 21.325
After GFC	232	21.516	1.183	18.029	19.184 23.849
combined	296	21.077	0.949	16.335	19.208 22.945
t-statistic	-0.881				
Pr(|T| > |t|)	0.378				

Table A4.2: Two-sample t-test with equal variance CAR between Conventional & Islamic Banks

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interv]	
Conv Banks	178	18.0173	0.3285854	4.383877	17.36885	18.66575
Islamic Banks	118	25.69322	2.26992	24.65765	21.19776	30.18868
combined	296	21.0773	0.9494707	16.33531	19.2087	22.94589
t-statistic	-4.06					
Pr(|T| > |t|)	0.000					

Table A4.3: Two-sample t-test with equal variance of LLR_GL between Islamic and Conventional Banks

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interv.]	
Conv Banks	185	3.616	0.194	2.644	3.232	3.999
Islamic Banks	125	3.330	0.226	2.534	2.881	3.778
combined	310	3.500	0.147	2.600	3.210	3.791
t-statistic	0.949					
Pr(|T| > |t|)	0.343					

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