Universiti Utara Malaysia

SUSTAINABILITY OF ISLAMIC BANKS: A COMPARATIVE ANALYSIS BETWEEN GCC AND NON-GCC COUNTRIES

SIRAJO ALIYU

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SUSTAINABILITY OF ISLAMIC BANKS: A COMPARATIVE ANALYSIS BETWEEN GCC AND NON-GCC COUNTRIES

By
SIRAJO ALIYU

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Tarikh : **20 Februari 2017**
(Date)

Nama Pelajar
(Name of Student)
: SIRAJO ALIYU (95205)

Tajuk Tesis/Disertasi
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Nama Penyelia/Penyelia-Penyelia
(Name of Supervisor/Supervisors)
: Prof Dr. Rosylin Mohd Yusof

Tandatangan

Nama Penyelia/Penyelia-Penyelia
(Name of Supervisor/Supervisors)
: Dr. Nasri Naiimi

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Abstrak

Kajian ini bertujuan untuk mengkaji kelestarian perbankan Islam daripada perspektif institusi dan kebajikan di negara-negara *Gulf Cooperation Council* (GCC) dan negara-negara bukan GCC. Melalui pendekatan institusi, kajian ini mengkaji tahap dan darjah kelangsungan perbankan Islam serta menilai hubungan dinamik jangka pendek dan jangka panjang kesolvenan (kemampuan membayar hutang) perbankan dan operasi kendiri. Pendekatan kebajikan mengkaji kesan dinamik peruntukan modal bank-bank Islam dan keputusan kewangan terhadap kesejahteraan masyarakat melalui indeks jangkauan dan *maqasid* syariah. Analisis bukan parametrik, separa parametrik, parametrik, dan kelangsungan panel telah digunakan untuk meramalkemandirian bank-bank Islam di negara-negara GCC dan negara-negara bukan GCC. Analisis panel integrasi bersama agregat dan analisis data banknegara juga telah digunakan untuk menganggarkan jangka masa panjang pergerakan bersama dan hubungan dinamik antara komponen kelestarian. Kajian ini menggunakan data ketidakseimbangan kewangan dan ekonomi makro antara tahun 1987 dan 2014. Secara umumnya, analisis bukan parametrik mendedahkan bahawa bank-bank Islam mempunyai daya kelangsungan yang tinggi, manakala bank-bank Islam di negara-negara bukan GCC mencatatkan kadar kelangsungan yang lebih rendah daripada bank-bank di negara-negara GCC. Tambahan lagi, analisis masa pemisah meramalkan 3.6 peratus kemungkinan kegagalan berulang bagi sampel keseluruhan bank. Analisis kelangsungan menunjukkan hasil yang sama tentang kelangsungan bank-bank Islam. Walau bagaimanapun, analisis negara agregat mendapati bahawa komponen kelestarian telah berkointegrasi di kedua-dua rantau kecuali jangkauan di negara-negara bukan GCC. Sebaliknya, analisis khusus banknegara mendedahkan pergerakan bersama komponen kelestarian kecuali operasi kendiri di negara-negara bukan GCC. Akhir sekali, keputusan analisis dinamik mendedahkan bahawa komponen institusi mempengaruhi *maqasid* syariah di negara-negara GCC dan tidak di negara-negara bukan GCC. Penemuan ini menyarankan agar bank-bank Islam di GCC lebih lestari daripada bank-bank di negara bukan GCC. Bank-bank di negara-negara bukan GCC perlu memberi fokus kepada operasi keperluan kendiri dan jangkauan untuk meningkatkan kelestarian mereka.

Kata kunci: kelestarian, bank-bank Islam, analisis kelangsungan, panel kointegrasi, analisis dinamik

Abstract

This study aimed to examine Islamic banking sustainability from institutional and welfarist perspectives within the Gulf Cooperation Council (GCC) and the Non-Gulf Cooperation Council (Non-GCC) countries. From the institutional approach, the study investigated the levels and extent of Islamic banking survival and assessed the short- and long-run dynamic relationships of banking solvency and operational self-sufficiency. The welfarist approach explores the dynamic impacts of the Islamic banks' capital allocation and financial decisions on societal well-being through the outreach and *maqasid* sharia indexes. Non-parametric, semi-parametric, parametric, and panel survival analyses were employed to predict the survivability of Islamic banks in the GCC and Non-GCC countries. Panel cointegration analyses of the aggregate and bank-country data were also used to estimate the long-run co-movement and dynamic relationships among the sustainability components. It utilized unbalanced financial and macroeconomic data between 1987 and 2014. In general, the non-parametric analysis revealed that Islamic banks had a higher survival rate, whereas Islamic banks in the Non-GCC countries recorded a lower survival rate than the banks in the GCC countries. Additionally, the split time analysis predicted 3.6 percent failure recurrence possibilities of the sample of all the banks. The survival analyses presented similar outcomes of the Islamic banks' survivability. However, the country aggregate analysis found that the sustainability components were cointegrated in the two regions except for outreach in Non-GCC countries. On the other hand, the bank-country specific analysis revealed the co-movement of the sustainability components except for operational self-sufficiency in the Non-GCC countries. Finally, the results of the dynamic analyses revealed that institutional components influenced *maqasid* sharia in the GCC countries and not in the Non-GCC countries. These findings suggest that Islamic banks in GCC are more sustainable than those in Non-GCC countries. Banks in Non-GCC countries should focus on operational self-sufficiency and outreach to enhance their sustainability.

Keywords: Sustainability, Islamic banks, survival analysis, panel cointegration, dynamic analysis

Acknowledgement

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List of Abbreviations

2LS	2 Least Square
ADF	Augmented Dickey Fuller
AFT	Accelerated Failure Time
AIC	Akaike Information Criterion
BE	Business Ethics
BIC	Bayesian Information Criterion
CAMEL	Capital Adequacy, Asset quality, Management efficiency, Earning power and Liquidity
CAR	Capital to Asset ratio
CBN	Central Bank of Nigeria
CBs	Conventional Banks
CCA	Caucasus and Central Asia
CDF	Cumulative Density Function
CEO	Chief Executive Officer
CFL	Capital Funds to Liabilities
CIR	Cost to Income Ratio,
CISL	Cambridge Institute of Sustainability Leadership
CSR	Corporate Social Responsibility
DEA	Data Envelopment Analysis
EAP	East Asia Pacific
ECA	Eastern Europe and Central Asia
ENL	Equity to Net Loans
EQTA	Equity to Total Asset
ES	Environmental Sustainability
FSS	Financial Self-sufficiency
GABV	Global Alliance for Banks of value
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GDPPC	Per Capita GDP
GFD	Global Financial Development
GLM	Generalized Linear Model
GMM	Generalized Method of Moments
GNP	Gross National Product
IBIS	Islamic Banks Information System
IBs	Islamic Banks
IFSB	Islamic Financial Service Board
IIFS	Institutions offering Islamic financial services
IMF	International Monetary fund
IMFIs	Islamic Micro Finance Institutions

INF	Inflation
IPS	Im, Pesaran & Shin
IRF	Impulse Response Function
IRR	Investment Risk Reserve
IRTI	Islamic Research Training Institute
IsDB	Islamic Development Bank
ISRA	International Shari'ah Research Academy for Islamic Finance
IV	Instrumental Variable
LADSTF	Liquid Asset to Deposit and Short term Funding
LCR	Liquid Asset Ratio
LLC	Levin, Lin & Chu
LLI	Loans Loss Reserves to Impaired Loans
MAIC	Modified Akaike Information Criteria
MDGs	Millennium Development Goals
MENA	Middle East and North Africa
MFIs	Microfinance Institutions
MI	Maqasid Index
MM	Modigliani & Miller
NGOs	Non-Governmental Organizations
NI	Net Income
NIEA	Non-interest Expenses to Average Assets
NLTA	Net Loans to Total Assets
Non-GCC	Non- Gulf Cooperation Council
OIC	Organization of Islamic Cooperation
OLS	Ordinary Least Squares
ONIL	Non-interest Bearing Liabilities
OOIA	Other Operating Income to Average Asset
OSS	Operational Self-Sufficiency
OUT	Outreach
PBS	Positive Behavioural Studies
PDF	Probability Density Function
PEN	Positive Ethical Theory
PER	Profit Equalization Reserve
POB	Positive Organizational Behaviour
POE	Positive Organizational Ethics
POS	Positive Organizational Scholarship
PP	Positive Psychology
PwC	Pricewaterhousecoopers
ROA	Return on Asset
ROAA	Return on Average Asset
SA	South Asia
SD	Sustainable Development

SDGs	Sustainable Development Goals
SDI	Subsidy Dependence Index
SOL	Solvency
SRI	Socially Responsible Investment
SSA	Sub-Saharan Africa
SVAR	Structural Vector Autoregressive
TCR	Total Capital Ratio
UAE	United Arab Emirates
UNEP FI	United Nations Environment Programs Finance Initiatives
UN-ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
VAR	Vector Autoregressive
VDC	Variance Decomposition
WCED	World Commission on Environment and Development

CHAPTER ONE
INTRODUCTION

1.1 Introduction

This chapter discusses the broad introduction of the thesis, which begins with the background and motivation of the study. The background linked the concept of banking sustainability with Islamic banking models and highlighted its diffusion to the geographical regions of the study. Consequently, the entire motivation for this study emerged from the theoretical, methodological and practical gaps which are immensely elaborated and splitted into subsequent sections. Furthermore, the following sections stress on the statement of the problem, research question, and objectives, scope, and outline of the study.

1.2 Background of the Study

The uncompromising present and future generations' social, economic and environmental aspect of life is regarded as the Brundland (1987) concept of sustainability. The general concept of sustainability is latterly related to various segments of life such as energy, transitional development, fiscal balances, education, economy, and banking and finance among others. In a specific context, recent financial crisis necessitates banks and other financial institutions to envision for long-term sustainability rather than mere profitability attainment (Banerjee, & Velamuri, 2015). Scholars have divergently viewed sustainability in banking and finance from two perspectives; the institutional and welfarist approach (Robinson, 2001; Hermes, Lensink, & Meesters, 2011; Nurmakhanova, Kretzschmar, & Fedhila, 2015; Mia, & Chandran, 2015; Bhanot, & Bapat, 2015). The institutional approach

views sustainability through banks' financial and operational sufficiency (Cull, Demirgüç-Kunt, & Morduch, 2007; Hartarska & Nadolnyak 2007). Nowadays, business complexities and challenges related to economic, social, and, environmental factors influenced the commitments of welfarist towards sustainable banking approach. The primary concern of welfarist are on the impacts of financial decisions and capital allocations of the banks towards sustaining society and environment (Jeucken, 2001; Central Bank of Nigeria - CBN, 2012; Global Alliance for Banks of value-GABV, 2012). The paradigm shift from Millennium Development Goals (MDGs) to Sustainable Development Goals (SDGs) indicated the need for combining the two perspectives to sustainability studies.

Similarly, the fundamental objectives of Islamic banks lie within the two prominent models (Chapra and Ismail model) of Islamic banking transactions (Lewis & Algaud, 2001; Dusuki, 2008a; Khattak, Khashif-Ur-Rehman, Sofwan & Wasim Ullah, 2011). The later has been developed on the presumption that Islamic banks should focus on the Shariah principles and guidelines for business transactions to maximize the values of shareholders and depositors (Lewis & Algaud, 2001; Ismail, 2002; Dusuki, 2008a). This model is in line with the institutional approach to sustainable banking, which implies that provision of social welfare is the function of the state. Therefore, survival and sustenance of the institution through solvency and operational sufficiency is of the primary interest. On the other hand, Chapra model is nested within the *maqasid* Sharia framework of equitable wealth distribution and social justice to enhance societal well-being and economic development. Therefore, financial decisions and capital allocation of the Islamic banks shall be balanced between profit and socio-economic benefit of society (Chapra, 1979;

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1985; Siddiqi, 1983; Naqvi, 2003; Mansour, Ben Jedidia, & Majdoub, 2015). The cardinal point of the model (*maqasid* shariah) is closer to the welfarists' approach of sustainable banking. Finally, Dusuki (2008a) concluded that the two models are moving on the same track of Shariah principles with a different emphasis on socio-economic objectives, which can only be achieved through sustainable banking practices. In a nutshell, Islamic banking sustainability is the ability for banks to survive their financial and operational sufficiency for a long-term period that has impact on the societal prosperity and environmental protection (Aliyu, Hassan, Yosuf, & Naiimi, 2017).

The last five decades have witnessed the growth of Islamic Banking assets, which accounted for 80 percent of the entire Islamic financial assets of the world (Venardos, 2005; Chachi, 2006; Nagaoka, 2012; Ernst & Young, 2013, 2014; Kammer, Norat, Pinon, Prasad, Towe, & Zeidane, 2015; Hussain et al, 2015). The growth of the Islamic financial assets has appreciated to about $1.6 trillion ($200 billion to $1.8trillion) between 2003 and 2013 up to $2trillion in 2014 (Islamic Financial Service Board-Islamic Research Training Institute –IFSB-IRTI, 2014; Hussain, et al., 2015). The emerging growth of the commercial Islamic banks begins in the seventies due to oil prices peak in the Gulf Cooperation Council-GCC countries (i.e. Bahrain, Kuwait, Qatar, Saudi Arabia, and United Arab Emirate with the exclusion of Oman) and spread to other parts of the world (which are categorized as Non- Gulf Cooperation Council-GCC countries). However, the world recession of the early eighties coupled with the fall of oil prices declined Islamic banks' performance (Warde, 2000). With this, the shock of macroeconomic activities affected Islamic banks and thus, Islamic banks become susceptible due to the economic recession

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and market failure (IFSB-IRTI, 2014). Nonetheless, currently over 550 Islamic financial institutions are operating in more than 75 countries of the world (ISRA, 2012). Recent studies (Lukonga, 2015; Hussain, et al., 2015) asserted that Islamic banks are predominantly in GCC, South East Asia, Sudan and Iraq with potentialities in the Sub-Saharan Africa, Caucasus and Central Asia (CCA). The recent attribution to the Islamic banking assets in the GCC countries is accounted for $598.8 billion compared to other Non-GCC countries such as Asia $ 209.3 billion, MENA (excluding five GCC) $ 607.5, Sub-Saharan Africa $24.0 billion and other countries $ 56.9 billion (Islamic Financial Service Board, 2016). Thus, the Islamic banks' assets proportions is an indicator for their potential economic investment to a particular region which can be impacted on their growth through capital allocation.

Islamic banks are found to have contributed more to the economic growth of Non-GCC countries (Malaysia and Indonesia) compared to GCC countries (Yusof & Bahlous, 2013). As a result, data from Global Financial Development (GFD) was utilized to portray the trend analysis between 2000 and 2011. Figure 1.1 and 1.2 depicted the scenario analysis of the GCC and Non-GCC countries. Recent development has shown that Islamic finance sector grew to 43 and 19 percent respectively in Indonesia and Turkey between 2009 and 2013. However, macroeconomic shocks of 2001 have affected banks adversely in Turkey. As reflected in Figure 1.1, the effects of the shocks in Turkey alone converge the Non-GCC countries (Turkey, Malaysia, and Indonesia) aggregate to become negative in 2001. Despite that the remaining two countries (Malaysia and Indonesia) have positive values. The values of the aggregate return on assets after tax reduced to 7.9 percent from 10.3

percent before tax (decline to 23.3 percent) in 2004 and the same effect in 2007. On the other hand, return on assets after tax for GCC countries differ insignificantly in 2004 and 2007 respectively which accounted for less than one percent difference. Therefore, taxes have effects on the rate of return, and it may influence the capital structure decision of the banks.
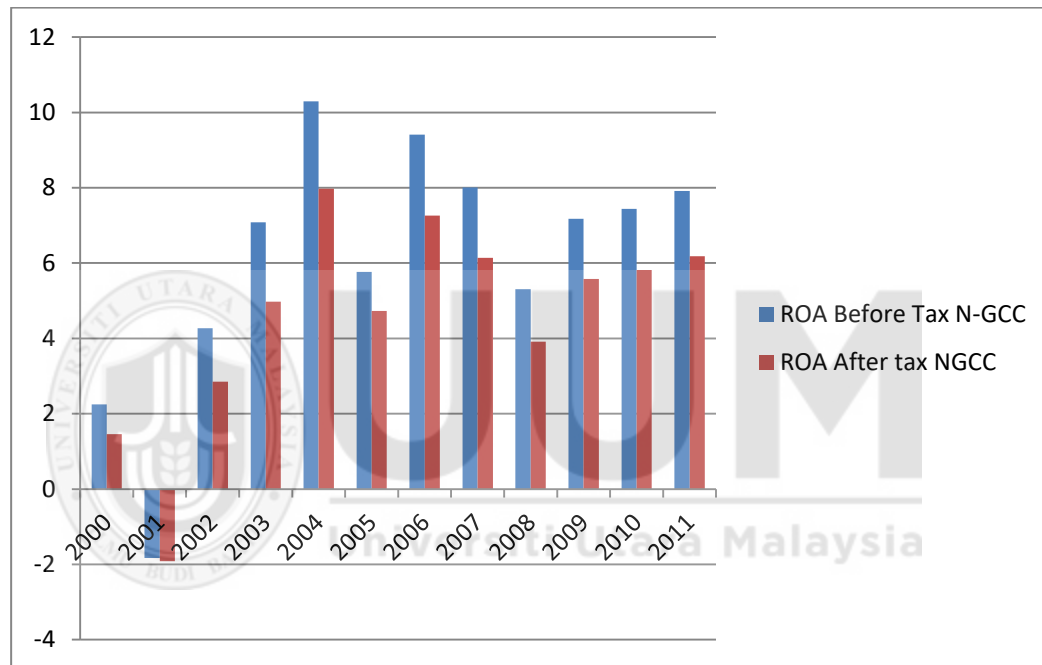
Figure 1.1: Return on Assets (Before and After Tax)

Meanwhile, corporate tax is detrimental to equity-based institutions, especially in the economic expansion (boom) period. Similarly, the tax can be burdensome to Islamic banks that typically operates on asset-based transactions and equity oriented. Given this, Kammer, et al., (2015) argued that Islamic banks are liable for double taxes on some of their products that cross-border. Meanwhile, figure 1.1 vividly recorded negative return on assets in 2001 that caused the survival of twenty conventional and one Islamic bank in Turkey under distress (Ali, 2007). The cornerstone motivation for the establishment of

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Islamic banks in the world is the prohibition of interest in the two sources of Shariah (Quran and Hadith) coupled with *maqasid* -shariah attainment (Dusuki & Abdullah, 2006). Demirguc-Kunt & Huizinga (2010) noted that non-interest income (such as trading) improves earning stability and reduces risks of the investment.

However, both GCC and Non-GCC banks have recorded poor performance to non-interest income ratio between 2000 and 2011. The non-interest income in GCC and Non-GCC countries declined by 38 and 17 percent respectively between 2005 and 2011. The descriptive trend of the consolidated data is vague to conclude the positions of Islamic banks in the regions. Therefore, country aggregate and country-bank specific data of Islamic banks are utilized to ascertain their solvency position and to predict banks' future survival which is part of the institution concept of banking sustainability. Meanwhile, the capital allocation of domestic credit to the private sector is not encouraging from the consolidated data of 2000 to 2011 to both GGC and Non-GCC countries alike.
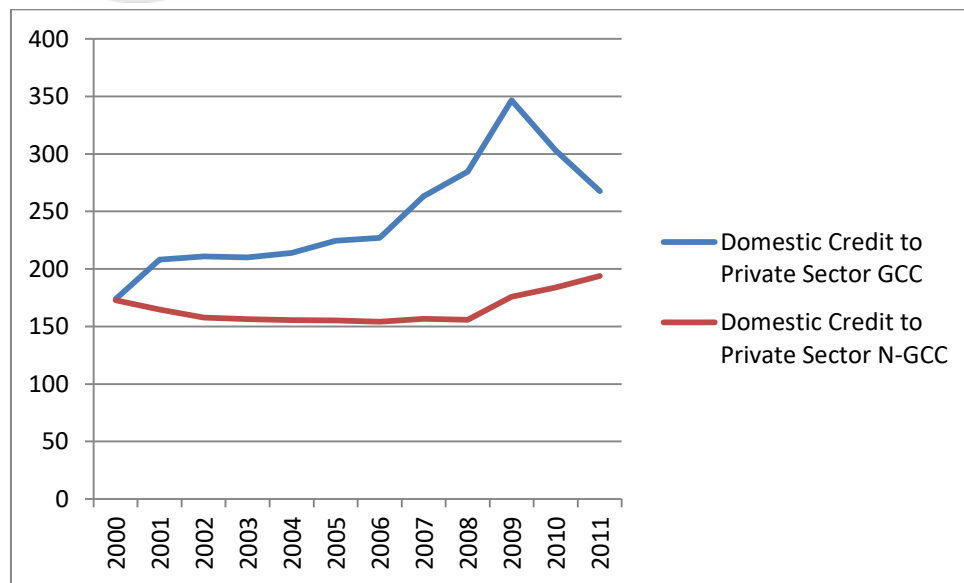
Figure 1.2: Domestic Credit to Private Sector

To begin with outreach from GCC countries, the domestic credit to the private sector in Fig. 1.2 declined by 13 and 12 percent in 2010 and 2011 respectively. Meanwhile, Non-GCC countries' outreach have 5 percent increase to both 2010 and 2011. The trend outcome is similar to the assertion of the International Monetary fund-IMF (2014) that there is a gap between outreach and those required banks financing in GCC countries. Thus, this is detrimental to not only on the outreach effect, but also to the *maqasid* impact in the case of Islamic banks' objectives. Therefore, Islamic banking sustainability has to be drawn from institutional and welfarist perspectives coupled with *maqasid* shariah.

1.3 Motivation of the Study

The paradigm shift from Millennium Development Goals (MDGs) to Sustainable Development Goals (SDGs) highlights the motivational factors which require integrating the institutional and welfarist perspectives towards transforming the world by the year 2030 (United Nations, 2015). For instance, institutional growth without societal and environmental values reservation can stagnate future development. Specifically to banking context, a lot of studies have been conducted on the conventional banking sustainability with consideration to institutional and welfarist perspectives (Robinson, 2001; Hermes, Lensink, & Meesters, 2011; Nurmakhanova, Kretzschmar, & Fedhila, 2015; Mia, & Chandran, 2015; Bhanot, & Bapat, 2015). Consequently, the general purview of the Islamic banking model lies within the Chapra and Ismail models which are relatively close to the two perspectives of banking sustainability. Nonetheless, despite the close relational link between Islamic banking models and banking sustainability, studies to integrate them into a single study are meagre. Furthermore, the modern Islamic banking began in 1963 at Egypt with Mit Ghamr local saving bank and Nasser Social Bank in 1971, while the

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subsequent banks established among the Non-GCC countries in those periods include Faisal Islamic Bank of Sudan (ISRA, 2012). Although, the incapacitating position of the Egyptian banks does not preclude the one in Sudan to sustaining its operations. On the other hand, the early Islamic banks in the GCC countries are those established in the 1970's, these include Bahrain Islamic banks and Dubai Islamic Bank which are still in existence. However, Islamic banks are not a solvent guarantee from failure in the GCC and Non-GCC alike. For instance, in the Non-GCC countries, the closed down of Taqwa bank in 2001 was attached to money laundering issues. Similarly, previous studies (Ali, 2007; Rajhi & Hassairi, 2011; Souaiaia, 2014) expressed that other Islamic banks around the globe have suffered different problems ranging from regulations in the case of Faisal Islamic Bank of United Kingdom (nd). Followed by International Islamic Bank of Denmark (1986) which had experienced liquidation due to higher financial exposures on a single concentrated client. On the same track, distress failure was the caused by the Islamic money management of Egypt (1988-89) while Islamic Bank of South Africa (1997) defaulted based on excessive debt and poor management. Similarly, Turkey financial crisis in 2001 has affected several banks in the country including one Islamic bank (Ihlas bank). Consequently, other Islamic banks found incapacitated in the GCC countries such as Bahrain (Elaf in 2013; Capinnova Investment Bank in 2012; Capivest Bank in 2012; BMI Bank in 2014); and United Arab Emirate (Dubai Bank in 2012) among others (Zawya, 2015).

The closure of Ihlas bank of Turkey is contrary to the earliest conceptual literature of Islamic banking. As proposed by Khan (1986), the theoretical analysis has established that

Islamic banks are capable of absorbing bankruptcy problem and cost of financial shock during the crisis compared to conventional banks. Similarly, theoretical studies (Khan & Mirakhor, 1987; Mirakhor, 1993; Ahmed, 2002; Hussain, Shahmoradi, & Turk, 2015) and empirical study of recent time (Shaukat, Hasan, & Alhabashi, 2014) have supported the superiority of Islamic banks against conventional banks regarding financial stability. These assertions failed in the case of Ihlas bank of Turkey in 2001. Thus, Khan (2015) argued that for Islamic banks to sustain stability in operations, transactions have to be asset-based. However, Denčić-Mihajlov, Malinić & Grabiński (2015) identified that corporations' crises concerning profitability; solvency and short of liquidity emerged from the operational inefficacy to compete favorably against their counterparts in the market. With regards to Islamic banks, Ernst & Young (2014) reported that Islamic financial assets growth had been increased by 16.4 percent annually between 2008 and 2012. With this, Islamic banks are expanding regarding size, but the situation is not consistent concerning operational efficiency compared with conventional banks (Beck, Demirgüç-Kunt & Merrouche, 2013). Though, Čihák, Demirgüç-Kunt, Feyen & Levine, (2012) argued that the efficiency of each bank depend on the macroeconomic performance of its respective country. In this way, operationally inefficient banks are liable to have a higher return on investment in the bullish upstream period and vice versa. In the same analogy, 2008 financial crisis had affected the traditional banks including those in GCC and Non-GCC countries while Islamic banks are insulated compared to conventional banks (Hasan & Dridi, 2011; Rajhi & Hassairi, 2011; Beck et al., 2013). As a result, the bailout has become an alternative culture to save those affected institutions during the crisis especially 'too big to fail' banks (Chapra, 2007; Dam & Koetter, 2012; Aliyu, 2014). Therefore, it is expected

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that the bank performance to influence the socioeconomic performance of the society and protect the environment as well.

Although the establishment of Islamic banks in both GCC and Non-GCC countries is more than a half of century, other studies claim social failure to Islamic finance (Asutay, 2007; Zaman & Asutay, 2009; Nor, 2012; Zaman, 2013; Nor & Hashim, 2014). From the welfarist view, social wellbeing through outreach and inclusiveness of financial services is of paramount concern coupled with *maqasid* consideration from an Islamic perspective. It is intuitively clear that wealth distribution (such as zakat and waqf), educating individual (sponsorship and staff training), establishing justices and outreach (via funds access) are other ways for uplifting the well-being of the people in the society (Asutay, 2012; Ngalim & Ismail, 2014; Shamsudin & Mohammed, 2015). Nonetheless, International Monetary fund-IMF (2014) reported that GCC countries distribute loans to the small concentrated number of borrowers which represents a small portion of their entire population. The claim is indicating lower outreach in the region, though there is insufficient of such evidences specifically on Islamic banks. Similarly, Kammer et al. (2015) have noted that Islamic banks finance real estate, and immediate consumers need rather than entrepreneurship businesses and industrial development. These revealed the limited outreach impact that would induce entrepreneurs' commitment towards real productive growth and development in the region. In this regard, the practice does not adequately achieve the *maqasid* -Shariah objectives of Islamic banks that have a direct link with, social justice, fairness and equal treatment in the society (Naqvi, 2003; Hassan, & Kayed, 2009). Therefore, investigating the Islamic banking sustainability components (solvency,

outreach, *maqasid* and operational sufficiency) in the two regions (GCC and Non-GCC) will enhance existing literature on Islamic banking sustainability, provide other insights to industry as well as policymakers' long-term strategies and decisions.

1.4 Problem Statement

Sustainable studies have captured the attention of academicians, practitioners and policy makers immediately after the Brundtland report of the late 1980's. Different studies on various themes to sustainability have been conducted on different dimensions. Such as; third world standard of living (Barbier, 1987); our common future (World Commission on Environment and Development-WCED, Brundtland, 1987; Pearce, 1987; Goodland & Ledec, 1987; Markandya & Pearce, 1988; Pearce, Barbier & Markandya, 1988; O'Riordan, 1988); global sustainability (Brown, Hanson, Liverman, & Merideth Jr, 1987); economic analysis (Pezzey, 1992); sustainable transitions (Geels, 2011, 2013; Markard & Truffer, 2012); sustainability of external and fiscal balances (Wu, Chen & Lee, 2001; Afonso & Rault, 2010, 2014; Herzberg, 2015); and sustainability and ethical behavior (Hoffman & Haigh, 2011; Dossa, 2013; Dossa & Kaeufer, 2014). In short, these studies have three cardinal points (economic, social and environmental) to achieve in relation to sustainability which is derived from the Brundtland report of 1987.

Specifically, some studies have related the issues of sustainability with financial institutions' functions. These are folds in two forms: institutional and welfares' approaches to sustainability (Robinson, 2001; Hermes, Lensink, & Meesters, 2011; Bhanot, & Bapat, 2015). The institutional scholars (Khandker, Khalily, & Khan, 1995; Cull, et al, 2007; Hartarska & Nadolnyak 2007; Ahmed, 2013; Aliyu, 2014) are more concerned with the

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operational and financial self-sustenance of the financial institutions. In contrast, welfarist has concerns with financial decisions on the social and economic wellbeing of the society through outreach and impact on the environment. These group include scholars (Weber, 2005; Shicks, 2007; Nor & Hashim, 2014; Dossa & Kaeufer, 2014;), and professionals (Jeucken, 2001; Imeson & Sim, 2010; CBN, 2012; GABV, 2012) which are having views on the extent in which bank financial decisions and capital allocations improve the poor and prevent environmental deterioration.

Despite all these studies, very few have been able to relate the issues of sustainability with the Islamic banks, and they mainly focused on the sustainable development. These includes; sustainable development from Islamic perspectives (Iqbal, 2005); sustainable development and Islamic Development Bank-(IsDB) aids (Mustafa & Razak, 2011); sustainable development and corporate social responsibility (Nor, 2012; Nor & Hashim, 2014); and Islamic Sustainable Development (Zaman, 2013a). However, previous studies on sustainable Islamic banks (for instance; Ahmed, 2013; Aliyu, 2014; Ismail & Possumah, 2014) have not sufficiently convened in-depth analysis to include a full range of the institutions in their samples. More specifically, they are not able to combine the method of analysis from institutional and welfare approach with consideration to *maqasid* -Sharia and outreach, the level of survival, cointegration analysis and policy directions. Despite the fact that sustainability of Islamic banks have to be measured on performance (operational and financial sufficiency) and *maqasid* -shariah functions (Rozzani & Abdulrahman, 2013; Abdul Rahman, & Masngut, 2014; Shamsudin & Mohammed, 2015). Even though, the performances of the commercial banks are measured by the proportionate analysis of

financial ratio. The financial assessment will not preclude having a particular estimation on a *maqasid* -shariah couple with the proxy measures of survival (survival analysis) and solvency (Z-score) of the Islamic banks.

The contradictory outcomes of solvency studies on Islamic banks are not clear about the specific direction to investors and regulators in their investment decisions and policies formulation. Recent comparative studies between conventional and Islamic banks reported conflicting results on the failure warning to Islamic banks with inconclusive debate on stability between the two different banking systems (Ghassan, Fachin & Guendouz, 2013; Abedifar, Ebrahim, Molyneux, & Tarazi, 2014). In line with this, Pappas, Ongena, Izzeldin, & Fuertes (2016) argued that Islamic banks (both GCC and Non-GCC countries) have a lower risk compared to their counterparts, which contradicts the findings of Beck, et al., (2013) on a similar study. Meanwhile, other studies of Alandejani and Asutay, (2013); Alandejani (2014) revealed unconditional support to Beck et al. (2013) on GCC countries with similar techniques (survival analysis) used by Pappas et al. (2016). Similarly, Pappas et al., (2016) argue that survival analysis is more suitable for Islamic banks assessment compared to solvency measures of Z- score. The issue relies on the business orientation between conventional and Islamic banks. After the period of their studies, it has been noted that some Islamic banks became incapacitated especially in Bahrain (Elaf in 2013; Capinnova Investment Bank in 2012; Capivest Bank in 2012; BMI Bank in 2014); Malaysia (EONCapital in 2011); and United Arab Emirate (Dubai Bank in 2012) among others (Zawya, 2015). The aftermath effect of the 2008 crisis worsens on the GCC Islamic banks (Hdayat, Abdul Rashid & Htay, 2014). Therefore, this necessitates further

investigation on the factors responsible for the persistent failures of Islamic banks despite the fact that other studies prove their viability of sustenance during the crisis period (Hassan & Dridi, 2011; Beck et al., 2013; Rosman, Abd Wahab, & Zainol, 2014).

A recent study found that the 2008 financial crisis has adverse effects on the profitability of the two modes (Islamic and conventional) of banking in the GCC countries (Khediri, Charfeddine, Youssef, 2015). The findings contradict previous studies (Hidayat & Abduh, 2012) and cover a shorter period of eight years. Therefore, further investigation will predict the long-term performance of Islamic banks in the GCC and Non-GCC countries alike. At the same time, Abedifar, et al., (2014) suggested for further investigation on the performance and risks of failure on Islamic banks in the GCC countries at this time of oil price decline (which began mid of 2014). The oil price decline has a tendency for real income shift to non-oil dependent nations (World Bank, 2015a). Meanwhile, GCC growth model depends on the global oil market as they experienced simultaneous oil price and growth decline in the early 1980s and 2000s (Callen, Cherif, Hasanov, Hegazy, & Khandelwal, 2014). Therefore, the effect of this situation may reflect on the Islamic banks' performance in the region and to subtle their sustenance in the future. Similarly, it not explicitly open whether Non-GCC countries Islamic banks are free from external global shocks.

Moreover, Moody (2015) exposed that there is the high-risk effect in the event of default on the huge loans of GCC banks since the funds are being disbursed to a single borrower of a particular sector. This practice is contrary to the socio-economic objective of *maqasid*

-Shariah, which advocates for social justice in the society. Nonetheless, this assertion posed to the entire GCC banks. Therefore, disaggregated information between the two modes of banking operations will identify the position of Islamic banks outreach in these countries. Recent studies are insufficient to provide clear evidence of the outreach of Islamic banks in the GCC and even Non-GCC countries. As a result, this has been recommended for future investigation to evaluate the financial inclusion (outreach) of the socio-economic needs of the public (Beck et al., 2013; Abedifar, et al., 2014). Likewise, in-depth outreach explains the degree in which businesses, firms, and enterprises utilize the Islamic bank's products and have positive relationships with long-term economic growth (Kammer, et al., 2015). Therefore, this study envisaged to evaluate the sustainability of Islamic banks from the institutional and welfarist perspectives in the GCC and Non-GCC countries alike.

1.5 Research Questions

Based on the above purview of the problem statement, the broad research question of this study will attempt to answer: Do Islamic banks' institutional and welfarist sustainability for the period of 1987 to 2014 differ between GCC and Non-GCC countries? The succeeding specific questions emerged from the main broad question to guide the study:

I. How do GCC Islamic banks' level and extent of survival rate differ compared to those in the Non- GCC countries?

II. Do Islamic banks in the GCC countries differ to those in the Non-GCC countries in terms of long-run solvency, operational self-sufficiency, outreach, and *maqasid*-Sharia objective?

III.   What are the dynamic relationship differences between solvency, operational

self-sufficiency, outreach, and *maqasid*-Sharia index of the Islamic banks in the

GCC countries compared to those in the Non-GCC countries?

1.6 Objectives of the Study

The aim of this study is to compare the levels and extent of the Islamic banks' institutional

and welfarist sustainability in the GCC and Non-GCC countries. The following specific

objectives are derived from the main objective, thus;

I.   To compare the level and extent of Islamic banks' survival between GCC and Non-

GCC countries.

II.   To compare the long-run solvency, operational self-sufficiency, outreach and *maqasid*

-Sharia objective of the Islamic banks in the GCC and Non-GCC countries.

III.   To compare the dynamic relationships between solvency, operational sufficiency,

outreach and *maqasid* index of the Islamic banks in the GCC and Non-GCC countries.

1.7 Scope of the Study

This study attempts to assess the Islamic bank's sustainability from the institutional and

welfarist approaches. Therefore, attention is given to banks' survival, solvency, operational

sufficiency, outreach and *maqasid* index that have not been consolidated in a single study.

Therefore, the study is divided into two major sections. Firstly, it stresses on the Islamic

bank's survival from the establishment date to the time of an event (failure or censored).

Secondly, concentrated on panel cointegration and dynamic analysis with the aid of

Impulse Response Function (IRF), and followed with Variance Decomposition (VDC) to

predict for policy formulations. The previous study employed similar methods of analysis on GCC and Non-GCC countries (Mohd & Bahlous, 2013).

Although, Hussain et al. (2015) claim that there are 410 Islamic banks worldwide at the end 2013, some of them are difficult to extract their financial information. This study focused on the 24 countries with 170 banks based on available data from databases used for data collection (BankScope and Islamic financial database of the Islamic Development Bank). Thus, this is consistent with previous Islamic banking studies (Pappas et al. 2016; Beck et al. 2013). The study is conducted based on multi-level stage analyses on the Islamic banks in the GCC and Non-GCC countries which began with survival analysis (1987-2014), aggregate panel data analysis (1995-2014), and bank-country specific panel data analysis (1993-2012). The justification of having GCC countries as a split block from the rest of the world is due to higher number of the Islamic financial institutions in the area (Abedifar et al., 2014). GCC region covered two-third of the entire Islamic banks with 70 percent of their total assets (Belanès, Ftiti, & Rym, 2015). Meanwhile, Islamic banks in these countries are considered as a unit of analysis at the country at bank-country specific analysis, countries for the regional intra-country analysis, and regions in the comparative analysis of panel analysis. The sample of 24 countries across the globe is utilized for survival analysis from countries that atleast have one Islamic bank with two years' observations for the survived and one year to failed bank, which is consistent with the previous criteria of similar study (Beck et al., 2013; Pappas et al., 2016). Therefore, the criteria were adopted due to limited data availability to some of the Islamic banks. However, panel cointegration and dynamic analysis concentrated on five GCC countries

(i.e. Bahrain, Kuwait, Qatar, Saudi Arabia, and United Arab Emirate with the exclusion of Oman) and four Non-GCC countries (Sudan, Iran, Egypt, and Jordan) for the aggregate panel analysis. Meanwhile, the bank-country specific analysis is conducted on the five GCC countries and five Non-GCC countries (Malaysia, Turkey, Egypt, Bangladesh, and Jordan). The long-term Islamic financial hub of the selected countries compared to other and data availability stands as the major reasons for their inclusion in the study. Therefore, it is important to investigate the long-term survival and solvency of Islamic banks in order to predict their future directions for policy formulations. At such, sustenance of Islamic banks is expected to have an impact specifically on the socio-economic well-being of the society and economic growth as a whole.

1.8 Significance of the Study

This study seeks to extend the Islamic sustainability literature through providing fresh evidence that will strengthen the best practices of Islamic banks for long-term survival. The study firstly presents a linking root of the sustainability concept from the Quran and Hadith. It is clear that Allah provides sustenance to His creatures (Q3:27; 3:37; 5:114; 6:151) through their joint efforts. However, institutional sustainability of Islamic banking transactions has not been linked to the original context of Quran in the previous studies. Therefore, addressing this gap tackled the uncovered vacuum and provided clear opportunities and directions for future research. It is observed that previous Islamic banking sustainability studies were conceptualized based on the conventional ideas of institutional and welfarist approach alone (Shamsudin & Mohammed, 2015). However, this study links the concept of *Ihsan* from Quran and Hadith to support the welfarist perspective of Islamic banking sustainability through *maqasid* Shariah principles. Prior

studies utilized the concept of *Ihsan* to banking activities and have not sufficiently able to join the two sources of Shariah in explaining the content (example: Beekun & Badawi, 2005; Zaman & Asutay, 2009; Nor, 2012; Zaman, 2013a; Shamsuddin & Ismail, 2013; Barom, 2013; Nor & Hashim, 2014; Ismail & Zali, 2014; Wan Abdul Aziz, Mohamed, Ibrahim, Muda, & Abdullah, 2014). Therefore, this study integrates other theories with Islamic financial view to leveraging the understanding in the areas of convergence and divergence stands in the literature. For instance, the Positive Ethical Theory-PEN (Dossa & Kaeufer, 2014) proposed sustainable banking practices as emerged from the external crisis and failed to realize other options that cause ethical relationships.

The conventional proxy to banking sustainability is mainly on the bank performance and outreach. In the same analogy, sustainability studies on Islamic banks have not been able to incorporate measures of *maqasid* Shariah index. The present study provides a new dimension in assessing Islamic banks through *maqasid* shariah, outreach, solvency, operational sufficiency and survival analysis in the single study. This envisions to explore not only the institutional benefit but the extent in which the banking activities impacted on the society and environment. The antecedent of sustainability emphasizes on long-term integration and survival of generations (Brundtland, 1987). Hence, previous studies of banking sustainability (Cull et al, 2007; Hartarska & Nadolnyak 2007; Bogan, 2012; Ahmed, 2013; Aliyu, 2014; Cull, Harten, Nishida & Bull, 2014; Banerjee, & Velamuri, 2015; Nurmakhanova, et al. 2015; Mia, & Chandran, 2015; Bhanot, & Bapat, 2015) failed to consider the long-term and dynamic relationships (short and long run). This study is also

designed to provide some insight to policy makers on the long-term strategies for the Islamic banking sustainability to impact on the economy, society, and environment.

The general findings of this study hope to guide Islamic banks on the activities that will sustain their operations for a longer period and reduce their risks to failure. Furthermore, it is not only the banks and policy makers that are anticipated to benefit from this study, rather, society and environment are also targeted to tap from the outcomes of the study. Specifically, investors and investment account holders of the Islamic banks will have a direction and confidence on the activities of Islamic banks not only in the GCC countries but rather in other Non-GCC countries. Finally, the study is expected to serve as bedrock step to the Islamic banking sustainability literature to future researchers.

1.9 Outline of the Study

The study consists of seven chapters and begins with an introduction. The introductory chapter contains seven sub-headings which include a background of the study and the problem statement. Similarly, research questions and objectives are drawn from the established problem statement section. The scope of the study gives the entire picture of the research coverage while the significance of the study is presented to identify the importance of the study to the literature and practical scene. Finally, the outline of the study explains the summary of each chapter of the study. Meanwhile, Chapter two focuses on the related literature of sustainability from the conventional and Islamic perspectives.

The third chapter discusses the theoretical framework, which is based on the institutional and welfarist approach. Institutional and welfarist approaches are underpinned with related theories from conventional and Islamic perspectives. Meanwhile, Chapter four details the process and methods adopted in the study. To achieve this, the conceptual framework is

presented, to summarize the idea in which the study was built on. After that, methods and variables for measurements are explained based on institutional and welfare approaches. Next two chapters present analysis of each model identified in chapter four. Finally, Chapter Seven summarizes, concludes and provides recommendations for long-term policy strategies and directions for future studies.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter reviews the related literature on the banking sustainability and its components.

The chapter begins with an overview of Islamic banks in the GCC and Non-GCC countries.

After that the following section and sub-section focus on the thematic issues of

sustainability, which include the conventional concept of sustainability, sustainable

banking, and its two approaches (institutional and welfarist). However, the chapter also

stresses on the Islamic aspect of sustainability from the two dimensions (institutional and

welfarist) based on the Islamic philosophy and finally the summary of the chapter is

presented.

2.2 The Concept of Sustainability from Conventional Perspective

The World Commission on Environment and Development–WCED (Brundtland, 1987)

revealed that sustainable development is a means of providing sustainable livelihood

through a reduction in poverty and environmental deterioration, renewing resources,

cultural and social coherence in our common future. The report linked between

environment (ecology), social and economic dimensions. Brundtland (1987) foresees

sustainable development as a world phenomenon, which has a long-term span that is

beyond regional or short-term issues. Barbier (1987) relates the concept sustainable

development to the economic performance of the third world nations. Thus, it relates to the

direct increase in standard of living indicators (real income, food, shelter, health care

facilities, education, sanitation and water supply) parallel with an increase in aggregate

growth of the economy. Contrary to Barbier's (1987) definition that only related the issue

to the third world countries, development cannot be considered sustainable if we

compromise future generation needs and their environment. Meanwhile, Brundtland report

further considered social equity among generations, the long-term standard of living as

well as economic growth that promotes conservation of plants and animal species.

In another view, World Bank (1987) prioritized relationships between poverty reduction,

sound environmental management and growth achievement. The tradeoffs between these

three objectives (economic, social, and environmental) are becoming necessary where both

cannot be achieved at one time. However, environmentalist view the concept of

sustainability as a component of a direct relation between biosphere components and

human beings livelihood. According to Brown et al. (1987), sustenance of human beings

across the world is aimed to achieve global sustainability, which has relations to the

sustenance of all components of the biosphere. In another dimension, Clark & Munn (1986)

argue that in the long-run period, the interaction between economic developments and

environment would impact human well-being.

However, sustainability is also considered as a social and structural reform that improves

the quality of present societal wellbeing without the likelihood of jeopardizing the future

generations' benefits (Goodland & Ledec, 1987). In another study by Pearce, et al., (1988)

sustainability of development is viewed from the vector of social objectives (real income,

health and nutrition, education, the fairness of income distribution and access to resources)

that improve over time. Also, Repetto, & Magrath (1988) consider sustainability to

economic systems within the concept of going concern concept of accounting. That is, to reasonably manage the resources in continuing prospects of the future generations' standard of living. In other words, the amount of income/asset consumed by present generation should not in any way lead to the liquidation of the future world consumption. The aim of sustainable development is to perpetuate equitable distribution of socioeconomic wellbeing across the present and future societies. This directly applies also to the stock of natural renewable resources management (tree, biosphere, land biomass, quality of soil) that are in use presently (without value reduction); in such a way that it will not preclude easy access to future generation or to reduce their real income (Markandya & Pearce, 1988; Pearce, et al., 1988). The wide spectrum of sustainability is beyond the simple environmental issues without ethical norms that would be influencing human activities in sustaining future generations. Therefore, responsible institutions shall be accountable for ethics implementation and the survival of all living things (O'Riordan, 1988). These institutions could be financial (such as banks) or non-financial institutions.

Previous studies link sustainable development with sustainable financial decisions of banks (Jecken, 2001; Mayo & Guene, 2001; Reifner, 2001; Weber & Remer, 2011). Specifically, United Nation Environmental Programme Finance Initiative –UNEP FI (2007); conceptualize that sustainable banks are those which their impact in current business activities (such as; products, service, and operations) would not in any way preclude future generations to meet their needs obligations (p. 41). This definition echoes that of Brundtland report of sustainable development. However, Weber (2012) traces the concept of sustainable banking backed to the 16th century which stated that the concept has other

ethical values that promote banking activities in relation to environment preservation and societal livelihood. These covered credit risk and environmental management in 1980's; mutual fund and indices sustainability in 1990's; lastly, carbon finance and impact investment in 2000's. Apart from the conventional view, Islam also documented other views in relation to sustainability which is detailed discuss in the next section.

2.3 The Concept of Sustainability from Islamic Perspective

The literal concept of sustainability can be understood from permanent alternation between day and night (Q10:6) based on the following verses:

> *And He has made the sun and the moon, both constantly pursuing their courses, to be of service to you; and He has made the night and the day, to be of service to you.(Q14:33)*
>
> *And it is He Who gives life and causes death, and His is the alternation of night and day. Will you not then understand? (Q23:80)*
>
> *Allah causes the night and the day to succeed each other (i.e. if the day is gone, the night comes, and if the night is gone, the day comes, and so on). Truly, in this is indeed a lesson for those who have insight. (Q24:44)*
>
> *And He it is Who has put the night and the day in succession, for such who desires to remember or desires to show his gratitude. (Q25:62)*
>
> *He has created the heavens and the earth with truth. He makes the night to go in the day and makes the day to go in the night. And He has subjected the sun and the moon. Each running (on a fixed course) for an appointed term. Verily, He is the All-Mighty, the Oft-Forgiving. (Q39:5)*

The day and night are succeeding each other without depriving either generation (in the past or presence) from the use of them. The welfarist view of sustainability extended to the environmental impacts which have direct links to outcome of business activities. Therefore, banking business has to be sustainable in such a way that will not destroy the conducive environment of human living. The permanent alternation between day and night has

translated a clear concept of sustainability. Similarly, apart from day and night, other creations (such as; the moon, sun, and stars) sustain the permanence positions in their existence.

> *Indeed your Lord is Allah, Who created the heavens and the earth in Six Days, and then He rose over (Istawa) the Throne (really in a manner that suits His Majesty). He brings the night as a cover over the day, seeking it rapidly, and (He created) the sun, the moon, the stars subjected to His Command. Surely, His is the Creation and Commandment. Blessed is Allah, the Lord of the 'Alamin (mankind, jinn and all that exists)! (Q7:54)*

In addition, Allah Has made this alternation (of night and day) useful and gives human beings sufficient means of livelihood and sustenance (Q3:27). In another verse (Q31:29), Allah expanded the issues beyond day and night with the inclusion of other sustainable creations (such as moon and sun) that are supportive to human sustenance, which is part of the environmental components of sustainability. Again, the following verses explores other elements:

> *Verily! In the creation of the heavens and the earth, and in the alternation of night and day, and the ships which sail through the sea with that which is of use to mankind, and the water (rain) which Allah sends down from the sky and makes the earth alive therewith after its death, and the moving (living) creatures of all kinds that He has scattered therein, and in the veering of winds and clouds which are held between the sky and the earth, are indeed Ayat (proofs, evidence, signs, etc.) for people of understanding. (Q2:164)*

> *And it is He Who spread out the earth, and placed therein firm mountains and rivers and of every kind of fruits He made Zawjain Ithnain (two in pairs - may mean two kinds or it may mean: of two varieties, e.g. black and white, sweet and sour, small and big). He brings the night as a cover over the day. Verily, in these things, there are Ayat (proofs, evidence, lessons, signs, etc.) for people who reflect. (Q13:3)*

Therefore, He (Allah) makes the day and night to interchange regularly and Has the power to hold one constant and destruct livelihood sustenance. With this, Allah challenges human beings:

> *Say (O Muhammad): "Tell me! If Allah made the night continuous for you till the Day of Resurrection, which ilah (god) besides Allah could bring you light? Will you not then hear?" (Q28:71)*

> *Say (O Muhammad): "Tell me! If Allah made the day continuous for you till the Day of Resurrection, which ilah (god) besides Allah could bring you night wherein you rest? Will you not then see?" (Q28:72)*

Allah expressed that;

> *It is out of His Mercy that He has made for you the night and the day that you may rest therein (i.e. during the night) and that you may seek of His Bounty (i.e. during the day) - and in order that you may be grateful. (Q28:73)*

Therefore, utilization of these bounties righteously and being obedient to Allah perpetuates means to a livelihood that would enhance sustenance. Sustainable development studies of the last quarter of a century have also acknowledged the impacts of financing for development which consider the environment as a crucial factor.

Conversely, the socioeconomic and environmental situations of the society is not being changed without human effort. Therefore, positive activities towards environment and society coexist livelihood and vice versa. For instance, sustainable investment is meant to improve well-being and the environment from degradation. It is evident in the content of Quran that Allah will not change the living condition of people to worse except they do it themselves:

> *".......Verily! Allah will not change the (good) condition of a people as long as they do not change their state (of goodness) themselves (by committing sins and by being ungrateful and disobedient to Allah). But when Allah wills*

a people's punishment, there can be no turning back of it, and they will find besides Him no protector. (Q13:11)"

It is severally mentioned in the Quran that the generations before the Prophet Muhammad transgress on earth, and Allah changed their living status from better to worse situations. At such, their actions initiated the preclusion of successive generations after them to have a good livelihood. For instance:

> *Indeed there was for Saba' (Sheba) a sign in their dwelling-place - two gardens on the right hand and on the left; (and it was said to them:) "Eat of the provision of your Lord, and be grateful to Him." A fair land and an Oft-Forgiving Lord!*
> *But they turned away (from the obedience of Allah), so We sent against them Sail Al 'Arim (flood released from the dam), and We converted their two gardens into gardens producing bitter bad fruit, and tamarisks, and some few lote-trees.*
> *Like this We requited them because they were ungrateful disbelievers. And never do We requite in such a way except those who are ungrateful (disbelievers). (Q34:15-17).*

The above verses stand as a clear example that disobedience to Allah affects not only the transgressors, rather the environment and habitat around them. Another example is that of the children of Israel where they had been given "*Al- manna* and quails", at the time when they submitted to the Will of Allah: (Q7:159) ".....The people of Musa (Moses) there is a community who lead (the men) with truth and establish justice therewith (i.e. judge men with truth and justice)". As a result of perfecting their deeds then:

> *And We divided them into twelve tribes (as distinct) nations. We directed Musa (Moses) by inspiration, when his people asked him for water, (saying): "Strike the stone with your stick", and there gushed forth out of it twelve springs: each group knew its own place for water. We shaded them with the clouds and sent down upon them Al-Manna and the quails (saying): "Eat of the good things with which We have provided you." They harmed Us not but they used to harm themselves (Q7:160). So also, Q2:57-58 and Q20:80.*

After that they later disobey, and Allah had changed it (enjoyment) with punishment (Q2:59). Allah summarized all destructions between generations due to their wrongdoing (Q29:40):

> *So We punished each (of them) for his sins, of them were some on whom We sent Hasiban (a violent wind with shower of stones) [as the people of Lout (Lot)], and of them were some who were overtaken by As-Saihah [torment - awful cry, etc. (as Thamud or Shu'aib's people)], and of them were some whom We caused the earth to swallow [as Qarun (Korah)], and of them were some whom We drowned [as the people of Nuh (Noah), or Fir'aun (Pharaoh) and his people]. It was not Allah Who wronged them, but they wronged themselves.*

Therefore, it is clear that generations are destroyed due to their unsubmissive attitude to the commandments of Allah. This is part of the reasons for which resulted to Muslims scholars have viewed links between human life and religion in all aspect. The earliest works of Islamic scholars was on the different dimensions of sustainable development (Islahi, 2004). The work of Abu Yusuf (1329 A. H.) in public finance to strengthen the state treasury. Likewise, Al-Mawardi, (1929, 1979, 1981) focused on religion and justice, social well-being and the environment, agriculture, crime free society, military, and power, education and training. Similarly, Al-Ghazali, (1964) in-depth analysis on life interdependence with sustainable growth and Ibn- Khaldun (1967) faced population size to productivity. All these contributions founded in concordance with the teachings and practice of Islam. Their treatises always linked religion to livelihood to aim the success (*Al-Falah*) in this world and hereafter. For instance, they linked sustainability development components with livelihood, the security of the state and religion practices. Moreover, the Quran mentioned that hunger and taste of life imposed to those transgress the path of Allah, as stated:

And Allah puts forward the example of a township (Makkah), that dwelt secure and well content; its provision coming to it in abundance from every place, but it (its people) denied the Favour of Allah (with ungratefulness). So Allah made it taste the extreme of hunger (famine) and fear, because of that (evil, i.e. denying Prophet Muhammad SAW) which they (its people) used to do. (Q16:112)

In another chapter of the Quran, Allah had made it clear to us that sustenance perpetuates through being obedient to Him:

(it is a great Grace and Protection from Allah), for the taming of the Quraish, (And with all those Allah's Grace and Protections for their taming, We cause) the (Quraish) caravans to set forth safe in winter (to the south), and in summer (to the north without any fear),So let them worship (Allah) the Lord of this House (the Ka'bah in the Makkah). (He) Who has fed them against hunger, and has made them safe from fear. (Q106:1-4).

Consequently, sustainability had superseded in the Islamic thought from two angles (i.e. *Tawhid* and *Mu'amalat*). The first is towards the understanding and believe in the actions of Allah to the world: *Tawhid Rububiyyah* (i.e. Uniqueness of Allah as the Omnipotent). Meaning, Allah, ".... The Lord of the world" (Q1:1); is the Creator (Q6:102; Q13:16; Q14:10; Q39:62; Q40: 62; Q42:11; Q59:24), Provider (Q51:58; Q62:11), the Sustainer of all existence and Ever-living (Q2: 255; Q3:2; Q20:111) and He provides sustenance to His creatures (Q3:27; Q3:37; Q5:114; Q6:151). The second aspect has to do with direct relationships between human actions in economic and social interactions. Therefore, all human shall observe doing right and forbidden wrong in social and economic relations. As Quran exalted this generation as the best:

You are the best nation produced [as an example] for mankind. You enjoin what is right and forbid what is wrong and believe in Allah. If only the People of the Scripture had believed, it would have been better for them. Among them are believers, but most them are defiantly disobedient. (Q3:110).

Meanwhile, other means for sustenance within the society is income distribution to reduce inequality. This has equally ordained the believers in Allah through Zakat and voluntary charity (sadaqah). Moreover, it can only be a channel to its appropriate provisions, as one is ready to be righteous. Therefore, inequality would perpetuate, as people are not willing to embrace the guidance of Islam and may lead to the seizure of the blessing of Allah. This category can be clear with other provisions in the Quran:

> *And if only the people of the cities had believed and fear Allah, We would have opened upon them blessings from the heaven and the earth; but they denied [the messengers], so We seized them for what they were earning (Q7:96).*

Therefore, actualizing sustenance and blessings of Allah must be linked to our commitment towards pleasing Him. Sustainability in relation to livelihood enhancement, and environmental protection as advocated in the work of Brundtland (1987) and that of Pearce, Barbier, and Markandya, (1988) could be easily achieved through being righteous. Consequently, reducing poverty, hunger, and environmental degradation/disaster have other external factors that are being controlled by Allah according to Islam (see: Al-Mawardi, 1929). Prophet Nuh has put it clear to his people:

> *And said, 'Ask forgiveness of your Lord. Indeed, He is ever a Perpetual Forgiver. He will send [rain from] the sky upon you in [continuing] showers. And give you increase in wealth and children and provide for you gardens and provide for you rivers (Q71: 10-12).*

It is clear that seeking forgiveness is another means for Allah's pleasure not only to sustainable livelihood but also in transactions. According to the Islamic guidance of transactions, indulging in interest, gambling and other non-permissible means of transactions are not accumulating the blessing of Allah. As mentioned in Al-Baqara, (276) "Allah destroys interest and gives increase for charities. And Allah does not like every

sinning disbeliever." It is evidently clear that recent financial crisis of 2007-2009 affected interest-based banks and they became defaulted due to accrued rate of interest which also increased the risk for the economic sustenance (Siddiqi, 2009; Chapra, 2009; Shaukat, Hassan & Al-habashi, 2014). Therefore, the survival of economic activities has to be socially relevant and consistent with faith values (Usman & Malik, 2014).

Recently, Dossa (2013) added that positive sustainability can only be achieved when the approach and the actors (stakeholders) are ethically sound. This argument is highly consistent with Hoffman & Haigh (2011) assertions in similar studies. Furthermore, sustainability studies were also linked to Islamic banking with social and ethical responsibilities (Rosly & Abu Bakar, 2003; Iqbal, 2005; Nor, 2012). In addition, Usman & Maliki (2014) concluded that conventional finance ethics is comprehensively inadequate compared with those of Islamic finance. Since Islamic finance is broadly based on teachings of Islam that originate from authentic sources of Quran and Hadith.

Despite several studies on sustainability, very few have been able to relate the concept of sustainability with the Islamic banks. These studies includes: sustainable development and Islamic Development Bank-IsDB aids (Mustafa & Razak, 2011); sustainable development and corporate social responsibility (Nor, 2012; Nor & Hashim, 2014); Islamic Sustainable Development (Zaman, 2013); sustainability and outreach (Ahmed, 2013); Institutional sustainability of Islamic banks (Aliyu, 2014); finally, ecology and Islamic finance (Usman & Malik, 2014). The conventional idea on sustainability has emphasized on the long-term maximum livelihood at present time that would not preclude the future generations'

standard of living (Hassan, 2006; Abdul Majid & Hussaini, 2011; Abdul Razaq & Ahmad, 2014).

Furthermore, Nor (2012) explores the relationships between the practice of sustainable development and corporate social responsibilities of the Islamic banks in Malaysia and traced back to the 2008 financial crisis that emerged as a result of institutional moral failure and ethical decadence. Consequently, the study admitted that the moderating effect of corporate social responsibility on the sustainable Islamic banking model is required to achieve sustainable development. In another study, Nor & Hashim (2014) relates sustainability of Islamic banking with the corporate social responsibility of Malaysian Islamic banks. The researchers found that Islamic banks are not prioritizing socio-economic objectives (e.g. poverty alleviation), but not completely failed in social responsibilities since they engaged in paying zakat, social and community development. The study recommends for incorporating Islamic moral economy (Asutay, 2007); El-Gamal, (2006) concept of Islamic banks and regulatory perceptions in future research. Moreover, their findings are not consistent with that of Asutay (2007) and Zaman & Asutay (2009) which revealed the complete failure of Islamic banking and finance toward societal contribution rather than maximizing profit.

Recently, Aliyu (2014) proposed a framework for sustainable Islamic banking, which was developed on the institutional aspect of sustainable banking and highlighted the social objective of *Shariah* to be achieved by Islamic banks. The study negated all moral decadence that is associated with the banking business such as interest rate, injustice, and

unfair dealing (see also; Siddiqi, 2009; Chapra, 2009). Meanwhile, Khan (2013) proposed corporate social responsibility framework for Islamic banking and finance of which among the components are: sustainability and market efficiency, *Shariah* governance, community-based banking, patrons and partner of poor and the weaker economy group, human resources and infrastructure, research and development, and innovation and cost leadership.

Similarly, Zaman (2013a) incorporates the functional roles of trust and leadership, *Iman,* and *Ihsan* to a proposed sustainable Islamic development model. And, further aligned the foundation of the social network to link between individuals, institutions, and society in the social capital. In the same way, Jan (2013) conceptualizes Islamic development model as a critique of Islamic finance failure to address societal problems such as poor economic development and well-being, education and health among others. The study envisaged quest for alternative means of development to the Muslim world under the shade of the Islamic moral economy. The proposed theoretical model was developed through the integration of epistemology of *Tawhid*, justice and *falah* of *Akhirah*. Nonetheless, previous studies (Asutay, 2007; Zaman & Asutay, 2009; Nor, 2012; Zaman, 2013; Jan, 2013; Nor & Hashim, 2014) are extending moral failure of the Muslim's economy on Islamic banking and finance. However, Islamic banks are responsible for sustaining the transactional morality, not for the economy as a whole. Therefore, the two perspectives of the sustainability will guide the study to evaluate the long-term survival of the banking transactions.

2.4 Sustainable Banking

Nowadays, banks are envisaged to realize a profit, survive longer period, and contribute to the social wellbeing of society (Dossa & Kaeufer, 2014; Banerjee & Velumuri, 2015). In this respect, the banking sustainability studies emerged from two divergent perspectives namely institutional and welfare approaches. The institutional focuses on the survival and solvency of the institutions, while welfarist concentrates on the capital allocation and financial decisions through outreach and *maqasid* sharia in the case of Islamic banks. The institutional and welfares' approaches to banking sustainability are derived from previous studies (Robinson, 2001; Hermes, Lensink, & Meesters, 2011; Nurmakhanova, Kretzschmar, & Fedhila, 2015; Mia, & Chandran, 2015; Bhanot, & Bapat, 2015). The operational and financial self-sustenance of the financial institutions is the concern of the institutional school of thought in which their studies diverse across different locations of the globe (Khandker, Khalily, & Khan, 1995; Oh, 1999; Conning, 1999; Morduch, 2000; Abraham, 2003; Cull, et al, 2007; Hartarska & Nadolnyak 2007; Shaw, 2010; McCormick, 2011; Hermes & Lensink, 2011; Ahmed, 2013; Aliyu, 2014).

In contrast, welfarist school of thought focuses on the financial decisions toward achieving social and economic wellbeing of the society through outreach and impact on the environment (Weber, 2005; Shicks, 2007; Conley, & Williams, 2011; Perpastergiou & Blanas, 2011; Hermes & Lensink, 2011; Nor, 2012; Ingham, Grafé-Buckens & Tihon, 2013; Askari & Rehman, 2013; Khan, 2013; Nor & Hashim, 2014; Dossa & Kaeufer, 2014; Tandogan & Özyurt, 2013). Consequently, other professionals outside the academic domain also supported the welfarist view (Jeucken, 2001; Imeson & Sim, 2010; CBN,

2012; GABV, 2012; Cambridge Institute of Sustainability Leadership-CISL & United Nations Environment Programs Finance Initiatives - UNEP FI, 2014; United Nations Economic and Social Commission for Asia and the Pacific- ESCAP, 2014). Their views extended to the link between financial institutions' decisions on societal impact and environmental prevention. The institutional approach is closer to Ismaili model of Islamic banking (Ismail, 2002). Meanwhile, the extension of the institutional approach to *maqasid* sharia realization gave birth to the Chapra model of Islamic banking (Chapra, 1979; 1985; 1992; 2000; 2007; Siddiqi, 1983; 1985; Naqvi, 2003; Rosly & Bakar, 2003; Haron & Kamarudden, 2005; Adelabu, Man, & Abdul Jubreel, 2011; Myers, & Hassanzadeh, 2013; Mansour, Ben Jedidia, & Majdoub, 2015). The cardinal point of the model (*maqasid* shariah) is closer to the welfarist's approach of sustainable banking. Therefore financial decisions and capital allocation of the Islamic banks shall be balanced between profit and socio-economic benefit of society.

2.4.1 The Institutional Approach

The institutional sustainability is proclaimed according to Nyamsogoro (2010) as permanence performance that repeats over time in both financial and operational stands. Consequently, Nurmakhanova, et al. (2015), adds that financial sustainability has to cover a long-run period of good performance. This definition is close to that of Banerjee, & Velamuri (2015), which characterize banks sustainability as bank soundness of being solvent for a long period. Thus, financial sustainability is regarded as the efficient ability of financial institution to be operating effectively and grow over time without any other support and interventions (such as subsidy, grant or bailout) within a minimal transaction cost and risk management (Hulme & Mosley, 1996; Hollis, & Sweetman, 1998; Zeller &

Meyer, 2002; Donford, 2003). Recently, Ahmed (2013) asserts that institutional sustainability is "the ability of financial institutions to sustain its activities without subsidies" (p. 209). It is imperatively clear that any financial institution supported by government intervention in the form of bailout or direct subsidy is not financially and/or operationally sustainable (see McCormick 2011, 2012; Aliyu, 2014). The proponents of institutional approach (Khandker, et al., 1995; Oh, 1999; Abraham, 2003; Cull, et al., 2007; Hartarska & Nadolnyak 2007; Shaw, 2010; McCormick, 2011; Hermes & Lensink, 2011; Hermes, et al., 2011; Ahmed, 2013; Aliyu, 2014) are of the view that maintaining operational and financial sustainability to the banking sectors is one of the mechanisms for rescuing them from being insolvent. Some financial institutions are being supported with subsidies or bailout from the government and Non-Governmental Organizations (NGOs) for them to sustain their operational cost (Khandker, et al., 1995; Hashemi, 1997; Halder, 2003; Bogan 2012; Aliyu, 2014). For banks to be financially sustainable, they must be able to cover all recurrent cost out of the return gained from loans and services (Hermes, et al., 2011). In some instances, this may reduce the level of their outreach and increase the cost of lending. Therefore, the trade-off between sustainability and outreach of financial institutions could be conflicting between the two perspectives (institutional and welfarist).

Institutional sustainability is measured based on financial and operational self-sufficiency (see: Hartarska & Nadolnyak, 2007; Cull, et al., 2007; Bogan, 2012; Quayes, 2012; Kinde, 2012; Ismail & Possumah, 2014). Most of these studies are conducted based on the capital structure variables assessment. These include the use of financial ratios from the balance sheet and income statement, market concentration index and other macroeconomic

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variables as control variables (such as inflation rate, the growth of real GDP, and exchange rate among others). In the same vein, Khandker, et al., (1995) points out that sustainability can be measured using financial, economic, institutional, and borrowers' viability. The first has to do with equalizing the cost per unit of the principal lent with the rate of interest. Secondly, the income derived from lending shall meet the opportunity cost (i.e. the economic cost of funds) of capital. The next is the long-term operational and managerial success of the institution (decision-making structure) in a relationship with their clients. The last is the crucial aspect, which can be measured through result assessment of the clients' business activities. This view extended the measures to other external stakeholders from demand side such as borrowers' viability to manage the loans. Some financial institutions are committed to cover their operational at all cost (i.e. extending unethical charges to clients) especially during recession periods.

The recent financial crisis of 2007-2009 has impoverished some financial institutions as a result of a moral failure in the traditional institutions (Siddiqi, 2009; Chapra, 2009; Lewis, 2015; Leathers, Raines, & Richardson-Bono 2015). Accordingly, McCormick (2011) notes that ethical and moral adherence to the banking sector are far beyond banking laws, regulations, and corporate governance reforms. It has to be incorporated with civil society's involvement in the sustainable investment decisions that is envisioned to improve the investors' and public confidence in the financial sector. In another study, McCormick (2012) points out that sustainable banks are those responsible banking that uses their financial power to allocate capital resources to ethical and sustainable investments. It is clear that responsible banks are those that are ethically and morally sound and in

compliance with laws, regulations, and corporate governance at the same time, investing customers' funds in a sustainable manner. In this respect, McCormick (2012) argues that banks must adopt long-term sustainability than short-term profit, and to focus on ethical moral relationships that are closer to behavioral and attitudinal issues. Therefore, sustainability is regarded as the capability of the organization to address its current business needs and to prepare for the future market and its environment (Vadari & Mallahi, 2014). Banks are urged to strive results through strengthening their corporate governance and risk management within the safe and stable environment, funding and quality assets for capital efficiency and sustainable profit (United Nation-ESCAP, 2014). This view links the institutional requirements of sustainability with environmental issues. Therefore, banks and other financial institutions have other roles to play in sustaining society and the environment such as through socially responsible investments.

2.4.1.1 Institutional Sustainability and Outreach tradeoff

Financial institutions as a backbone of every business financing have other duties to play in supporting business activities in addition to contributing the economic growth as a whole. Banks are desirous to alleviate the hardship and improve the socio-economic development of poor and committed entrepreneurs (Abdulrahman, 2010). Therefore, the need for the sustainable business model is an integral tool for business sustenance in the system and to attain the spiritual, and social objectives (Khaled, 2011). For instance, Hartarska & Nadolnyak (2007) conducted a cross-country study on the influence of regulations on sustainability and outreach. The findings of, Hartarska & Nadolnyak (2007) contradicts the earlier study of Arun (2005) which finds no relationship between sustainability and regulations. However, Arun reveals that sustainability is associated with

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less leverage status. On the other hand, Quayes (2012) finds a positive relationship between depth outreach and financial sustainability and suggested for future study to investigate the relationship between disclosure and financial performance. Consequently, Cull, et al. (2007) explore the financial and operational self-sufficiency and revealled that small banks are not sustainable compared to the large banks. Moreover, the authors highlight that the trade-off between sustainability and outreach is not feasible to banks that are located in village areas. In the same vein, Bogan (2012) asserts that grant (bailout) has a long-term effect on the operational sufficiency of financial institutions. Therefore, any changes in capital structure may indeed influence the efficiency of financial organizations (either positive or negatively).

Outreach in conjunction with capital structure variables are being used to measure the extent in which financial inclusion impacts the societal sustenance. In this respect, Kinde (2012) concludes that there is no significant relationship between outreach, capital structure (debt to equity), and sustainability within the period of the study (2002-2010). The paper suggested for exploring other dimensions of sustainability in future research. However, Ismail & Possumah (2014) conclude that the strength of capital structure has a greater impact on performance and sustainability of Islamic financial institutions. The authors support the view of using philanthropy funds such as voluntary charity (sadaqa), and the obligatory charity (Zakat) to support the sustenance of the Islamic financial institutions especially microfinance banks. Another consistent suggestion by Ahmed (2013) is that obligatory charity (Zakat) and waqf (voluntary endowment) would enhance

the sustenance and outreach of Islamic financial institutions especially on the provision of benevolent financing (*Qard hasan*).

In addition, Zaigham and Asghar (2011) extend the work of Zeller and Meyer (2002) in sustainability triangle with a specific focus on financial stability, societal welfare, and outreach. The result of the study revealed that financial institutions under investigation are not sustainable during 2009-2010. This finding supported that of Brau & Woller (2004) and Morduch (2000) as most banks that relied on intervention (such as subsidy, bailout or grant) are not self –sufficiently sustainable. Therefore, intervention funds (subsidies and bailout) have to be deducted in assessing the actual performance of the banks. As a result, Yaron & Manos (2007) argue that the subsidy dependence index is more robust in evaluating the sustainability compared to self-sufficiency. Furthermore, they also argue that outreach index is deemed fit to evaluate the social objective of the banks which contradicted the views of most of the scholars and professionals in the field. For microfinance institutions, it is intuitively clear that these institutions are mostly depending on the subsidy provided to cover their operational cost, which is contrary to commercial banks.

Nonetheless, empirical findings of microfinance banks are expected to be useful to other financial institutions in a similar situation since they are sharing similar characteristics in their capital structure (Bogan, 2012). However, the institutional performance of commercial banks is being assessed directly in relation to their efficiency, solvency, and survival (Cihak & Hesse, 2010; Abedifar et al. 2013; Beck et al. 2013; Pappas et al. 2016).

These studies used capital structure variables in line with CAMEL (Capital Adequacy, Asset quality, Management competency or efficiency, Earning power or quality and Liquidity) assessment to measure the survival and solvency of commercial banks. The studies used either non-parametric, semi-parametric, or parametric approach such as panel data analysis, data envelopment analysis, and or survival analysis to evaluate distance to failure, the risk of failure and solvency of the banks.

2.4.1.2 Banks Performance, efficiency, and Solvency

Institutionalist utilises performance, efficiency and solvency measures in predicting the sustainable and survival rate of the banks through the aids of CAMEL rating (Zeller & Meyer, 2002; Hartarska & Nadolnyak, 2007; Cull, et al., 2007; Ploeg, 2010; Zaigham & Asghar,2011; Kinde, 2012; Pappas, et al., 2014; Nurmakhanova, et al. 2015; Mia, & Chandran, 2015; Muhammad & Hashim, 2015). Similarly, Bikker (2010), evaluates different methods of measuring banks performance and employs efficiency (cost and profit efficiency, scale and scope of economies), cost (cost to income ratio and cost margin), profit (return on capital and assets and net interest margin) and market structure (number of banks and concentration) and concluded that all of them have relevance to banks performance. Consequently, previous studies found significant relationships between capital structure variables and the bank performance, and also a negative relationship with concentration index (Naceur, 2003; Grygorenko, 2009; Rajha, & Al-Slehat 2014).

However, Yosuf & Bahlous, (2013) proclaim that inefficient, malfunction-banking system leads to banks failure, and restrain financial inclusiveness to riskiest entrepreneurs. In

another study, Fiordelisi, Marques-Ibanez & Molyneux (2011) assess the intertemporal relationship between capital, risk and efficiency (cost and revenue) in the European Union banks. The study finds that banks inefficiency is a clear picture of bad management hypothesis which has tendencies to increase risk hazard and reduce the capital position of the bank in the short run and vice versa. Their findings supported the previous results of Berger & De Young (1997), and Williams (2004) on the similar sustainability study. It is notably clear that banks' survival is directly related to their operational efficiency, which is one of the measures of the institutional approach to sustainability.

In another comparative study between Malaysia and Pakistan Islamic banks, Khan, Chaudhary, Asad, Khan & Naqvi (2013) assert that Malaysians banks are operationally efficient compared to Pakistan banks'. Likewise, Rosly & Abu Bakar, (2003) find Islamic banks in Malaysia have a higher profit but are inefficient due to poor resource utilization. However, Hazzi and Al-Kilani (2013) have contrary findings on Malaysian Islamic banks. They report that Islamic banks are less profitable (similar to Samad & Hassan, 1999), more liquid, and less risky (consistent with Ryu, Piao & Nam, 2012; Samad, 2004) compared to the conventional banks. Similarly, Kouser, Amir, Mehvish & Azeem (2011) pointed out that conventional banks' performance in Pakistan outweighs that of Islamic banks in the country within the period of 2006-2010. Additionally, disaggregated data on financial earnings are more insightful in predicting specific issue for future financial positions of a firm (Fairfield, Sweeney, & Yohn, 1996; Alam & Brown 2006; Ohlson & Peng, 2006; Esplin, Hewitt, Plumlee, & Yohn, 2010). For the same reason, Farooq (2013) finds

disaggregated earning is more informative to Islamic banks compared to conventional banks in Pakistan.

However, the financial crisis of 2007-2009 engulfed many banks to distress and revealed their inefficiency to sustain longer. The effect of the crisis on conventional banks had not reflected the same on the Islamic banks. This paves the way for many comparative studies being conducted particularly in the Middle East, and Southeast Asian countries. Within GCC, Kader, Asarpota & Al-Maghaireh (2007) reaffirm that UAE Islamic banks are characterized by less risk and liquidity, less efficient and more profitable, which is not enough to conclude their long-term survival. On the other hand, Siraj & Pillai (2012) conducted a comparative study between conventional and Islamic banks on the evaluation of the crisis consequences on the two-model banking. The study reveals that Islamic banks in the GCC region have more equity finance compared to conventional banks. Similar comparative study (Al-Hares, Abu-Ghazaleh, & El-Galfy, 2013) supported the same findings and affirmed that banks at GCC region are financially fit to comply with Basel III guideline before 2019. In addition to capital regulations and maturity match, Islamic banks have higher capital regulations and maturity match compared to conventional banks (Bitar, 2014). However, inconsistent findings were documented on conventional and Islamic banks in the region (Parashar & Venkatesh, 2010; Hasan & Dridi, 2011). These studies that find higher liquidity, profit and capitalization of Islamic banks in GCC countries are not sufficient to conclude their long-term sustenance.

Meanwhile, Srairi (2013) finds that Islamic banks are stable with lower credit risks compared with conventional banks in the Middle East and North African region. In another study, which includes North African countries, Noor & Ahmed (2011) conducted an efficiency test among Islamic banks within the Middle East and North African countries and found that only Kuwait and Saudi Arabia's banks are efficient during the period of the study. Nevertheless, earlier on, Islamic banks in Bahrain were found to be profitable and having low risks in 1980's, (Turen, 1996). Similar findings were revealed on Islamic banks in Bahrain, which are not affected by the shocks of the financial crisis (Hidayat & Abduh, 2012). This, therefore, does not guarantee Bahrain's banks to be financially solvent for a longer period. However, Bitar (2014) discovers lower solvency measure (Z-score) for Bahrain, Malaysia, Iraq and Pakistan and higher for Saudi and Turkey. Secondly, the average return on the asset was low in Bahrain, Kuwait, Malaysia, and Singapore. Therefore, analyzing banks' survival coupled with long-term solvency will help in ascertaining their sustainability.

Complexities in the literature on comparative studies between conventional and Islamic banks indicates inconclusive findings for policy makers and non-experts in the society. For instance, by employing parametric analysis, Beck, et al. (2013) finds Islamic banks are less solvent compared to conventional banks. The findings of Pappas et al. (2016) have an inverse result compared to that of Beck, et al. (2013) by using the non and semi-parametric approach of survival analysis. Interestingly, another study which employed survival analysis for GCC region finds that conventional banks have higher survival chance compared to Islamic banks (Alandejani, 2014; Alandejani & Asutay, 2013). As a result,

further investigation on the aggregated and disaggregated data would make the findings more robust and conclusive.

Meanwhile, Chukwuogor-Ndu, & Wetmore (2006) noted that small size banks are profitable compared to medium and large banks before recession period. Similarly, recent studies reveal that small size Islamic banks have long survival period, and solvent relative to that of conventional banks (Cihak & Hesse, 2010; Beck, et al., 2013; Ouerghi, 2014; Pappas, et, al., 2014). The findings contradict that of Abduh and Idrees (2013), as they proved that the larger firms are better off than small firms based on economies of scale. On the other hand, Abedifar et al., (2013); Srairi (2013); Rozzani & Abdul Rahman (2013); Olson & Zoubi (2008) find no significant difference between the two banking models (Islamic and conventional) in relation to solvency. Therefore, further investigation is required beyond the previous time frame of their studies. Recent mergers and acquisition of some Islamic banks in GCC region and Asia between 2011 and 2014 (such as EONCapital in 2011; Dubai Bank in 2012; Capinnova Investment Bank in 2012; Elaf in 2013; BMI Bank, in 2014) revealed their incapacitation to sustain operations for the long period.

In another study, Abduh and Idrees (2013) identifies that inflation influences the profitability of Islamic banks as well as concentration and financial market development. In the same vein, Asutay and Izhar (2007) concludes that majority of Islamic banks' profit was sourced from financing activities rather than services and that the banks are biased towards short-term financing. Similarly, operational self-sufficiency is an important

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determinant of banks' sustainability that has been measured through operational income to overhead cost ratio. In this regard, Muhammad (2013) realizes that cost to income ratio influences profit of a firm. Therefore, the cost to income ratio stands as an important indicator in predicting banks' operational efficiency. In an attempt to investigate the agency cost hypothesis on Islamic banks in Malaysia, Pratomo & Ismail (2007) adapted Berger & di Patti (2006) procedure and found that lower equity capital ratio or higher leverage is related to profit performance. This implies that profitability of Islamic banks is linked with having enough leverage.

However, Cihak and Hesse, (2010) find that proportion of market share is not influencing Islamic banks strengths. In another study, Ouerghi (2014) assesses the resilience of Islamic and conventional banks during and after the crisis and proclaim that Islamic banks are solvent and less profitable during the crisis, and also less profitable and exposed to credit risk after the crisis. Secondly, other studies (Cihak & Hesse, 2010; Beck, et al, 2013) find that small size Islamic banks are better performing compared to large size banks. These studies have failed to account for long term relationships regarding solvency and effect size of the banks. Therefore, further investigations on the extent of Islamic banks survival and long-term solvency is required since the banks have recorded better performance in the short term.

In an effort to identify the level of distance to failure on the banks, Z- score was used to measure the solvency risk (see: Al-Osaimy & Bamakhramah, 2004; Maechler, Mitra, & Worrell, 2005; Demirgüç-Kunt, Enrica, & Thierry, 2008; Cihak & Hesse, 2010; Demirgüç-

Kunt, et al., 2013; Ouerghi, 2014). However, Z- score did not consider the life span of the banks before failure event. As a result, some studies employed survival analysis (Cole, 2014; Henebry, 1997; Pappas, et al., 2014; Stepanova & Thomas, 2002). Therefore, evaluating banks' failure from these two measures will ease the ambiguity of findings in the literature which leaves policymakers in inconclusive positions. With this, comprehensive foresight recommendations to decision makers and banks' management will certainly guide future decisions.

2.4.2 Institutional Sustainability: Islamic perspective

The sustainable Islamic finance and economic system must operate within the profit and loss sharing principles, depositors to be considered as investors, and the bank shall allocate free interest loan to both small and large business (Siddiqi, 2014). However, the recent financial crisis of 2007-2009 insinuates depositors, investors, and other stakeholders to become interested and selective in transactional relationships towards reputable and sustainability of the institutions. In addition, institutional sustainability indicators are identical for every bank with different motives either with regards to social, profit or combined objectives such as Islamic banks (Ismail, 2010). In Islam, Allah has sent down the book (Quran) that clarifies everything including transactional relationships (Q16:89). For instance, Demirguc-Kunt & Huizinga (2010) drew the attention of banks to non-interest income (such as trading-Q4:29) as the most stable and less risky with increasing rate of return. This assertion has been declared openly in Quran (2:275) "Allah has permitted trading and forbidden Riba (usury)" which in turn will reduce the severe injustice among surplus and deficit agent of the economy. Islamic banks are established based on interest-free transactions as been prohibited in Quran (2:275-279). However, Chong and

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Liu (2009), Cevik and Charap (2011) and Ergec and Arslan (2013) discovered that some of the Islamic banks transactions mimic those with interest rate based. Consequently, depositors' behaviors in Malaysia are influenced by the tangible reward of profit in this world, not the reward of hereafter (Zainol & Kassim, 2010). In the study, the results showed that increase changes to interest rate usually diverts Islamic banks' depositors to conventional banks and vice versa. Similarly, the same attitudes are found from the Indonesian depositors (Kasri & Kassim, 2009). However, the early study by Haron & Ahmad (2000) revealed a negative relationship between interest and deposits to Islamic banks in Malaysia. Therefore, these findings showed that customers are profit motivated which revealed their tendency to be influenced by the changes in return rather than abstaining from interest. This implies that customers are liable to withdraw their balances to conventional banks in the event of higher interest above the return on *mudarabah* account. As a result, it will reduce Islamic banks' funds for investments which may affect their long-term performance and solvency. It is clear here to understand that sustainability of Islamic banks have a direct link with deposit side as proclaimed same to conventional banks (Khandker, et al., 1995).

With regards to Islamic banking sustainability, Aliyu (2014) developed a framework, which has direct derivational support from the analogy of verses from Quran and Hadith. The framework has the structural links between the player and elements of the banking business that would sustain Islamic banking. Therefore, banks sustainability is a stakeholders' (such as depositors, bankers, regulators, investors, shareholders) commitments through moral ethical behavior (Dossa & Kaeufer, 2014). However, Ismail

(2002) the proponent of Islamic banks' values maximization than attaining social well-being of society, developed arguments based on the three verses (2:275; 282 & 4:29) of the Quran. The institutional perspective of Ismail (2002) denounced the Chapra model that advocated for welfare attainment. Though, the author recognizes other Islamic obligations of Islamic banks such as zakat and charities among others but emphasizes on the normal exchange contracts for Islamic banks as to maximize its values (Ismail, 2002, 2014; Dusuki, 2008a). Referring to Ismail (2002), the institutional approach is based on the deferred contractual relationship as mentioned in (Q2:282). Similarly, various lessons in the verse which include; recording transactions, capacities, relationship between players, justice, accountability and commercial contracts have been extended. Meanwhile, *Ihsan* and forbidden activities are linked to the verse (Q2:282) as follows:

> *O you who believe! When you contract a debt for a fixed period, write it down. Let a scribe write it down in justice between you. Let not the scribe refuse to write as Allah has taught him, so let him write. Let him (the debtor) who incurs the liability dictate, and he must fear Allah, his Lord, and diminish not anything of what he owes. But if the debtor is of poor understanding, or weak, or is unable to dictate for himself, then let his guardian dictate in justice. And get two witnesses out of your own men. And if there are not two men (available), then a man and two women, such as you agree for witnesses, so that if one of them (two women) errs, the other can remind her. And the witnesses should not refuse when they are called (for evidence). You should not become weary to write it (your contract), whether it be small or big, for its fixed term, that is more just with Allah; more solid as evidence, and more convenient to prevent doubts among yourselves, save when it is a present trade which you carry out on the spot among yourselves, then there is no sin on you if you do not write it down. But take witnesses whenever you make a commercial contract. Let neither scribe nor witness suffer any harm, but if you do (such harm), it would be wickedness in you. So be afraid of Allah; and Allah teaches you. And Allah is the All-Knower of each and everything.*

The above verse has a comprehensive structure that can sustain financial transaction, between the institution, individuals, and society as a whole.

Table 2.1: Conceptual deductions from the Quranic Verse (2:282)

The Structure	Elements	From the Quranic verse	The concepts derived
Relationships	Dyadic	*"O you who believe! When you contract a debt for a fixed period, write it down. Let a scribe write it down in justice between you".* Also .... *"And get two witnesses out of your own men".*	Debtor-Creditor relationship with or without (Q2:283) intermediation.
	Network		Inclusion of the scribe and witnesses such as banker and referees extend the relationship to network
Functions	Bank staff/Management	*"Let him (the debtor) who incurs the liability dictate, and he must fear Allah, his Lord, and diminish not anything of what he owes. But if the debtor is of poor understanding, or weak, or is unable to dictate for himself, then let his guardian dictate in justice."*	The third party shall record the transaction, such as bank's staff as custodians of the capital owners' funds via justice and disclosure. Protecting the interest of all stakeholders through abiding with the prudential regulations of Islamic financial transactions.
	Governance		
Capacities	Human Resourcefulness & Infrastructure	*write it down*	Knowledge of the transaction required on scribe- Islamic financial transaction and also equipment for recording transactions
Islamic moral Transaction mode	*Adl*	*"Write it down in justice between you. Let not the scribe refuse to write as Allah has taught him, so let him write. Let him (the debtor) who incurs the liability dictate, and he must fear Allah, his Lord, and diminish not anything of what he owes"*....And also in the verse...... *"So be afraid of Allah; and Allah teaches you. And Allah is the All-Knower of each and everything".*	Justice is required in the Islamic finance transaction between parties involved.
	Ihsan		Fear of Allah has been established in Hadith Jibril (Muslim: book1:4) as a hierarchy of *Ihsan.* Also, *Adl* and *Ihsan* are merged in Q16:90 where *Ihsan* took the position of benevolence, generosity, charity e.t.c.

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Table 2.1 (continue)

Banking Business	Risk management	*"You should not become weary to write it (your contract), whether it be small or big, for its fixed term, that is more just with Allah; more solid as evidence, and more convenient to prevent doubts among yourselves, save when it is a present trade which you carry out on the spot among yourselves, then there is no sin on you if you do not write it down. But take witnesses whenever you make a commercial contract. Let neither scribe nor witness suffer any harm, but if you do (such harm), it would be wickedness in you".*	Fixed term and spot Banking businesses in the form of *mudarabah, musharakah murabaha, istisnah masaqah, muzara'a,* salam, *qard hassan* e.t.c. have to be on record in order to evaluate the risks and assess the impact on societal wellbeing that does not harm to the people and environmental.
	Result based assessment		
Accountability	Monitoring	*"And get two witnesses out of your own men. And if there are not two men (available), then a man and two women, such as you agree for witnesses, so that if one of them (two women) errs, the other can remind her. And the witnesses should not refuse when they are called (for evidence)".*	Institutional monitoring and evaluation through internal and external control will suffice long-term survival.
	Evaluation		

Structure and Elements adapted from Aliyu (2014), Qur'an verses adopted Taqi-ud-Din Al-Hilaali and Khan (1998)

Table 2.1 summarizes the structure therein the verse and begins with the dyadic relationship (i.e. the debtor and creditor) and extends to network relationships with or without intermediation.

Similarly, with the inclusion of other parties such as witnesses and other immaterial elements; capacities (human capital skills [knowledge of the transactions and writing skills], capital adequacy [Q2:280] and infrastructure [as writing materials]), Islamic moral transaction mode (*Adl*, *Ihsan*, abstain from evil deeds in the transaction including interest-2:275-279, consent of the parties involved, fear of Allah), and accountability (witnesses, and record keeping) provide clear understanding of the phenomenon. In addition, other elements are also considered in the verse such as the managerial and corporate governance functions, banking business, and the other stakeholders' interest.

In this section, the institutional banking sustainability has been discussed, and the subsequent sub-sections (2.4.1.1-2.4.1.7) elaborate each element based on Islamic perspective of financial transactions. The first sub-section (2.4.1.1) deals with recording transaction as earlier directed in the Quran (2:282) which coincides with the conventional assertions of the institutional sustainability (Cull et al. 2007; Hartarska & Nadolnyak, 2007; Nyamsogoro, 2010; Alali & Romero, 2013) and solvency (Roy, 1952). Meanwhile, an accomplishment in recording transactions necessitates Islamic banks' staff to be equipped with the knowledge of the Islamic financial transactions coupled with banks' capital adequacy requirement. The Islamic exchange relations in the banking business was discussed in the sub-section (2.4.1.3), in which a link was established with the concept of

justice and *Ihsan* thereafter. Intuitively, Islamic banks transactions are restricted to certain prohibited activities such as interest, gambling, and speculations among others. Therefore, a particular sub-sections also detailed on the accountability and commercial contracts.

2.4.2.1 Recording Transactions

The institutional sustainability analysis is a product of financial records (Cull, et al. 2007; Hartarska & Nadolnyak, 2007; Nyamsogoro, 2010; Alali & Romero, 2013). Therefore, proper financial records of the bank such as income statement and balance sheet records are integral requirements for the institutional approach of analysis. In banking transactions, the verse (2:282) and other verses are sufficient to establish certain principles for sustaining financial transactions in the banks. Allah said, "O you who believe! When you contract a debt for a fixed period, write it down". Ibn Kathir (2003) noted that Allah commanded us to write any delay transaction: "that is more just with Allah; more solid as evidence, and more convenient to prevent doubts among yourselves". Tabari (nd) opined that either it is a sale of commodity or loan it is compulsory to have witnesses and/or to write. The verse also extends to managerial functions in transactions. It noted that operational self-sufficiency is an integral part of management efficiency in funds management. Therefore, it is apparently clear that inefficient banks are found not sustainable (Bogans, 2012). From conventional perspective, management functions are categorized into planning and organizing, directing and control (Daft, 2012). Meanwhile, managers are delegating responsibilities to their co-workers that have direct relationships with customers (Dedu & Nitesscu, 2014). In view of this, recording transactions are part of those duties and responsibilities of the co-workers in the banks which are immensely required in assessing the sustainable performance of the banks.

Table 2.2: The Three Perspectives of Corporate Governance

Aspects	The Anglo-Saxon Model	The European Model	The Islamic Model
Episteme **Objective**	Rationalism and Rationality	Rationalism and Rationality	*Tawhid.*
Rights and Interest	To protect the interest and the right of the shareholders.	The right of the community in relation to the corporation.	To protect the interest and rights of all stakeholders but subject to the rules of the *Shari'ah.*
Corporate goal	Shareholders control managers for the purpose of shareholders' profit.	Society controls the corporation for the purpose of social welfare.	*Shari'ah* objective or *maqasid al-Shari'ah.*
Nature of Management	Management dominated.	Controlling shareholders dominated.	Concepts of vicegerency, *shura,* and interactive, integrated and evolutionary process.
Management Board	One-tier board.	Two-tier boards: executive and supervisory hold separate responsibilities.	*Shari'ah* board as the ultimate governance.
Capital and ownership structure	Widely dispersed ownership; dividends prioritized.	Banks and other corporations are major shareholders; dividends less prioritized.	Shareholders and depositors or investment account holders.

Source: International *Shariah* Research Academy for Islamic Finance-ISRA, 2012:690

Accordingly, the functions of management have a direct link to that of the corporate governance. For Islamic banks to have long-term sustenance, they must strengthen their corporate governance structure in accordance with the principles of *Sharia* (Aliyu, 2014). However, the concept of Islamic corporate governance structure supersedes the conventional ideas of Anglo-Saxon's and that of the European model. The Islamic model incorporated other functional components of "*Tawhid, Shura, and Shariah* rules with Islamic morality and maintains the private goal without ignoring the duty to social welfare" (International *Shariah* Research Academy for Islamic Finance-ISRA, 2012:690). The features of the three models of corporate governance have been summarized based on four major issues in Table 2.2. The Islamic model centered on the epistemology of *Tawhid* ideology rather than those models of rationality which are derived from the selfishness of human logical thinking that contradict the essence of human existence. In this regard, the Islamic philosophy of corporate governance has a direct link to *maqasid shariah* which is considered as a major construct of welfare approach of sustainability.

The Islamic model in Table 2.2 begin with *Tawhid* (the oneness of Allah). The essence of our being on earth has a purpose (Q3:191), that is to worship Allah (Q51:56), He alone, and unify Him in worship. Therefore, surrendering to the Wills of Allah is the only means that will rescue and sustain the interest of all stakeholders. In essence, all actions are accounted and will be judged accordingly hereafter on the day of resurrection (Q99:7-8). Secondly, stakeholders' rights and interest are channels to achieve *maqasid al-Shariah* through integrative and interactive evolutionary process through the concept of *shura* and vicegerency (Hasan, 2008, 2009, 2012). At this stage, the balance between the two

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approaches of sustainability through *maqasid* and *shura* council. For instance, the structure of Islamic banks have *shura* council for approving products and legalizing profit realized which is close to the institutional approach to sustainability while is *maqasid* aligned to welfare approach. Furthermore, the highest supreme council under this model is *Shariah* board for regulating the activities of the corporation (bank) according to Islamic injunctions. The Islamic financial system is built on contractual investment agreement of profit and loss sharing, sale mode and deferred payments among others. Thus, depositors or investment account holders have capital ownership of the business contrary to the conventional approach. Therefore, sustenance of Islamic banks has a link with investment account holders as they are considered as part of the capital owners of the banks. Meanwhile, active participations of the communal representations in governance framework will strengthen Islamic banks' efforts to attain social and economic objectives which in fact, are considered welfare approach of sustainability. Therefore, successes of the management and governance functions are nested within the active institutional capacities.

2.4.2.2 Capacities

Human capacity is considered crucial in predicting banks' long-term sustainability (Šlaus, & Jacobs, 2011; Rajeswari, 2015). With regards to Islamic banks, human capital capacities include the skills of writing transactions and having knowledge in relation to the terms of the contracts which is part of the contractual requirement for transactions as contained in the Quran 2:282. As a result of the command to "write it down": financial records become integral requirements for assessing financial and operational self-sufficiency which in turn reflect the sustenance of banks (Cull, et, al 2007; Hartarska & Nadolnyak, 2007;

Nyamsogoro, 2010). In this respect, Khan (2013) argues that most of the Islamic banks personnel are employed from conventional banks. And, the banks failed to provide them with intensive training on the core Islamic banking values and practices which make them less equipped. Despite that recruitment and development (of human resources) are considered as a critical for building effective management team (Pearce & Robinson, 2003).

It is noted that poor skills and capacity acquisition resulted to 2007-2009 financial crisis of the banking industry (CBN, 2012a:3). In the same vein, considering the peculiarities of Islamic finance in general, staff training and re-training on interval basis is of significant importance (Iqbal, Ahmad & Khan, 1998; Iqbal, 2008; Sanusi, 2011; Dogarawa, 2013). Similarly, Nienhaus, (2013); Archer & Abdel Karim, (2013); White & King (2013) emphasises on the need of Islamic banks and regulators to be equipped with sound knowledge of Islamic transactions. Meanwhile, experts and scholars are recommended to have intensive knowledge of Fiqh *Muamalat* (Aliyu, 2014). Likewise, Archer & Haron (2013) opined that training is necessary for the employees of Islamic banks in order to complement and sustain with the challenges highlighted in Basel III and other ratios computations for sufficient information disclosures. In this way, Podpiera & Weill, (2008) assert that educating banks managers have a likelihood of improving their efficiencies. Similarly, Islamic financial literacy is also required by the customers for the sustenance of their businesses that in turn have direct impacts on the respective of financial institutions' stability in terms of repayment (Alpay & Haneef, 2015; Lukonga, 2015). In the modern transactions, computational procedures are applied to assess the efficiencies, performance,

strength and weaknesses of the banks' transactions. To this end, those records are the rooting ground for operational and financial self-sufficiency which is found in the institutional approach of sustainability. (see: Cull, et al, 2007; Hartarska & Nadolnyak, 2007; Nyamsogoro, 2010).

However, financial capacity of adequate capital is required for Islamic financial transactions. Therefore, capital adequacy explains the banks' strength to hedge against contagion risk as a result of loan loss or repayment delay (Adhikary, 1992). It is intuitively clear that higher loan loss provisions which resulted from bad debts are considered as banks' costs to failure. Therefore, Islamic financial institutions requires enough capital adequacies to sustain financial transaction and to complement the condition for the extension of time to the debtor. As said:

> *And if the debtor is in a hard time (has no money), then grant him time till it is easy for him to repay, but if you remit it by way of charity, that is better for you if you did but know (Q2:280).*

The above verse implies the need for sufficient funds for continuous transaction activities due to extension and loans loss provisions that are being applicable also to Islamic banks. In addition, adequate capital will help the Islamic banks to safeguard the *maqasid* objective as stated in verse (Q2:280) and to have long-term survival in the business (Bitar, 2014). Similarly, previous studies (Iqbal, Ahmad & Khan, 1998; Iqbal, 2008) assert that Islamic banks require higher liquidity ratio and risk management to survive in the system. Consistently, Ismail (2010) stresses the importance of capital adequacy with continued positive trend of profits for Islamic banks to earn sustenance in the system. In addition, capital adequacy increases stock and absorbs losses that may occur within the Islamic

banks. Adhikary (1992) foresees capital adequacy as a tool for strengthening the institutions' structure, protecting depositors against any risk and losses to which the bank may be exposed to and at the same time to maintain general confidence in the banking system.

However, Ahmed, Asutay & Wilson (2014) assert that Islamic banks have already embraced the Basel II standards, but the requirement of Basel III and net stable funding ratio are not giving considerations to the modes of Islamic banking activities. However, capital adequacy regulation is aimed at promoting financial stability, reducing systematic and unsystematic financial shocks. At the same time, to reduce the serious loss of depositors and investment account holders (IAH) in case of insolvency of the bank (ISRA, 2012:641). Nonetheless, the issue here, to Islamic banks is on IAH (such as; *mudarabah* account holder) which regulators are not treating them as common equity to the bank but rather as a liability. Similarly, in principle Islamic banks financing are not on loans basis, whereas their mode of financing is counted as loans under Basel III (Ahmed, Asutay & Wilson, 2014). However, ISRA (2012) argued that Basel III requirement is not closed to the conformity with Islamic financial activities compared to Basel II which is closely related to Islamic Financial Service Board (IFSB-2) issued in 2005, and at the same time has taken care of Investment Risk Reserve (IRR) and Profit Equalization Reserve (PER) similar to "capital conservation and countercyclical". In this way, sufficient capital is required for Islamic banking transactions against all form of risks and failure. Finally, Bitar (2014), recommends for IFSB to formulate standards for capital adequacy of Islamic banks that will suit their transaction modes. Therefore, in all ramifications, excess liquidity would

functionally sustain the effectiveness and efficiency of the banking business through available infrastructures (such as; provision of legal, supervisory, regulatory and market framework).

2.4.2.3 Relationships in the Bank

Sustainability disclosure of the banks is one of the processes to identify corporate responsibilities that extend to the poor, society and environment (Platonova, Asutay, Dixon, & Mohammad, 2016). All these are accessed through transactional records of the corporate financial statements (see: Ballou, Heitger, Lanes, & Adams, 2006; Frost, Jones, Loftus, & Van Der Laan, 2005; Amran & Haniffa, 2011; Joseph & Taplin, 2011). Again, proper monitoring records of transactions are used to measure "bad management" hypothesis (Fiordelisi, et al., 2011). For example, banks operating with a high level of overhead cost and lower assets return have a likelihood of distress (Wheelock & Wilson, 2000; Maghyereha, & Awartani, 2014). The situation can also emerge from bad luck hypothesis, where huge non-performing loans resulted to higher cost and bank failure at the end (see: Podpiera & Weill, 2008). In some cases, bad luck and management hypothesis arises due to poor relational coordination of activities within the corporation. Therefore, strengthening relationships between managers and co-workers in the bank is a necessary condition for efficiency and managerial risks reduction. Pleasant relationships between management and co-workers is found to be among the factors that strengthen good performance, efficiency, future survival and sustenance of the banks (Constantinescu, & Morar, 2009; Essien, Adekunle, & Oke-Bello, 2013; Nwagbara, Smart Oruh, Ugorji, & Ennsra, 2013). Therefore, relationships between management and co-workers in the Islamic bank should be treated under the guidance of Quran:

Is it they who would portion out the Mercy of your Lord? It is We Who portion out between them their livelihood in this world, and We raised some of them above others in ranks, so that some may employ others in their work. But the Mercy (Paradise) of your Lord (O Muhammad صلى الله عليه و سلم) is better than the (Wealth of this world) which they amass (43:32).

For Islamic banks to sustain, efficient management relationship between lower and higher carder has to transpire. As Allah had raised others in ranks to employ others and work with them. Therefore, lower ranking staff are mandated to respect and obey those in authority as long as they do not contradict the teaching of Islam:

O you who believe! obey Allah and obey the Messenger (Muhammad صلى الله عليه وسلم), and those of you (Muslims) who are in authority. (and) if you differ in anything amongst yourselves, refer it to Allah and His Messenger (صلى الله عليه وسلم), if you believe in Allah and in the Last Day. That is better and more suitable for final determination. (Q4:59).

The interactional relationship (*mu'amalat*) between the lower and higher cadre in the working class has to be balanced as the two verses commanded. This will enhance smooth relationships and selflessness, commitment towards value maximization of the bank. Therefore, equal respectable treatment between managers and co-workers up to customers will sustain the banks' relationship to have longer surviving transactions. At such, it is mentioned in Quran:

And by the Mercy of Allah, you dealt with them gently. And had you been severe and harsh-hearted, they would have broken away from about you; so pass over (their faults), and ask (Allah's) Forgiveness for them; and consult them in the affairs. Then when you have taken a decision, put your trust in Allah, certainly, Allah loves those who put their trust (in Him). (Q3:159).

Poorly and inefficient managerial operations (leadership inclusive) are also found to be attached to unsustainable banks (Wheelock & Wilson, 2000). Consequently, Islamic sustainable managerial leadership will not sustain longer without combining the elements

of *Ash-shaja'ah* (courage and bravery) and *Al-Karam* (generosity) which are products of *Al-Ihsan* (Zaman, 2013). The manager has to stand firmly in establishing justice by placing everything in their right positions without discrimination or taking undue advantages of others. At such, *Ash-shaja'ah* alone cannot suffice sustainable leadership without generosity ('Ali Al-Bazzar, nd) as found in the lofty virtues of Ibn Taymiyyah. This condition is a reflection of the good principal-agent relationship that can be applied to bankers-customers' relationships. In this way, having good relationship sustains customers, which in turn yields the higher return to the bank. Again, it reflects on the good deeds of perfection (i.e. *Muhsin*). *Muhsin* is a person (could be a leader/manager) who acts on the functions of *Ihsan* and is regarded as "the good doer who performs good deeds for the sake of Allah without any show-off or gain praise or fame e.t.c., and in accordance with the *Sunnah* (legal ways) of Allah's Messenger" (Taqi-ud-Din Al-Hilali & Khan, 1419AH:21).

For the manager of the bank to acts as *Muhsin*, then must submit himself to Allah and be righteous (Quran 4:125; 16:120; 31:22). This criterion is another input that abolishes self-interest, asymmetry of information, moral decadence, misappropriation and embezzlement of the corporation resources (example; funds and assets, e.t.c.) for the sake of banks' sustenance. Similarly, this criterion has to be aligned to the fulfillment of obligations (Q5:1) and oaths (Q16:91) to ensure the success in this world and the hereafter (Q28:77). In Islam, bank-customer relations are expected to be cordial of being compassionate, lenient, fair treatment and justice in affairs (Dakhallah & Miniaouni, 2011). Consequently, Islamic bank and customers' relationship is multifaceted depending on the transactions. The bank can be financier or entrepreneur based on the contract engagement (Aliyu, 2014;

Zaheer, 2013). Therefore, all contractual relationships have to be put in writing (i.e. to account for the financial obligation) in order to achieve future sustainability.

Previous studies noted that it is not only financial and operational self-sufficiency that have to be counted as part of sustainable measures to financial institutions. For instance, Molina (2002) relates banks survival analysis with deposit side effect and found that depositors determine banks' sustenance through their ability to pay high interest on the deposit. Therefore, in the case of low interest pay out by the bank, depositors withdraw their money to hedge against failure. It is acknowledged in the literature that deposit side of the bank also influences the performance of a bank (See: Khandker, et al., 1995; Haron & Ahmad, 2000; Kasri & Kassim, 2009; Zainol & Kassim, 2010; Zaheer, 2013). Besides share capital and retained earnings, deposits from the customer (especially from investment account) are being mobilized as another source of fund to Islamic banks (Al-Deehani, Karim & Murinde, 1999). The higher the mobilized deposit, the greater sufficiency of capital available for investment/financing and the greater will be the return to the Islamic banks and vice versa. In this regards, justice and fairness are the only transparent medium that is expected to transpire between the partners in business (capital provider and entrepreneur/bank and customers) contrary to debtor-creditor relations (Alpay & Haneef, 2015).

2.4.2.4 Justice and *Ihsan*

Justice and *Ihsan* are other components of sustainability studies (Zaman, 2013; Noor, 2012; Jan, 2013). Similarly, justice is one of the major construct of the *maqasid* index of the welfarist approach, and *Ihsan* is extended through charitable acts (Mohammed &

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Abdulrazaq, 2008; Antonio, Sanrego, & Taufiq, 2012; Ngalim & Ismail, 2014; Shamsudin & Mohammed, 2015). Allah Said: "Let a scribe write it down in justice between you". The concept of *Al-Adl* (Justice) has a broad-spectrum meaning in which single word will not comprehend it compositions. The literal definition of justice according to Baalbaki (1995) is categorized into five different stages. Meanwhile, the closest meaning in this context is grouped as "just, fair, equitable, unbiased, unprejudiced, evenhanded, fair-minded, rightful, honest, upright and straightforward" (p. 742). Similarly, some keywords used in defining justice are found to be related to the conceptual definition of other contextual literature (Ibn Kathir, 2003; Ismail & Zali, 2014). Scholars interpreted *Adl* in explaining the content of (Q16:90). They understand/perceive it as placing things rightfully at their equal/appropriate position via exploring the following verses of the Quran: it is apparently clear in the law of equality in punishment. For instance, (2:178) "...free for the free, the slave for the slave, and female for the female...", likewise in (16:126) Allah permits us only to do alike "And if you punish (your enemy, O you believers in the Oneness of Allah), then punish them with the like of that with which you were afflicted". In Islam, " The recompense for an evil is an evil like thereof, (42:40)", " And We ordained therein for them: Life for life, eye for eye, nose for nose, ear for ear, tooth for tooth, and wounds equal for equal (Q5:45)". These citations explicate the act of similar placement without transgression of any rights in the case of punishment.

Adl is a necessary condition for sustainable Islamic transactions and relationships (Zaman, 2013; Noor & Hashim, 2014; Aliyu, 2014). In general, 'writing with *Adl'* in the contractual terms and agreement is a sub-set to offer (*Ijab*) and acceptance (*qabul*) in the Islamic

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contract ('*Aqd*) of the transaction (ISRA, 2012 p. 193). In essence, before writing the transaction, the parties must agree on the subject matter of contract or transaction. Likewise, to the scribe (banker) should not hide any vital information due to the ignorance of the debtor. Therefore, the banker should record the exact transaction with truthfulness without hidden charges or asymmetry of information in the case of return or loss on the transactions (see; Ibn Kathir, 2003). Moreover, Allah added "Let not the scribe refuse to write as Allah has taught him, so let him write." The scribe (banker) must remember that (Q16:78): "And Allah has brought you out from the wombs of your mothers while you know nothing. And He gave you hearing, sight, and hearts that you might give thanks (to Allah)"**.** Therefore, utilising the knowledge appropriately is part of the appreciation to Allah as commanded. The banker in this position must write the contract as knowledgeable in the area and shall not conceal anything as Allah commanded to write (see: Ibn Kathir, 2003). Likewise the debtor, as said, "And he must fear Allah, his Lord, and diminish not anything of what he owes" while interpreting the content of the transaction.

The command of writing contract is another directive in the duties of religion. As such, Ibn Kathir (2003) referred the writing contract as an act of charity. As a result, the verse revealed the intensive needs for financial literacy on the bankers as well as their customers. Furthermore, the verse stresses on the alternative to writing; "But if the debtor is of poor understanding, or weak, or is unable to dictate for himself, then let his guardian dictate in justice". The guardian in this position could be a professional practitioner (lawyer, accountant, and banker e.t.c.), close relative or the co-worker of the bank. Therefore, justice

should be incorporated in any transaction with clients while concealing truth diminishes the blessing of Allah on the transactions:

> *Narrated Hakim bin Hizam: The Prophet said, "Both the buyer and the seller have the option of cancelling or confirming the bargain unless they separate." The sub-narrator, Hammam said, "I found this in my book: 'Both the buyer and the seller give the option of either confirming or cancelling the bargain three times, and if they speak the truth and mention the defects, then their bargain will be blessed, and if they tell lies and conceal the defects, they might gain some financial gain but they will deprive their sale of (Allah's) blessings." (Bukhari: Book 34, Hadith 327)*

Furthermore, Ibn Kathir (2003) and, Tabari (nd), in their interpretation of this portion of the verse (Q2:282) added 'truthfulness' and 'fairness' while writing the transaction. In Quran (9:119), Allah commanded us not only to be truthful but also to be part of those who are truthful in their deeds and actions. The Quran highlights the acts of truthfulness: "O you who believe! be afraid of Allah, and be with those who are true (in words and deeds)". According to Zaman (2013), the functional truthfulness is within the Islam-*Iman- Ihsan* paradigm as proposed for Islamic institutional sustainable development. The concept of truthfulness is the link between *Assa'adah Al-haqiqiyyah* (real fortune of this world and hereafter) with Islamic institutional sustenance. Consequently, this view is similar with that of Zaman & Asutay (2009) in their effort of restoring divergent from reality to the real aspiration, which was built on the premise of Hadith Jibril. The Hadith Jibril had explained the path to *Ihsan* with an implicit inclusion of *Adl* concept to the highest esteem of *Ihsan* while Quran (16:90) included *Adl* without the foundation of Islam and *Iman* as contained in the following Hadith. Thus, revealing and joining the two will extend to the clear understanding of the concept.

Hadith Jibril (Badi, 2002):

*While we were one day sitting with the Messenger of Allah, sallallahu 'alayhi wasallam, there appeared before us a man dressed in extremely white clothes and with very black hair. No traces of journeying were visible on him, and none of us knew him. He sat down close by the Prophet, sallallahu 'alayhi wasallam, rested his knee against his thighs, and said, O Muhammad! Inform me about Islam." Said the Messenger of Allah, sallallahu 'alayhi wasallam, "Islam is that you should testify that there is no deity save Allah and that Muhammad is His Messenger, that you should perform salah (ritual prayer), pay the Zakah, fast during Ramadan, and perform Hajj (pilgrimage) to the House (the Ka'bah at Makkah), if you can find a way to it (or find the means for making the journey to it)." Said he (the man), "You have spoken truly." We were astonished at his thus questioning him and telling him that he was right, but he went on to say, "Inform me about Iman (faith)." He (the Messenger of Allah) answered, "It is that you believe in Allah and His angels and His Books and His Messengers and in the Last Day, and in fate (Qadar), both in its good and in its evil aspects." He said, "You have spoken truly." Then he (the man) said, "Inform me about Ihsan." He (the Messenger of Allah) answered, "It is that you should serve Allah as though you could see Him, for though you cannot see Him yet He sees you." He said, "Inform me about the Hour." He (the Messenger of Allah) said, "About that the one questioned knows no more than the questioner." So he said, "Well, inform me about the signs thereof (i.e. of its coming)." Said he, "They are that the slave-girl will give birth to her mistress, that you will see the barefooted ones, the naked, the destitute, the herdsmen of the sheep (competing with each other) in raising lofty buildings." Thereupon the man went off. I waited a while, and then he (the Messenger of Allah) said, "O 'Umar, do you know who that questioner was?" I replied, "Allah and His Messenger know better." He said, "That was Jibril. He came to teach you your religion (*Muslim: Book1 # 4*).

The hadith above interlink Islam, Iman and *Ihsan* as a straight path to paradise. Islam has five foundational pillars, followed by Iman with six articles and then *Ihsan*. There are unseen things for every Muslim must believe in, as an integral part of Iman (see; Quran: 2:177; 54:49 and 64:11). The next is *Ihsan*, and the literal meanings of *Ihsan* include "almsgiving, beneficence, benevolence, charity, favor, good turn, kind act, kindness, the performance of good deeds and philanthropy" (Baalbaki, 1995 p50). Therefore, *Ihsan* in the hadith refers to "serving Allah as if you could see Him", which qualifies the perfection of deeds with a high esteem of ability. Similarly, this applies to any commandment directed

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by Allah, as He said, "Let a scribe write it down in justice between you." It means neither the owner of the capital nor debtor has to write, rather, somebody else like a banker that has useful skill quality management techniques (Wan Abdul Aziz, et al., 2014). The manager must assume this position of performing good deeds as to perfect the content of the commandments without defect (see Zaman & Asutay, 2009). Despite that "you cannot see Him yet He sees you." This implies the attribute of Iman (that you believe in Allah: The Ever Living). Allah said:

> *Allah! La ilaha illa Huwa (none has the right to be worshipped but He), the Ever Living, the One Who sustains and protects all that exists. Neither slumber, nor sleep overtake Him. To Him belongs whatever is in the heavens and whatever is on earth. Who is he that can intercede with Him except with His Permission? He knows what happens to them (His creatures) in this world, and what will happen to them in the Hereafter. And they will never compass anything of His Knowledge except that which He wills. His Kursi extends over the heavens and the earth, and He feels no fatigue in guarding and preserving them. And He is the Most High, the Most Great (2:255 and, also see; Quran: 2:110; 2:233; 2:237; 2:265; 3:20; 3:156; 3:163; 4:58; 4:134; 5:71; 8:39; 8:72; 11:112; 33:9; 48:24; 49:18; 57:4; 60:3; 64:2).*

He is always close to us with His knowledge: "Allah knows the fraud of the eyes, and all that the breasts conceal (Q40:19)". Similarly, Allah said (Q50:16): "And indeed We have created man, and We know what his ownself whispers to him. And We are nearer to him than his jugular vein (by Our Knowledge)". Therefore, the highest degree of perfection is an exclusive righteousness in all forms of good deeds through remembering Allah while performing every action. As said:

> *Those who believe and do righteous good deeds, there is no sin on them for what they ate (in the past), if they fear Allah (by keeping away from His forbidden things), and believe and do righteous good deeds, and again fear Allah and believe, and once again fear Allah and do good deeds with Ihsan (perfection). And Allah loves the good-doers (Q5:93).*

This can only be achieved after one fulfilled the hieratical stage of *Adl*. For instance, after admonishing the believers on equal treatment; "And if you punish (your enemy, O you believers in the Oneness of Allah), then punish them with the like of that with which you were afflicted." Ibn Kathir (2003) said is the hierarchy of justice. Then, the second part of the verse is the hierarchy of *Ihsan*. As well, Allah extended to the level of perfection by saying: "But if you endure patiently, verily it is better for As-Sabirin (the patient ones, etc.)". Likewise, (Q42:40) Allah said: "The recompense for an evil is an evil like thereof," and concludes with the position of perfection as: "but whoever forgives and makes reconciliation, his reward is due from Allah". The next in the series of examples is; (Q5:45) as it is mentioned: "And We ordained therein for them: life for life, eye for eye, nose for nose, ear for ear, tooth for tooth, and wounds equal for equal." Then the hierarchy of *Ihsan* here is, "But if anyone remits the retaliation by way of charity, it shall be for him an expiation." In the same vein, human beings were created to worship Allah He alone; (Q51:56; Q7:29; Q3:18) and is the justice fulfillment to worship Allah as prescribed in the pillars of Islam. Then, any additions beyond the obligatory duties are considered as Nawafil (voluntary or non-obligatory deeds) and are the hierarchy of *Ihsan*.

Furthermore, applying the same principle to banks, practicing Shariah-based mode of financing and paying Zakat is an obligatory duty on banks. For the zakat, has to be distributed to eight prescribed classes of people (Q9:60). This is the purification of the wealth while any benevolent charities in the form of sadaqa, social responsibilities (societal and environmental) are other kinds of *Ihsan*. Several studies reported to have proposed integrating Zakat and Waqf in sustaining consumable loans to Islamic financing (Wilson,

2007; Ahmed, 2007; Hassan, et, al. 2013; Abdulrahman, Muhammad & Mahayudin, 2013; Muhammad & Zakaullah, 2013; Ashraf & Hassan, 2013; Zouari & Nabi, 2013; Abdulrahman, 2010; Obaidullah and Khan, 2008; Alpay & Haneef, 2015). The loans under Islamic contracts are on benevolent (*Ihsan* based), which are free from the interest that aims to alleviate the hardship of the poor and to sustain development (see Brundtland, 1987; Abdul Razak & Ahmad, 2014). Likewise, it is the right of the creditor to receive the loaned amount from the debtor at the initial due time. However, extending time to the debtor in hardship and remits the debt in the form of charity is the hierarchy of *Ihsan* (Q2:280).

In Islam, sustenance of this world and hereafter is in line with the fulfillment the pillars requirements of Islam and the article of faith. Therefore, the two foundational structures of Islam and Iman influenced the entire life of the believer in *Ibadah*, transactions, *mu'amalat* and other components of life struggles. Meanwhile, to sustain Islamic banking business, *Adl* and *Ihsan* are considered of paramount importance. For instance, mudarabah transaction is based on trust between sahibul mal (e.g. bank) and mudarib (entrepreneur). The bank entrusted entrepreneur to report the outcome of the transactions with *Adl* in order to share the profit and loss on the agreed principles. Similarly, in some cases, the banks are expected to extend their relationship with entrepreneurs to the hierarchical level of *Ihsan* (e.g. sadaqa-charity) and vice versa. Therefore, for Islamic banking business to sustain, and there is a need for upholding to the path of *Ihsan*. Figure 2.1 below depicts path to *Ihsan* through *Adl* with the pillars of Islam and articles of faith with the aid of the mentioned Hadith of Jibril and Quran (16:90).
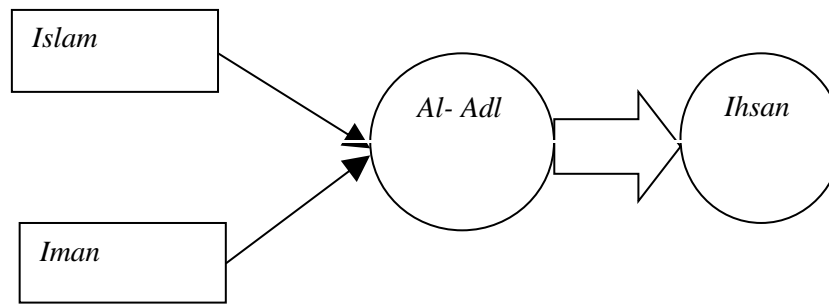
Figure 2.1: Conceptual frame to Al-Ihsan

In addition, Beekun and Badawi, (2005:13) assert that;

> *The responsibility of each stakeholder [must be] morally anchored since it is based on the concepts of trust (Amana see: Q4:58), equity, balance and fairness ('Adl and Qist see: Q4:135), benevolence and excellence (Ihsan). At all times, mankind must not forget his/her role as God's steward or vicegerent on earth.*

These cannot be perfectly believed and functionally performed the required duties without the concept of Islam and *Iman* and followed with *Ihsan*. Naturally, without divine guidance, human beings are extremely struggling for mutual rivalry in piling up worldly materials (Q102:1; 57:20); which led them to become "ungrateful to Allah" and "violent in the love of wealth" (Q100: 6&8). Therefore, Allah has summarized the moderator of life sustainability in a comprehensive verse of the Quran. The Quran (16:90) enlarged the content after *Adl*, *Ihsan* and added with generosity, which is part of *Ihsan*. The second part of the verse provides other prohibited provisions which include *Al- Fahsha'*, *Al- Munkar*, and *Al-Baghy*.

> *Verily, Allah enjoys Al-'Adl (i.e. justice and worshipping but Allah Alone – Islamic Monotheism) and Al-Ihsan [i.e. to be patient in performing your duties to Allah, totally for Allah's sake and in accordance with the Sunnah (legal ways) of the Prophet صلى الله عليه وسلم in a perfect manner], and giving (help) to kith and kin (i.e. all that Allah has ordered you to give them e.g., wealth, visiting, looking after them, or any other kind of help), and forbids Al-Fahsha' (i.e. all evil deeds, e.g. illegal sexual acts, disobedience of parents, polytheism, to tell lies, to give false witness, to kill a life without*

right), and Al-Munkar (i.e all that is prohibited by Islamic law: polytheism
of every kind, disbelief and every kind of evil deeds), and Al-Baghy (i.e. all
kinds of oppression). He admonishes you, that you may take heed.

The above verse is regarded as *Ajma'u Ayatan fil Qur'an-* The most comprehensive verse

in the Quran as cited in the Quran interpretation of Ibn Khathir (2003) "*Ash-Sha` bi*

reported that *Shat iyr bin Shakl* said: I heard Ibn Mas` ud say: The most comprehensive

Ayah in the Qur'an is in Surah An-Nahl (Q16:90)". In addition to *Ihsan*, the verse separates

"generosity" due to its importance to human relations.

Generosity to kith and kin is an extension of kindness (of wealth, visiting, looking after

them, and any related kind of help) to close associates depending on the nature of the

relationships. In this respect, parents have special consideration (Q17:24) since they bestow

humility and mercy to their children, right from the childhood stage. Furthermore, parents

and other close relatives are considered foremost in terms of blood relationships while staff

are close associates to management when it comes to the place of work (say: banks).

Hadith:

> *There are people from the servants of Allah who are neither prophets nor*
> *martyrs; the prophets and martyrs will envy them on the Day of*
> *Resurrection for their rank from Allah, the Most High. They (the people)*
> *asked: Tell us, Apostle of Allah, who are they? He replied: They are people*
> *who love one another for the spirit of Allah (i.e. the Qur'an), without having*
> *any mutual kinship and giving property to one. I swear by Allah, their faces*
> *will glow and they will be (sitting) in (pulpits of) light. They will have no*
> *fear (on the Day) when the people will have fear, and they will not grieve*
> *when the people will grieve. (Dawud: Book 23: Hadith 3520).*

This *hadith* explicitly expresses that there are other human relationships apart from close

and mutual ones that will extend mankind to the success (*Al-Falah*) in this world and the

hereafter. Extending generosity among close associates (colleagues at work) is another part

of *Ihsan* that encompasses other aspects of sustainability through welfare approach of *maqasid shariah* (such as *maslaha*-public interest). Therefore, operative staff with management are under this category of relationship when it is built for the sake of Allah. Similarly, Islamic banks officers have to extend their generosity to fellow colleagues as reported: (Bukhari: Book 73; *Hadith* 43 & 44) "Prophet said: Gabriel continued to recommend me about treating the neighbours kindly and politely so much so that I thought he would order me to make them as my heirs". The "Prophet also said: By Allah, he does not believe! (three times) that person whose neighbor does not feel safe from his evil" (Bukhari: Book 73, Hadith 45). In view of this, the close neighborhood in the corporation while on the service delivery is not far between management and operative staff. Therefore, generosity consists of harmonious relationship and commitment to provide services to increase financial efficiency, which in turn strengthen the institutional sustainability. Similarly, the Messenger of Allah Said:

> *Do not be envious of one another; do not artificially inflate prices against one another; do not hate one another; do not shun one another; and do not undercut one another in business transactions; and be as fellow-brothers and servants of Allah. A Muslim is the brother of a Muslim. He neither oppresses him nor humiliates him nor looks down upon him. Piety is here - and he pointed to his chest three times. It is evil enough for a Muslim to hold his brother Muslim in contempt. All things of a Muslim are inviolable for another Muslim: his blood, his property and his honour (Muslim Book 32, Hadith: 6219).*

Generosity to staff expedient their performance and solidify the relationship, coexistence and build trust among co-workers. In view of this, social responsibility has to begin with workers first (i.e. the closed partner in terms of working relations) then follow by others. Social responsibilities are well-known practices in Islam, in the sense that extending them to the public and sustaining environment including other non-human creations (animal,

plants and architectural creators) are part of good virtues of generosity. Islamic financial institutions are urged to incorporate Islamic social responsibilities in all aspects of their transactions (Farook, 2008).

2.4.2.5 Forbidden activities

As highlighted in the previous subsection, the second part of the verse (16:90) stresses on the group of forbidden activities (such as *Al-Fahsha, Al- Munkar,* and *Al-Baghy*). Ibn Kathir (2003) and Taqi-ud-Din Al-Hilali & Khan, (1419 AH) defined *Al-Fahsha'* (Q6:151-152) "as all things that are forbidden (i.e. all evil deeds, e.g. illegal sexual acts, disobedience to parents, polytheism, to tell lies, to give false witness, to kill a life without right etc.)". Similarly, *Al-Munkar*; "are those forbidden deeds that are committed openly by the one who does them (i.e. all that is prohibited by Islamic law: polytheism of every kind, disbelief and every kind of evil deeds, etc.)". On the other hand, *Al-Baghy* is a means to aggression towards people (i.e. all kinds of oppression). These forbidden acts are committed through the influence of *Shaitan*. In another verses, the Quran proves that "[immoral sins of indecency, vulgarity and obscenity are being commanded by *Shaitan]*: He *[Shaitan (Satan)]* commands you only what is evil and *Fahsha* (sinful), and that you should say against Allah what you know not" (Q2: 169) despite, "Nay Allah never commands of *Fahasha* (immorality)" (Q7:87). Similarly, *Shaitan* (Satan) is the one that order mankind to evils and abstain them from extending social responsibilities (charity, *Zakkah* and donations) through threatening with poverty (Q2:268).

In another verse of the Quran (Q24:21) Allah makes it clear that *Shaitan* (Satan) drives

human feelings to commit *Al- Fahsha* and *Munkar*, and He forbids us not commit them in

(Q16:90). In the verse (Q24:21) Allah warns the believers:

> *O you who believe! Follow not the footsteps of Shaitan (Satan). And whosoever follows the footsteps of Shaitan (Satan), then, verily he commands Al-Fahsha' [i.e. to commit indecency (illegal sexual intercourse, etc.)], and Al-Munkar [disbelief and polytheism (i.e. to do evil and wicked deeds; to speak or to do what is forbidden in Islam, etc.)]. And had it not been for the Grace of Allah and His Mercy on you, not one of you would ever have been pure from sins. But Allah purifies (guides to Islam) whom He wills, and Allah is All-Hearer, All-Knower.*

> *[But] Those who avoid great sins (Al-Munkar) and Al-Fawahish (illegal sexual intercourse) except the small faults, - verily, your Lord is of Vast Forgiveness. He knows you well when He created you from the earth (Adam), and when you were foetuses in your mothers' wombs. So ascribe not purity to yourselves. He knows best him who fears Allah and keeps his duty to Him [(i.e. those who are Al- Muttaqun) (Q53:32)].*

Therefore, it is enough for the Islamic banks to avoid any sinful act in the means of

sustaining the business. This has categorically been made clear to the banks not to finance

those transactions which reflect *Al Fahsha* in all its ramifications neither than *Al Munkar*

such as interest. In addition, some of the great sins are identified in another Hadith

including interest (Riba):

> *Abu Huraira: "Avoid the seven great destructive sins." They (the people!) asked, "O Allah's Apostle! What are they?" He said, "To join partners in worship with Allah; to practice sorcery; to kill the life which Allah has forbidden except for a just cause (according to Islamic law); to eat up usury (Riba), to eat up the property of an orphan; to give one's back to the enemy and fleeing from the battle-field at the time of fighting and to accuse chaste women who never even think of anything touching chastity and are good believers." (Bukhari: Volume 8, Book 82, number 840).*

> In another tradition of the prophet *"narrated by Anas bin Malik said: Allah's Apostle mentioned the greatest sins or he was asked about the greatest sins. He said, To join partners in worship with Allah; to kill a soul which Allah has forbidden to kill; and to be undutiful or unkind to one's parents." The Prophet added, "Shall I inform you of the biggest of the great*

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sins? That is the forged statement or the false witness." Shu'ba (the sub-narrator) states that most probably the Prophet said, "The false witness." (Bukhari: Book 8; Vol. 73; Hadith 8).

The commandments of Allah are also found in (Q17: 22-37). These include other acts that Allah warned us not to do amongst others: spendthrifts; breach covenants; reduce measure; walk on earth exultantly/with conceit and arrogance; say that they have no knowledge on; speak arrogantly. The next is *Al-Baghy* (all kind of oppression) which is part of *Munkar*, but it has been mentioned separately in the verse to admonish humankind on its dreadfulness:

> *The Prophet reported to have said: There is no sin more fitted to have punishment meted out by Allah to its perpetrator in advance in this world along with what He stores up for him in the next world than oppression and severing ties of relationship (Abu Dawud Book 41, Hadith 4884).*

The *hadith* reveals the grievousness of the sins (oppression and severing ties of relationships). Moreover, aggression towards depriving the right of someone and overbearing the weak ones is an act that bound to grievous punishment. For instance imposing a high rate of interest on poor client that is capitally deficient to start the business will perpetuate and overburdening the weaker through injustice. Therefore, the banker will not record any transaction that is unlawful as Allah prohibited in the verses of Quran and Hadith. These include interest (*Riba*) bearing transaction as banned in four different chapters of the Quran (2:275, 276 and 278; 3:130; 4:161; 30:39). Similarly, Imam-Shamsu ed-deen Dhahabi (2012) includes interest (*Riba*) among the seventy major sins (in the book of major sins). In this respect, applying these concepts (abstain from forbidden businesses) to financial transactions will moderate the banking practices in the system. In addition, being adhere abiding by ethical standards would solace the customers' confidence (Adebayo and Hassan, 2013).

2.4.2.6 Accountability

Accountability is a means of tracking and reporting the financial transaction through the use of internal and/or external auditing control (Brinkerhoff, 2004) and will not suffice without proper accounting records. Therefore, intimate records of any single transaction will intensify the performance and sustenance of the bank. Equally, Quran emphasises on bookkeeping and account irrespective of the volume of the trade as said:

> *You should not become weary to write it (your contract), whether it be small or big, for its fixed term, that is more just with Allah; more solid as evidence, and more convenient to prevent doubts among yourselves, (2:282).*

The above instruction could be exempted in a situation of spot transaction as mentioned: "Save when it is a present trade which you carry out on the spot among yourselves, then there is no sin on you if you do not write it down". Again, in a situation where the scribe is absent, and the parties firmly trust each other, then, they shall discharge the trust faithfully as stated:

> *And if you are on a journey and cannot find a scribe, then let there be a pledge taken (mortgaging); then if one of you entrust the other, let the one who is entrusted discharge his trust (faithfully), and let him be afraid of Allah, his Lord. And conceal not the evidence for he, who hides it, surely his heart is sinful. And Allah is All-Knower of what you do (2:283).*

Conversely, Islamic contracts requires witnesses for each transaction (Q2:282). Likewise, in the banking practice, witnesses are used in almost all transactions. In the same way, the emphasis of the scribe was on the financing contract while witnesses are considered as a requirement for the commercial transaction in Islam: "But take witnesses whenever you make a commercial contract". Therefore, witnesses are vital tools for Islamic business transaction especially those for the delay period (Tabari nd; Ibn Kathir, 2003). The famous

required combinations of witness are men or else combination of sex in the proportion of two women to one man:

> *And get two witnesses out of your own men. And if there are not two men (available), then a man and two women, such as you agree for witnesses, so that if one of them (two women) errs, the other can remind her(Q2:282).*

The witnesses to transactions are bound on them to speak truth to the best of their knowledge on the account of the dispute in transactions. Therefore, Allah mandated their appearance on demand for evidence: "And the witnesses should not refuse when they are called (for evidence)". After that they shall say nothing but truth:

> *O you who believe! Keep your duty to Allah and fear Him, and speak (always) the truth. He will direct you to do righteous good deeds and will forgive you your sins. And whosoever obeys Allah and His Messenger (صلى الله عليه وسلم), He has indeed achieved a great achievement (i.e. He will be saved from the Hell-fire and will be admitted to Paradise).*

As well, "Let neither scribe nor witness suffer any harm, but if you do (such harm), it would be wickedness in you" as they speak the truth, no threat or harm shall be inflicted on the witnesses nor on the scribe.

2.4.2.7 Commercial Contract

Apart from witnesses, Islamic commercial contracts (*Aqd*) are transacted with consents of the parties (offeror and offeree) involved with the inclusion of offer and acceptance of the subject matter as mentioned:

> *O you who believe! Eat not up your property among yourselves unjustly except it be a trade amongst you, by mutual consent. And do not kill yourselves (nor kill one another). Surely, Allah is Most Merciful to you. (Q4:29)*

Therefore, consent will be given from the both sides of the transaction on the prior knowledge of the condition, term and the structure of the transaction. Therefore, knowledge

of the products and the primary transactional process is required to both parties involved in the sustenance of the business. In view of this, Dzolkarnaini & Minhat (2012) argue that Islamic financial institutions' sustainability growth will be affected in near future, as their products are not attractive compared to conventional banks products to non-financial sectors. Thus, it is the responsibility of the bank to promote a wide range of products. Pricewaterhousecoopers [PwC] reported only 13 percent of their sample found extremely familiar with Islamic banks' products in GCC countries, 12 percent never heard about it and 34 percent not very familiar with the Islamic bank (PwC, 2014). This shows the urgent need of the institutions to extend awareness of their products and the system in general. It is also observed in the previous studies that for Islamic Banking products, awareness is not known to rural dwellers compared to the urban settlers (Hakim, Bhatti & Al Jubair, 2011).

However, product promotion strategies on large scale will attract more customers to embrace Islamic banking products (Bashir, 2013; Haron & Wan Azmi, 2005; Loo, 2010; Raza, Saddique, Farooq, Awan & Amin, 2012; Abdullah, Sidek & Adnan, 2012; Hakim, et al., 2011). The need for advertising banking products is important for sustaining Islamic banks and achieving long-term earnings (Hakim, et al., 2011). To this end, direct promotions with Islamic ethical standards are the views of Hassan, Chachi & Lateef (2008), these were based on: avoidance of false (Q2:42; Q3:71; Q9:34; Q16:62; Q16:105; Q43:19; Q74:45) and misleading advertisement, rejection of high pressure manipulations or misleading sales tactics and avoidance of sales promotions that use deception or manipulation. This is consistent with other recommendations of the previous studies (Akhter, Abassi, Akhter & Umar, 2011; Bari & Abbas, 2011; Saeed, Ahmed & Mukhtar,

2001) on the needs for applying ethical standards to advertisements of the banking products.

Islamic banks have varieties of products and services. These includes *Mudaraba* (Trustee financing/partnership); *Musharaka* (Equity Participation/joint venture), *Murahaba* (cost plus markup), *Qard Hasan* (Benevolent loan), *Ijara* (leasing), *Bai Bithaman Ajil*, *Bai' Salam*, *Ijara wa iqtina* (Leasing financing), *Jo'alah* (service charge), *Muzara'ah* (share of harvest) and direct investment (Mollah & Hamiduddin, 2013; Hassan, et, al. 2013; Ashraf & Hassan, 2013; Goud, 2013; Zouari & Nabi, 2013; Hakim, et al., 2011; Dusuki, 2008; Sadique, 2008; Ahmed, 2008; Kaleem, 2008; Khaled, 2011). Therefore, promoting such products would attract new clients and sustain the existing customers with ultimate considerations to risk management, which concur with the guiding principle in Islam (*Q4: 71; 102*).

Management of risk in Islamic banks is found severely inefficient compared to conventional banks, which threaten their future survival and sustenance (Mahbubu Rahman, Azizur Rahman & Azad, 2015). Similarly, Islamic banks have to weigh the risk involved in their businesses to hedge against instantaneous default, considering the nature of their products which is more prone to high risks. According to ISRA (2012:555-556), risk is divided into three: Firstly, essential risk; that is the risk inherent in all business transaction. This has fulfilled the maxim (Article; 85, 87 and 88) of *Al-Majalla Al-Ahkam Al-Adliyyah*-The Ottoman Courts Manual-Hanafi, (2000) expressed that any enjoyment or advantages are liable to attaching liability or compensation and they are moving together.

Secondly, the prohibited risk; example *gharar* (uncertainty), gambling, cheating, fraud. Thirdly, permissible risk that is neither part of the two categories mentioned above example operation risk, liquidity risk, market risk, credit risk, legal and regulatory risk, strategic risk, equity investment risk, rate of return risk displaced commercial risk, fiduciary risk, *Shariah* compliance risk and reputation risk among others (ISRA, 2012; 556-563; IFSB, 2005; Zouari and Nabi, 2013; Steinwand, 2000).

In addition, there is another risk, which is not part of those, three mentioned but is also important to the Islamic financial transaction. This is a risk in any transactions that will annihilate the blessings of Allah even if the business transaction is yielding returns, those returns would not be accepted by the side of Allah. For instance, "Allah will destroy *Riba* (usury) and will give increase for *Sadaqât* (deeds of charity, alms, etc.) And Allah likes not the disbelievers, sinners (2:276)". The major issue here is the guarantee of His forgiveness when the offense is committed knowingly. "He forgives whom He wills, and punishes whom He wills" [Q3:129]. This risk falls into two kinds, losing the blessing of Allah on the business and the certainty of His forgiveness for those indulging into interest-*Riba* (for example) while intuitively they knew it is forbidden. In another perception by Ibn Qayyim (2004: 105-108) in his book, *Adda'u Waddawa'* sins destroy the blessing of wealth, knowledge, action and obedience in worship. This assertion can also be traced through (Q7:96):

> *And if the people of the towns had believed and had the Taqwâ (piety), certainly, We should have opened for them blessings from the heaven and the earth, but they belied (the Messengers). So We took them (with punishment) for what they used to earn (polytheism and crimes, etc.).*

Therefore, blessing of Allah will not sustain the sinful people and the generation after them. This risk applies to the financial transaction as when the bank indulges in interest (*Riba*) based transactions. Consequently, it is implicitly supported in the general principle of IFSB (2012:12) through the term 'compliance of *Shariah*':

> *An IIFS should have in place a sound and comprehensive liquidity risk management framework, integrated into its enterprise risk process, in order to maintain sufficient liquidity to meet its daily funding needs and to cover both expected and unexpected deviations from normal operations for a reasonable time. The IIFS should have an appropriate governance process, including board and senior management oversight, in order to identify, measure, monitor, report and control the liquidity risk in compliance with Shariah rules and principles and within the context of available Shariah-compliant instruments and markets. Supervisory authorities should have a rigorous process for evaluating the liquidity risk management position and framework of IIFS and requiring prompt corrective action in case of any deficiency.*

As well, the emphasis on *Shariah* compliance in risk management does not preclude other mandates of *maqasid shariah* such as societal well-being that is closer to welfarist approach of sustainability.

2.4.3 Welfarist Approach

The second perspective aligned their conceptual idea of sustainability in banking and finance with the two sustainable development constructs (i.e. the societal and environmental impacts). Welfarists are of the opinion that financial institutions have to focus on capital allocation and financial decisions that are socially and environmentally responsible. This group comprises both strands of scholars (Weber, 2005; Shicks, 2007; Conley, & Williams, 2011; Perpastergiou & Blanas, 2011; Hermes & Lensink, 2011; Nor, 2012; Ingham, et al., 2013; Askari & Rehman, 2013; Nor & Hashim, 2014; Dossa & Kaeufer, 2014; Tandogan & Özyurt, 2014) and professionals or institutions (Jeuken, 2001;

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Imeson & Sim, 2010; Central Bank of Nigeria - CBN, 2012; CISL & UNEP FI, 2014; UN-ESCAP, 2014). The banks are expected to contribute not only to the economically feasible and viable long-term development but also in socially relevant and environmentally responsible.

The relationship between institutional sustainable banking, management of environmental and societal development have become more challenging issues to financial regulators and policy makers. However, CISL and UNEP FI (2014) argue that Basel III requirements had neglected environmental risk issues especially in the provision of credit to environmentally sustainable financing. In this regard, they recommended for proper modeling, data collection and analysis on the estimation of financial sustainability in relation to environmental sustainability. Consequently, McCormick (2012) characterizes the post 2007-2009 financial crisis with a deficiency in adequate available data for long-term financial sustainability and societal contribution.

From the institutional perspective, banks can only coherently contribute to sustainable economic growth and development when they are financially and operationally feasible. In view of this, McCormick (2011) argue that when the financial institutions blemished, the society would be in the crisis beyond the meltdown of 2008 since they will lose their livelihood. It is indeed agreed, the strength of every economy is linked with their financial soundness to reduce poverty, unemployment, underground economy practices and provide amenities for the societal standard of living. McCormick concluded that without a sustainable financial system, human rights and sustainable development policies would not

be easily achieved. Similarly, Khandker, et al. (1995) admit that Grameen Bank will not survive without subsidy except with high cost of borrowing which has adverse effects on the performance of the poor. The authors lamented the bank's efforts toward sustaining the poor through credit allocation and admitted that without the founder of the bank, the future sustenance is in question. Therefore, staff commitment is highly required for the survival of the bank. Another experience embedded in Malaysia during the Asian financial crisis of 1998. The lessons were quite exciting which had bridged the "deficit gap to abundance." In this context, Oh (1999) recommends for strengthening efforts toward an Islamic financial system, human resources, risk management, prudential regulation, and financial sector reform among others for Malaysia to sustain economic development.

Meanwhile, Imeson and Sim, (2010) foresees that societal development can attain the level of equilibrium between altruism and self-interest of the institution through sustainable banking. The perception is clear when the banking interest is aligned to that of staff, shareholders, customers and society's value fulfillments. The altruism here is extended not only to the banking business partners but also to wider society in the community. In this respect, banks have the potential in sustaining development using sustainable investments that are environmentally friendly. However, financial control reduces excessive finance towards less-profitable investments. In view of this, Abraham (2003) finds that adequate control (i.e. financial and management) system would also promote institutional sustainability. Accordingly, Abraham (2003) linked accountability to sustainability as shock absorbers to the internal crisis through adequate monitoring for ensuring that reliable information is well managed. Therefore, financial control has to do with the management

of funds and its allocations while management controls include the segregation of duties and responsibilities, personnel and asset management, which in turn will sustain the society in general.

Several studies focused on the sustainability and outreach to the poor. Outreach refers to the coverage regarding inclusiveness and the in-depth percentage of the served poor (Ahmed, 2013). In this respect, Cull, et, al. (2007) claim that serving the poor and earning a profit can be achieved, but, not on the core poor. Additionally, they conclude that tradeoff between outreaching the poorest and profitability of the bank is clear in the sense that the village bank should be given subsidies to compensate the high average cost and to focus on the poorest clients. The assertion is consistent with that of Khandker, et al., (1995) from similar sustainability study. Likewise, another study by Zerai and Rani (2011) reveal insignificant trade-off between outreach and operational sustainability in India. Similarly, negative tradeoff relationship was found between outreach and sustainability (Hermes, et al., 2011) which is inconsistent with the result of Cull, et al., (2007) on similar studies. Furthermore, it was found that outreach can be achieved through a social network (Wydick, Hyres, & Kempf, 2011). Another study claims that outreach through the network can equally reduce the cost of reaching the poor (Hermes, & Lensink, 2011). Conversely, Ahmed (2013) argues that enormous utilization of zakat and waqf funds to IMFIs will settle the tradeoff difficulties between the sustainability and serving the poor with outreach. In addition, the author further identified that nonprofit financial institutions outreach the poor but not financially sustainable compared with the profit-oriented banks, and recommended for further research to explore more on the tradeoff.

2.4.4 Welfare approach: Islamic perspective

Demirguc-Kunt, Klapper & Randall, (2014) found 20 percent (24 against 44 percent) gap between Muslim adults with a formal bank account and non-Muslim population. This has shown the alarming needs for Islamic banks to reduce the unbanked population through in-depth outreach. Similarly, further studies have suggested on Islamic banks outreach and inclusiveness for country effect specific due to an insufficiency of previous empirical evidence (Naceur, Barajas, & Massara, 2015). Furthermore, outreach without other elements of *maqasid* shariah (such as *hifz al-mal*) will not improve socioeconomic well-being through committed entrepreneurship. Moreover, Setia (2014) concludes that Islamic transactional objective is to ensure the establishment of socio-economic exchange that influences the community interest without taking any undue advantages. Islamic banks were established to fulfil the mandate of *maqasid al-shariah* (see; Ismail, 2010a). Especially, the aspect of wealth preservation (*hifz al-mal*) that is being extended to the social and economic impact of the society through productive commitments (Bellalah, 2003; Dusuki, & Bouheraoua, 2011).

In analogical view, Laldin, (2013 p257) opined that Islamic banking operations would be achieved through other components of *maqasid* Shariah: " brotherhood (*ukhuwwah*), cooperation (*ta'awun*), social equality and justice (*Adalah*), just and fair allocation of resources, protection of environment, elimination of poverty, and helping society to achieve well-being (*maslahah*). Similarly, ISRA (2012) added that besides maximising profit, Islamic banks are to fulfil *maqasid* al *Shariah* such as equitable distribution of wealth and spiritual health, justice and fairness for sustaining societal well-being in their

capital allocation and financial decision. Therefore, financial inclusion shall impact the livelihood of all for everyone to have sustenance. These accorded with the following verses of the Quran: "And We have provided therein means of living, for you and for those whom you provide not [moving (living) creatures, cattle, beasts, and other animals] (15:20)". In the spirit of Islamic brotherhood those who haves shall assist the have-nots with sustenance as it was mentioned Quran (51:19): "And in their properties there was the right of the beggar, and the *Mahrum* (the poor who does not ask the others)". Similarly, in another verse Allah revealed the identity of believers in spending their wealth (Q70:25): "For the beggar who asks, and for the unlucky who has lost his property and wealth, (and his means of living has been straitened)" and command not refused those requested for sustenance (Q93:10). All these explicate the concept brotherhood, cooperation and improvement of societal well-being that financial institution are not excluded.

Islam advocates helping one another. For instance, Islam inspires for a time extension to the debtor on the debtor-creditor relation (Ali, 2014). Similarly, encourages the creditor to remits it by charity as esteem position of *Ihsan* is better for those who know as contained in Quran (2:280):

> *And if the debtor is in a hard time (has no money), then grant him time till it is easy for him to repay, but if you remit it by way of charity, that is better for you if you did but know.*

The condition of the above is closer to the welfarists' approach of sustainability in providing services to the core poor (see Akhter, N. Akhter, & Jaffari, 2009). It is clear that the verse admonishes the virtues of alleviating the hardship of the poor. In the case of banks, managers have to balance between the institutional sustenance and that of the well-being of the society.

Thus, the disclosure of information becomes necessary to capital owners (shareholders and investment account holders). Nonetheless, Islamic banks should diversify means for achieving institutional sustenance and wellbeing of the society.

The verse (2:282- transactional relations) concludes with "So be afraid of Allah, and Allah teaches you. And Allah is the All-Knower of each and everything". The end part of the verse summarised the fundamental condition of fulfilling the required commandments enclosed in the verse and recast it initials as: "O you who believe". Meaning that the believers shall fear Allah and remember that He watches them while on their daily activities (Ibn Kathir, 2003). Secondly, "and Allah teaches you" to the right and prohibited wrong acts. Therefore, abstain from all forbidden acts. Similarly, the foundational conditions of Islam-*Iman* and *Ihsan* paradigm of Hadith Jibril and Quran (16:90) are prerequisites for fulfilling the commandment within the verse (2:282). As a result, sustainability of Islamic banks is in line with the compliance of *Shariah* commandments. Within this, Allah will provide the banks' secure means to sustain (both the institution and the well-being of society) as; "Allah is the All-Knower of each and everything".

2.5 Literature Gap

Table 2.3 presents the sustainability banking studies with the summarized findings. Based on the purview of existing survey literature, Islamic banking sustainability studies are largely conceptual in structure. Nonetheless, the few empirical studies are conducted using descriptive analysis that is insufficient to guide for policy formulations.

Table 2.3: Summary of Findings

Author (s)	Methods/Paper type	Period(s)	country (ies)/Insitution(s)	Major Findings
Conning (1999)	Proposition	1998	72 institutions	The tradeoff between institutional and welfarist sustainability are controlled via monitoring and costs delegation within the agency relationships that are influenced by moral hazard between clients, bank staff, and investors. As a result, banks charges higher interest rate and personnel cost per borrowed amount on targeting poorest of the poor. This higher charges will not reflect the bank's leverage due to monitoring cost.
Olivares-Polanco (2005)	OLS regression	1999-2001	Latin America	Realized indifference loan size effect between non-profit and commercial based institutions, whether regulated or not, but rather age and competition of the organization determine its loan size and reduce outreach. Finally, found a tradeoff between sustainability and depth outreach.
Hartarska (2005)	Regression random effect model	1998-2001	Central & Eastern Europe and the Newly Independent state	There is evidence that governance explains sustainability and outreach. Managers' experience improves institutional performance and not based on performance reward. Lower wages deter outreach, and representation of stakeholders' on the board is associated with the tradeoff.
McIntosh and Wydick (2005),	Proposition			Microfinance growth increases the level of low-income entrepreneurs and competition in developing nations. It is found that capital structure is irrelevant to monopolistic market and borrowers' motivation to a competitive market. It is noted that externalities emerged due to information asymmetry and clients' multiple loans. Also, altruism influence non-profit banks to extend subsidies to borrowers. FSS and subsidy shall coexist so long as the grant is channeled to core poor.

Hashemi and Rosenberg (2006)	Conceptual			It is identified that MFI overlooked social protections, and equalize it with grants and subsidy which misrepresent ideal market practice and sustenance of the institution. MFI needs to explore other ways through safety net plans to impact the wellbeing of the core poor.
Cull, Demirgüç-Kunt, and Morduch (2007)	Descriptive and Regression analysis	1999-2002	124 institutions in 49 countries. Covering six global region	High profit is associated with the higher interest rate to individual lenders up to certain level, and then credit demand will fall which will affect the profit as well. Altruism led other institutions to charge lower interest rate and realized a lower profit. On the other hand, banks experienced poor performance on solidarity(group) lending. Part of the result also revealed other possibilities of earning profits and serving poor, but a tradeoff arises only between profit and serving the poorest. The increase in fees does not ensure the greater yield of return while cost thriftiness diminishes when serving better-off customers.
Yaron and Manos (2007)	Descriptive			It is argued that FSS is deficient compared to SDI through overestimating self-sufficiency. It neglected the cost of mobilizing funds and rate of return, consider equity as cost-free. Also, banks with profit and non-profit objectives are treated as the same in FSS. Thus, SDI does not have these deficiencies, while outreach that is socially inclined have to be adopted. Furthermore, it is also argued that unadjusted financial ratios are misleading.
Akhtar (2008)	Conceptual			Sustainability of Islamic finance depends on improving legal, and regulatory framework that will bring the structure and products in line with Islamic principles. Also, there is a need for risk management, global cooperation with monitoring and control, consumer protection and financial diversifications through innovative means. As such, Islamic finance has the potentials to achieve the economic and social objectives of sustainability via its modes of transactions and ethical values.
De Crombrugghe,	Regression	2004-2005	India	Most of the financial institutions are cost inefficient which may hinder their long-term prosperity to outreach the poor. It was found that difficulties in costs of outreach on small

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Tenikue, and Sureda (2008)				and unsecured loans can be attained without additional monitoring cost or increase in loan size. Thus, sustainability and outreach can be achieved at the same time using group lending and individual assessment.
Mohammed, Razak, and Taib (2008)	Conceptual			It has been noted with interest that objective of Islamic banking via *maqasid* sharia is not covered in the literature. A proposed *maqasid* index for assessing Islamic banks was developed in the composition of financial and non-financial ratios. The index was built based on the three conceptualized objectives of *maqasid* (educating individuals, establishing justice and public interest). The objectives are diversified through nine dimensions with ten elements and performance ratios.
Akhter, Akhtar, and Jaffri (2009)	Descriptive	2004-2008	Pakistan	The study revealed that Akhuwat bank does not meet the FSS requirements for sustainability. Nonetheless, the bank can outreach and exonerate reasonable numbers of extreme poor with interest-free loans. Finally, recommended for incorporation of Zakat, *Awqaf*, institutional capacity building, and Takaful for institutional sustenance.
Mersland and Strøm (2009)	Random effect	1998-2007	60 countries	The performance and outreach of this study were measured in consonance with the bank-customer relationship, competition, and regulation. The local directors predict the performance of the firms than female CEO, international directors, and board of internal auditors. Meanwhile, customers increase with dual CEO. Likewise, outreach is high with group lending than individuals, and no difference was found in performance and outreach to profit and non-profit based institutions. Regulation and competition have insignificantly influence performance.
Kai (2009)	Regression fixed effect model	2003-2006	Developing countries	The findings expressed that competition is insignificant to FSS and reduces outreach while the experience of the banks increases. Similarly, bank reduces poor core lenders as competition intensified. Likewise, the richer client is better off when competition is high as interest rate falls. It

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				is suggested that government and donor intervention can help to sustain core poor in the market via subsidy and grants. As such, an increase in extensive outreach has tendencies of reducing FSS.
Ayayi and Sene (2010)	Regression	1998-2006	101 countries	The findings revealed higher quality portfolio and interest rate permit reasonable profitability which in turns lead to FSS. However, women clients are insignificantly related to FSS. Similarly, outreach and age of the institution have a lower influence on FSS. The paper claimed profit maximization, management efficiency, and good governance would guarantee FSS.
Zaigham and Asghar (2011)	Descriptive	2009-2010	Pakistan	The study was conducted on three MFI (A-First microfinance bank; B-Kashaf Bank; C-Khusali Bank). The result revealed a decrease in OSS to A while B and C have positive increase, and only C able to recover it costs efficiently (transaction cost per client) during the period of study. There is a slight increase in the outreach of AB while there is not any in C. In a nutshell, the banks were not entirely financially sustainable since lenders are not able to repay their loans in time.
Nor and Asutay (2011)	Descriptive		Malaysian	It is found that IBs are not committed to prioritizing CSR, inadequate compliance with other Islamic values and ethics in the industry, and insufficient awareness of CSR among stakeholders. Though, respondents have the perception that IBs are established to promote ethical and morality, sustain society through human capital empowerment and objective of sharia. Therefore, good governance, and right protections (customers and employee) have to be in place.
Hermes, Lensink, and Meesters (2011)	DEA stochastic frontier analysis	1997-2007	Africa, East-Asia & Pacific, East Europe & Central Asia, Latin America & the Caribbean, South Asia	The findings of stochastic frontier analysis showed a negative relation between efficiency and outreach which revealed tradeoff. Also, banks with lower outreach and higher women lending customers are evidently inefficient.
Cull, Demirgüç-Kunt, and	regression	2003 & 2004	covering six global region	It is claimed that compliance with regulation is costly; rather it influence banks functions to expand. Banks with

Morduch (2011)				Profit motivation comply with supervisions, reduce outreach to women and core poor and maximize profit. In a similar way, socially motivated banks extend outreach and curtail profit.
Ahlin, Lin, and Maio (2011)	Regression	1996-2007	six regions	MFIs have tendencies of being influenced by the macroeconomic and institutional factors that will link with economic development. Corresponding, the result was found between MFI performance and macroeconomic indicators. For instance, MFI is liable to bear cost at the expenses of stronger growth, lower default in operation is associated with financially sound economies via charging lower interest rates. The findings revealed nothing related to rivalry and substitutions. In another word, outreach is sluggish to higher manufacturing and labor-force participation. Finally, the performance of MFIs depended on the each country's macroeconomic environmental context.
Kar (2011)	Regression	2005-2007	81 country	The findings of this study exhibited the possibility of MFIs sustenance without an increase in interest return and loan size. Group lending and moderate interest rate can increase outreaching the poor.
Bogan (2012)	Regression, fixed effect, IV of 2LS	2003-2006	covering six global region	The paper explained sustainability, outreach, and efficiency within the context of capital structure and life cycle hypothesis. The finding revealed an association between asset, capital structure, and performance. Similarly, the size of banks have relation with their performance, but not with outreach and sustainability. Grant has inverse and direct relationship to sustainability and cost per lender respectively. Therefore, the grant has a long-term adverse effect on operational sustainability. In essence, this is highlighting the long-term negative repercussion of grant and bail out on the institutional sustainability.
Cihak et al. (2012)	Research paper	2008-2010	Global	The introduction of GFD database came alongside with financial depth, access, efficiency and stability measures with indicators from financial institutions and markets.

				The regional comparison translates on the level of income classification. For instance, SSA and higher income having scored low and high of the average dimensions respectively. Meanwhile, access to finance is also low in the MENA region. As such, countries with higher income proportionately shown high dimensions scale compared to low-income countries.
Kinde (2012)	Regression, Random effect	2002-2010	Ethiopia	It is found that FSS is being explained by outreach, dependency through the intervention of grant and subsidy, and cost per lender while staff productivity and capital structure are considered insignificant.
Quayes (2012)	3 least square model	2006	83 country	Initially, the outcome express no relationship between FSS and outreach. Then, the sample was divided by disclosure. The result also revealed tradeoff for the low disclosure while those with the higher disclosure is shown positive direction. After that, using three least square model has offered inverse relation between outreach and FSS to low disclosure which is complementary positive to a higher level of disclosure. Finally, concluded that outreach does not preclude FSS.
Antonio, Sanrego, and Taufiq (2012)	Simple additive weight	2008-2010	Indonesia & Jordan	The *maqasid* Sharia is key to the objective of Islamic banking establishment. The paper explores *maqasid* index to assess the performance of IBs in Indonesia and Jordan. Simple additive and weight method of Mohammad et al. (2008) was applied, and found Indonesian IBs have better performance compared to Jordan IBs.
Ismail and Possumah (2012)	Descriptive	2007-2010	covering six global region	It is not clear whether Islam MFIs can attain the level of sustainability, efficiency, and performance since capital become a constraint for MFIs expansion. Therefore, exploring another source of capital could enhance their ability to sustain longer time. Islamic MFIs capital structure is enough for them to sustain and to perform better. However, for attaining lower cost of financing to Islamic MFIs, they should utilize philanthropy funds than too much dependency on grants from government and donor agencies.

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				The findings showed that MFIs outreach clients and achieved performance in countries with low access to finance which fulfill the market-failure hypothesis. The outcomes also depicted negative relations between outreach of MFIs and financial development of such nations. For instance, as a result, of commercial banks failure, MFIs respond to fill the gap. Similarly, MFIs outreached core poor in developed countries where they have a functional financial system which implies that they compete with commercial banks at the expense of MFIs.
Vanroose and D'Espallier (2013)	Regression	1997-2006	Latin America, Caribbean, South-African region, Middle East and North African, South Asia, South East Asia Pacific	
Ahmed (2013)	Descriptive of case studies		Bangladesh, Trinidad & Tobago, Indonesia, Malaysia	The outcomes revealed an interchange of priority, non-profit institutions prioritize poverty reduction through inclusiveness and performed better in outreach while profit motivated organizations are entirely sustainable than outreaching poor. Accordingly, integration of zakat and waqf found sufficient in moderating the gap between outreach and sustainability to non-profit organizations.
Zaman (2013)	Analytical			Development studies of the present time recognized the impact of social capital and trust as an integral part of sustaining society through the corporate network. Furthermore, the paper showed interlinking and dynamic model of Islam, *Iman*, *Ihsan*, which explains the network relationship between the corporation and society that gave way to sustainable development. Based on the model, Islamic SD fails as a result of a failure in Iman.
Mohammad and Shahwan (2013)	Content analysis		Malaysia	The study investigated the extent in which the elements of *maqasid* sharia are intimately observed in the fulfillment of the Islamic banking objective in Malaysia. It was found that IBs are profit motivated than socially concern entities.
Nor and Hashim (2014)	the thematic of content analysis		Malaysia	Exploring CSR and sustainable practices of IBs in Malaysia has been identified the following findings. First, IBs are reinvigorated to perform CSR services that will have direct impacts on societal development and environmental protections. Islamic banks are committed towards social responsibility through zakat, charity, and social welfare, but is not enough to achieve welfarist

				objectives of sustainability. IBs are found not keen to social motivation towards poverty alleviation. Thus, incorporating Islamic moral economy mode concept will motivate IBs toward social perspectives.
Ngo, Ly, and Mullineux (2014)	Regression, GMM	1995-2011	Africa is Sub-Saharan Africa, Asia is South and East Asia, ECA is Eastern Europe and Central Asia,	The study is based on the three categorizations of MFIs scales (small, medium and large). Based on capitalization, small and medium are inadequate compared to large scale institutions which led them to become bankrupted during the financial crisis. It was found that large MFIs attain efficiency, profitability, sustainability, and outreach, and found no tradeoff between efficiency and outreach. Similarly, it was also documented that large loan size is related to higher cost and found regulated MFIs are more sustained. Therefore, small and medium MFIs can be consolidated through a merger for them to sustain longer.
Abate, Borzaga, and Getnet (2014)	DEA stochastic frontier analysis	2012	Ethiopia	The paper explores the efficiency of MFIs in Ethiopia on the social motivation mission. The tradeoff between outreach and efficiency expressed difficulty in achieving the two objectives at a time. Disbursing loans to core poor are found positively related to cost efficiency while outreaching women have negative relations. Similarly, cooperative MFIs have better cost efficiency gap through social collateral compared with specialized MFIs.
Aliyu (2014)	Content analysis		Nigeria	The paper explores six themes for IBs to adopt for their functional sustenance in Nigeria. The themes include; "structure, capacities, functions, Islamic moral economy mode, banking business and accountability" which were deduced qualitative using content analysis and found them supportive of the Islamic banking regulations and guidelines.
Ashraf, Hassan, and Hippler (2014)	Regression analysis	2003-2009	83 Countries	The study found GDP size influence banks' performance, while women clients are driving loans repayment and profitability in OIC countries and to the rest of the world.
Ngalim and Ismail (2014)	Content analysis	2010-2011	Malaysia, Indonesia & GCC	Performance indicators of CBs are not enough to measure the *maqasid* objectives of the IBs. As a result, the paper shed lights on Islamic financial development theory, and assess 20 IBs based on new constructs used in measuring

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				the performance of IBs. The constructs are "services offered, environmental and policies to support delivery services, education to support delivery services, and redistribution of wealth".
Ahmed et al. (2015)	Descriptive			SDGs is an extension of MDGs programs which present other new agenda. Islamic finance has several role to play in uplifting SDGs through social inclusiveness, allocating financial resources, financial stability, environmental protection, and promoting economic growth. Similarly, profit and loss arrangement of Islamic finance reduce risk and enhance intermediation. So also, the domestic and international resources can be mobilized from Islamic capital and money market for infrastructure and other substantial investment (via external and private).
Marwa and Aziakpono (2015)	Regression		Tanzania	The outcomes recorded high profitability and financial sustainability in Tanzanian Saving and Credit Cooperatives. The result depicted 61 percent of the cooperatives samples are operationally sustainable while 51 percent attained both operational and financially sustainable stage. These evidently presented promising future to the cooperative practices
Nurmakhanova, Kretzschmar, and Fedhila (2015)	Regression, Simultaneous equation	2006-2008	Africa, East-Asia & Pacific, East Europe & Central Asia, Latin America & the Caribbean, South Asia	Unlike previous studies, the paper considered outreach and financial sustainability as an endogenous variable. The finding is encouraging as prioritizing on FSS will not preclude outreach. In conclusion, MFIs that operates on the pure commercial banking principles can be able to alleviate poverty as well.
Mia and Chandran (2015)	Malmquist Total factor productivity index	2007-2012	Bangladesh	MFIs practitioners and policymakers are nowadays focusing on utilizing scarce resources to achieve FSS and outreach. Using Malmquist approach of total productivity, the findings showed overall productivity progress of 43 percent in Bangladesh which depends on efficient managerial efforts. Secondly, the output was divided based on FSS and outreach and revealed 4 and 5 percent of productivity progress respectively. Despite that, it was noted inadequate innovative saving products which may

				have the tendencies to improve the performance of the observed results.
Bos and Millone (2015)	DEA stochastic frontier analysis and Regression	2003-2010	101 countries	Business model depends on the motive of an institution, be it profit, social or dual objectives. The findings revealed that tradeoff between outreach and financial performance. The tradeoff reduces as the institution is becoming more efficient. The findings have implications for investors, donor agencies, and practitioners. Investors shall invest their funds to profit- efficient MFIs for yielding higher returns, donor organizations that are socially inclined shall access MFIs with social motives, but those who diversify their wealth partly to profit-efficient and part socially motivated are likely to optimize.
Widiarto and Emrouznejad (2015)	DEA	2009-2010	MENA, EAP, SA	Based on the input-oriented model, Islamic and conventional MFIs business models are almost same in the pure overall, social and financial efficiency in global and MENA selection, and socially efficient for the two business models in SA and overall efficiency for output-oriented globally. Output oriented revealed conventional business model performed efficient in social and finance than Islamic model in global, and EAP, and Islamic model is socially efficient in SA. The findings reflect a warning signal to Islamic model.
Shamsudin and Mohammed (2015)	Content analysis		Malaysia	It is ambiguous to conclude that IBs are *maqasid* compliance without exploring their performance ability based on objective indicators. Qualitatively, IBs in Malaysia are found focused on establishing justice concept while CBs preferred profit maximization which is part of public interest concept. Therefore, IBs have with an emphasis on achieving its dual objectives which are different from that of CBs.

Note: FSS, financial self-sufficiency; OSS, Operational Self-Sufficiency; MENA, middle east and north Africa; EAP, East Asia Pacific; SA, South Asia; UAE, United Arab Emirates; SSA, Sub-Saharan Africa; GCC, Gulf Corporation Council; ECA, eastern Europe and central Asia; 2LS, 2 least square; IV, instrumental variable; DEA, data envelopment analysis; GMM, generalized method of moments; OLS, ordinary least squares, MFIs, microfinance institutions; CBs, conventional banks; IBs, Islamic banks; MDGs, Millennium development goals; SDGs, sustainable development goals; GFD, global financial development; CSR, corporate social responsibility; SD, sustainable development; CEO, chief executive officer; SDI, subsidy dependence index; OIC, organization of Islamic cooperation;

Similarly, to the best of our knowledge, most of the existing Islamic banking literature have less emphasis on combining the two perspectives of sustainability coupled with consideration to *maqasid* sharia. In general, banking sustainability studies failed to consider the long-run predictions in their modeling despite its immense relevance to sustainability. Additionally, the few Islamic banking studies that focus on *maqasid* sharia also neglected to consider the long-term viability of the banks on this objective. Moreover, despite the different views between Islamic and conventional perspective to banking practice, previous Islamic banking literature have less focus more on theoretical links to sustainable banking. Therefore, this present study attempts to bridge the gaps mentioned above in the Islamic banking sustainability literature.

2.6 Summary

This chapter reveals the related literature on sustainability, which is critical to the survival of Islamic banks. Consequently, the concept of sustainability from the conventional perspective is built on the Brundtland's definition of the long-term resources utilization of the present generation without compromising the forthcoming generations' needs. In this way, sustainable banking is defined in the same tune with sustainable development. After that, two perspectives emerged in the banking sustainability. However, the Islamic concept of sustainability outweighs the conventional view through Islam-*Iman-Adl* and *Ihsan* paradigm, *Shariah* compliance and accountability. Similarly, the Islamic concept of sustainability is a balance of both institutional and welfarists approach. Therefore, the optimal mix between the two approaches is needed for successful attainment of Islamic banks sustainability.

CHAPTER THREE
THEORETICAL FRAMEWORK

3.1 Introduction

The previous chapter discussed related literature on sustainability from the two distinguished perspectives (conventional and Islamic) in relations to institutional and welfarist approach to sustainability. This chapter focuses on the relevant theories of the two approaches (institutional and welfarist) to sustainability.

3.2 Institutional Approach

Studies related to banking sustainability applied capital structure theories to support the institutional approach of financial sustainability (Bogan, 2012; Johnson 2015). Nowadays, business complexities coupled with the recent global financial meltdown that engulfed many banks resulted to government interventions through bailout, subsidies, and grant in order to ensure financial solvency and self-sufficiency of the banks (Bogan, 2012). In this situation, the mixture of the banks' capital is beyond the traditional assumption, which concludes that banks have excess leverage. The institutional perspective of banking sustainability diffused around the operational and financial sufficiency in which distance to failure risk is used to quantify the long-term sustainability. Meanwhile, institutionalist assesses banks' distance to failure through solvency measures. Likewise, solvency indicator is used not only to distance to failure, rather on the sustainability of fiscal balances (Burnside, 2005). Therefore, solvency stands as the yardstick for quantifying the financial sufficiency of the banks to infer their ability to survive a longer period of the operations. Nonetheless, operational self-sufficiency of Islamic banks is another component to

institutional sustainability that provides insight into the ability for the bank to operate without relying on external intervention to survive longer (Ismail, 2010).

3.2.1 The Theory of Banking Solvency

The theoretical background of the banking solvency began with the earlier work of Roy (1952). Although, the work focused on safety first and thereafter its application was found suitable to the subsequent financial and banking studies (Al-Osaimy & Bamakhramah, 2004; Maechler, Mitra, & Worrell, 2005; Demirguc—Kunt & Huizinga, 2010; Ouerghi, 2014; Cihak & Hesse, 2010; Beck, et al., 2013; Ghassan, et al., 2013; DeYoung & Torna, 2013; Bertay, et al., 2013; Abedifar, et al., 2013; Pappas, et al., 2016; Berger, Goulding & Rice, 2014; Fu, et al., 2014 Laepetit and Strobel, 2013; 2015). The theory was statistically developed based on the joint probability of the future event occurrences. The theoretical focus of this frame was postulated with some uncertain predictions due to systematic and unsystematic risks that are attached to financial activities. Thus, the bankruptcy likelihood is associated with not only the internal costs, but rather other externalities that are not necessary within the banking business frame. The assertion of the embedded causes to failure are similar to that of financial distress cost due to monitoring, moral hazard, an administrative and legal cost which are found within the tradeoff theory of the capital structure (Myers, 1984). Though, Niu (2008) claims that corporations are faced with some vectors of negative and positive signs which comprise bankruptcy cost, assets, and profitability. Banks profitability has a direct link with their solvency position, and profit is realized in the event of net income exceed expenses incurred within a given accounting period. In view of this, Roy (1952) illustrated a situation under an uncertain condition with

an expected gross profit (m) shall be above the quantities of the final return (π). However, the expected gross profit can be attached with a standard error (σ) since the situation is uncertain. Although, past information regarding return and its volatility signalized the possible outcome with a precise assumption on the value of $(m), and (\sigma)$. Therefore, the relational function between the expected return and its standard error can be denoted by $f(\sigma,m) = 0$. Meanwhile, it is impossible to determine the precise probability of the final return (π) with a given values $(m), and (\sigma)$. Therefore, calculating the upper bound of this probability is the only alternative which can be achieved through Bienayme-Tchebycheff inequality. Suppose the final return is a random variable (ξ) and having a substitute:

$$p(|\xi - m| \geq m - \pi) \leq \frac{\sigma^2}{(m-\pi)^2}. \qquad (3.01)$$

Therefore,

$$p(m - \xi \geq m - \pi) = p(\xi \leq \pi) \leq \frac{\sigma^2}{(m-\pi)^2}. \qquad (3.02)$$

Arguably, in the event that bank is minimizing default $p(\xi \leq \pi)$, then the bank operates on the $\sigma^2/(m-\pi)^2$ which is equivalent to maximizing $(m-\pi)/\sigma$. Interestingly, in the event that random variable of the final return ξ is normally distributed with m mean and standard deviation σ, then the bank will certainly minimize the default probability. Therefore, for any bank realizes constant variance σ for all the values of the expected return m, then, that bank is set to maximize $(m-\pi)/\sigma$ the anticipated return.

The banks are operating within the broad spectrum of risky claims assets which include interest on loans in the case of conventional banks which returns on investment accrued Islamic banks, securities, and cash among others. Therefore, incorporating assets to the earlier discussions will predict insolvency when the effect of the current losses exhaust the bank capital (Hannan & Hanweck, 1988). The insolvency risk prediction was given little attention in the Islamic banking literature. More specifically, combining the failure risk from the insolvency and survival perspectives. Boyd and Runkle (1993) rely on the profitability, assets, and equity to measure the banks' failure risk. Following Hannan and Hanweck (1988), π is the profit, A stand as assets, E refers to equity, and the insolvency likelihood can be generated as:

$$\pi / A < -E / A \tag{3.03}$$

Where random variables π / A and $-E / A$ stands for profit to assets and equity (representing capital) to assets respectively which can shorten in the following form, that is, $r = \pi / A$ and $k = -E / A$. Again, substituting to minimizing default equation $(m - \pi) / \sigma$, which emerges from (3.02) will get the following:

$$(r + k) / \sigma \tag{3.04}$$

Therefore, Boyd and Runkle (1993) express the failure realization of r in which losses exceed k and the probability can be written as:

$$p(\pi < -E) = p(r < k) = \int_{-\infty}^{k} \phi(r)dr. \tag{3.05}$$

As such, Demirgüç-Kunt, Feyen, and Levine (2012) claimed that in the event where r normally distributed, then $p(r < k) = \int_{-\infty}^{z} N(0,1)dr$ and z is refers as Z-score. Boyd and Runkle (1993) further conclude that, in the case where the normal distribution for the r did

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not hold, then, the Z-score will accommodate the lower bound on the default probability which enshrined within the Tchebycheff inequality. Alternatively, the situation can be established in such a way that the likelihood of insolvency can be represented as:

$$p \leq (1/2)\sigma^2 / (r+k)^2 \tag{3.06}$$

Where 1/2 in the equation (3.06) is explaining the fact that the default only occurs in one tail of the distribution (Hannan and Hanweck 1988). Applying Chebyshev inequality allows for estimating using the upper bound of the insolvency probability (Laepetit and Strobel, 2013; 2015), and can express as:

$$p(r \leq -k) \leq Z^{-2} \tag{3.07}$$

The bank insolvency here can be explained as $(r+k) < 0$, and the Z-score can be explained as:

$$Z \equiv \frac{\mu r + k}{\sigma_r} > 0 \tag{3.08}$$

Arguably, Laepetit and Strobel (2015) proposed a modified insolvency measures without altering the prior assumption of normality constant variance to profit, and state it as:

$$p(r \leq -k) \leq \frac{1}{1+Z^2} < 1 \tag{3.09}$$

Where the Z is defined as stated in the equation (3.08), and the difference between the Z-score in the equation (3.08) and (3.09) is that the improved version has the maximum value of 0.5 at Z=1, with $\lim_{z \to \infty} D(Z) = \lim_{z \to 0} D(Z) = 0$. Although, the application of the improved version is less in the literature compared to the traditional once in the banking and financial studies (see chapter four for detail). Apart from banks failure risk due to insolvency position, operational self-sufficiency is another component to the institutional sustainability which has the theoretical support in banking and finance studies.

3.2.2 The Operational Self-Sufficiency

The operational self-sufficiency is the ability for the bank to operate with sufficient revenue that will cover its financial and operational expenses coupled with loans loss provisions. Therefore, settlement of expenses and profit realization stands as an integral part of achieving operational self-sufficiency. Likewise, operational efficiency through cost minimization increases the probability of profit maximization as explained in equation (3.02) above. In the close discussions, Berger and di Patti (2006) assert that agency conflict results to managers' turn into inefficient work performance, demanding for their preferential inputs or outputs which in turn have an effect on the bank's value maximization. It is conceptually clear that such a condition will detrimentally affect operational self-sufficiency of the bank and affect their long-term survival. In addition, disagreement between principal and agent necessitate conflict that results to inefficiency in the banking industry.

The agency cost theory as earlier constructed by Jensen & Meckling (1976) was an extension of Fama & Miller (1972). The theory emerged from the conflict of interest between less dedicated efforts of the managers on the firm value maximization and the shareholders' total claims of ownership. As a result, managers' perquisite consumption and higher salaries demand to infringe inefficiency and bad management of the bank's resources (Myers, 2001). Agency cost has direct implication on the bank's operational self-sufficiency, which managers are maximizing their interest than those of the shareholders. The higher the agency cost, the lower the tendency of the bank to sustain in the future. Moreover, the management investment decision (i.e. over or under investment) are

regarded as other costs to inefficiency (Stulz, 1990). The words of Nui (2008) realizes that managers are self-centered not only to perquisite consumption but also require immediate yield via short-term investment which usually affect the liquidity position of the banks. That is, investing all funds available at the expense of shareholders even in high risk and uncertain situations.

However, Chaganti and Damanpour, (1991) suggest that managers' equity ownerships commit them towards the sustenance of the firm, fulfilling the initial owners' interest (shareholders) and reduces agency conflict. From the non-banking firm's view, Jensen (1986) proposes debt financing as a tool to instigate discipline and alleviate the conflict between managers and shareholders since the firms will be engaged in payment of capital cost (see, Myers, 2001). In the same vein, Grossman and Hart (1982) argued in a similar position that debt financing reduces perquisite spending and commit managers to divest their investment decisions against bankruptcy cost. Similarly, Margaritis and Psillaki (2010) concluded a support to agency hypothesis that efficient firms are those with high leverage and manage their cost for survival. In contrast view, Berger and di Patti (2006) argued that agency cost can be largely affected in the banking industry since the managers hold private information concerning their clients. The more devastating situation can increase the cost of agency conflict due to access with the government deposit insurance scheme since it can inflict the managers' laxity from performing adequate efforts to maximize the value of the bank. Although, functional banking regulations can offset the situation, for instance, the Basel capital requirement and other corporate governance enforcement have disciplinary effects on the managers to meet certain threshold of the

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safety net amount. Additionally, Berger and di Patti (2006) emphasis on another outside debt remedy through regular examinations and regulators' actions on the cost of financial distress, bankruptcy, and illiquid condition of a bank. Similarly, the bank must be monitoring their various loans portfolio to ensure adequate refunds indue time to meet the demand deposit. With this, banks have to ensure tradeoff between credit and liquidity against bankruptcy cost (Diamond and Rajan, 2000). Thus, the bank is liable of choosing set of decisions that can suit its targeting objectives. For instance, a bank with socially objective banks can focus on the allocating credit than profit oriented bank which will concentrate towards investing the fund to the high yielding ventures. Therefore, bank managers are deemed to strategies on the best alternate means for achieving the long-term survivability.

In sum, the institutional approach is concerned with the solvency, long-term survival of the institution and operational sufficiency which is usually deduced from past financial information (Roy, 1952; Cull et al. 2007; Hartarska & Nadolnyak 2007; Nyamsogoro 2010; Alali & Romero 2013). Therefore, the information recording required capacity that will sufficiently provide an accurate financial report. Nonetheless, the banking capacities include fulfilling the regulatory requirement of capital adequacy stands as a necessary condition for the bank to acquire. It is noteworthy clear that the solvency equations (3.03-3.02) considered the importance of capital. Bank can only be insolvent when the capital ratio depleted as return volatility is highly affecting the positive additional interaction between capital ratio and return on assets. Similarly, the functions of the banks, management, regulators and corporate governance are entirely demanded proper synergy

that will enhance the institutional performance. At this juncture, a conflict within banking industry increases agency cost which tends to support the bad management hypothesis, and affects the bank's performance coupled its survivability in general. At the same time, the banking transactions are envisioned to yield adequate returns that will sustain its' long-term growth opportunity. Subsequently, monitoring the loans defaults is another cost intensive to the banking industry, but that it is another preferential objective that a bank can trade-off on the between credit allocation and liquidity against expenses tend to incure due to its operations.

3.2.3 Institutional Approach: Islamic Perspective

The earlier theoretical postulations of Islamic banks claim that the system is more solvent and can absorb the shock of the financial crisis compared conventional counterpart (Khan 1986, Darrat 1988; Bashir & 1983; Bashir & Darrat 1992; Bashir, Darrat & Sulaiman 1993; Hassan & Aldayel 1998). The Islamic banking models are proposed to operate within the diverse utilization of real assets portfolios which negates prohibited activities such as gambling, speculations, complex derivatives and interest among others (Khan 1986; Darrat 1988; Khan 2010). These prohibitions originated from Quran and the Sunnah which make Islamic banking and finance less susceptible to the high volatility of the financial shock and economic crisis. The recent global financial crisis proved the situation since Islamic banks are less affected with the shock of the crisis, which was evident during the recent financial crisis (2007-2009). Therefore, the financing structure of Islamic banks has been classified based on the mode and the nature of the business transaction (Ahmed, 2007). The funding structure is mostly based on profit and loss sharing or sale based mode and also recognizes benevolent loans (Qard) finance. With this, Islamic banks are not only to

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maximize profit, but rather to optimize the well-being of the society. In the words of Metawelly (1984), Islamic banks are broadly presumed to attain satisfactory profit (through attainment of the social objective). Similarly, this view is consistent with that of Chapra model in considering social value maximization (see: Dasuki & Abdullah, 2006; Adelabu et al., 2011). Although, the Ismaili model emphasis on the bank's owners' value maximization (Ismail, 2002). The two models of Ismaili and Chapra are close to the welfarist and institutional approach to sustainability (Aliyu et al. 2017).

The institutional perspective of sustainability is aligned more to Ismaili model than Chapra. The proponent of the value maximization argued within the principles of Quran (2:275; 2:282; 4:29) and gave support to institutional perspective. The institutional school focus on the solvency, and long-term survival of the banks coupled with operational self-sufficiency which depend on the financial records (Cull, Demirgüç-Kunt, and Morduch 2007; Hartarska and Nadolnyak 2007; Nyamsogoro 2010; Alali and Romero 2013). This is consistent with the earlier prescription in the Quran (2:282) and the theoretical background of the solvency postulations (Roy, 1952). The difference between the Islamic financial view and that of solvency is that the former is precise on the certain transaction real tangible assets while the latter hypothesized on the uncertainty conditions. With this, recording transaction necessitates skills capacity and knowledge of the transaction. Therefore, Islamic bankers are required to have sufficient knowledge of the transaction in order to hedge against the legal cost which links failure likelihood within the paradigm of agency theory (Myers, 1984).

Despite the capacity need in term of knowledge, capital adequacy is also identified in sustainable Islamic banking (Aliyu, 2014; Aliyu et al. 2017). In link with capital adequacy, conventionally, debt is cheaper compared to equity financing. Despite the advantage of debt financing, Islam prohibits all transactions with interest, but, promotes profit and risk sharing (Rajhi & Hassairi, 2012). Nevertheless, too much debt leads to bankruptcy (Lewis, 2015). Therefore, for Islamic banks to be sustainable, they must focus towards equity and other non-interest sources of funds. Meanwhile, there is a constraint on debt to Islamic finance as it must be backed by the asset, at such, leverage ratio of the Islamic financial institutions should be equal to the value of their tangible assets (Ahmed, 2007). Although, the conclusion of the previous study (Nazir & Saita 2013) that debt reduces agency cost, recent studies condemned excessive use of debts (Lewis, 2015; Myers, & Hassanzadeh, 2013; Leathers et al. 2015).

In determining banking solvency, capital and return on asset stand as an important component. Meanwhile, Islamic banks mobilize finance through investment account holders' funds apart from internal financing and equity that have been emphasized in a previous study (Ahmed 2007). In support of pecking order concept, Nagano (2009) realizes that external financing is the last resort to debt borrowing followed by Islamic bonds, which was not issued based on information cost. Also, the author claimed that Islamic bonds issuers are distinct from the internal finance sources and is preferred compared to the other sources of funds. However, investment account holders of Islamic banks are found diverting their deposits to conventional banks in the event of the low return, which reduces the banks' liquidity position (Kasri & Kassim, 2009; Zainol & Kassim, 2010). Similarly,

other studies pointed out that debt financing superiority in the conventional capital structure cannot take a broad view of Islamic finance since they differ in the cost of funding (Bellalah 2003; Rajhi & Hassairi 2012). The former aligned with the cost of debt and equity while the latter is on profit and loss sharing basis. Meanwhile, Al-Deehani & Karim (1999) and Bellalah (2003) argue that Islamic mode of transaction adds value to both owners of capital and investment account holders with lower financial risk in term of complete failure to the bank.

In another study, Williamson (1988) viewed debt and equity financing as indifferent and argue that they only vary in the characteristic of assets to be financed and the governance structure of the firm. However, previous studies (Myers, & Hassanzadeh, 2013; Buiter & Rahbari, 2015) pointed out that debt and its bearing cost (interest rate) are the real causes of the recent financial crisis and led to social cost within society. Meanwhile, social cost deters human sustenance and national development of most developed nations in which reciprocity of debt with equity finance and risk sharing will militate against risk (Myers, & Hassanzadeh, 2013; Buiter & Rahbari, 2015). Similarly, failure in business and poor financial performance emerged due to over-leveraging banks with debt which is more probable during a poor economic performance such as recession (Marks, Robbins, Fernández, Funkhouser & Williams, 2009). Therefore, Islamic banks have to functionally strategies of their capital mix which is more inclined towards management and corporate governance functions.

The functional performance of the management, corporate governance and regulator are found within the attribute of Justice and Ihsan which stands to maximize the entire stakeholders' interest (Aliyu et al. 2017). Consequently, for Islamic banks to sustain, the system must promote their businesses in accordance with the sharia guidelines and principles that advocate for moral dealing among the parties involved. This will reduce the inefficiency and bad management practices which as a result, the agency cost theory emerged (Jensen & Meckling, 1976). The agency cost affects the operational self-sufficiency and deters the prospective banking growth in the future. Therefore, the function of the Islamic moral transaction mode has the supporting mechanism to strengthen the Islamic banking relationships that are targeting long-term sustenance. Everything encompasses, monitoring and control are another input that aims to reduce bad management practices and establish efficiency which has a direct effect on the operational sufficiency in the system. In a nutshell, institutional sustainability of Islamic banks business is built within the structural component relation that has linked with the functions and capacities which are moderated with Islamic moral transaction mode and through the prudential means of accountability.

3.3 Welfarist Approach

Several studies of sustainable banking focus not only on the institutional approach rather extended to other aspects of societal benefits (see: Rahman, 1999; Jeucken, 2001; Hermes & Lensink, 2011; Nor, 2012; Ingham, Grafé-Buckens and Tihon, 2013; Askari and Rehman, 2013; Khan, 2013; Ismail, 2014). In another study of Islamic finance, Akhter, N. Akhter, and Jaffari (2009) opines that operational and financial sufficiency are not enough to explain sustainability of Islamic banks since they operate at zero level of interest and

improving the standard of living of the extreme poor. In addition, other studies added score

sheet for Shariah compliance measures to performance indicators of Islamic banks (Samad

& Hassan, 1999; Sarker, 2006; Rozzani & Abdulrahman, 2013; Abdul Rahman & Masngut

2014). Similarly, Shamsudin and Mohammed (2015) argue that it is a misappropriation of

priority to concentrate on financial ratio alone without other measures of *maqasid* al-

shariah in assessing survival performance of Islamic banks. Therefore, incorporation of

maqasid al-shariah measures will serve as a yardstick to evaluate the existing gap between

practice and theory in the Islamic banks' operations. In another study, Siddiqi (2014) notes

failure in upholding the real practices of Islamic financial principles and suggested for the

incorporation of psychological and sociological measures of analysis in order to enhance

the future generation of Islamic finance. In addition, sustainability studies integrated other

ethical values of Islam such as justice, Ihsan, morality and creed which is more relational

in the course of social exchange (Zaman, 2013; Nor & Hashim, 2014; Aliyu, 2014; Dossa

and Kaeufer, 2014; Ismail, 2014).

3.3.1 The Theories of Welfarist Approach

The welfarist approach is underpinned with the social exchange theory which consists of

the material (e.g. money, and goods) and immaterial benefits (e.g. rewards, and advice)

and relates it down to the positive ethical network of sustainable banking. Similarly, the

theories have been discussed from an Islamic perspective.

3.3.1.1 Social exchange and network analysis

Social capital scholars (such as Zaman, 2013; Ng, Mirakhor, & Ibrahim, 2015) in the

contemporary financial development often use a social exchange in explaining the

exchange relationships which are linked to Islamic sustainable development. The earlier work of social exchange begins with that of Homans "Social Behaviour as Exchange," (1958), and the work on "Social Behavior: Its Elementary Forms" (1961) published in 1974 which established the micro-foundation of social exchange relationships on the basis of functional influence on rewards, punishment, positive acts, and valuing result of an actor through direct relationships (e.g. banking business). Consequently, Homans (1961) opines that actual behavior through face-to-face of individual contacts is sub-institutional (Cook & Whitmeyer, 1992). Moreover, Homans' social structure does not interlink the individual behavior with the complex relationships within the societal setting and indirect relationships. After that, it had been expanded to macro processes (e.g. conflict and dissolution, opposition and group formation, cohesion and social integration, among others) of non-reductionism by Blau (1964) followed by Emerson (1972) power dependency through interpersonal and institutional interactions.

However, Heath (1976) argues that the institutional interactions of social structure founded within the microeconomic rationality of exchange are based on quality, quantity, and rates reciprocity. Hence, Gouldner, (1960) earlier argued that reciprocity emerged due to exchange gratification, belief, and moral norms, which appear in various studies thereafter. Firstly, depends on interconnection/dependence of the exchange transaction (see: Homans, 1961; Blau, 1964; Kelley, 1968; Molm, 1994, 2001, 2003; Alge, Whiethoff & Klein, 2003; Uhl-Bein & Maslyn, 2003). Secondly, reciprocity has relation to the traditional belief of the people (see Lerner, 1980; Bies & Tripp, 1996). The third division rooted into ethical, moral norms (e.g. Ensher, Thomas, & Murphy, 2001; Tsui & Wang, 2002; Wang, Tsui,

Zhang, & Ma, 2003; Shore & Coyle-Shapiro, 2003). Conversely, Islamic banking transaction manifested within the three parameters of reciprocity in exchange. For instance, transactions have to be within the confined shariah beliefs and moral norms values that consider social justice for the each party involved. In this regard, Islamic exchange of transaction is closer to welfare approach of sustainability as focuses it on the *maqasid* shariah.

The social exchange also took place for immaterial gain between actors such as; love, symbols, statues, a piece of advice, service, and information (see Foa & Foa 1980; Flynn, 2003). Meanwhile, in the Islamic mode of transactions, materials are exchanged for the anticipation of hereafter rewards (e.g. charity, zakat e.t.c.). Concisely, economic and social exchange are translated into "extrinsic" and "intrinsic" value derivations, which are expected to reciprocate in the future either on resources acquisition or sociability process. Therefore, the social exchange must incorporate the attributes of actors' "commitment, loyalty and trust" to each other (Cropanzano & Mitchell, 2005, p. 875). These can be achieved through enforcing the standing regulations of the exchange as pronounced by Emerson, (1976).

As part of the economic aspect of the exchange, parties tend to negotiate while on the exchange (e.g. Cook, Emerson, Gillmore, & Yamagishi, 1983) to reach a certain agreement. This is highly similar to Islamic banking contract as to make a deal negotiable in price and markup in the case of murabahah. However, reciprocity relationship between employer and employee would tend to improve dedication, loyalty, and trust among parties,

as such, is better than negotiable agreement (Molm, Takahashi, & Peterson, 2000). Despite

that the details of the agreement have to be clear and understood by each party and, include

time, legal implications and specification of duties and responsibilities involved (Molm,

2000, 2003; Cropanzano & Mitchell, 2005).

Meeker (1971) postulates six interpersonal exchange relations which include; altruism,

rationality, group gain, status consistency, reciprocity, and competition. These proposed

relationships are beyond the rule of reciprocity. For instance, altruism, as supported by

Batson (1991, 1995), is another motive for exchange despite the self-sacrifice and would,

not necessarily yield any instant material rewards that are opposite to competitive

assumption. In this regards, Islam sees it as the reward of the hereafter. However, Shafir

and LeBoeuf (2002) and Meeker (1971) argue on the assumption of rationality and

conclude that most people are irrational in their social and economic activities. Therefore,

another rule of exceptional generalization of rationality is also introduced to exchange rule.

Consequently, group gain "do not necessarily involved dyadic or network exchange

relations" (Cropanzano & Mitchell 2005, p. 879), individuals in the group are gained as a

result of being within the group. The next assumption has the common feature with group

gain, but this depends on class-level that emerged due to the status quo of either higher or

lower status, race, legacy, rank or personality (see Mauss, 1967; Lind, 1995). Therefore,

people are being favored or relate with those of the same class. However, exchange

inequality is a negative relationship, which emanates when one party in the relationship

and asymmetrically concealed the power of information (Cook and Rice, 2006). On the

contrary, by integrating social exchange in Emerson's (1972) extends the exchange

interaction in such a way that power is rational and subjective (it may or not to influence) but expected to be balanced (i.e. when all parties depend on the each other's valuable resources). Similarly, Cook and Rice, (2006 p.705) assert, "equally dependent on each other means equal power."

The first and most famous social network relationship came out of the seminal work of Emerson (1972) which rooted from the works of Blau (1964) and Homans (1961). This relationship could be individual, corporation/organization or state. The relationships are in three forms, positive, negative and null according to Emerson (1979). Meanwhile, a null relationship stands when there is no relationship between the actors while negative and positive, relationships depend on the outcome of the correlations either positive or negative (see, Cook & Whitmeyer, 1992; Cook & Rice, 2006). One of the distinguished features of social exchange and network analysis is the empirical observation that was attached to the later (Cook & Emerson, 1978).

However, mutual trust among social network members sustains their coexistence to have long-term relationships. In another study, Perrone, Zaheer, & McEvily, (2003) prove that interpersonal trust among customers and services providers (such as the bank) and buyers-sellers enhance their relationship. Similarly, Masterson, Lewis, Goldman, and Taylor, (2000) identify that interactional and procedural justice in exchange relation influences the organization outcome. With this, positive ethical relationship within society found to contribute towards organizational performance (Deckop, Cirka, & Andersson, 2003). This is similar to the assertion of the positive ethical actor in sustainable banking (Dossa &

Keaufer, 2014). At this point, it is clear that sustainable banking business and finance is incomplete without exchange relations between actors, elements and the institution (Aliyu, 2014). The conceptual idea behind sustainable finance could be 'spurious' or even 'erroneous' when exchange relations are excluded.

3.3.1.2 An Overview of Positive Ethical Network-PEN

Positive Ethical Network-PEN (2013) developed theoretically through the lens of Positive Organizational Ethics (POE), Positive Organizational Scholarship and Socially Responsible Investment (SRI). To begin with, POE, Sekerka, Comer and Godwin (2014) foresaw POE as a field that studies people, their actions and context in order to promote and sustain moral strength for achieving ethical organizational performance. According to them, POE is in between Business Ethics (BE) and Positive Behavioural Studies (PBS) in Figure 3.1. PBS includes POS, Positive Psychology (PP), and, Positive Organizational Behaviour (POB).
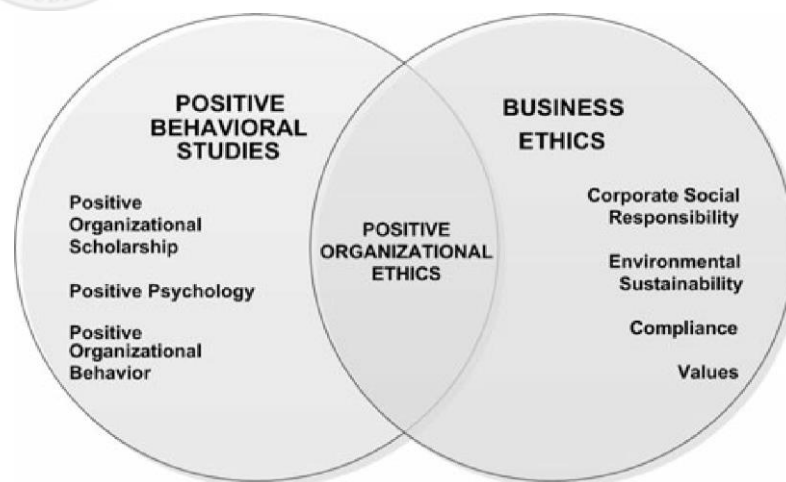
Figure 3.1: Positioning of POE between Positive Behavioral Studies and Business Ethics
Source: Sekerka, et al., (2014)

On the other hand, BE contained Corporate Social Responsibility (CSR), Environmental Sustainability (ES), compliance, and, values reservations. Integrating these concepts together would indeed lead to in-depth diagnoses on the organizational problems and challenges using the single framework. POB is a study which concentrates on the potentiality of human resource and their psychological capacities. In this regard, Luthans (2002) notes that performance in the workplace has a positive relation with the efficient co-workers' capacities enhancement and management. Therefore, as identified by Sekerka, et al., (2014) POB focuses on the intellectual and effective human skills that buffer individuals' ability to meet the organizational tasks. The next is PP, which has a little concentration in the literature. PP refers to positive knowledge and skills of individuals and/or institution that pledge to enhance the quality of life and prevent unreasonable and meaningless issues that may arise in life (Seligman & Csikszentmihalyi, 2000). POS, on the other hand, foster into account of the interpersonal factors that would create, enhance and sustain positive outcome of organizational relationship (see Cameron, Dutton & Quinn 2003, p4; Cameron & Caza, 2004). These positive attributes as contained in Bernstein (2003) include; wellbeing indicators, appreciation, collaborations, virtuousness, vitality, and meaningfulness in the workplace. Other constructs used in POS research apart from those mentioned above include; trust, positive deviance, corporate social responsibility, organizational citizenship, whistleblower, strength, and extraordinariness (Cameron 2003; Spreitzer & Sonenshein 2003, 2004; Sutcliffe & Vogus 2003; Sekerka, et al. 2014).

The last segment (in figure 3.1) is BE, include corporate social responsibility, environmental sustainability, compliance of rules and regulation, and, values attainment.

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It is explicitly clear that POB is of micro-view (i.e. individual psychology) while POS focus on the macro- view (i.e. positive aspect of the organization) and POE intersect between the two as to improve the collective power of inquiry for the better attainment of real world situation. Therefore, amalgamating POS and POE then, a theoretical framework for sustainable financial innovation to sustainable banking emerged as Positive Ethical Network (PEN).

3.3.1.3 Positive Ethical Network

Dossa (2013) developed a theoretical framework of PEN to serve as the founding root of sustainable finance innovation in sustainable banking. The coordinating mechanism of PEN (positive ethical actors) was tested on Triodos bank to trace the link between external crisis and sustainable financial innovation (Dossa & Kaeufer, 2014). Positive moral ethics is joined with sustainable ecology in the managerial decision to achieve sustainable innovation (Arnaud & Sekerka, 2010). These interconnections of business ethics required a commitment of all stakeholders involved to sustain it for a longer period. Moreover, Sekerka, et al., (2014) admits the Sekerka's (2010) view on the blame to POE in preaching towards positive character without prohibiting wrong doings. This contribution had a strong support in Islamic economics and finance principles of transactions.

PEN as derived from POS, and adopted its positive ethics. Positive interpersonal relations trigger organizations to appreciate virtue qualities that are altruistic in nature (Bolino, Turnley & Bloodgoog, 2002; Cameron 2003; Fredrickson 2003; Gittell 2003a; Park & Peterson 2003 Caza, Baker, & Cameron, 2004). With this, Dossa & Kaeufer, (2014) postulate that positive ethical actors of similar manner could join and pursue means of

solving their external crisis. Since the actors' relationships are beyond dyadic interaction in the case of an organization, then, they are been regarded as a network. The primary criteria, which had differentiated this concept and network analysis, are the inclusion of positive ethical behavior and external crises. The positive inclination would elevate the status of the organization to beauties of moral fulfillments. With this, it is clear that POS is associated with religion values in terms of moral philosophy. The relationship between POS and organizational resilience through forgiveness and courage would be a real discovery in the contemporary research (Bernstein, 2003).

 According to Dossa & Kaeufer, (2014) PEN is a network of positive actors (individual or group) that share the same positive ideology and goals to achieve within a formal or informal organizational/institutional setting. The theory links between external crisis with PEN and sustainable financial innovation. As argued by Arnaud & Sekerka (2010) that sustainable innovation obliged positive ethical condition. Enhancing individual intellectualism as proposed by POB, strengthening coordination through extraordinariness as supported by POS would attribute to positive ethics cultivation within an organization (Sekerka, et al., 2014). To achieve this objective, there is a need for high-quality management and other actors' mutual respect relationship through proper information sharing and selflessness (Gittell, 2003b). Figure 3.2 depicts the interlinking relationships between actors to their final goals, which are built on a positive assumption.

However, external crisis originates from PEN, which contradicts formation of POS, and, POE, that adopted positive behavioral resilience as a mechanism that absorbs internal shocks and crisis (Cameron 2003; Caza, & Cameron, 2008).
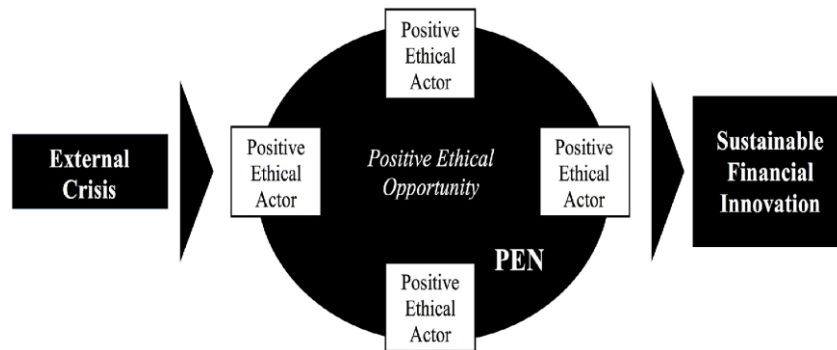
Figure 3.2: External Crisis - PEN – Sustainable Financial Innovation
Source: Dossa and Kaeufer, 2014

Though, the external crisis of PEN theory is not categorically clear, likewise, the positive behavior in POS (Caza, & Cameron, 2008). Although, Dossa & Kaeufer, (2014) used five crises to explain the proposed framework; (1) riots in France of 1968, (2) Chernobyl disaster of 1986, (3) North-South divide of 1990s, (4) debts crisis in South America of 1994 and (5) consumer debt of 2000s as factors that trigger Triodos bank's intervention in providing sustainable financing to concerned stakeholders. It is invariably clear that; external crisis would determine the situation in which the intervention is required. Dossa & Kaeufer (2014), reported that Triodos bank provided them with sustainable finance through; wind energy fund to Chernobyl disaster, microfinance investment fund to North-South divide, fair trade fund to debt in South America and sustainable checking account to consumer debt issue. A positive change to PEN actors were derived as they used the crisis as an opportunity to collaborate for sustainable innovation. As such, this is also considered as an advantage taken from market value derivation through products and services (Dossa & Kaeufer, 2014).

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PEN was found consistent with the case study of Triodos Bank, as crisis causes PEN, which later ended to sustainable financial innovation practices. The PEN theory recommends for the future elaboration of the theory and its applicability to other situations and the likelihood of the theory to be caused by motives other than a crisis.

3.3.2 Welfarist Approach: Islamic Perspective

The social and economic exchange is inevitable interaction as no one is self-sufficient (except Allah [Q112:2]) and/or to live in isolation. From the conventional perspective, social exchange reciprocates based on rewards, punishment, affirmative acts, and valuing result of an actor through direct relationships (Homans 1958; 1961; 1974). This position had been presented earlier in the Islamic contextual documents, which include two segments of reciprocity (see; sub-section 3.3.1.1: social and exchange network). The first is a reward or punishment for the relational activities that were performed as a result of the religious dictates. The second falls within the exchange between human beings upon their performed actions which have immediate outcomes. For instance: "So whosoever does good equal to the weight of an atom (or a small ant), shall see it. And whosoever does evil equal to the weight of an atom (or a small ant), shall see it (Q99: 7-8)". Again, Allah said: "Is there any reward for good other than good? (Q55:60)". In contrast to punishment, the reward has a multiplier effect on the side of Allah to humankind as mentioned:

> *Whoever brings a good deed (Islamic Monotheism and deeds of obedience to Allah and His Messenger صلى الله عليه وسلم) shall have ten times the like thereof to his credit, and Whoever brings an evil deed (polytheism, disbelief, hypocrisy, and deeds of disobedience to allah and His Messenger صلى الله عليه وسلم) shall have only the recompense of the like thereof, and they will not be wronged (Q6:161).*

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Consequently, these rewards have an everlasting effect and sustain life in the hereafter (Q16:97):

> *Whoever works righteousness, whether male or female, while he (or she) is a true believer (of Islamic Monotheism) verily, to him We will give a good life (in this world with respect, contentment and lawful provision), and We shall pay them certainly a reward in proportion to the best of what they used to do (i.e. Paradise in the Hereafter).*

To mention few, all verses above fall into the first category while the second category has to do with human relations on day-to-day social and economic exchange, which include trade, finance and banking. In financial transactions, the exchange is bounded within the contractual principles as earlier mentioned (Q2:282). The financial relationship in the verse (Q2:282) begins with dyadic relationships (i.e. between debtor and capital owner), later extended to the inclusion of scripture and witnesses. These include skills and knowledge to the transaction, honesty, sincerity, justice, and accountability. The immaterial objects (such as; brotherhood (Q49:10), a piece of advice (Q3:159), sharing information) reciprocation to the relationship is identified in Islam prior to the social exchange pronouncement. Example;

> *Abu Huraira reported Allah's Messenger (may peace be upon him) as saying: Don't nurse grudge and don't bid him out for raising the price and don't nurse aversion or enmity and don't enter into a transaction when the others have entered into that transaction and be as fellow-brother and servants of Allah. A Muslim is the brother of a Muslim. He neither oppresses him nor humiliates him nor looks down upon him. The piety is here, (and while saying so) he pointed towards his chest thrice. It is a serious evil for a Muslim that he should look down upon his brother Muslim. All things of a Muslim are inviolable for his brother in faith: his blood, his wealth and his honour (Muslim: Book 32: Hadith 6219).*

According to Cropanzano & Mitchell (2005), exchange relation has to incorporate commitment towards fulfilling the needs of one another. This replicates the suggestion of Siddiqui (2014) which says that the sustainable financial, and economic system shall adjust

towards Islamic socio-economic justice distribution principles. In this way, the earlier work of Chapra (1979) was advocated for wellbeing attainment, brotherhood, justice, and income distribution. Therefore, social justice will not fulfill its peak level without altruism as supported in the concept of *Ihsan*. It was narrated that "Anas report to have said: The Prophet said, None of you will have faith till he wishes for his (Muslim) brother what he likes for himself (Bukhari:Book 1:Volume 2: Hadith 12)". In accordance with this principle, dyadic relationships in banking activities could be extended to societal benefit through proper capital allocation that would benefit the society in general. In the most complex society, money exchange between surpluses to deficit agents' passes through the medium of an intermediary channel (banks) which is shifted from dyadic to network exchange.

The social network relationship came out of the seminar work of Emerson (1972) within the founding root of Blau (1964) and Homans (1961). This relationship could be between individual, corporation/organization or state. In Islam, the relationship is always positive contrary to the conventional view on the network relationship, which has negative and neutral outcomes. It is clearly stated from the tradition of the prophet:

> *Suhaib reported that Allah's Messenger (may peace be upon him) said: Strange are the ways of a believer for there is good in every affair of his and this is not the case with anyone else except in the case of a believer for if he has an occasion to feel delight, he thanks (God), thus there is a good for him in it, and if he gets into trouble and shows resignation (and endures it patiently), there is a good for him in it (Muslim: Book:042, Hadith, 7138).*

Similarly, Allah Has made provision to reward those believers who endure any calamity happened to them (such as systematic risk in business). Verily the rewards of Hereafter are better than the enjoyment of this world. As stated (Q93:4): "And indeed the Hereafter is better for you than the present (life of this world)." In another chapter, Allah said,

"Although the Hereafter is better and more lasting" (Q87:17). In regards to loss of wealth and other merchandise, Allah makes it clear:

> *And certainly, we shall test you with something of fear, hunger, loss of wealth, lives And fruits, but give glad tidings to As-Sabirun (the patient). Who, when afflicted with calamity, say: "Truly! To Allah we belong and truly, to Him we shall return." They are those on whom are the Salawat (i.e. who are blessed and will be forgiven) from their Lord, and (they are those who) receive His Mercy, and it is they who are the guided ones (Q2:155-157).*

Therefore, the Islamic concept of relationship is wider compared with conventional one. In the same analogy, network actors of the Islamic frame are bound to be ethically positive in consonance with religious teachings. This view was adopted in developing sustainable banking theory of positive ethical network (see Dossa, 2013; Dossa & Keaufer, 2014). However, previous research of positive ethical network was conceptually developed to alleviate the external crises and hardship of the society through sustainable financing. Nonetheless, the authors lack foundation compared to Islamic sustainable finance, which was built on the divine revelation and prophetic guidance on the right and wrong.

As the Islamic finance have a complete path to *Ihsan* concept and *maqasid al-Shariah*; PEN was initiated on the lens of positive organizational ethics, positive organizational scholarship, and socially responsible investment. In general, Islamic rules, principles, and guidance were all positive and made to sustain the positive side of human sustenance. In similar analogy, the actors of Islamic banks are assumed to be ethically positive with good expectations in all situations (profit or loss) as stated in the Hadith:

> *Suhaib reported that Allah's Messenger (may peace be upon him) said: Strange are the ways of a believer for there is good in every affair of his and this is not the case with anyone else except in the case of a believer for if he has an occasion to feel delight, he thanks (God), thus there is a*

good for him in it, and if he gets into trouble and shows resignation (and endures it patiently), there is a good for him in it. (Muslim-Book-042, Hadith 7138)

In contrast, PEN assumes all actors converged as a result of external crisis while Islamic finance actors are organized to fulfill the objective of placing them on earth (Q2:30). Again, the essence of the human being on earth is to worship Allah (Q51:56) through all their endeavors. Therefore, the financial transaction would not be an exception, and it is formed through the guidance of religion. In contrast to PEN theory, Islamic finance is on ethical actors and investment without compromising any Shariah prohibited contracts that are aiming dual rewards of this world (regarding profit or loss) and Hereafter and at the same time to fulfill *maqasid* of Shariah.

3.4 Summary

It is evident from this framework that sustainability assessment is being underpinned from two major perspectives (institutional and welfarist). The theories rooted in institutional approach are not able to predict optimal capital structure. Meanwhile, some of these theories are not applicable to real world situations. Notwithstanding, they are found relevant to some particular situation and phenomenon depending on time and firms' attributes. Capital structure theories are constructed on the cost of capital effects to firms' value which is parallel to the Islamic approach to capital structure. Nevertheless, the theories are relevant to survival and performance assessment to both Islamic and conventional mode of financing. Islam prohibits interest and gambling among others and replaces them with the fairest and convenient mode of interactions (e.g. taxes with an obligatory charity-zakat). With this, the capital structure of Islamic banks is more of equity than debt. Consequently, Islam has Ihsan concept to achieve *maqasid* of Shariah as an

inbuilt to its structure, which synonymously shares a close boundary with corporate social responsibility in terms of welfare approach. In the welfare concept, the social network exchange is extended to altruism, trust, and positive ethical principles. The concepts have other explicit constructs that share common features with Islamic values. Nonetheless, Islamic concept extends to the reward of this world and the hereafter, which outweighs the conventional perspective in terms of the multiplier effect. As a result, the Islamic concept does not have a negative and neutral effect all the times. Therefore, assessing sustainability under Islamic perspective will not be completed without quantification from the two angles, that is, institutional and welfarist approach.

CHAPTER FOUR
RESEARCH METHODOLOGY

4.1 Introduction

This chapter focuses on the data, research methods, and processes for data analysis. Accordingly, the chapter covers the conceptual framework, model specification and estimation procedure, justification for variables and their measurement based on the two approaches (institutional and welfarist).

4.2 Conceptual Framework

The conventional definition of sustainability concentrated on the long-term utilization of resources for better life enjoyment without detrimental prejudice effects on present and future generation needs (Brundtland, 1987). In the same analogy, UNEP-FI (2007) proclaims that the current impacts of banks' operations, services, and products should not prevent the needs of future generations' demands. Therefore, banks' efforts should focus on not only profit maximization, but also have to be in line with societal well-being attainment. This assertion is deeply rooted in the *maqasid Shariah* concept (Chapra, 2000; Laldin, 2013; ISRA, 2012). Therefore, sustainability of Islamic banks has dual survival objectives, which include long-term business performance and improving the well-being of the society (Ismail & Possumah, 2014). In this way, well-being attainments have a direct relation to *Shariah* compliance (Samad & Hassan, 1999; Rozzani & Abdulrahman, 2013; Abdul Rahman, & Masngut 2014; Shamsudin & Mohammed, 2015). In turn, the exchange of good deeds for rewards in Islam have to fulfill the conditions of *Shariah* compliance for dual benefits (i.e. for the bliss of this world and hereafter).

It is unambiguously understood that sustainability in Islam has a dual survival function to achieve. Where, S_f referred to the sustainability function of dual vector of s_1 and s_2; S_f stands as the vector of all activities that will tranquillizes betterment of here and hereafter enjoyment as mentioned in (Q28:77):

> *But seek, with that (wealth) which Allah has bestowed on you, the home of the Hereafter, and forget not your portion of legal enjoyment in this world, and do good as Allah has been good to you, and seek not mischief in the land. Verily, Allah likes not the Mufsidun (those who commit great crimes and sins, oppressors, tyrants, mischief-makers, corrupts).*

The success of the vector s_1 can be easily assessed through the combination of variables from the performance activities and that of the path to *Ihsan* (see chapter two). The key performance measures are those which have direct relationships between the sources of funds to the bank (equity, debt, retained earnings, and investment account holders' deposits, among others); the business activities (mode of financing and its return on investment); and settlement of voluntary and major obligations (dividend payout, zakat, taxes, social cost and environmentally costs, charity, social welfare). Therefore, Islamic bank performance indicators can be deduced from capital structure theories and the path to *Ihsan* measures. In this way, ethical value reservation (justice, *Ihsan*, abstain from evil) are identified as the components of that path to *Ihsan*. The path has been summarized in the most comprehensive and moderated verse (16:90) in the Quran (Ibn Kathir, 2003). With this, the vector s_1 has relations to each Islamic bank activities. However, the conventional default risk measures to banking institutions are in the form of CAMEL (Alali & Romero, 2013). In the same vein, Islamic banks have other mandates in fulfilling the conditions of the vector s_1 through realizing a normal profit, justice, *Ihsan* and abstain from all prohibited

activities in order to achieve S_2. Meanwhile, S_2 referred to the successful infinite survival

of hereafter (*Al-Falah*) that can be drawn from the performance of the vector$\mathcal{S}_1$. As such,

human beings are in complete loss except those on the right path as mentioned:

> *By Al-'Asr (the time).Verily! Man is in loss. Except those who believe (in Islamic Monotheism) and do righteous good deeds, and recommend one another to the truth (i.e. order one another to perform all kinds of good deeds (Al-Ma'ruf) which Allah has ordained, and abstain from all kinds of sins and evil deeds (Al-Munkar) which Allah has forbidden), and recommend one another to patience (for the sufferings, harms, and injuries which one may encounter in Allah's Cause during preaching His religion of Islamic Monotheism or Jihad, etc.-Q103:1-3)*

The second function S_2 cannot be easily measured within this framework, rather the first

function$\mathcal{S}_1$ through Islamic banking activities (see fig. 4.1). In general, sustenance and its

attainment are achieved through safeguarding justice and righteousness in the society. It is

clear in Islam that Allah changed not the betterment of any generation to worse situation

except they transgress on earth (Q13:11; 34: 15-17; 43:11). The contraventions of deeds

are not exceptional to specific issues rather to the generality of all human relations, actions

and endeavors, which includes financial and non-financial transactions. This was evidently

reflected in the 2007-2009 financial crises, which emerged as a result of financial

recklessness, moral decadence and excessive debt (Myers, & Hassanzadeh, 2013; Lewis,

2015; Leathers, et al. 2015). It is notably clear that bankruptcy cost to Islamic banks may

include all transactions that mimic conventional interest-based, high-level uncertainty, and

gambling. Therefore, this study focuses on the long-run activities of the Islamic banks

performance in relation to their survival and cointegration to the main objective of *Shariah*.

Therefore, from the objective of the study as summarized in Table 4.1, the conceptual

framework (see Fig. 4.1) emerged and aligned with the required methodology, which

nested from the theoretical definition of banking sustainability.

Table 4.1: Research Objectives and Methods of analysis

S/N	Research Objectives	Methods of Analysis	Expected output
1	To compare the level and extent of Islamic banks' survival between GCC and Non-GCC countries.	Survival analysis	Probability of survivals
2	To compare the long-run solvency, operational self-sufficiency, outreach and *maqasid* -Sharia objective of the Islamic banks in the GCC and Non-GCC countries.	Panel Cointegration analysis	Long run co-movement
3	To compare the dynamic relationships between solvency, operational sufficiency, outreach and *maqasid* index of the Islamic banks in the GCC and Non-GCC countries.	Impulse response function and Variance Decomposition	Percentage of forecast error variance in contributing to solvency, operational sufficiency, outreach and *maqasid*

Figure 4.1 depicts the conceptual framework of the study and begins with the approaches

to the Islamic banks' sustainability (i.e. welfarist and institutional). The formerly enclosed

maqasid and access to financial services through the outreaching public, which in turn has

a multiplier effect on societal sustenance through entrepreneurial, hard work and

commitment towards funds utilization. Meanwhile, the later focused on the institutional

performance in operation and higher rate of return, which is being quantified using survival

and cointegration analysis. Methodologically, the levels of survival analysis to Islamic

banks in the GCC and Non-GCC countries is analyzed based on non-parametric approach.

Meanwhile, semi-parametric predicts the survival determinants to Islamic banks in both

the GCC and Non-GCC countries. The extents of the predicting determinants are further

investigated through parametric, and survival panel, and confirmatory analysis was

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extended using mixed effect model. Similarly, prediction of the long-run co-movement through cointegration and dynamic relationship forecasted on the solvency, operational self-sufficiency, outreach and *maqasid* index.
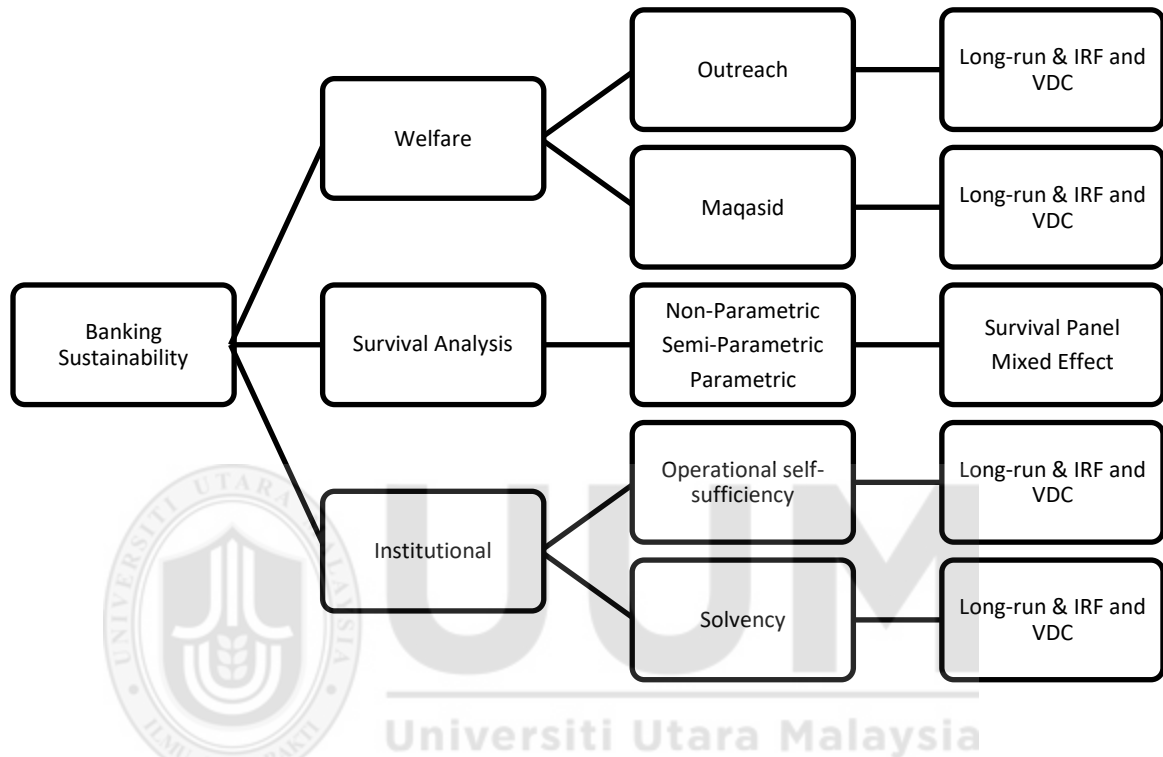
Figure 4.1: Conceptual Framework of the Study

4.3 Hypothesis Development

The concept of the sustainability is an uncompromising economic, social and environmental need of present and future generations (Brundtland, 1987). Methodologically, long-term prediction on sustainability literature is acknowledged to the fiscal and external balances studies (Wu, Chen, and Lee 2001; Holmes 2006; Herzberg 2015; Ucal and Alici 2010; Tronzano 2013). Therefore, sustainability studies are expected to forecast beyond short-period, rather envision for long-term that will impact not only present generation. Specifically, banking sustainability is divergently divided into

institutional and welfarist perspectives. Consequently, the earlier literature of corporate finance conceded the need for techniques that will ensure the growth and survival of the corporation (Modigliani and Miller, 1958). Moreover, the recent literature of comparative analysis between Islamic and conventional banks affirm that the global sample of Islamic banks survives better compared to the conventional counterparts (Pappas et al., 2016), whereas it contradicts the earlier finidng of Alandejani (2014) on the GCC countries. After their period of study some banks become incapacitated in the both GCC (e.g. Bahrain-BMI bank and United Arab Emirate-Dubai bank) and Non-GCC (Malaysia-EONCapital) regions (Aliyu et al. 2017). Despite the fact that GCC Islamic banks found relatively have higher surviving rate and stability during the 2007-2008 financial crisis compared to other Islamic banks within Middle Eastern and Asia countries (Hassan & Dridi 2011; Rosman et al. 2014).Therefore, investigating multilevel units (bank, country and regional group) of analysis of survival and failure rate for Islamic banks will provide new evidence in the literature that can guide policymakers. With this, the study hypothesized that:

H1$_A$: *The level of Islamic banks survival is different in the GCC countries compare to Non-GCC countries.*

H1$_B$: *The extent of Islamic banks survival in the GCC and Non-GCC countries can be higher than failure.*

Beck et al. (2013) concludes that Islamic banks are less solvent, which contradicts other findings of Islamic banks' distance to failure, although their conclusion is on small scale banks (Cihak & Hesse 2010; Abedifar et al. 2013). Meanwhile, Belanès, Ftiti, and Regaïeg (2015) realize that Islamic banks in GCC countries experienced a severe decline in operational efficiency two years after the financial crisis. The finding supported the earlier

claim of Sarra Ben Slama Zouari and Boulila Taktak (2014) on the sample that included other Non-GCC countries. The implication of these findings indicate that there is no difference between the GCC and Non-GCC banks regarding the decline of solvency, and operational sufficiency, which is similar to other conclusions on the operational performance of Islamic banks (Beck et al. 2013; Johnes, Izzeldin, and Pappas 2014). Moreover, there is no segregation between GCC and Non-GCC Islamic banks toward social failure outreach. In view of this, studies (Zaman & Asutay, 2009; Zaman 2013) claim that the failure of social objective among the Islamic banking industry is not limited to the outreach rather it diffuse to *maqasid* sharia requirements. The conclusion is similar to other findings on the *maqasid* index of Islamic banks (Mohammed et al. 2008; Mohammad & Shahwan, 2013; Ahmed 2013; Shamsudin & Mohammed 2015). Thus, the following hypothesis is formulated:

H2: *The GCC countries' Islamic banks have no difference compare to Islamic banks in the Non-GCC countries in terms of long-run solvency, operational self-sufficiency, outreach and maqasid -Sharia objective.*

Despite the expected indifference solvency, operational self-sufficiency, outreach and *maqasid* index, the situation may tend to exhibit tradeoff in the long-run. Thus, tradeoff position may hold in the long-run due to the business complexity and environmental changes that causes disequilibrium as documented in other banking sustainability studies (Conning, 1999; Oliveres-Polanco, 2005; Hermes et al. 2011; Abate, Borzaga & Getnet, 2014; Bos & Millone, 2015). Their findings provide other insights to policymakers on the long-term strategies that enhanced both institutional and welfarist aspect of sustainability.

Thus, the following hypothesis is formulated in the case of Islamic banks of the GCC and Non-GCC countries.

H3: *The dynamic relationship between solvency, operational self-sufficiency, outreach, and maqasid - Sharia index of the Islamic banks in the GCC countries is different compared to Islamic banks in the Non-GCC countries.*

Therefore, the above hypotheses can be tested through various methods. For instance, the first two are to be tested using survival analysis. The third hypothesis utilizes panel co-integration analysis, while the last one tested by IRF and VDC.

4.4 Methods for Models Estimation

The general methods of analysis are adopted from different econometric perspectives of modeling (such as survival analysis, panel data cointegration with policy predictions-IRF and VDC). The former, designed to evaluate the time and censor to failure in relation to the conditional and unconditional situation of an event. Similarly, the later was used to assess the long-run cointegration and to explore unobserved heterogeneity with an extension to policy predictions (Wooldridge, 2013). As a result, financial and non-financial data were utilized from the banks' financial reports. With this, the study explores the extent in which Islamic banks tend to sustain and to maintain the objective of Shariah. At the same time, macroeconomic indicators are employed to serve as control variables.

4.5 Sustainability Studies: Variables and Measurement

Sustainability studies are in two perspectives (institutional and welfare approaches) with different focus, some studies merged the two features in particular research without *maqasid* (Zeller & Meyer, 2002; Hartarska & Nadolnyak, 2007; Cull, et al., 2007; Zaigham

& Asghar,2011; Kinde, 2012; Ahmed, 2013; Ismail & Possumah, 2014; Nurmakhanova, et al. 2015; Mia, & Chandran, 2015). Other studies of sustainability emphasize the processes of maintaining and prolonged institutional solvency position alone (Herzberg, 2015; Banerjee, & Velamuri, 2015). Nonetheless, recent studies of Islamic banks supported the consideration of *maqasid* -al-Shariah in Islamic banking research (Rozzani & Abdulrahman, 2013; Abdul Rahman & Masngut, 2014; Shamsudin & Mohammed, 2015). The inclusion of *maqasid* al-shariah features shares a close boundary with the positive ethical network theory, which emanates from positive psychological and sociological theories (Dossa & Kaeufer, 2014). To this end, this study considers the concept of *maqasid* al-*shariah* under welfarist approach, though it begins with the institutional approach. Therefore, apart from the four primary dependent variables (solvency, outreach operational sufficiency, and maqasid index), all other independent variables are based on CAMEL rating (Lane, Looney & Wansley 1986; Pappas et al. 2016).

4.5.1 Institutional Approach

The institutional approach to performance evaluation focused on the firms' financial (Mufda et al, 2014) and non-financial (Shamsudin & Mohammed, 2015) records (such as *maqasid* al-Shariah) to evaluate their financial and operating self-sufficiency, solvency and their survival. Previous banking institutional focused studies employed CAMEL rating as primary independent variables and time variance to failure to serve as the dependent variable in the case survivor analysis (Gonzlez-Hermosillo, 1999; Alali & Romero, 2013). Similarly, alternative views are considered as driven focus of interest such as return on assets or equity, especially to self-sufficiency and Z- score to solvency analysis. To this end, CAMEL standard has been justified from previous studies.

4.5.1.1 Capital Adequacy

Capital adequacy is measured by the weighted risk as the denominator to capital, which are counted in three major forms; equity, debt, and hybrid. The earlier work of Lane, Looney & Wansley (1986) considered capital as the leverage to individual banks and measured capital in three components of the logarithm function. These variables include total capital and funds (sold and purchase of securities) on the proportionate to total assets and total loans over the total capital. In contrast, this study is modeled to investigate the influence of total capital ratio on Islamic banks in the GCC and Non-GCC countries. As such, the aim is to explore the extent of the banks' Sharia compliance since their transaction is being restricted on hybrid and excessive debt with interest. Therefore, capital quality will be measured by the ratio of equity to total asset and loans, capital and return interaction to assets ratio, total capital ratio, and capital funds to liabilities as have been used in previous studies (Kosmidou, Pasiouras, Doumpos, & Zopounidis, 2006; Ploeg, 2010; Pappas, et al., 2016; Ouerghi, 2014; Cihak & Hesse, 2010; Beck, et al., 2013).

4.5.1.2 Asset Quality

Credit risks that are associated with loan portfolios, assets and real estate written off are measured through asset quality in both current and future events. In view of this, asset quality influences banks' performance and their activities depend on reinforcing risk management. In similar analogy to prior study, two measures (loan/financing loss reserve to impaired loans, and net loans to total assets) are considered as a proxy for asset quality (Wall & Koch, 2000; Arena, 2008; Fiordelisi, et al, 2011; Hazzi & Al-Kilani, 2013; Abduh & Idrees, 2013; Pappas, et al., 2016). The probability of banks' failure also depends on

their assets' quality which influences the cash inflow trend (Giammarino, Lewis, & Sappington, 1993). The cash inflow of the banks improves their operational self-sufficiency, solvency, and survival respectively.

4.5.1.3 Management Efficiency

Management efficiencies are proxies with total operating expenses of its income and personnel to its total operating expenses. These ratios expatriate the proportion in which managers' interest suppurate against that of the shareholders in the event of perquisite consumption or vice versa. The higher the former ratio inflicts on the bank; the more likelihood of failure. Efficiency measures such as cost to income and overhead growth have been used in the previous banking studies (Beck et al. 2013; Pappas et al. 2016). Meanwhile, this study consider non-interest expenses to average assets due to the peculiarity of the Islamic banks' activities (Cole & Gunther, 1995).

4.5.1.4 Earnings

Earnings reflect other measures such as sustainability, earnings quality and quantity, and its past trends (Ismail, 2010; Ploeg, 2010). However, excessive composite risks (credit, market, operational, and Shariah compliance among others) tend to decrease the sustainable likelihood of the banks. The variables under this category include all returns, profits, and incomes that accrue to the value of the bank. Several studies used different measures such as net interest income, operating income to average assets, return on average asset and/or equity, (Hartarska & Nadolnyak, 2007; Cull, et al., 2007; Zaigham & Asghar, 2011; Pappas, et al., 2016). Moreover, this present study considers operating income to

average assets as the conditioning survival analysis due to its relevance to sustainability indicator of the operational self-sufficiency.

4.5.1.5 Liquidity

Exposure to potential future and current liquidity risks to Islamic banks are characterized by their inability to pursue new investment opportunities, financing businesses and access to customers' fund on demand (Ismail, 2010). In addition, insolvency and distress are attached to low liquidity positions, which are being influenced by pitiable earnings and asset quality of the bank. With this, Pappas et al. (2016) employed two measures of which this present study is adopting (net loans to an asset, liquidity ratio, and liquidity asset to deposit plus short-term funding). The banks are liquidity sufficient in the event of unexpected demands are promptly settled without embedding the institutions to signalized failure indication to their customers. As such, favorable outcome of the liquidity indicator predicts survival time of the banks (Cole & Gunther, 1995).

4.5.1.6 Operational Self-Sufficiency (OSS) and Outreach

This accounted for institutional ability to continue in operation without constraint and realized positive returns. The index (OSS) has been employed in various studies as a proxy to sustainability (Hartarska & Nadolnyak, 2007; Cull, et al., 2007; Ismail, 2010; Zaigham & Asghar, 2011). When OSS reaches 100 percent it means high institutional sufficiency and less than 100, weaker percent reflects insufficiency (Ismail, 2010; Bogan, 2012; Kinde, 2012; Bhanot, & Bapat, 2015). However, financial institutions are been considered worth functioning through in-depth outreach that serve the broad range of the population. Therefore, an average of loan size at the proportion of Gross National Product (GNP) is

being used as a measure for width (breadth) outreach in (Cull et al., 2007). Meanwhile, the measure to depth outreach is financing to Gross Domestic Product (GDP) per capita (Ahmed, 2013) while Čihák et al., (2012) divided the financing with GDP.

4.5.1.7 Return on Asset and Equity

The tools used as proxy for firms' profit and measured based on the proportion of investment return of the asset and/or equity. The net income to average asset (equity) explains the percentage of assets (equity) utilised to realise return on investment (Chukwuogor-Ndu, & Wetmore, 2006; Asutay & Izhar, 2007; Ismail, 2010; Aebi, et al., 2012; Abduh & Idrees, 2013; Farooq, 2013; Alali & Romero, 2013; Wanke, Azad, & Barros 2016). However, the tools are prominent measures of Islamic banks' performance and to indicate their effectiveness in business activities.

4.5.1.8 Macroeconomics variables

The macroeconomic variables of GDP, per capita income and inflation are employed in the previous banking studies (Cull, et al., 2007; Cihak & Hesse, 2010; Demirguc--Kunt, & Huizinga, 2010; Bogan, 2012; Al-Wesabi, & Ahmad, 2013; Abduh & Idrees, 2013; Ghassan, et al., 2013; Ouerghi, 2014; Fu, Lin & Molyneux, 2014; Abedifar Molyneux & Tarazi, 2013; Ouerghi, 2014; Bertay, Demirgüç-Kunt & Huizinga, 2013; Rajha & Al-Slehat, 2014). Therefore, this study adopted same to serve as control variables.

4.5.1.9 Z-score

Herzberg (2015) foresees solvency ability to settle balances as a measure used to proxy sustainability conditions of the country. Thus, banks solvency measures or predict the

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extent in which financial leverage of the banks meets their obligations for a long-term period. With this, Al Hares, et al., (2013) gauged Islamic banks solvency in the proportionate of debt to equity, equity multiplier, and debt to the asset. This measure is not acceptable as a proxy to insolvency compared with Z- score despite the recent argument in the literature (Lepetit & Strobel, 2013; 2015). The solvency measure of Z-score has been widely used in the banking literature to assess the bank's soundness (Al-Osaimy & Bamakhramah, 2004; Maechler, Mitra, & Worrell, 2005; Demirguc—Kunt & Huizinga, 2010; Ouerghi, 2014; Cihak & Hesse, 2010; Beck, et al., 2013; Ghassan, et al., 2013; DeYoung & Torna, 2013; Bertay, et al., 2013; Abedifar, et al., 2013; Pappas, et al., 2016; Berger, Goulding & Rice, 2014; Fu, et al., 2014). Therefore, Z-score can be expressed as; where k is the capital asset ratio (CAR= equity/asset), and μ is average return on the percentage of the asset (ROA= profit/asset and σ as return volatility, a standard deviation of ROA). The standard deviation of ROA measures the dispersion of return to diminish equity (Cihak & Hesse, 2010). Therefore, the insolvency of a bank is associated with lower Z-score that fall below 0.1 percent or (CAR+ROA) ≤ 0 (Lepetit & Strobel, 2013; 2015).

4.5.1.10 Time to failure and recent

The dependent variable in survival analysis to banks is time to failure, which is defined as the time interval from the banking establishment to an event period (Pappas, et al., 2016). However, failure of banking institutions does not solely mean complete closedown. In this regard, Vazquez & Federico (2012) considered bank failure to those that are not on active status at Bankscope database. The conditions of those banks are categorized in dissolved condition, dissolved by merger, receivership, bankruptcy and/or liquidation. In addition, those with consistent negative return can be classified into failure category. The observable

time frame of the study is also splitted to predict chances of the recurrence of an event in the survival analysis and denoted as recent. The split also considered as time varying covariate in the survival study (Cleves et al. 2010; Royston & Lambert, 2011).

4.5.2 Welfarist Approach

The *maqasid* performance measures are considered as another yardstick for sustainability evaluation to Islamic banks. Therefore, Islamic banks have been suggested to serve the social and economic well-being of the society at the end of the predetermined financial transactions period (Shamsudin & Mohammed, 2015). In view of this, Islamic sustainability literature has attached zakat and waqf as sources of funds to Islamic microfinance (Ahmed, 2013; Ismail & Possumah, 2014). Nonetheless, zakat is an obligatory payment to Islamic banks in accordance with the prescribed threshold (nisab) that is kept or transacts for a year (fall within Justice). Conversely, the *waqf* is voluntary endowments for the social and spiritual well-being satisfaction of the Society (fall within *Ihsan*). Therefore, this is directly applicable to Islamic banks. In general, several studies proposed measures and operational definition to *maqasid* dimensions (such as; educating individuals, establishing justice, and public interest ratios) of Islamic banks (Mohammed & Abdulrazaq, 2008; Antonio, Sanrego, & Taufiq, 2012; Ngalim & Ismail, 2014; Shamsudin & Mohammed, 2015). However, Ngalim & Ismail, (2014) extended the measures to services offered, environment and policies to support delivery services. In line with the previous studies (Mohammed & Abdulrazaq, 2008; Antonio, et al., 2012) the summary of the *maqasid* index can be expressed as:

$$MI = \sum_{p=1}^{4} x_1 + x_2 + x_3 + x_4$$

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Table 4.2: Summary of the Variables and Measures

	Measures	Definition:	
Survival Analysis			
Time to Failure	Binary indicator of value 0 to fail and 1 to censor banks[1]	Qualitative dependent variable that measure time to event (failure or censor of the bank)	Lane et al. 1986; Pappas et al 2016
Recent	Time varying covariate[1]	Period interval difference to recent time	Royston & Lambert 2011
Capital Adequacy			
	Equity/Asset[3]	Bank's protection to failure due to its large equity cushion	Pappas, et al., 2016
	Capital and return to asset ratio[2]	Interaction between capital and return to assets	Cihak & Hesse, 2010
	Total capital ratio[1]	Banks Tier 1 and 2 capital to risk based assets	Cole & Gunther, 1995
	Equity/Net Loan[1]	Loan book loss absorption by the equity cushion	Pappas, et al., 2016
	Capital funds/Liabilities[2]	Percentage of capital fund in liabilities form	Kosmidou et al. 2006
Asset Quality			
	Loan loss reserve/Impaired loans[1]	Percentage of loan portfolio reserved for written off.	Wanke et al. 2016
	Net loans/Total assets[1]	Percentage of loans that is tied up with the Bank's assets	Wanke et al. 2016
Management efficiency			
	Non-interest expenses to average assets[1]	The expenses incurs on proportion of the average assets generated as a result of banks activity	Wanke et al. 2016
	Cost to income[3]	Efficiency of cost spent to income generation	Pappas, et al., 2016
Earnings			
	Other operating income to average assets[1]	Operating income as proportion of earning asset quality of the bank, low cost of funding or demand for margin	Wanke et al. 2016
	Return on average asset[2]	Performance efficiency on the bank's asset return	Pappas, et al., 2016
	Return on Asset[3]	Net income to average total asset	Pappas, et al., 2016
	Net income[2]	Bank's total earnings	Wanke et al. 2016
Liquidity	Net loans/asset[1]	Percentage of loans that is tied up with the Bank's assets	Pappas, et al., 2016
	Liquidity asset ratio[3]	Percentage of liquid assets available	Wanke et al. 2016
	Liquid assets/deposit and short term funds	Percentage avail liquidity to meet short term withdrawal	Pappas, et al., 2016

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Table 4.2 (continue)

			Cole & Gunther, 1995
Balance sheet	Other non-interest liabilities[1]	Liabilities employed	
Business cycle	GDP- per capita[1&2] Inflation[1]	Macroeconomic effect on Banks performance	Poghosyan & Cihak, 2011
Institutional Approach: Panel Cointegration Analysis[2,3 &4]			
OSS[2,3&4]	Operating Revenue/Financial, loan loss provision and operating expenses	Operating self sufficiency	Cull et al. 2007
Z score[2,3&4]	(ROA+CAR)/SD(ROA)	Banks solvency indicator	Beck et al. 2013
Welfare Approach: Panel Cointegration Analysis[2,3&4]			
Outreach[2,3&4]	Average loans size/GDP	Financial inclusiveness for all	Ahmed 2013
Maqasid **Index[3&4]**			
Educating individuals	Education grant/total income	Education grant for advance knowledge	Mohammed & Abdulrazaq, 2008
	Research expense/total expense	Research for advance knowledge	Mohammed & Abdulrazaq, 2008
	Training Expense/total expense	Training for installing new skills and improvement	Mohammed & Abdulrazaq, 2008
	Publicity expense/total expense	Publicity for creating awareness of Islamic banking	Mohammed & Abdulrazaq, 2008
Establishing Justice	profit/ total income	Fair return and dealing with investors	Mohammed & Abdulrazaq, 2008
	Bad debt/ total investment	Affordable price for the products and services	Mohammed & Abdulrazaq, 2008
	Interest free income/ total income	Interest free to eliminate of injustice	Mohammed & Abdulrazaq, 2008
Public Interest	Net profit/ total asset	Improves investors' profitability	Mohammed & Abdulrazaq, 2008
	Zakah/ Net Income	Wealth and income redistribution	Mohammed & Abdulrazaq, 2008
	Investment deposit/total deposit	Real sector investment	Mohammed & Abdulrazaq, 2008
Environment	Environment expenses/Total expenses	Environmental cost	Ngalim & Ismail, 2014
Control Variables to Panel Cointegration Analysis[2]			
Business cycle	GDP per capita (for the country aggregate)	Macroeconomic effect on Banks performance	Poghosyan & Cihak, 2011
Impulse Response Function and Variance Decomposition[4]			

Table 4.2 (continue)

	Operating Revenue/Financial, loan loss		
OSS	provision and operating expenses	Operating self sufficiency	Cull et al. 2007
Z score	(ROA+CAR)/SD(ROA)	Banks solvency indicator	Beck et al. 2013
Outreach	Financing/GDP	Financial inclusiveness for all	Cull et al. 2007
Maqasid Index	Average of *Maqasid* indicators	Islamic Banks' objective	Mohammed & Abdulrazaq, 2008

The variables used in the Table are categorized based on four different methods of analysis. 1. Survival analysis, 2. Panel cointegration (country aggregate data), 3. Panel cointegration (Bank per country specific data), 4. Impulse response functions and variance decomposition.

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Where $x_1 - x_4$ representing the objectives (educating individuals, establishing justice,

public interest, and environment), and each x_1, x_2, x_3, and, x_4 contained other elements (E),

weight (W) and ratios (R) assigned to it (see Appendix A). Therefore, in the case of these

objectives, multiple attribute decision-making has to be considered for assessment.

Applying the simple additive weight represented by W, R is the performance ratio, and E

is the element outcome in the event. The higher is the index, predicts better performance

and vice versa.

4.6 Sources of Data and Sample

The reliability of the Bankscope data has been lamented in the previous studies

(Bhattacharya, 2003; Gennaioli, Martin, & Rossi, 2014). It is widely acknowledged in

several studies that Bankscope served as a prime source of data and financial information

of bank research (Fiordelisi, et al., 2011; Cihak & Hesse, 2010; Demirguc--Kunt, &

Huizinga, 2010; Anginer, Demirguc-Kunt, & Zhu, 2013; Alandejani & Asutay, 2013;

Beck, et al., 2013; Ouerghi, 2014; Bitar, 2014; Pappas, et al., 2014;). Similarly,

macroeconomic data is sourced from World Bank development indicators, and Islamic

Banks Information System (IBIS-IsDB database) is utilized for panel cointegration

analysis.

At the end of 2013, the population of Islamic banks reached 410 across the globe (Hussain

et al. 2015). Nonetheless, some of those banks' financial statement are not accessible in

most of the available database. Therefore, insufficiency of data necessitate this study to

focus on the 24 countries with 170 banks based on available data from BankScope for survival analysis, and this is consistent with previous Islamic banking studies (Pappas et al. 2016; Beck et al. 2013). However, this study was able to increase the sample in terms of years' coverage. The survival analysis is based on multi-level stage analyses for Islamic banks in the GCC and Non-GCC countries between 1987 and 2014. Meanwhile, panel cointegration concentrates on Islamic Banks from countries of GCC, and the Non-GCC for the country aggregate and country-bank specific. As such, a sample period of longitudinal aggregate panel data analysis is between 1995 and 2014, and also used the five GCC countries (i.e. Bahrain, Kuwait, Qatar, Saudi Arabia, and United Arab Emirate with the exclusion of Oman), and the four Non-GCC countries (Sudan, Iran, Egypt, and Jordan). The selection of the five GCC countries are in line with the previous study from the same region (Yusof, Bahlous, & Tursunov, 2015). The aggregate is used to estimate solvency, outreach, and operational self-sufficiency, which addresses part of the second and third objectives. The remaining part of the objective two and three is set on the *maqasid* index of which the indicators are not available in the Bankscope database. Therefore, the reason behind outsourcing bank-bank-country specific data is due *maqasid* Sharia index which some the indicator are not available in the BankScope database. As a result, the bank-specific data was also collected from IBIS database, and the *maqasid* index is constructed based on the previously developed measurement (Mohammed & Abdulrazaq, 2008). Similarly, data collected in the IBIS- Islamic finance database is for the period between 1993 and 2012. The countries covered in this segment of analysis include the five GCC and five Non-GCC (Malaysia, Turkey, Egypt, Bangladesh, and Jordan). The split between GCC and Non-GCC is due to the fact that the former has two third of the global Islamic

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banks' assets with a higher number of Islamic financial institutions (Abedifar et al., 2014; Belanès, Ftiti, & Rym, 2015). Meanwhile, Islamic banks in these countries are considered as a unit of analysis in the country at bank-country specific analysis, countries for the regional intra-country analysis, and regions in the comparative analysis of panel analysis. Furthermore, IBIS database recorded 195 banks out of which 39 of them are inactive. The bank-specific analysis is also extended to IRF and VDC to evaluate the dynamic relationship between outreach, solvency, operational self-sufficiency and *maqasid* index for policy formulation.

In pursuance of the broad objective of this research, econometric analysis of the panel data is employed in two different perspectives. These include survival and panel cointegration data analyses. The former is proposed to predict conditional and unconditional lifetime to the failure of Islamic banks comparatively within the group of countries. Similarly, the later is to evaluate the long relationships of the explanatory variables on the dependent variable of each model. In addition, the dynamic analysis will be conducted and impulse response.

4.6.1 Survival Analysis

The earlier literature of corporate finance divided specialist in the field into three categories which include those quests for the techniques that will ensure survival and growth of the firm (Modigliani & Miller, 1958). The institutional scholars of banking sustainability are concerned with operational and financial self-sufficiency which support the financial corporation to survive and enhance growth for the longer period. In a nutshell, sustainability studies are concerned with the long-term survival of an event, activity or

transitions. This can be traced in the work of Markard & Truffer (2012) which proposed survival of fifty years and above to transitional sustainability. Therefore, survival time considered relevant in sustenance assessment. Survival analysis often refers to duration model in economics, time to failure, event or terminal point data are used to evaluate the life span of activity within the frame of the study (Harrell, 2001). Survival analysis has been widely used for medical and biological studies, engineering, social, and management sciences. Consequently, the method is utilized for in-depth assessment of reliability and sustenance of an activity over time coverage. The techniques superseded the banks' insolvency and failure studies presented in the work of Demirgüç-Kunt (1989) that neglected time to event analysis which underestimated the institutional functions before failure. In general, the model outweighed binary logit and probit, discriminant analysis due to censoring application and expected time variance prediction to an event. In addition, it performed efficiently since it can also be estimated using partial maximum likelihood and negated the distribution assumption over ordinary least square-OLS (Shumway, 2001; Jenkins, 2005; Pappas, et al., 2016).

This present study employs Nonparametric of Kaplan-Meier (1958), and Nelson (1972)-Aalen (1978) functions to survival and hazards couple with conditional survival models through semi-parametric and parametric models. Interestingly, survival analysis of banking literature is dated back to Lane, et al., (1986) which utilized the Cox hazards model of semi-parametric approach (Cox, 1972) and predicted bank failure. Thereafter, several studies in relation to conventional bank failure were conducted using a proportional hazard model (Whalen, 1991; Cole & Gunther, 1995; Henebry, 1997; Wheelock & Wilson, 2000;

Molina, 2002; Dabos & Escudero, 2004; Cole & Wu, 2009; Gomez-Gonzalez & Kiefer, 2009; Putnam, 2015). Despite that few studies have been able to use the techniques on Islamic financial institutions through comparative survival study between Islamic and conventional banks (Alendajani & Asutay, 2013; Pappas, et al., 2016). However, their findings are contradictory and incomplete for the regulators' decision-making despite close time range and similar source of data. At the same time, Alendajani and Asutay, (2013) include other parametric models of estimation (complementary/colog-log, Weibull and clog-log with unobserved heterogeneity) which were utilized in prior studies of conventional banks (Sales & Tannuri-Pianto, 2007; Evrensel, 2008; Männasoo & Mayes, 2009).

Following previous studies (Wooldridge, 2002; Lee & Wang, 2003; Machin, Cheung, & Parmar, 2006; Liu, 2012), the model can be framed at such: let T be the non-negative entire time of banking activity, which has a discrete and continuous time property (Kalbfleisch & Prentice, 2002). Meanwhile, t is the failure time of the initial establishment of a bank, which begins from zero to infinity i.e., ∞. The survival time of the individual banks to operate without failure is associated with three functions of the unconditional survival function. These include probability density function $f(t)$, - (p.d.f.), cumulative density function $F(t)$ (c.d.f.) and survival function is $S(t)$. Survival and failure function are products of probability, which is nonnegative that ranges as $0 \leq S(t) \leq 1$. Where; $S(0)=1$, the probability of survival is one at zero time while in the event of $S(\infty)=0$, time is

infinity the probability is zero (see, Lee & Wang, 2003; Liu, 2012; Jenkins, 2005; Pappas, et al., 2014).

$S(t) = P$ (banks to survive greater than t)

$$S(t) = P(T > t) \tag{4.01}$$

Referring to cumulative distribution function definition; $F(t)$ of T where bank fail below time t will be given as:

$S(t) = 1 \text{-} P$ (banks fail below t)

$$= 1 \text{-} F(t) \tag{4.02}$$

Considering (c.d.f.), the cumulative failure function can be written as (see: Jenkins, 2005):

$$P(T \leq t) = F(t) \tag{4.03}$$

Therefore, to summarize, the survival equations in the event of survivor function

$$P(T < t) = 1 - F(t) \equiv S(t). \tag{4.04}$$

The slope of c.d.f. is p.d.f. by definition and is expressed as:

$$f(t) = \frac{\partial F(t)}{\partial t} = -\frac{\partial S(t)}{\partial t}. \tag{4.05}$$

Furthermore, p.d.f. defined as the limit of probability of a bank fail within a short time interval t (i.e. instantaneous failure) to $t + \Delta t$ at proportionate to the probability of failure at Δt in the event of unconditional probability. In nutshell, it is expressed as such:

$$f(t) = \frac{\partial F(t)}{\partial t} = -\frac{\partial S(t)}{\partial t} = \lim_{\Delta t \to 0} \frac{p(t \leq T \leq t + \Delta t)}{\Delta t} \tag{4.06}$$

The Failure function $f(t) \geq 0$ could be higher than zero (Jenkins, 2005). Equation (4.06) expressed the negative slope at time t of the function. At the same time, hazard rate can be estimated with the extension of (4.06), and it is written as:

$$h(t) = \frac{f(t)}{1 - F(t)} = \frac{f(t)}{S(t)} \tag{4.07}$$

$$h(t) = \lim_{\Delta t \to 0} \frac{p\{T \in (t, t + \Delta t] | T \geq t)}{\Delta t}$$

(4.08)

Following Allison (1982) instantaneous bank failure rate is expressed in equation (4.07), and (4.08) presented the conditional event of the probability of $T \geq t$ at t time. This reveals that Δt moves to 0. The hazard rate of the bank failure is conditional to the limit of the interval to failure time. Since the hazard rate emerged from the slope of c.f.d in (4.05), it can also be written as:

$$h(t) = \frac{-\partial \log S(t)}{\partial t}.$$

(4.09)

Equation (4.09) expressed that $S(t)$ is monotonically decreasing, as one will be multiplying by the time. This implies that $h(t)$ is non-negative and not necessary ≤ 1 (Allison, 1982). The three survival functions are interrelated. The rate of hazard can easily be expressed in terms of explanatory variables as a conditional event.

4.6.1.1 Predicting Unconditional Survival Period

The first model in this section is formulated to predict the unconditional survival period of Islamic banks within the sample countries. In essence, survival analysis embedded within hazard evaluation of failure which has a direct relation to the financial sector and banks in particular. Therefore, various estimators have been deployed to assess the extent of Islamic banks survival in the system. In this regards, Lee & Wang (2003) asserts that Kaplan- Meier (1958) estimator is a product-limit method, which calculates each lifespan indicator and the survival function. Therefore, this present study also extended to predict the survival and cumulative hazard function on the GCC and Non-GCC, and the group of four (GCC,

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Asia, MENA and Others). Following Liu (2012), the unconditional survival time for Kaplan-Meier is written as:

$$S(t) = \prod_{t_i < t} \frac{n_i - d_i}{n_i}$$

(4.10)

The Kaplan-Meier (1958) survival probability at a time t is $S(t)$, i, referred to individual bank event experiences or right censoring at a time $(i = 1, 2, 3, \ldots n)$, t_i is the individual bank censor or survival times, which is less than t. The notation begins with the individual banks observation n_i at t_i and d_i (the event number at its time happened). Therefore, actual data of bank failure is utilized at the time of the event (failure). The null hypothesis for the unconditional survival function is tested using the log-rank test and likelihood ratio for the homogeneous group within the split sample of survivor functions. Conversely, the cumulative hazard function is originated from the work of Nelson-Aalen which is expressed as follows:

$$H(t) = \int_0^t h(u) du$$

(4.11)

The cumulative hazard function $H(t)$ is determined by the integration of the hazard in multiplicative of failure. Furthermore, extending the analysis to parameterization of the time interval covariate will informatively predict the recurrence of an event at each period while others are held constant.

4.6.1.2 Parameterization Analysis

The parameterization of the time recurrence chance of an event is estimated through piecewise and Poisson models. Subsequently, the period of the analysis is predicted

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through split of yearly intervals. As such, the models to be estimated considered the covariates of the banks' financial reports and time which recorded at the end of each calendar period. Therefore, the first survival model in this scenario is written as exponential:

$$h_{ij}(t \mid X_i) = \alpha_j \exp(X_i\beta) \tag{4.12}$$

Where the hazard rate for each bank is $h_{ij}(t \mid X_i)$, and α_j is the baseline that does vary with the event of interval period j, X_{ij} is the vector coveriates of the each bank and the log-hazard ratio determine with the regression parameter β. For consistency, the model is also fit based on generalised linear model of the poisson regression:

$$\ln(\mu_{ij}) = \ln(y_{ij}) + \alpha_j + X_i\beta \qquad d_{ij} \sim Poisson(\mu_{ij}) \tag{4.13}$$

The mean of the Poisson distribution stands as μ_{ij} and the time risk y_{ij} for the banks in the j interval is added through offset $\ln(y_{ij})$. The model is based on log-hazard scale with base line α_{ij}, without assuming independent Poisson distribution d_{ij}. In this way, the generalised linear model is used to estimate the Poisson model which is expected have the same likelihood function with that of piecewise exponentials (4.12).

However, failure can be conditional on other explained variables that are liable for its occurrence. Previous derivations rely on time alone to hazard rate- $h(t)$, while, in the extension, hazard function will be conditioned on both time and other explanatory variables $h(t, X)$. Meanwhile, the inclusion of the vector X is representing the set of explanatory variables in the model $X = (x_1, x_2, x_3, ...)$ i.e. banks specific and macroeconomic variables.

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Similarly, the same application can be integrated with hazard function $H(t, X)$, survival

function $S(t, X)$, hazard rate, $\hbar(t, X)$ and so on. The linear characteristic heterogeneous

combination is incorporated as follows:

$$X\beta' \equiv \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \ldots\ldots + \beta_\kappa x_\kappa.$$ (4.14)

The variable k was observed on each bank within the sample, βs are the parameters and the

linear index is $X\beta$ with the assumption that X_k values are not covariates with or

influence with time variation (Jenkins, 2005). Henceforth, following Alendajani & Asutay

(2013) and Pappas et al. (2016), equation (4.14) would be incorporated to continuous time

on semi-parametric and parametric models of the proportional hazards.

4.6.1.3 The Cox Semi- Parametric model

Reflecting the words of Liu (2012), Cox model is efficient compared with baseline hazard

rate through the estimation of partial likelihood approach and the influx of censor. The

model is derived from the hazard rate at the proportion of X when $h(t)$ experiencing the

event at time t = (1, 2, 3, 4..........∞). The multiplicative effect of the covariates term as

$h(t) = \exp(X\beta')$ where β' is the vector of the coefficient in the regression equation and

it provide the set of covariates $X = (x_1, x_2, x_3, \ldots)$ effect on the hazard rate. Following Pappas

et al. (2016), in the first place, the conditional variables will be utilised to estimate the Cox

model in different stages in order to evaluate each step effect. Therefore, Cox model is

written as:

$$h(t|X) = h_0(t) \exp(X\beta')$$ (4.15)

Where $h_0(t)$: summarized the dependency on time t for all banks, not on the explained variables and it is referred to as the baseline hazard function for the duration T (continues time). The hazard rate $h(t|X)$ is reflecting the probability of a particular bank to fail at any point in time (with the period frame) given the conditioning coveriates. Similarly, given that, X in equation (4.15) is multiplicative or proportionate to restrict the function $h(t|X)$ within the range $(0,\infty)$. The Cox model is multiplicative in term of $\exp(X\beta')$ as the function of non-negative, and it has the assumption that individual bank hazard is proportionate to one another. In other words, for each two banks within a given set, hazard function of the first bank is proportionate to the second bank. At the same time, the exponential coefficient in the function (4.15) emerges the hazard risk ratio (Hr). For given covariate t_n as a dichotomous variable $t_{n1} = 1$ and $t_{n0} = 0$ while covariates take the value of zero, the hazard ratio is written relative risk ratio:

$$
\begin{aligned}
Hr &= \frac{h_0(t)\exp(x_{n1}\beta_n)}{h_0(t)\exp(x_{n0}\beta_n)} \\
&= \exp\left[(x_{n1} - x_{n0})\beta_n\right] \\
&= \exp(\beta_n),
\end{aligned}
\tag{4.16}
$$

In addition, dichotomous covariates express intuitively to relative risks in a case where it falls strictly between fail and survive (i.e. 1, 0). In contrast, continuing cases to hazard ratio can simply increase $Hr > 1$ or $Hr < 1$ at a given unit of change to the value the covariate. Therefore, the model is considered as semi-parametric, that is, it does not specify nuisance of the hazard baseline $h_0(t)$. With this, the change in banks heterogeneity is proportionate to that of the function scale $\exp(X\beta')$. Similarly, to interpret the Cox hazard function (4.15) into survival probability considering vector of X can be written as:

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$$S(t, X) = \left[S_0(t)\right]^{\exp(X\beta')} \tag{4.17}$$

Nonetheless, the earlier models presented in equation 4.12 and 4.13 considered time varying coveriates for the expontial and Poisson regression models. For continuity, subsequent models adhered the inclusion of time varying coveriates together with financial and macroeconomic variables of the banks. Therefore, the semi-parametric hazard rate is written to covariate with considering the time varying covariate and cluster as illustrated in Banerjee et al (2003):

$$h_{ij}(t_{ij} \mid X_{ij}) = \left\{h_0 \exp(\beta_0 \lambda_z)\right\} \exp(X_{ij}\beta') \tag{4.18}$$

The Cox model 4.18 above incorporated the time varying covariate. However, following previous literature (Cleves et al. 2010; Gutierrez, 2002), the hazard rate for each bank-cluster is $h_{ij}(t_{ij} \mid X_{ij})$, and the time covariate λ_t is multiplied with the baseline that vary with the event of interval period t, X_{ij} is the vector of coveriates the each banks at cluster j with the regression parameter β. For consistency, the study modelled based on the banks cluster and tested the effects of variance groups and frailty. The initial model named Cox 1, then shared 2, (i.e. group of GCC and Non-GCC), shared 4 (GCC, Asia, MENA, and others), and effron estimation. The model 1 in the Cox combinations is estimated based on the above equation (4.18) and frailty have subsequently added in the model 4.19. This study considers inclusion of time varying coveriates and set the shared model based on cluster variation (two group of GCC and Non-GCC, and four group of Asia, GCC, MENA, and others) and also accounted for unobserved heterogeneity (frailty). The shared frailty model for the banks cluster is estimated in the previuos banking study (Pappas et al. 2016). The frailty model can be an extension of the previous model and expressed as:

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$$h_{ij}(t_{ij} \mid X_{ij}) = \left\{ h_0 \exp(\beta_0 \lambda_z) \right\} \exp(X_{ij}\beta' + \upsilon_j) \tag{4.19}$$

Shared frailty regarded as an extension to hazard proportion model that account for the multiplicative effect of unobservable risk (Ibrahim, Chen & Sinha, 2001; Kalbfleisch & Prentice, 2002). In the Islamic banking study, Pappas et al. (2016) claim that unobserved latent variable is associated with macroeconomic factor and it represented as υ_j which is frailty factor. A bank operating in the country with higher hazard risk to failure will have the latent value of $\upsilon_j > 1$ and vice versa (Gutierrez, Cater & Drukker, 2001). Similarly, i = 1, 2, ..., n represent the individual bank in j country, β stands as (p x 1) vector of unknown coefficient and X is (p x 1) covariate vector of bank i at cluster j. It's random effect distribution measures the expected value of the baseline. Likewise, in equation (4.16) S_0 stands as survival baseline has the same definition with that of hazard h_{0i} rate equation. The exponent coefficient $\exp(X_{ij}\beta')$ is the hazard ratio and increases with the percentage of additional risk of failure $[100(\exp^{\beta'k} - 1)]$ at k^{th} covariance.

The default Cox model estimation is provided based on Breslow (1974)'s method for ties (ties-means several event at particular observable period). Similarly, for ascertaining the successive risk weight and exact marginal approximation, Efron's (1977) approximation is selected which is more accurate than the default estimator (Cleves et al. 2010). At the end of the series of estimation, the findings will conclude either there is variation in the modeling setting or the time varying and cluster set-up adjusted the model to have consistent results. As a result, the deficient concern of the semi-parametric on the baseline

motivate needs for further estimations to verify outcomes. Therefore, parametric approaches with consideration to their distributional assumptions have likelihood to provide different information on the outcome.

4.6.1.4 Parametric models

The parametric models to survival analysis are divided into log-time and hazard parameterization. In the semi-parametric approach, the baseline is left without parameter while the covariates have it. Specifically, this present section concentrates to hazard parameterization which focused on the three distribution (exponential, weibull and gompertz) for analysis.

4.6.1.5 The Weibull, Exponential and Gompertz model

Weibull model is a product of exponential distribution without the constant assumption of the hazard rate (Weibull, 1939; 1951). The variability of hazard rate influences its wider applicability in many disciplines (Lee & Wang, 2003). The model is given as such:

$$h\left(t_{ij} / X_{ij}\right) = h_0(t_{ij}) \exp(X_{ij}\beta')$$
(4.20)

$$= pt^{p-1} \exp(\beta_0 + X_j\beta')$$
(4.21)

$$= pt^{P-1}\lambda$$
(4.22)

Consider that, p as the shape parameter in the model and greater than zero, $\lambda = \exp(X_{ij}\beta')$ and exp (.) represent the exponential function. The variance of the hazard function is monotonically rising (falls) with time $p > 1$ ($p < 1$) or $p = 1$. In the event where $p > \lambda$ (λ is less than p) means higher hazard rate (lower hazard rate) to the respective survival time. For robustness within the survival models extension to a semi-parametric approach of the

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proportionate hazard function of Cox (1972) is of paramount importance. The model is out of misspecification of a life span in relation to the parameters that are enclosed in parametric approach. At the same time, Liu (2012) argued that Weibull and exponential can be proportioned in a similar way to Cox model. The outcome between the Cox and parametric approach can be the same especially when controlled for time varying and cluster. In spite of this debate, it may still be relevant in the case of assessing heterogeneity of the model. Note that, $h_0 = \exp(\beta_0)$ and adding λ_t as time varying covariate the model can be expressed as follows:

$$h(t_{ij} \mid X_{ij}) = h_0 \exp(X_{ij}\beta)\lambda_t^{p} \tag{4.23}$$

However, exponential is the simplest and restrictive baseline hazard model with single parameter which is constant at time changes (Cleves, 2010; Liu, 2012; Rabe-hesketh & Skrondal, 2012).

Following Cleves et al. (2010) the exponential model can be presented as:

$$h(t_{ij} \mid X_{ij}) = h_0(t_{ij})\exp(X_{ij}\beta)$$

$$= \exp(\beta_0 + X_{ij}\beta) \tag{4.24}$$

Adding time varying covariate λ_t to the above model, and arrive as:

$$h(t_{ij} \mid X_{ij}) = \left\{h_0 \exp(\lambda_t\beta)\right\} \exp(X_{ij}\beta) \tag{4.25}$$

Following the above conditions to the Gompertz regression, then, the model will be arrieved as:

$$h(t_{ij} \mid X_{ij}) = h_0 \exp(X_{ij}\beta)\gamma\lambda_t \tag{4.26}$$

The shape of the Gompertz model depends on the time changes with γ, the model increases with time at $\gamma > 0$ and decreases with time at $\gamma < 0$. With an extension of the models to complete panel set up of random-effects will guide the analysis to further investigate the response on the predicting variables. As a result, this study focus on the survival panel and mixed effect model.

4.6.1.6 Survival Panel Analysis

The panel survival analysis has similar likelihood-ratios test compared with random effect of the parametric models (Stata Corp, 2015). In essence, the results can support parametric panel models, especially when the modelling are guided with some conditioning restrictions. Following the work of Morgan (1993), adding $\upsilon_i s$ as an unobserved random effect to the panel is assumed to satisfy the properties of independent and identically distributed (iid) $N(0,\sigma_{\upsilon}^2)$.

The equation below contained the panel properties with an adding unobserved random effect υ_i to the hazard proportion model.

$$h(t_{ij}) = h_0(t_{ij})\exp(X_{ij}\beta + \upsilon_i) \tag{4.27}$$

The proportionate hazard $h(t_{ij})$ depends on the conditional influence of the predictors vector X_{ij}. Similarly, the parametric assumption is also applied on the baseline hazard function $h_0(t_{ij})$, considering time varying covariate added to model (4.28) will arrived as:

$$h(t_{ij}) = \left\{h_0 \exp(\beta\lambda_t)\right\}\exp(X_{ij}\beta + \upsilon_i) \tag{4.28}$$

The next model is estimated based on the assumptions of mixed effect modelling which is expressed as follows:

$$h(t_{ij}) = h_0(t_{ij}) \exp(X_{ij}\beta + z_{ji}u_j) \qquad (4.29)$$

For this, z_{ij} is a vector of 1 x q of the random effects covariates and u_j random effects are realize from the cluster multivariate normal distribution. Furthermore,

$$h(t_{ij}) = \{h_0 \exp(\beta\lambda_t)\} \exp(X_{ij}\beta + z_{ij} + \upsilon_i) \qquad (4.30)$$

The above situation in equation (4.30) is only informing us the covariates that can lead to survival of the Islamic banks. Nonetheless, sustainability envisions long-term survival of an institution. Therefore, extending to a technique that focuses on the long-term comovement of the banks predicting variables in relation to sustenance response components will strengthen the analysis.

4.6.2 Panel Data Analysis

Panel data analysis was broadly used in finance and banking research in order to acquire detailed information that is reliable and efficient among banks' activities across the globe (Apergis & Sorros, 2009; Fiordelisi, et al, 2011; Hidayat & Abduh, 2012; Bogan, 2012; Kinde, 2012; Al-Wesabi, & Ahmad, 2013; Ouerghi, 2014). As a result, panel data are employed to reduce biases and collinearity among variables of interest at the same time to acquire more degree of freedom (Gujarati, 2003). Panel data combined the features of cross-section and time series that measure changes in each bank at a particular period for the span period of the study (Verbeek, 2004). The linear panel model can be deduced from the earlier (4.14) and express as:

$$y_{it} = \alpha_i + X_{it}\beta' + u_{it}. \qquad (4.31)$$

Where y_{it} referred to the dependent variable for bank i cross-sectional identifier for the time t (1, 2, 3 ... 20); α_i stands for intercept and X_{it} is the vector of the explanatory variables at K dimension as contained in the equation (4.14). Furthermore, β' is the index of $\beta_1, \beta_2, \beta_3......\beta_k$ in which each coefficient measures marginal effect of the correspondent variables in the vector X_{it} (Verbeek, 2004). Similarly, the frailty and panel models of survival analysis is accounted for the heterogeneity of each country's unobserved variable as equal functions to random effect of the panel data analysis (Liu, 2012).

4.6.2.1 Panel Model Specification

For simplicity, from equation (4.31), B and M are attached to each x subset variable for identification within the vector of X_{it}. Where βx_{it} is representing the bank-specific variables for two categories of the analysis. The first category of the banks specific is related to country aggregate estimation which include capital and return to asset ratio, capital funds to liabilities, liquid assets to deposit and short term funding, net income, and return on average assets, and Mx is referred to the sub set of macroeconomic variables (per capita of gross domestic product). Second category of analysis emerged as a result of insufficiency of *maqasid* index components in the first category of aggregate data collected from BankScope. Therefore, data was also collected from Islamic Banks Information System (IBIS) on bank-country specific for the period of 1993 to 2012. Moreover, the analysis focused on the bank specific variables such as: return on assets, cost to income ratio, liquid asset ratio, and equity to total asset since the last of the analysis assumed endogeneity to vector variables. Similarly, the four dependent variables are representing

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each phenomenon such as; solvency using Zs as the Z-score, OSS refers to operational self-sufficiency, OUT stands for outreach and MI denoted as *maqasid* index which is applicable to second category. The panel model equations are expressed as:

$$Zs_{it} = \alpha_i + X_{it}\beta' + u_{it} \tag{4.32}$$

$$OSS_{it} = \alpha_i + X_{it}\beta' + u_{it} \tag{4.33}$$

$$OUT_{it} = \alpha_i + X_{it}\beta' + u_{it} \tag{4.34}$$

The next model (4.35) on the maqasid index is application for the second category of the cointegration in addition to the first three above.

$$MI_{it} = \alpha_i + X_{it}\beta' + u_{it} \tag{4.35}$$

The last cointegration model test the long-run comovement between the sustainability components (*maqasid* index, solvency, operational self-sufficiency, and outreach) as covariates to the model five.

$$MI_{it} = \pi_i + X_{it}\phi + \varepsilon_{it} \tag{4.36}$$

Where the intercept is π and ϕ is coefficient of the covariates X and the error term stands as ε.

Previous studies of financial sustainability are not able to consider the conceptual definition of a long-term relationship in their methodological applications (Cull et al, 2007; Hartarska & Nadolnyak 2007; Bogan, 2012; Ahmed, 2013; Aliyu, 2014; Cull, Harten, Nishida & Bull, 2014; Banerjee, & Velamuri, 2015; Nurmakhanova, et al. 2015; Mia, & Chandran, 2015; Bhanot, & Bapat, 2015). Meanwhile, these studies failed to investigate the shock influence on the dynamic relationship (short or long run) between the endogenous variables within sustainability framework (i.e. operational and financial (solvency) sufficiency, outreach, and *maqasid -shariah*). On the other hand, cointegration has been used in sustainability studies of countries' imbalances studies to assess the long-term relation (Wu,

et al., 2001; Holmes, 2006; Herzberg, 2015). Therefore, quantification of cointegration test is expected to determine the long-term relationship that is quite close to the conceptual definition of sustainability. Methodologically, the data are subjected to unit root pre-estimation in order to avoid supurious outcome in the long-run analysis.

4.6.2.2 Panel Unit Root Test

Wooldridge (2013) realized that permanence unit increase of the explanatory variables relationships to their dependent variable leads to long-run propensity. Therefore, non-negative or zero value is expected within a given particular time range of measurement to predict sustainability. The analysis is subject to the time series information, which may contain the stationary problem. The unit root test is a prerequisite for cointegration and dynamic vector autoregressive analysis (simply VAR model) which are among the priorities of this study. However, Ghassan, et al., (2013) realized that Islamic banking literature overlook the non-stationary and individual banks heterogeneity on the financial stability studies despite its paramount importance. Conversely, as a result of cross-section interdependence effects among the individual banks, Pedroni (1999; 2004) has been adopted for heterogeneity test of panel cointegration. Cross-section banks of the small sample with heterogeneous intercept and cointegrate slope are allowed to be tested using Pedroni test procedure (Shaukat, Hassan & Al-habashi, 2014). Specifically, Pedroni (2004) used panel analysis for a short time frame of twenty years and less than (< 20 years) in subsequent studies (Mohd & Bahlous, 2013; Hassan, Abubakar & Abdullah, 2014).

Statistical power across panel sections stands the main aim of the unit root as well as cointegration tests (Breitung & Pesaran, 2008). Similarly, considering features of panel

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data, which constitute time series attributes, is required to fulfil stationary position in order to avoid a spurious regression (Gujarati, 2003, Kasri & Kassim, 2009). As a result, this study employed extended traditional measures to unit root tests, which were built on Augmented Dickey-Fuller (ADF) unit root tests (Al-Iriani, 2006). These include that of Maddala & Wu (1999); Choi (2001). Similarly, with recent development in the work of Levin, Lin & Chu –LLC (2002) as well as that of Im, Pesaran & Shin-IPS (2003) are also considered (Holme, 2006).

Following Enders (2014), from the simplest process of univariate equation; $\alpha_1 = 1$ given that

$y_t = \alpha_1 y_{t-1} + \varepsilon_t$ then, to test for $\alpha_1 = 1$ is the same as $\rho = 0$ when $y_t = \alpha_1 y_{t-1} + \varepsilon_t$ is been subtract by y_{t-1} to both side and realized $\Delta y_t = \rho y_{t-1} + \varepsilon_t$ at $\rho = \alpha - 1$. For unit-root, test three conditions are given under Dickey & Fuller (1979):

$$\left.\begin{array}{l} \Delta y_t = \rho y_{t-1} + \varepsilon_t \\ \Delta y_t = \alpha_0 + \rho y_{t-1} + \varepsilon_t \\ \Delta y_t = \alpha_0 + \rho y_{t-1} + \alpha_{2t} + \varepsilon_t \end{array}\right\} \tag{4.37}$$

The three test procedures include the first random walk without intercept and drift term, next include intercept and the last added both intercept and drift on a linear function. The parameter ρ is the major concern in those three equations and unit root can be detected when $\rho = 0$. Furthermore, Enders (2014) noted that some time series are not in this order $\Delta y_t = \alpha_0 + \rho y_{t-1} + \alpha_{2t} + \varepsilon_t$. Therefore, the extended Dickey fuller (known as ADF) test can be derived by adds and subtract of $\alpha_p y_{t-p+1}$. Then, the following equation will emerge:

$y_t = \alpha_0 + \alpha_1 y_{t-1} + \alpha_2 y_{t-2} + \alpha_3 y_{t-3} \ldots\ldots + \alpha_{p-2} y_{t-p+2} + \alpha_{p-1} y_{t-p+1} + \alpha_p y_{t-p} + \varepsilon_t$ By addition and

subtraction of $(\alpha_{p-1} + \alpha_p) y_{t-p+2}$ again, p is the lag (ranges from 1-4) being selected

considering minimum value of the AIC and/or BIC in the model and finally arrived at:

$$\Delta y_t = \alpha_0 + \rho y_{t-1} + \sum_{i=2}^{p} \beta_i \Delta y_{t-i+1} + \varepsilon_t \tag{4.38}$$

Where; $\rho = -(1 - \sum_{i=1}^{p} \alpha_i)$ and $\beta_i = -\sum_{j=i}^{p} \alpha_j$.

In the case of $\rho = 0$ it expresses the unit root of the entire equation at first difference.

Benerjee, Marcellino & Osbat (2005) and Breitung & Pesaran (2008) explore the weak

performance of ADF to the panel structure of exchange rate relation in rejection of the null

hypothesis. In similar assertion, ADF is constrained to panel data and specifically on a

small sample (Wu, 2000; Al-Iriani, 2006). However, recent development in the literature

of panel unit root expressed to have higher power compared to that of individual time series

(Maddala & Wu, 1999; Breitung, 2000; Hardi, 2000; Choi, 2001; LLC, 2002; IPS, 2003).

Nonetheless, the ground foundation of their formulation emerged from ADF and provided

avenue for a small sample to perform efficiently with the choice of large lag (IPS, 2003;

Breitung & Pesaran, 2008). Following Baltagi (2005) and begins with Levin, Lin and Chu

(2002) test that assert that small samples can be accommodated within the LLC and moves

towards equilibrium. LLC hypothesis expressed as:

$$\Delta y_t = \rho y_{i,t-1} + \sum_{i=1}^{p_i} \theta_i \Delta y_{i,t-i} + \alpha_{mi} d_{mt} \varepsilon_{it} \tag{4.39}$$

Where m=1, 2, 3 and d_m is the vector of the concern variable with a_m as coefficient to the

three models which can be summarized as $d(d_1 = \{\varnothing\}, d_2 = \{1\}, d_3 = \{1, t\})$. In addition,

LLC three stages can be performed and allow ρ the intercept to differ among individual's banks. The three steps begin with calculating different ADF for each cross-sectional regression. Followed by, ratio estimation to both long and short run standard deviation, and at the end calculate the panel regression test. In a similar analogy, IPS (2003) utilized ADF procedures and permits heterogeneity to dynamics situation (cross-country level) which contradicts homogeneity assumption of LLC (Baltagi, 2005; Al-Iraini, 2006). Similarly, in the event of a serial correlation problem, IPS (2003) preferred average of ADF test across panel section units. Therefore, concluded the null hypothesis as each series has unit root against the alternate hypothesis. Given the same ADF model above (4.38), the average

ADF t- statistic test is $\bar{t} = \dfrac{1}{N} \sum\limits_{i=1}^{N} t_{\rho i}$, Where $t_{\rho i}$ is t- statistic for individual, t- bar performs

efficiently even with a small sample and outweighs LLC test with normal distribution at the position of the null hypothesis (Al-Iriani, 2006). Furthermore, IPS calculated for mean and variance in standard form as Z-bar. The Z-bar follows Monte Carlo simulation is expressed as:

$$t_{IPS} = \frac{\sqrt{N}\left(\bar{t} - \dfrac{1}{N}\sum_{i=1}^{N} E\left[t_{iT} \mid \rho_i = 0\right]\right)}{\sqrt{\dfrac{1}{N}\sum_{i=1}^{N} \mathrm{var}\left[t_{iT} \mid \rho_i = 0\right]}} \Rightarrow N(0,1) \tag{4.40}$$

Where T and N are set to infinity $(T \rightarrow \infty, N \rightarrow \infty)$, and $E\left[t_{iT} \mid \rho_i = 0\right]$ and

$\mathrm{var}\left[t_{iT} \mid \rho_i = 0\right]$ are calculated within the variance simulation of T and ρ 's. However,

Baltagi (2005) argued that both LLC and IPS are relatively time problematic in consonance with number of observations that is not maintaining normal size. This resulted in either T or N varies (large or small) as $N \rightarrow \infty$ such as, N is fairly small compared to T ($N/T \rightarrow 0$) and vice versa. Meanwhile, Brooks (2014) argued that, IPS is sufficient to modest N in

relation to T compared to LLC that is more effective in the event of small T and large N. However, Breitung (2000) recommends for unbiased adjustment, which applied to "detrending methods" alongside with Monte Carlo simulation. Furthermore, the author realizes sensitiveness of LLC and IPS on the deterministic term. In the same way, Breitung (2000) employed three stages and begin with identical step with that of LLC, followed by orthogonal transformation and finally pooled regression (Brooks, 2014). The first step used $\Delta y_{i,t-L}$ to derive adjusted LLC residual e_{it}, and $\upsilon_{i,t-1}$ while the last step expressed as $e_{it}^* = \rho \upsilon_{i,t-1}^* + \varepsilon_{it}^*$. However, Hadri (2000) developed a testing method based on langrage multiplier of residual based with consonance to Monte Carlo simulation to deal with a small sample problem. In contrast to previous unit root tests (such as; Bretung, 2000; LLC, 2002; IPS, 2003), Hadri (2000) determine the unit root stationary position at the alternate hypothesis. The testing method takes account of serial correlation disturbance, heterogeneous error and individual predictable movement across the panel. The model was emerged from OLS residual of y_{it} back substitution on intercept and/or intercept with trend and arrive at:

$$y_{it} = r_{io} + \beta_i t + \sum_{s=1}^{t} u_{is} + \varepsilon_{it} = r_{io} + \beta_i t + \upsilon_{it} \tag{4.41}$$

Where $\upsilon_{it} = \sum_{s=1}^{t} u_{is} + \varepsilon_{it}$ means that, stationary could be obtained at $\sigma_u^2 = 0$ where $\upsilon_{it} = \varepsilon_{it}$.

According to Breitung & Pesaran (2008), Hadri (2000) test performed worse on small samples, which had been taken care subsequent tests of LLC (2002) and IPS (2003). In another study (Maddala & Wu, 1999; Choi, 2001) proposition of Fisher type test as their

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proposed measure for panel unit root test is expressed as: $P = -2\sum_{i=1}^{N} \ln p_i$. This is

representing P-value of individual panel member unit-root, which has similar process with

IPS. Fisher type test outweighs IPS in statistical power and size, and can also be tested on

unbalance data (Baltagi, 2005; Breitung & Pesaran, 2008). According to Maddala & Wu

(1999) bootstrap Fisher is best to execute on non-stationary panel cointegration analysis.

After that, Choi, (2001) modified P value test of Maddala & Wu, (1999) with the use of

inverse chi-square test of P value and found is outperformed IPS and LLC (Baltagi, 2005).

Brooks (2014) exemplified and adopted a panel analysis with unit root summary result.

Therefore, this study utilized all the tests for comparative advantages.

4.6.2.3 Heterogeneous Panel Cointegration

The earlier work of Granger (1981); Engle & Granger (1987) followed with some studies

in the early 1990's (Johansen, 1991; 1995; Phillips, 1991) hinted the cointegration tests.

This begins with the concept of cointegration from the linear group of non-stationary

variables of the single cross section, which has the same combination order (Breitung &

Pesaran, 2008). However, Enders (2014) asserts the possibilities of nonlinear and different

combined variables to have long-run relationships. Nonetheless, panel cointegration is free

from complexities that are found in single cross section cointegration. These consists

heterogeneity, and asymptotical issues reflect on N and T, cross (section) unit cointegration

(dependence) and in some cases unbalanced data for panel study (Breitung & Pesaran,

2008). With this among other reasons necessitate different tests to panel cointegration

compared with the single cross section.

Panel cointegration has been used for sustainability studies with an advanced testing procedure of Engle & Granger and that of Johansen test (Wu, Fountas, Chen, 1996; Wu, et al., 2001; Afonso, & Rault, 2010, 2014). Similarly, Al-Iriani (2006) argued that Johansen (1988) test did not suit panel rather individual cointegration and preferred Pedroni test. Meanwhile, a residual-based test of Pedroni (2004) has been tested and found efficiently out-performed others tests in a comparative study (Hlouskova & Wagner, 2009). In addition, Malinen (2012) asserts that Pedroni's (2004) tests of panel heterogeneity alone contained eleven different statistical tests, which expressed it robustness compared with other measures. In different assertion, Brooks (2014) admits the generality of Pedroni tests in which permitted each group to have different intercept and deterministic trend. Pedroni (2000) proposes panel cointegration test that deals with small sample issues, permit short run dynamic heterogeneity, nuisance-free and with the unbiased estimator (Mohd & Bahlous, 2013). Meanwhile, Pedroni (1999; 2001) has been employed in the previous panel cointegration of sustainability study (Holme, 2006). Following the work of Hassan, Abubakar & Abdullah (2014) and Brooks (2014), the long-run model estimation can be simplified as:

$$y_{it} = \alpha_i + \delta_i t + \sum_{m=1}^{M} \beta_{mi} x_{mit} + \varepsilon_{it} \tag{4.42}$$

Where; $t = 1... T$; $i = 1,..., N$ and $m = 1, ..., M$ while α and δ_i are the parameters for fixed effect possibilities and deterministic trend. The y_{it} and x_{it} are presumed to be order one integrated I(1) while $\varepsilon_{it} = \rho_i \varepsilon_i (t-1) + w_{it}$ referred to the estimated residual (Al-Iriani, 2006). The ranges of seven Pedroni tests (1999; 2000; 2001; 2004) are generally divided into "within dimension" and "between dimensions" which are normally distributed

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(Pradhan, 2009; Farahani & Dastan 2013). The former comprised four panel tests (panel: υ -statistic; ADF type of t- statistics; Phillips and Peron ρ (rho) and t- statistics) while the later has three (group: ADF type t- statistics; Phillips and Peron ρ (rho) and t- statistics) tests (i.e. group mean cointegration statistics). The test permits heterogeneity of parameters and similar time factor across the panel members (Al-Iriani, 2006). The criterion suggested that in the event where the critical value exceeded the calculated, the hypothesis of null will be rejected. This implies that long-run relationships exist between variables. At the same time, post-test measures will be employed to verify the dynamic relation of the long and short run response relations among variables. Therefore, variance decomposition and impulse response function is also employed.

4.6.3 Variance Decomposition and Impulse Response Function

Previous comparative study on Islamic banks between GCC and Non-GCC countries employed both panel cointegration, IRF & VDC for the method of analysis (Yusof & Bahlous, 2013). Similarly, this study extends the investigation to country specific with the aim to explore the dynamic response of the variables in the models. In this situation, consideration priorities on country specific which were emphasized in the argument of Herzberg (2015) on sustainability study. In the same analogy to previous studies on Islamic banks (Majid, Mohd & Razal, 2007; Mohd, Bahlous & Kassim, 2010; Ergec & Arslan, 2013; Bahlous & Mohd, 2014) utilized VDC and IRF. In view of this, the similar approach is employed to the last part of this study to further explore the source of responses and changes among variables in the models. Meanwhile, Nurmakhanova, et al. (2015) considered outreach and self-sufficiency as endogenous variables in a recent study on

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banks' sustainability. In addition, this study adds *maqasid* index and solvency to investigate the dynamic relationship between the variables as modeled in equation 4.36. The easiness of IRF & VDC is that the endogenous and exogenous variables are indifferent to the forecast error variance (Majid, Mohd & Razal, 2007). According to Enders (2014), IRF and VDC are equally referred to innovation accounting and functionally investigate the relationship between variables. In addition, the account of innovation could be small (less important) or large depending on the response to variables. Furthermore, Brooks (2014) expatriates that the degree of responsiveness of the unit shocks between each explanatory variable and dependent on the model explores through impulse function. This implies through single standard deviation effect on the error term in one equation, and others remain constant in the VAR system over time. Conversely, VDC measures its own and other variables shocks that spread through the entire VAR dynamic system. Similarly, it usually forecasts the future error variance of each explanatory variable series in the model and the two (IRF and VDC) explain the related information (Brooks, 2014).

4.7 Summary

This chapter presents the procedures in which the study is conducted. With this, the emphasis is given to the conceptual framework that paves the way for the adoption of the two methods of analysis (survival analysis and panel cointegration). Meanwhile, IRF and VDC are employed to measure the degree of responsiveness to the endogenous variables in the VAR system.

CHAPTER FIVE
RESULTS AND DISCUSSION: SURVIVAL ANALYSIS

5.1 Introduction

This chapter presents the sample structure and discusses results and analysis based on survival methods. The estimations begin with a descriptive analysis of banks' financial and macroeconomic indicators. Consequently, time to event analysis of non-parametric analysis is initiated by Kaplan-Meier (1972) survivor function and Nelson-Aalen (1978) cumulative hazard estimates. Moreover, parametrization of failure split time is estimated to predict the recurrence chances of an event. After that means equality of difference between GCC and Non-GCC countries were estimated among the banks' specific variables. In addition to non-parametric survival modeling, semi-parametric analysis of Cox model is also adopted using shared frailty models and Efron approximation. The parametrization analysis is concluded with comparative analysis based on the distributions of Weibull, exponential, and Gompertz models. The last in parametrization entails to panel survival model and the study further investigates the intra-bank cluster heterogeneity using Weibull distribution and mixed effect model.

5.2 Descriptive Analysis

This analysis begins with a descriptive analysis of a sample of 170 banks from 24 countries using unbalanced data from Africa, Asia, Europe, and the Middle East region for the period of 1987-2014. The entire sample is classified based on geographical regions except for Iran and Turkey that are included in the last category for analysis convenience. The five of GCC countries (excluding Oman) are the first-panel group, and the Non-GCC countries

comprised Asia, Middle East, and North African countries, and others. Although Iran and Turkey should be part of MENA, due to the conditional requirements of survival analysis influenced their shift to the last group (others). In fact, for Turkey is logically justifiable since the country is struggling to be part of European Union.

Table 5.1: Sample countries and banks

Country	Banks	Percent	Cum.	Survive	Failed
GCC (exc. Oman)					
Bahrain	24	14.1	14.1	18	6
Kuwait	11	6.5	50.6	9	2
Qatar	6	3.5	74.7	5	1
Saudi Arabia	5	2.9	77.6	5	-
United Arab Emirate	11	6.5	97.6	9	2
Non-GCC					
Asia					
Bangladesh	8	4.7	18.8	8	-
Brunei	3	1.8	20.6	1	2
Indonesia	10	5.9	32.9	10	-
Malaysia	19	11.2	63.5	18	1
Pakistan	9	5.3	70	8	1
Singapore	1	0.6	78.2	1	-
MENA (exc. Iran & Turkey)*					
Egypt	3	1.8	22.9	3	-
Gambia	1	0.6	23.5	0	1
Jordan	3	1.8	44.1	3	-
Lebanon	3	1.8	52.4	1	2
Mauritania	2	1.2	64.7	1	1
Palestine	2	1.2	71.2	2	-
Sudan	16	9.4	87.6	12	4
Tunisia	1	0.6	88.2	1	-
Yemen	4	2.4	100	4	-
Others					
Cayman Island	1	0.6	21.2	-	1
Great Britain	6	3.5	27.1	6	-
Iran*	16	9.4	42.4	12	4
Turkey*	5	2.9	91.2	4	1
Total	**170**	**100**		**141**	**29**

*Are included to others for analysis conveniences to have failed and survive banks

Meanwhile, the similarity between Sudan and Iran in term of survived and failed banks lead our conclusion to separate them (see Table 5.1). Therefore, despite the Cayman Island recorded one bank that failed, and Turkey has only one bank also failed with four survived, then the inclusion of Iran make a better conclusion in the survival analysis. Table 5.1 depicts the total number of banks with the percentage of each country's sample representation including those survive and fail within the period of study. Based on the sample, Islamic banks from one of the GCC country (Bahrain) have a higher representation of 14.1 percent whereas 11.2 percent from Malaysia which is one of the Non-GCC countries that is within Asian region. Similarly, Iran and Sudan from the Middle East and Africa regions have equal sample proportion of 9.4 percent respectively. Correspondingly, Islamic banks exclusively dominate the banking institution in these two countries (Hussain et al. 2015). Moreover, Islamic banks in the two GCC countries (Kuwait and United Arab Emirate) share similar percentage in the sample accounting for 6.5 percent, while 5.9 percent is allocatated to one of the Non-GCC countries (Indonesia). The countries with least percentage of representation are those within last three categories in Table 5.1 like Cayman Island (others), Gambia (MENA), Singapore (Asia) and Tunisia (MENA) with 0.6 percent. It is clear that based on the available sample, Islamic banks predominantly occupy a higher percentage in the Middle East (GCC and MENA) and Southeast Asian countries.

According to Table 5.1, 29 banks are reported failed with six from Bahrain, Iran and Sudan recorded four banks each while two banks each are accounted from Brunei, Lebanon, Kuwait, and United Arab Emirate. The last category of the failed banks comprised those

countries with one bank, and they include Cayman Island, Gambia, Malaysia, Mauritania, Pakistan, Qatar, and Turkey. The recent failure of Islamic banks stands as an early warning which requires policymakers to redesign and implement other monitoring measure contrary to the prior postulation of the bank's resilience even during the crisis (Khan, 1986). Similarly, as a result of higher banks failure in Bahrain compared with other countries, the number of survived sample banks in the country became equal with that of Malaysia. Likewise, Sudan and Iran shared the same proportion of survived banks while Cayman Island and Gambia lost it completely. However, our sample remains the same for surviving and failed banks in some countries such as Bangladesh, Egypt, Great Britain, Indonesia, Jordan, Saudi Arabia, Singapore, Tunisia and Yemen.

Consequently, Table 5.2 illustrates the comparative descriptive statistics for survival analysis which consists of the bank-specific and macroeconomic variables. The bank's specific variables are drawn from the income statement, financial ratios, and balance sheet. The total asset, equity, earnings assets, and total of liabilities and equity are in millions of dollars, and the remaining of financial indicators are expressed in thousands of dollars and ratios. Similarly, the last two column in Table 5.2 illustrates the macroeconomics variables which are in percentage. The entire sample consists of 1,476 bank-year observation (i.e. 555 of GCC and 921 Non-GCC). The sample constitute of 141 survived and 29 failed banks (see chapter four for the operational definition of failed banks). However, the macroeconomic variables have shortfall of 21 observations in the Non-GCC countries due to insufficiency of data from Palestine and Cayman Island.

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Table 5.2: Descriptive Analysis

Variable	GCC			Non-GCC		
	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.
Equity / Tot Assets	37.78357	31.01181	555	17.28458	18.8845	921
Assets	5667890	1.02E+07	555	4984849	1.05E+07	921
Equity	1091671	1875546	555	394961	757766.6	921
Total Earning Assets	4932265	8760678	555	3966773	8430415	921
Total Liabilities & Equity	5667890	1.02E+07	555	4984849	1.05E+07	921
Loan Loss Res / Gross Loans	433.0541	232.5572	555	428.9653	237.6789	921
Loan Loss Prov / Net Int Rev	582.8162	315.8836	555	597.456	304.8163	921
Loan Loss Res / Impaired Loans	408.8847	174.1578	555	454.5527	149.7752	921
Impaired Loans / Gross Loans	337.1604	156.5327	555	382.0673	128.259	921
NCO / Average Gross Loans	174.9568	72.82622	555	187.2334	63.56832	921
NCO / Net Inc Bef Ln Lss Prov	304.5351	113.9842	555	326.6178	93.39999	921
Impaired Loans / Equity	397.6649	179.6863	555	445.9403	149.6546	921
Unreserved Impaired Loans / Equity	281.1261	100.4284	555	297.9468	79.95805	921
Tier 1 Ratio	349.6775	122.5146	555	364.4897	135.0264	921
Total Capital Ratio	452.8036	167.7194	555	446.5071	203.3244	921
Equity / Net Loans	689.4613	381.8114	555	657.975	395.4793	921
Equity / Cust & Short Term Funding	669.6054	393.6851	555	642.0239	357.6161	921
Equity / Liabilities	639.4432	375.0975	555	643.4604	375.9998	921
Cap Funds / Tot Assets	188.4613	53.12814	555	197.5798	37.70187	921
Cap Funds / Net Loans	191.1009	32.27713	555	186.5027	47.44846	921
Cap Funds / Dep & ST Funding	198.7045	48.90552	555	203.1694	44.56048	921
Cap Funds / Liabilities	194.9892	49.93902	555	200.8806	42.65788	921
Subord Debt / Cap Funds	94.58739	24.97907	555	93.53529	25.33813	921
Deposits & Short term funding	757.7441	444.3799	555	694.0033	398.0103	921
Net Income	656.5045	407.2505	555	703.7275	396.1632	921
Net Interest Margin	363.2162	193.2844	555	432.5451	209.0641	921

Table 5.2 (continue)

Return on Average Assets (ROAA)	318.9838	170.1259	555	271.1672	131.9785	921
Return on Average Equity (ROAE)	579.3099	352.3937	555	606.8306	343.9325	921
Cost to Income Ratio	578.0559	376.9952	555	733.2421	370.828	921
Net Loans / Total Assets	693.2072	398.2643	555	644.8817	370.838	921
Net Loans / Customer & ST Funding	757.4	406.8983	555	652.6906	376.8912	921
Liquid Assets / Dep & ST Funding	703.9099	408.3669	555	663.4148	376.8562	921
Interbank Ratio	567.2613	263.7644	555	573.4191	252.9898	921
Net Loans / Tot Dep & Bor	526.3117	221.0539	555	521.0282	224.1527	921
Loans	736.2847	424.0213	555	710.6363	416.7749	921
Gross Loans	759.0468	419.2126	555	706.9794	418.3682	921
Less: Reserves for Impaired Loans / NPLs	646.1622	319.1536	555	653.2443	338.6258	921
Other Earning Assets	716.4072	427.7374	555	729.8621	416.6247	921
Loans and Advances to Banks	712.0288	386.9282	555	694.8784	386.9455	921
Derivatives	115.4901	21.72501	555	114.1933	23.49268	921
Other Securities	709.2721	399.5965	555	712.6417	423.1424	921
Remaining earning assets	286.5369	204.2026	555	422.1868	181.1259	921
Fixed Assets	635.0919	405.6675	555	687.7101	385.3286	921
Total Customer Deposits	818.8396	409.6961	555	646.5147	384.4883	921
Deposits from Banks	662.7514	368.8289	555	668.9338	358.0391	921
Other interest bearing liabilities	386.9441	224.4664	555	388.1726	216.8668	921
Trading Liabilities	29.53874	3.25563	555	29.36482	3.797227	921
Long term funding	357.0252	194.363	555	358.0195	187.1594	921
Other (Non-Interest bearing)	703.9784	415.7586	555	704.1227	396.7185	921
Other Deposits and Short-term Borr.	340.0432	86.70801	555	309.9392	110.7698	921
Loan Loss Reserves	85.62703	9.852137	555	82.98154	14.88224	921
Other Reserves	458.7225	173.0657	555	428.8382	175.4613	921
Net Int Rev / Avg Assets	323.8	168.9272	555	369.8534	178.3195	921
Oth Op Inc / Avg Assets	236.3802	172.689	555	255.8056	184.2947	921
Non Int Exp / Avg Assets	316.0973	201.8649	555	356.392	197.6222	921
Pre-Tax Op Inc / Avg Assets	322.4324	147.2176	555	356.8567	135.0371	921

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Table 5.2 (continue)

Non Op Items & Taxes / Avg Ast	188.3856	131.7078	555	105.8502	109.7395	921
Dividend Pay-Out	334.6252	147.2407	555	370.0185	136.1621	921
Inc Net Of Dist / Avg Equity	363.2108	142.7069	555	394.9729	129.7078	921
Recurring Earning Power	332.8198	175.7297	555	317.4061	157.1377	921
Non Op Items / Net Income	432.9135	197.2502	555	475.0858	184.6479	921
Size	14.32302	1.779098	555	13.72055	2.007824	921
GDP per apita	0.3615243	0.4092521	555	0.8320844	0.7797872	900
Inflation	2.843901	2.766116	555	12.44202	16.02557	900

Similarly, the number of observation is categorized according to main regional separation of the study, that is, GCC and Non-GCC which accounted for 555 and 921 sample banks respectively. These also comprise of four groups stratification, and GCC are having 555, Asia 264, MENA 406 and others 251.

Table 5.2 presents the data in three categories, first are those in million U.S. dollars (assets, equity, total earning assets, and total liabilities and equity), those labeled in proportional ratio thousand of U.S. dollars are the second category (fixed asset, total customer funds, Totalliabilities, and loans among others) the those labeled in proportional ratio, and the last category are those in percentage. Table 5.2 also depicts the average number of each sample variable in column two for the GCC countries and column five to Non-GCC countries. Meanwhile, the dispersion from mean represented the standard deviation in the fourth and sixth columns respectively. Consequently, their respective observations are depicted column four and seven. To begin with, equity cushion ratio (equity/ assets) that account for an average of 38 percent for the GCC Islamic banks is comparatively doubled that of Non-GCC banks despite their higher observations. The outcome supported the earlier conclusion that the total assets GCC Islamic banks represent two-third of the entire Islamic banks of the world (Belanès, Ftiti, & Rym, 2015). It justifiable in this context since the absolute total assets of just five GCC countries have a different of $683, 041,000 of the 19 countries of the Non-GCC countries. Likewise, the total earnings of the GCCs' Islamic banks accounted for $4, 932,265,000 compared to $3, 966,773, 000 of the Non-GCC banks. Conversely, the loan loss reserve to impaired loans ratios of the Non-GCC banks is slightly higher compared to that of GCC countries. Despite that, the dispersion from the mean

indicated a wide gap which exhibits significant variation among the GCC banks in term of loans provision size. At the same time, this illustrates that wide gap between the large and small banks in the region looking at size. The size is representing the logarithm of total assets of the entire regional bank. For instance, between the two group (GCC and Non-GCC), the size dispersion is higher in the Non-GCC compared to GCC countries since the values express 2.0 and 1.7 respectively.

However, it is numerically clear that the group of Non-GCC banks recorded higher returns (net income, return on average assets and equity, and recurring earning power) compared to GCC banks. This may like resulted due to the number of banks within the Non-GCC group compared to GCC banks. Nonetheless, the two groups indicate higher variations in term of profitability, that is, some banks within certain countries have an advantage ahead of other. It is true within the intra-country comparison within Non-GCC countries, for instance, the 16 Malaysian Islamic banks that are developed compared to that of Cayman Island which eventually reported single bank. Furthermore, GCC Islamic banks have higher liquidity ratios compared to that of the Non-GCC countries with an evidence of volatility. Therefore, the solvency of these banks can not be clearly determined at the description level without in-depth analysis using distance to failure ratio. Surprisingly, the two group of countries share almost similar trading liabilities of $ 29. 53 and 29.36 to GCC and Non-GCC respectively. Moreover, Non-GCC countries economic indicators have higher average compared to that of GCC countries due to their out-number compared to the former.

The above descriptive table informatively illustrated that GCC banks have higher assets compared to Non-GCC despite their number tripled the former. The assets performance of the GCC countries and the possible acceptance of the Islamic banks in the region greatly influence them to have higher liquidity compared to the Non-GCC banks. Although regarding profitability Non-GCC documented higher compared to GCC due to the number of banks in this group coupled with impaired loans provisions. In sum, the descriptive assessment indicates possible influence of financial information in explaining banking sustainability.

5.3 The Non-Parametric analysis

With the aid of Kaplan-Meier's model for the survival function and Nelson-Aalen for cumulative hazard, the analysis begins with the non-parametric analysis. As a result, the data was spread across the 90 time in which at each period is predicting the probability of survival and the corresponding cumulative hazard function.

Table 5.3 presents the predicting cumulative banks' survival and hazard functions for the 90 split period. The split of the period is based on year interval after the first period which accounted the between establishment and the availability of data. This is consistent with previous studies on survival analysis (Wheelock & Wilson 2000; Molina, 2002). The study has the sample number of 170 banks. The first period in Table 5.3 begins with the full sample of 170 banks, a bank failure decrease the number of banks to 169 (i.e. the number of banks that are exposed to failure risk in the sample). Similarly, it is observed that the survival function of the remaining sample is more than 99 percent.

Table 5.3: Survivor and Cumulative Hazard Function

Time	# of Banks	Fail	Censored	Survivor function	Nelson-Aale Cum. Haz.
1	170	1	0	0.9941	0.0059
2	169	1	0	0.9882	0.0118
4	168	0	1	0.9882	0.0118
5	167	3	6	0.9705	0.0298
6	158	1	1	0.9643	0.0361
7	156	1	7	0.9582	0.0425
8	148	1	7	0.9517	0.0493
9	140	2	9	0.9381	0.0635
10	129	1	11	0.9308	0.0713
11	117	2	8	0.9149	0.0884
12	107	2	4	0.8978	0.1071
13	101	0	3	0.8978	0.1071
14	98	0	3	0.8978	0.1071
15	95	1	2	0.8884	0.1176
16	92	1	8	0.8787	0.1285
17	83	1	2	0.8681	0.1405
18	80	0	6	0.8681	0.1405
19	74	4	2	0.8212	0.1946
20	68	0	5	0.8212	0.1946
21	63	0	1	0.8212	0.1946
22	62	0	3	0.8212	0.1946
23	59	0	1	0.8212	0.1946
24	58	1	5	0.807	0.2118
25	52	0	1	0.807	0.2118
26	51	0	1	0.807	0.2118
28	50	1	3	0.7909	0.2318
29	46	1	1	0.7737	0.2536
30	44	1	4	0.7561	0.2763
31	39	1	3	0.7367	0.3019
32	35	0	4	0.7367	0.3019
33	31	0	2	0.7367	0.3019
35	29	0	6	0.7367	0.3019
36	23	0	1	0.7367	0.3019
37	22	0	1	0.7367	0.3019
38	21	0	4	0.7367	0.3019
39	17	0	1	0.7367	0.3019
40	16	0	6	0.7367	0.3019
42	10	0	1	0.7367	0.3019

Table 5.3 (continue)

43	9	0	2	0.7367	0.3019
50	7	1	0	0.6315	0.4448
57	6	0	1	0.6315	0.4448
61	5	0	1	0.6315	0.4448
62	4	0	1	0.6315	0.4448
80	3	1	1	0.421	0.7781
90	1	0	1	0.421	0.7781

The outcome of the initial limit product can be estimated directly after deducting the failed bank in the first period (170-1=169/170=0.9941). On the other hand, the cumulative hazard function is 0.0059 (1-survival function – 0.9941). Furthermore, the sample also reduces with one bank due to failure event in the second split period. At such, the bank's survival function reduces and the cumulative hazard rate increases to 0.0118. The calculation at period four changed with an inclusion of censored observation (those that not account failure and having an insufficient record to end period) through subtracting half of the censored lost and failed banks from the accounted sample (due to interval period range). According to Kalbfleisch & Prentice, (2002) an adjustment for the censored deduction has to take place especially in confounding cases as result of censored observations such as period six, seven, eight, and so on. For instance, in period six, the adjusted estimate can be calculated at such; 158-0.5(1-censored) =157.5, then, 157.5-1(failed bank)/157.5 = 0.9937*0.9705(survived at period 5) = 0.9643. Moreover, in the same period six, the cumulative hazard function can be derived by deducting the survivor function from one. The sequence of the estimation maintains in similar position with an exception to those periods where failure has zero records. For instance, for the period 13, 14, 18, 20-23, 25, 26, 32-43, 57-62, and 90, the survival and cumulative hazard values of

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those periods remain the same with their preceding period due to the absence of failure record.
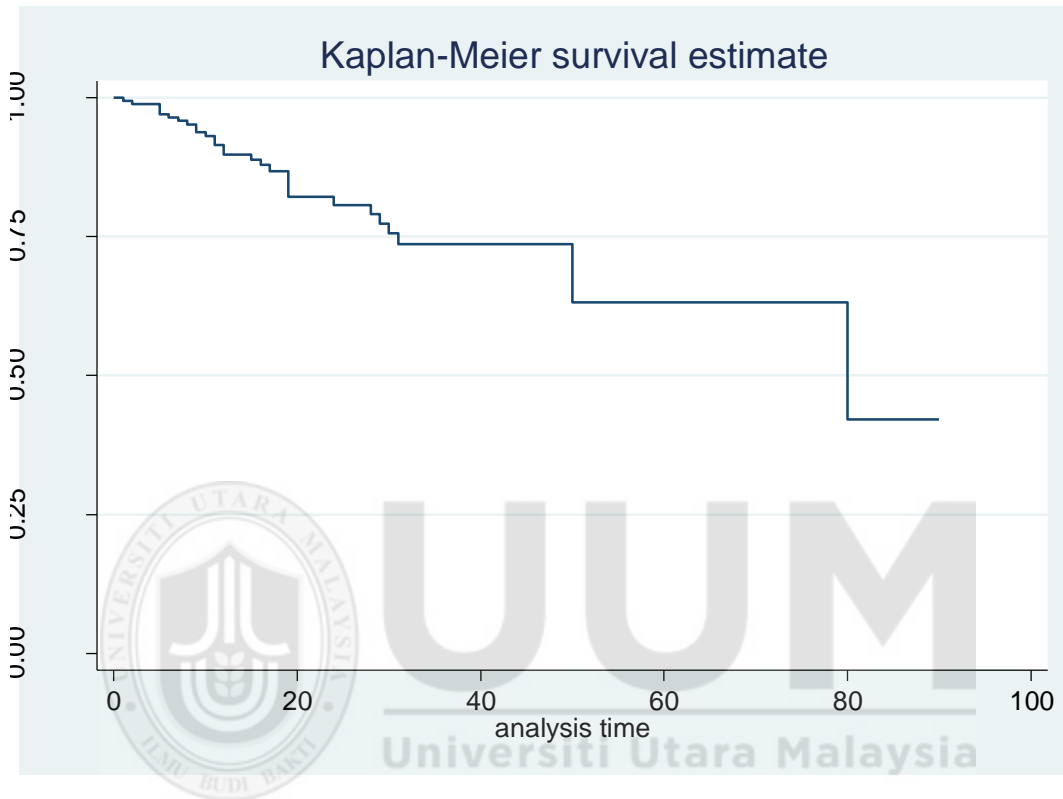
Figure 5.1: Islamic banks time survival analysis

The probability value of the survival function automatically become one since the failure values are zero. Therefore, the survival values at that particular period will replicate it previous value since the product of one should multiply it.

Figure 5.1 explicitly illustrates the scenario of the survival function, and it is graphically clear at period 32, 43, 57, and 62. Similarly, the steep decrease on the survival curve at the periods 50 and 80 is necessitated due to the failure recorded at that split periods. It is noteworthy that the cumulative hazard curve is an inverse to that of survival (see Figure

5.2). Therefore, as the probability of the survival is falling, the cumulative hazard curve is moving upward. In a nutshell, after split time 25 Islamic banks are having more than 80 percent of survival rate.
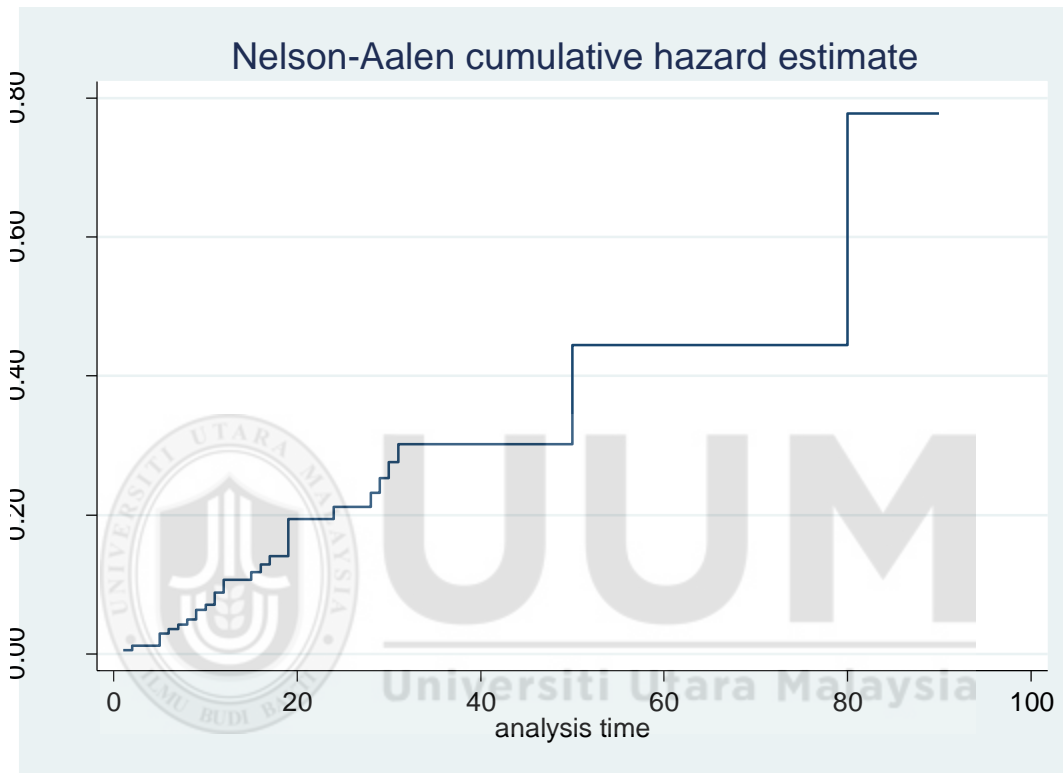
Figure 5.2: Islamic banks cumulative hazard

The result is consistent with the findings of Pappas et al. (2016) which states that Islamic banks have higher survival rate than conventional banks around 30 years. The predictions also expressed that survival rate of Islamic banks is lower than 60 percent at any time above period 60 and the subsequent fall to 40 percent at period 80 and above. The implication of this findings is that as the life span of Islamic banks increases they will be exposed to other failure risks due to business complexities. Therefore, the policymakers have to use this early warning signal and advance their strategies ahead of time to address the anticipating

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bank-time failure effects of the Islamic banks. The findings of this study for early warning concur that of the previous studies and the information sign of the signaling theory (Al-Osaimy & Bamakharamah, 2004; Saeed & Izzeldin, 2014). At such, designing policies and monitoring the Islamic banks' failure likelihood will improve the possibility of survival chances of the banks (Pappas et al. 2016).

Meanwhile, for the analysis of various clusters, the study first considers dividing the data into GCC and Non-GCC countries (group 0= Non-GCC and group 1= GCC countries). Appendix B and Figure 5.3 presents that Non-GCC countries have 113 banks at the beginning of the analysis and only one failed at that period which accounts for 99 percent of banks are found to be survive based on the survival function. At period four, one bank becomes censored without failure of any bank in the sample. Similarly, between the period of 13, 16, 20, 23, 25, 28, 31, 43, 61, 62, and 90 none of the banks recorded failure. During these periods the survival function values reflected the prior time values since no any hazard was recorded. The cumulative hazard graph in Fig. 5.3 is an inverse of the survival function curve which expresses that any recorded hazard reduces chances for being able to survive.

For GCC countries, survival function curve is also depicted in the Fig. 5.3 which is a graphical representation of the GCC survival function in the Appendix B. During the time split of 5 and 6, none of the GCC banks recorded failure in our sample. Therefore, their survival function is 100 percent at those periods. Similarly, the remaining banks in the sample survived without failure during period 9, 10, 13, 18, 24, 32 and 57. These periods

consider as favorable to Islamic banks in the GCC since they operate without failure effect. At those periods none of the GCC banks in our sample become affected with either merger, dissolution, acquisition or close down.

The Non-GCC banks recorded longer survival period ahead of the GCC countries with more than 30 times split (GCC ended at 57 percent while NGCC extended to 90 percent). However, based on cumulative function Non-GCC countries have the lower survival rate of 43 percent at the end period of 90 compared to the 66 percent at period 57 of the GCC countries. The possible reasons for the discrepancies are due to failure number of banks in Non-GCC countries exceeded those in the GCC countries (18 against 11). The cumulative hazard estimates reveal a consistent inverse time to cumulative hazard exposure in the Non-GCC is higher than that of GCC banks. In other words, few number of the Non-GCC banks will have longer periods while a large number of GCC banks are predicted to have higher survival rate, which clearly shown in the below figures. The findings are closer to that of the previous study which prioritizes the Islamic bank's performance in the GCC countries than the Non-GCC countries (Rahim, Rahman & Rosman, 2013). Figure 5.4 and Appendix C reveal the four regional groups of GCC, Asia, MENA and Other Countries. The time split is grouped based on the banks life-span. The time classifications vary based on the banks' lifespan sustained within the interval from their establishment and the event or end period of the study (i.e. 2014). Among the groups, GCC began with time 5 and six without failure and ended at time 57, while the second group is those banks from the Asian region, they start at split period four up to 61. The failed banks in the Asian group are four, and between period 20 and 61, all banks sustained the survival of 7 percent (see fig. 5.4).

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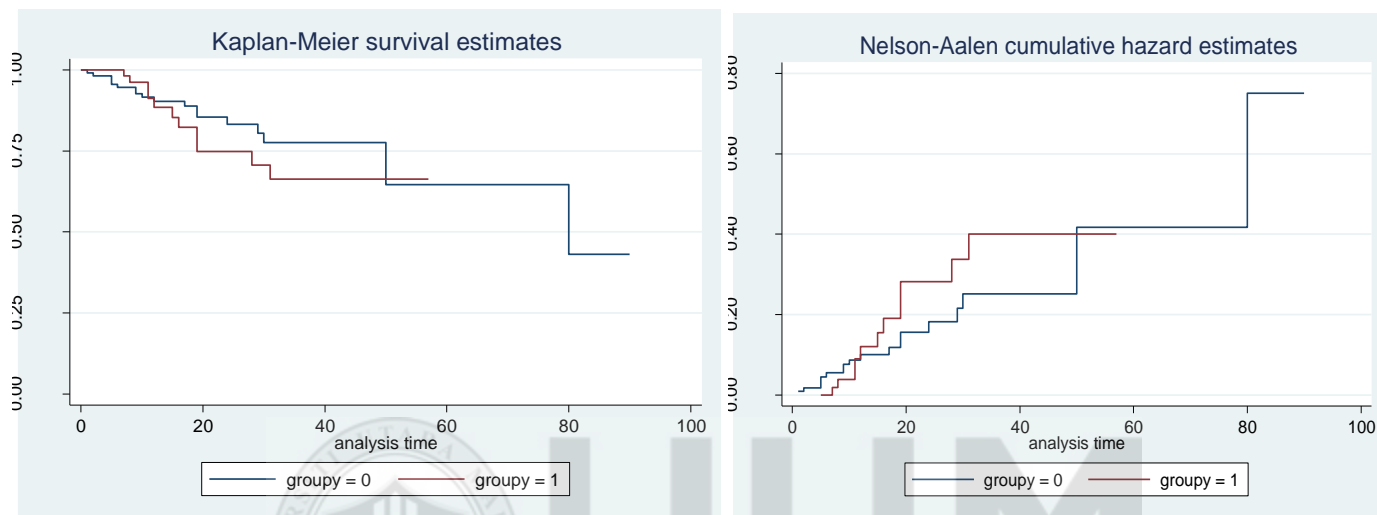
Figure 5.3: Survival and cumulative hazard for the group of two
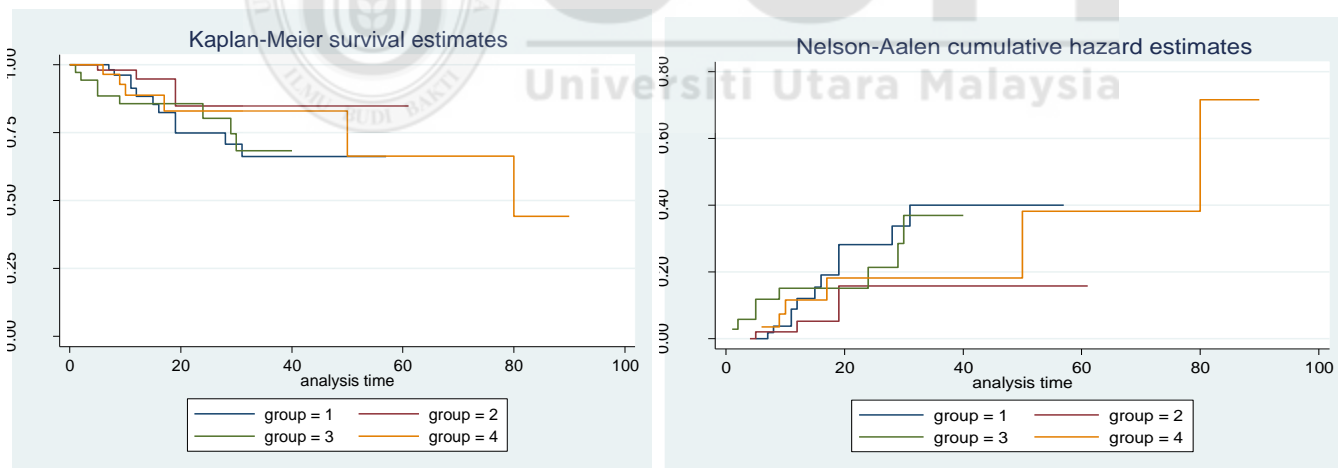
Figure 5.4: Survival and cumulative hazard for the group of four
Figure 9: group 0: Non-GCC; group; GCC. Figure 10: group 1; GCC, group 2; Asia, group 3; MENA, group 4; others.

Similarly, failed MENA Islamic banks are eight in the sample and 35 of them begins at the first period with 97 percent and closed at 40 times split with 68 percent of survival function as depicts in figure 5.4. The last group is other countries, and have the longest time span due to a long period of establishment. Accordingly, Asian banks have highest survival function with 85 percent at the terminal period, those in MENA record 68 percent while GCC banks have 66 percent, and the least is the other countries with 44 percent.

Table 5.4: log-rank test for equality of survivor functions

Two Group	Events observed	Events expected	chi2(3)	Pr>chi2
NGCC	18	18.25		
GCC	11	10.75		
Total	29	29	0.61	0.8951
Four Group				
GCC	11	10.75		
Asia	4	5.41		
MENA	8	7.88		
Other countries	6	4.96		
Total	29	29	0.01	0.9233

Moreover, equality of failure between group clusters can not be determined without statistical power. Therefore, the log-rank test is used to assess the probable variation of failure within each cluster. Table 5.4 illustrated the log-rank test for equality between the groups of two and that of four.

Table 5.4 presented no significant difference between the expected and observed distributed groups of the failure rate. The classification between GCC and Non-GCC appear to each have almost the same outcome of the Chi-square distribution between observed and the expected failed banks (i.e. GCC-18 and 18.25; Non-GCC 11 and 10.75).

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Similarly, the split of the Non-GCC does not cause many variations on the particular group. As such, the difference between observed and expected failure events does not vary significantly in Asia, MENA, and other countries. Though, out of the total of 29 failed banks, eleven of them are found in the GCC countries and the rest domicile in the Non-GCC countries. Consequently, within the Non-GCC countries and MENA have the highest of eight failed banks, followed by six banks from other countries and Asia has four banks. The findings confirmed the comparison between the observed failed banks in each group is not differ significantly from the expected based on the sample. With this, Non-GCC countries have the highest failed banks, and therefore, financial outreach these countries will reduce, and it will affect the wellbeing of the society. Nonetheless, the effect is less severe in Asian and other countries since they have least failed banks and it expected to have more impacts of the banks compared to other regions.

The number of failed banks accounted only one-sixth of the total sample banks in the study. As a result, it is clear that censored banks outnumbered those failed within the period of analysis. Therefore, the restricted mean survival time is ineffective to account for average proportions of the time split banks group in the sample. At such, extended mean for the survival time is applied to adjust the situation. Table 5.5 below ascribed the restricted and extended mean survival time of the sample according to the group of analysis. The extended mean is estimated using the Kaplan-Meier survival estimator curve to zero (Klein and Moeschberger 2003).

The extended of survival time for Non-GCC countries is higher and above that of GCC countries (Non-GCC-2587.668 and GCC-725.501). This is not is surprising since the number of Non-GCC banks is more than those in the GCC countries.

Table 5.5: Restricted and extended mean of survival time

Two group	No. of subjects	Restricted mean	Std. Err.	[95% Conf. Interval		Extended mean
NGCC	921	71.0073(*)	0.7323834	69.5719	72.4427	2587.668
GCC	555	44.60893(*)	1.546785	41.5773	47.6406	725.5006
Four group						
GCC	555	44.60893(*)	1.546785	41.5773	47.6406	725.5006
Asia	264	57.13636(*)	0.4285343	56.2965	57.9763	3798.503
MENA	406	34.41379(*)	0.9928006	32.4679	36.3596	761.2411
Others	251	71.27888(*)	0.6941936	69.9183	72.6395	3016.341

(*) largest observed analysis time is censored, mean is underestimated

We further extend the analysis by regrouping the countries into various regions such as Asia, MENA, and other countries. Our findings reveal that Islamic banks in Asia accounted the highest extended mean of survival time 3,798.503, followed by other countries with 3,016.341, MENA countries have 761.241 and GCC accounted for 725.501. In other words, Asia has the highest average survival time for the banks followed by those from other countries, MENA and GCC countries which reflect the sequential reverse outcome of the log-rank test. Therefore, Islamic banks in the Non-GCC and Asia countries are expected to have the high impact on the societal well-being since they have highest survival time than those from other countries.

However, nonparametric analysis of survival and hazard functions are not sufficient to determine the unknown parameter of the split time over the period of the study. Consequently, it is unknown whether or not the hazard function has the likelihood to

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increase or decrease. Therefore, the study extends the analysis to time split parametrization in order to explore the time-specific effect holding other periods constant.

5.4 The parametrization of failure split time

In addition to the non-parametric bank failure analysis, this study extends to exponential and generalized linear model to predict each time parameter while others are assumed to be constant. Table 5.6 and Appendix D contains only the split time, frequency and percentage of the failed banks at each time interval and their parameters. Similarly, the recent variable is the proportional hazard ratio of the last period of the study (i.e. 2014). The first split period has the bank failure recurrence rate as 0.000618* 100 = 0.0618 per 100 bank-time split (an interval of a year), while the fifth-period increase to 0.0366 per 100 bank-time split. This implies that recurrence probability increases with the number of failed banks in the sample (at period 5, three banks failed compared to period one and two). After that, the likelihood of failure recurrence as reduces the frequency of the failed banks is become one. However, period 9, 11, and 12 have the same representation of failed banks in the sample at 6.9 percent each, and the prior time effect influences their parameters. Meanwhile, period 19 is the higher time split period which accounts for 0.16 per 100 bank-time split period of failure rate recurrence. It is evidently clear that failure recurrence rate increases as time split increase with the increase in some failed banks (see period 30, 31, and 50).

At the same time, the probability of not having a recurrence of banks failure for the first year can be calculated as the exponential (-0.000618*1) = 0.9994, and for the second period conditional on not having one in the first time split is exp (-0.000176*1) =0.9998

(multiplication of one is the time split length period). Similarly, at period nine the estimation will become exp (-0.000255*1) = 0.9997 while holding other periods constant.

Table 5.6: Split of failure time

Split time	Freq.	Failure Percent	GLM	EXP
1	1	3.45	0.000618***	0.000618***
			(0.000897)	(0.000897)
2	1	3.45	0.000176***	0.000176***
			(0.000255)	(0.000256)
5	3	10.34	0.000366***	0.000366***
			(0.000455)	(0.000455)
6	1	3.45	0.000147***	0.000147***
			(0.000219)	(0.000219)
7	1	3.45	0.000101***	0.000101***
			(0.000147)	(0.000147)
8	1	3.45	0.000107***	0.000107***
			(0.000156)	(0.000156)
9	2	6.9	0.000255***	0.000255***
			(0.000333)	(0.000333)
10	1	3.45	0.000161***	0.000161***
			(0.000239)	(0.000239)
11	2	6.9	0.000341***	0.000341***
			(0.000433)	(0.000433)
12	2	6.9	0.000443***	0.000443***
			(0.000555)	(0.000555)
15	1	3.45	0.000218***	0.000219***
			(0.000316)	(0.000316)
16	1	3.45	0.000199***	0.000199***
			(0.000286)	(0.000286)
17	1	3.45	0.000259***	0.000259***
			(0.000376)	(0.000376)
19	4	13.79	0.00106***	0.00106***
			(0.00110)	(0.00110)
24	1	3.45	0.000327***	0.000327***
			(0.000478)	(0.000478)
28	1	3.45	0.000289***	0.000289***
			(0.000424)	(0.000424)
29	1	3.45	0.000296***	0.000296***
			(0.000427)	(0.000427)
30	1	3.45	0.000272***	0.000272***
			(0.000397)	(0.000397)
31	1	3.45	0.000307***	0.000307***
			(0.000458)	(0.000458)
50	1	3.45	0.00351***	0.00351***
			(0.00517)	(0.00517)
80	1	3.45	0.00305***	0.00305***
			(0.00453)	(0.00453)
Recent			1.036***	1.036***
			(0.00852)	(0.00852)
Observations	29	100	1,476	1,476

* , **, *** donate significance of the time split at 10%, 5% & 1% respectively

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Therefore, it is clear that the probability of not having a recurrence reduces the value of the hazard increases (see; period 19 against others). The findings concur the assumption that all Islamic banks are homogeneously in term of characteristics and regulations compliance. Therefore, as one bank failed, it will influence other banks to be affected. Similarly, the presumption can be clear through signaling theory expressions. As such, failure of a bank might have bad signal on the investors' and customers' confidence which can lead them to take advance decisions.

The value 'recent' is introduced as time-varying covariate that is different from the previous time split dummy variables. Thus, recent is considered as proportionate hazard value in the model and is the last most recently ended period of the study (2014). Therefore, the model assumes that there is 3.6 percent increase (1-1.036*100) of the banks risk exposure to the banks. Therefore, Islamic banks have to monitor and control the failure risk exposure from increasing.

However, parameterization models are also fit beyond time split dummy variables. In corporate finance, the influence of financial statement and balance sheet items coupled with business cycle movement that is influenced by other macroeconomics environmental exogenous variables are found to be important in predicting the hazard or survival of banking sector (Poghosyan & Cihak, 2011; Pappas et al. 2016, Chiaramonte & Casu, 2016). As a result, this study includes them as the covariate in predicting survivorship of the Islamic banks in the GCC and Non-GCC countries. Similarly, the study considers the

time split of "recent" as an explanatory variable. A similar study (Pappas et al. 2016) concludes that survival analysis is best to explain through time-varying covariate. Therefore, the subsequent analysis begins with exploring means difference of financial statement and balance sheet variables across the GCC and Non-GCC countries. The univariate analysis equal variance will guide the analysis to explore whether the two groups (survive and failed from two regions) differ significantly in term of their financial variables. The similar recent study considers equality variance comparison before extending to survival analysis (Pappas et al. 2016).

5.5 Mean difference for equality test

Banks failure depend on the different circumstances due to financial and non-financial factors that can cause the institution to be inactive (Vazquez & Federico, 2012). Poor performance and insolvency are considered to be the financial consequence of banks failure, while non-financial factors include the regulations issues and other prudential attributes that cause banks to fail. For instance, Taqwa bank was closed down due to money laundering, while regulations issues affected Faisal Bank of United Kingdom (Ali, 2007; Rajhi & Hassairi, 2011; Souaiaia, 2014).

On the other hand, those affected as a result of financial factors include Islamic Bank of South Africa and Ihlas bank of Turkey among other (Aliyu et al. 2017). Therefore, it is evidently clear that some banks are closed down through other factors apart from financial distress. As a result, Table 5.7 presents a means difference for equality between survived and failed banks as well as the group difference between GCC and Non-GCC countries to explore the possible financial activities that can influence banks failure.

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Table 5.7 presents four columns and begins with a comparison of pooled banks between GCC and Non-GCC countries, followed by column 3 and four which illustrates survive and failed banks in the GCC, and Non-GCC countries. The aggregate number of the pooled sample banks are 170 with 29 failed, and 114 survive. The groups are divided based on a dummy of zero (Non-GCC) and one (GCC). The last two columns present mean of equal variance between GCC and Non-GCC countries based on surviving and failed banks. The analysis of equality in this study set the difference deduction from Non-GCC to GCC. The column of pooled banks identified that the equity size of the GCC countries outweighs that of Non-GCC countries with $696,709.6 which also supported their total earnings difference of $965,491.3.

Table 5.7: Mean difference between GCC and Non-GCC countries

	GCC & Non-GCC	GCC & Non-GCC	
	Pooled Banks	Survive	Failed
Number of Banks	170	141	29
Survived	141		
Failed	29		
Finan. statement & Balance Sheet items($ 000)			
Asset	-683041.3	-1350501.0*	2565506.1*
Equity	-696709.6***	-831279.4***	1274
Total Earning Asset	-965491.3*	-1561946.3**	1930659.0*
Total Liabilities & Equity	-683041.3	-1350501.0*	2565506.1*
Gross Loans	-52.07*	9867.7	-5.944
Reserves for Impaired Loans	7.082	160.4	12.94*
Loans and Advances to Banks	-17.15	9687.1	16.19*
Fixed Assets	52.62*	247.4	-11.01
Total Customer Deposits	-172.3***	498.3	-34.46***
Deposits & Short term funding	-63.74**	-57.95**	-10.04
Net Income	47.22*	34.84	9.094
Other Securities	3.37	78.59	19.72*
Remaining earning assets	135.6***	28200	15.04***
Other (Non-Interest bearing)	0.144	30.15	228070.1*
Other Deposits and Short-term Borrowings	-30.10***	-16.38	-0.163

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Table 5.7 (continue)

Loan Loss Reserves	-2.645***	-3.016***	-0.0522
Other Reserves	-29.88**	-30.15**	-0.618
Financial Ratios (%)			
Loan Loss Res / Impaired Loans	45.67***	47.60***	1.501
Impaired Loans / Gross Loans	44.91***	50.75***	0.113
NCO / Average Gross Loans	12.28***	15.97***	-0.728
NCO / Net Inc Bef Ln Lss Prov	22.08***	26.93***	-0.485
Impaired Loans / Equity	48.28***	57.59***	-1.146
Unreserved Impaired Loans / Equity	16.82***	19.06***	-0.395
Tier 1 Ratio	14.81*	14.88*	0.965
Equity / Cust & Short Term Funding	-27.58	-6.41	-26.07**
Equity / Tot Assets	-20.50***	-18.32***	-31.68***
Equity / Liabilities	4.017	18.02	-19.21*
Cap Funds / Tot Assets	9.119***	9.543***	-0.325
Cap Funds / Net Loans	-4.598*	-5.309*	-0.192
Cap Funds / Dep & ST Funding	4.465	5.927*	-0.722
Cap Funds / Liabilities	5.891*	28277.4	-0.69
Subord Debt / Cap Funds	-1.052	182.9	-0.344**
Net Interest Margin	69.33***	50.61***	35.15***
Return on Average Assets	-47.82***	-35.63***	-29.49***
Cost to Income Ratio	155.2***	138.1***	21.01**
Net Loans / Total Assets	-48.33*	-74.60***	21.46*
Net Loans / Customer & ST Funding	-104.7***	-107.7***	2.775
Liquid Assets / Dep & ST Funding	-40.5	78.68**	-2.944
Net Int Rev / Avg Assets	46.05***	29.42**	33.68***
Oth Op Inc / Avg Assets	19.43*	20.40*	0.856
Non Int Exp / Avg Assets	40.29***	46.13***	-3.032
Pre-Tax Op Inc / Avg Assets	34.42***	41.02***	0.868
Non Op Items & Taxes / Avg Ast	-82.54***	-66.87***	-32.70***
Dividend Pay-Out	35.39***	21.52**	11.38***
Inc Net Of Dist / Avg Equity	31.76***	23.74***	8.442*
Non Op Items / Net Income	42.17***	49.93***	-0.536
N	1476	1273	203

* , **, *** donate significance at 10%, 5% & 1% respectively

Similarly, GCC banks have the higher mean difference of \$172.3 as total customer deposits, other deposits and short-term borrowing of \$ 30.10 and loan loss reserves of

$2.645. The higher differences in the loans loss reserves of the GCC signalized the likelihood of poor asset quality. However, Non-GCC countries' banks are find significantly differed with GCCs' banks in the net income of financial statement with $47.22 and remaining earnings of $135.6. From the financial ratio view, Non-GCC banks are find having significant different on all indicators of asset quality (45.67%, 44.91%, 12.28%, 22.08%, 48.28% and 16.82%). The findings supported the recent assertion of having a higher risk of GCC countries' loans as they disburse to single borrower of a particular sector (IMF, 2014; Moody, 2015). Despite the significant outcome of the GGC on the return on asset (47.82%), they are operationally inefficient compared to Non-GCC countries. These differences reveal by various efficiency indicators such as; a cost to income (155.2%), other operating income to the average asset (19.43%), non-interest expenses to the average asset (40.29%), pre-tax operating income to the average asset (34.42%) and non-operating items to net income (42.17%). Therefore, regulators and policy makers in the GCC countries have to focus on the measures that will enhance their Islamic banks' operational efficiency in the region.

The next analysis examines the intra-regional variance of each group based on survive and failed banks. The survived group of banks are coded zero while the failed ones (the groups are set to be zero minus one). The number of survived banks in the GCC countries are found to be significantly more than failed banks in the financial statement information which include assets, equity, earning asset, total liabilities, and equity, and deposit and short-term funding. The Non-GCC survive banks are found significantly capable in attaining asset quality compared to GCC countries survive banks which have higher loan

loss provisions and reserves. Moreover, Non-GCC survived banks are found significantly different in operating efficiency compared with GCC banks. The significant indicators include cost to income (138.1%), other operating income to average asset (20.40%), non-interest expenses to average asset (46.13%), pre-tax operating income to average asset (41.02%), dividend payout (21.52), and non-operating items to net income (49.93%). Nonetheless, survived GCC banks are evidently having enough asset and short-term funds to cover the net loans compared to Non-GCC banks with 74.06% and 107.7% respectively. Though, Non-GCC survives banks have a significant difference excess liquidity of 78.68% compared to those in GCC countries. The excess liquidity of the Non-GCC survived banks is possibly recorded due to the out number of sample banks (113) compared to those in GCC countries (57). At this juncture, the findings reveal that GCC countries are more liquid and enough assets but with high loan loss provisions, while Non-GCC banks are significantly different regarding cost efficiency ratios.

The last column in the Table 5.7 presents that failed banks in Non-GCC countries has the significant difference in relation to asset, liability and equity, other securities, and gross loan of the financial statement. The failed banks of GCC countries are found significantly different on various equity ratios (26.07%, 31.68%, and 19.21%). Similarly, GCC accounting profitability of 29.49%, differs significantly compared to that of Non-GCC. In contrast, Non-GCC has significant difference in liquidity (21.46%), cost efficiency (21.01%) and dividend payout (11.38%). Despite the banks are found failed, but they vary in some characteristics such as equity, cost efficiency, and dividend payout ratio. So far, the analysis is based on univariate equality test which only measures differences among

the covariates. Therefore, the study extends to more robust analysis based on the semi-parametric approach of the Cox (1972) model.

5.6 Semi-Parametric of Cox model

Table 5.8 and Appendix E details conditional variables to the time to failure as dependent in the Cox models of model1, shared model 2 and 4, and Efron approximation model. The first covariate to the models "Recent" which is the time split covariate to the recent period (i.e. end of the study period-2014) to explore the effects of the banks' risk exposure.

The time-varying covariate has been used in previous survival analysis as the explanatory variable (Wheelock & Wilson, 2000; Molina, 2002). The other banks specific variables are product of CAMEL and they include ONIL which represent other non-interest bearing liabilities, ENL is equity to net loans, NLTA stands as net loans to total assets, LLI is the loans loss reserves to impaired loans, TCR expressing the total capital ratio, OOIA demonstrating other operating income to average asset, and NIEA is the non-interest expenses to average assets. The last two variables are the macroeconomic indicators that represent per capita GDP and Inflation. The banks' specific variables are selected based on CAMEL theoretical positions as explained in chapter four. For instance, a total capital ratio is considered as a component of the capital adequacy measure. Nonetheless, the indicator is based on the influence of the banking activities between conventional and Islamic banks. The total capital ratio combined both tier I and II, although tier II contained other capital that is not considered in Islamic banking transactions (such as hybrid capital with excessive debt and subordinated debts). Thus, consistent utilization of debt based hybrid capital has tendencies of increasing banks hazards to failure compared to equity cushion which is absorbing loans losses (Wheelock & Wilson, 2000; Myres & Hassanzadeh, 2013; Lewis,

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2015). Therefore, the model considered the two indicators related to adequacy to assess their impacts on time to an event. Similarly, the assets quality in the model is measured through loans loss to impaired loans, but efficiency and earning are proxies by non-interest expenses to average assets and other operating incomes respectively.

Table 5.8: Result of Semi- Parametric Approach

	Cox Models			
Failure	Model 1	Shared 2	Shared 4	Efron
Recent	1.048***	1.048***	1.048***	1.049***
	(0.014)	(0.014)	(0.014)	(0.014)
ONIL	1.002***	1.002***	1.002***	1.002***
	(0.001)	(0.001)	(0.001)	(0.001)
ENL	0.999**	0.999**	0.999**	0.999**
	(0.001)	(0.001)	(0.001)	(0.001)
NLTA	0.999	0.999	0.999	0.999
	(0.001)	(0.001)	(0.001)	(0.001)
LLI	1.005**	1.005**	1.005**	1.005**
	(0.003)	(0.003)	(0.003)	(0.003)
TCR	1.002	1.002	1.002	1.002
	(0.001)	(0.001)	(0.001)	(0.001)
OOIA	0.997**	0.997**	0.997**	0.997**
	(0.001)	(0.001)	(0.001)	(0.001)
NIEA	1.002**	1.002**	1.002**	1.002**
	(0.001)	(0.001)	(0.001)	(0.001)
GDPPC	0.467**	0.467**	0.467**	0.456**
	(0.162)	(0.162)	(0.162)	(0.158)
INF	0.996	0.996	0.996	0.996
	(0.004)	(0.004)	(0.004)	(0.004)
OBS	1,455	1,455	1,455	1,455
# of Groups		2	4	

ONIL - non-interest bearing liabilities, ENL is equity to net loans, NLTA stands as net loans to total assets, LLI is the loans loss reserves to impaired loans, TCR expressing the total capital ratio, OOIA demonstrating other operating income to average asset, NIEA is the non-interest expenses to average assets, GDPPC represent per capita GDP and INF-Inflation. * , **, *** donate significance at 10%, 5% & 1% respectively; model 1-represents the entire sample, shared 2-represent the stratification of GCC and Non-GCC groups while shared four is the four strata of GCC, Asia, MENA, and other countries, and efron is an approximation (see chapter four for detail).

Intuitively, the interpretation of hazard estimations is within the components of percentage, i.e., 100% (estimated value – 1). Therefore, the outcome with a negative value is predicting a reduction in the term of hazards and increase survivability and vice versa. Similarly, any outcome of greater than or equal to one is depicting increase to failure risk and reduces the survivability chances. Although, the interpretations of the survival coefficient is counted after deducting it from one since the opposite of the probability is the hazard to failure (see chapter four for detail derivations).

In Table 5.8 begins with "recent" as a predictor of the time-varying covariate. The recent time of model 1 predicts that there is a likelihood of 4.8 [4.8% = 100% (1- 1.048)] percent of bank failure recurrence increase as a result of conditional covariates bank-time risk exposure. The subsequent outcome of recent hazard rate is similar in shared 2 and four at (4.8%) which is representing GCC and Non-GCC group, and GCC, Asia, MENA, and other countries group respectively. Consequently, the shared 2 and 4 have similar increase of 4.8 percent while the Efron approximation presented an outcome of 4.9 percent. This predicts five percent (approximately) likely failure hazard increase to Islamic banks due to their time risk exposure as they grow within the system.

In Table 5.9, the results of the financial conditional covariates are expressed similar hazards coefficients for the different Cox models after considering time-varying covariates. In principle, Islamic banks are prohibited from performing any transaction that is prohibited such as interest, gambling and speculative businesses (Khan, 2010). As such, non-interest bearing indicators are considered closer to the activities of Islamic banks such as fees income and non-interest bearing expenses and liabilities which also used in the previous

banking studies (Cole & Gunther, 1995; Beck et al. 2013). The values of non-interest bearing liabilities are presumed to reduce the profit gain of the banks and too much liabilities increases chance of banks failure. The result related to non-interest bearing liabilities predicts increase chances of the Islamic banks' failure which is consistent with the previous findings of similar conclusion which states that higher liabilities is associated with failure possibilities (Cole & Gunther, 1995; Shumway, 2001). The situation is more advancing in the event of lower earnings with higher liabilities. Interestingly, the findings on equity cushion to avert risks and absorb losses on the Islamic banks financing is in line with the previous claims in the literature (Alfriend, 1988; Admati et al. 2013). The finding is inferred to the asset-based capital formation of Islamic banks which constitute the major proportion of their capital position since it proved that it absorbs losses and reduce failure bankruptcy (Khan 1986). As such, it is expected for those banks with higher equity to have higher returns, and it will enable them to survive longer (Abedifar et al. 2013). It is practically evident that Islamic banks are less affected by a recent global financial crisis which probably due to their Sharia restriction on other transactions include interest-debt based (Cihak & Hesse 2010; Hassan and Dridi 2011; Beck et al. 2013; Alqahtani, Mayes, and Brown 2016). As such, equity finance predicts long-term survival of Islamic banks and minimizes failure hazard rates. In contrast, loans loss reserves express indications of excessive impaired loans which is negatively affecting the banks' sustenance. Therefore, a positive increase in the loans loss reserves to impaired loans is predicting failure increase to Islamic banks. Therefore, Islamic banks are expected to reduce the impaired loans and loan loss reserves in order to survive longer period.

Nonetheless, an operational self-sufficiency of Islamic banks is incomplete without considering other operating income components (Ismail, 2010). Supportive findings (Demirgüç-Kunt & Huizinga 2010; Mayes & Stremmel 2012) on the other operating income to average asset reveals a consistent outcome that has tendencies to improve survival and reduce failure hazards to Islamic banks. The findings reflect the prior expectations of the previous banking studies (Meyer & Pifer, 1970; Brown & Dinc, 2005). With this, the more revenue banks have today, the lower the likelihood to fail in near future. Therefore, it is suggested for Islamic banks to improve other sources of enhancing operating income and to reduce unnecessary expenses. Banks with higher expenses tends to have the poorer managerial efficiency which may, in turn, leads to failure. Therefore, managerial efficiency can be determined with an expected negative value of expenses to average assets (Athanasoglou et al. 2008). At such, Islamic banks have to strategies other means of efficient resource utilization.

In contrast, Brown and Dinc (2005) found that GDP per capita increases hazard rate which contradicts prior expectations. The findings of previous studies (Grossman, 1993; Wheelock 1995; Pappas et al. 2016) support the real economic activities in predicting survival of the banks which is similar to the outcome of this study (i.e. per capita GDP is predicting lower failure risk of the banks). In a nutshell, increase per capita income of the citizens has direct impact on the Islamic banks' survival likelihood since the institutions' transactions focuses on the real economic activities. Though, findings of this study on inflation is consistent with previous studies (Brown and Dinc 2005; Schaeck, Cihak, & Wolfe 2009; Poghosyan & Cihak, 2011), that is, it does not support impact of the inflation

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in influencing banks failure. Consistent with previous studies, the initial findings of this study to Cox models confirmed the effectiveness of CAMEL composition in predicting banks' failure which supported the earlier predictions (Lane et al. 1986; Gonzlez-Hermosillo, 1999; Alali & Romero, 2013). Therefore, fulfillment of the CAMEL requirement by Islamic banks is an integral requirement for attaining their long survival position. The policymakers have to be consistently monitoring the banks' failure indicators in order to hedge against it future occurrence. At this juncture, the study extends to the parametric approach of survival analysis which is design to investigate the consistency of the predicting variables on the tri-variate response of Islamic banks using panel survival analysis and mixed effect model.

5.7 Parametric Approach to survival analysis

Methodologically, the semi-parametric approach of the Cox models neglect the baseline parameter, the shape of the distribution, and then, the estimation is relative rather than absolute. Therefore, the study further investigates the conditional variables using hazard and panel survival approaches. Table 5.9 and Appendix F and G illustrate two different parameterizations (hazards parameterization and panel survival models).

The hazard parameterization covers three models (Weibull, Exponential, and Gompertz) while panel survival models (Weibull models and mixed effect). The modeling of this study considers time-varying covariate through time split as an additional explanatory variable in the model (Molina, 2002; Clave et al. 2010). Thus, an inclusion of the time-varying covariate will influence the flexibility of the model without restricting the estimation to particular distribution (Rabe-Hesketh & Skrondal, 2012). As such, this present study

employs various models to verify the results through the inclusion the time-varying

covariate which treat each time interval with its discrete distribution.

Table 5.9: Parameterization of Hazards and Survival Panel

Failure	Hazard Parameterization			Survival Panel	
	Weibull	Expon	Gompertz	Panel Weibull	Mixed Effect
Recent	1.049***	1.049***	1.049***	1.049***	1.049***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
ONIL	1.002***	1.002***	1.002***	1.002***	1.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
ENL	0.999**	0.999**	0.999**	0.999**	0.999**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
NLTA	0.999	0.999	0.999	0.999	0.999
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
LLI	1.005**	1.005**	1.005**	1.005**	1.005**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
TCR	1.002	1.002	1.002	1.002	1.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
OOIA	0.997**	0.997**	0.997**	0.997**	0.997**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
NIEA	1.002**	1.002**	1.002**	1.002**	1.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GDPPC	0.452**	0.458**	0.448**	0.458**	0.448**
	(0.160)	(0.159)	(0.161)	(0.159)	(0.161)
INF	0.996	0.996	0.996	0.996	0.996
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Constant	2.12e-06***	2.55e-06***	2.61e-06***	2.55e-06***	2.61e-06***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	1,455	1,455	1,455	1,455	1,455

ONIL - non-interest bearing liabilities, ENL is equity to net loans, NLTA stands as net loans to total assets, LLI is the loans loss reserves to impaired loans, TCR expressing the total capital ratio, OOIA demonstrating other operating income to average asset, NIEA is the non-interest expenses to average assets, GDPPC represent per capita GDP and INF-Inflation. * , **, *** donate significance at 10%, 5% & 1% respectively.

5.8 Hazard parameterization

Weibull and Gompertz distribution assume monotonic (either increase or decrease) hazard rate with time (as highlighted in chapter four). In an event where the probability and the gamma value of the estimation are greater than one, then the monotonic increase is assumed, while the exponential model assumes constant hazard rates with the change of time. The analysis is set to consider the banks' clusters during data declaration (in the software) with expansion on each interval period to have different baseline parameter for the flexible outcome (Rabe-Hesketh & Skrondal, 2012). In a nutshell, the distribution does not matter much in our scenario.

The results of the hazard parameterization covariates in Table 5.9 supports the earlier outcome of the Cox models with little variation in the coefficient of the macroeconomic variables. A one percent increase to per capita of the citizens (GDPPC) will reduce the hazard rate by 45 percent in the Weibull, Gompertz, and mixed effect model estimation while exponential and panel survival models report 46 percent. The finding is consistent with the previous study as the increase of per capita income reduces banks failure incidence (Wheelock, 1995). Consequently, for a more robust analysis, various models have been employed to justify the results. As such, the result in Table 5.9 also reveals that an increase of the non-interest liability predicted 2 percent reduction to the banks' survival. Therefore, reduction of Islamic banks liabilities has the tendency to improve their survivability. However, one percentage increase in equity funds and other operational income of the banks have the likelihood to increase their survival chances by 0.1 and 0.3 percent respectively. Therefore, equity cushion to absorb loans losses and operational income are

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found influential to improve the survival of the Islamic banks. However, an increase of 0.2 percent chances of the banks' failure is also predicted as one percentage increase in non-interest expenses superseded average assets. The result at this juncture explains the inefficient utilization of available resources that are translated on the banks' hazard to failure. The finding is supportive of bad management hypothesis that implicatively affects the corporate sustenance which predicted higher cost leads to banks' failure (Cole & Gunther, 1995; Molina, 2002; Fiordelisi, & Mare, 2013). Consistently, as identified from the semi-parametric approach, per capita income reduces banks hazards rates and increases prediction on the banks' survival. The survival of Islamic banks is linked with the real sector activities since they transact on the profit and loss sharing principles which relate between banker and entrepreneur. Therefore, the increase in per capita has relation with the business outcome which also the banks will benefit with their gain profit.

5.9 Survival Model: Panel and Mixed effects

Table 12 also presents the results of the panel and the mixed effect of the survival regression with a Weibull distribution. The last two column in Table 5.9 presents similar outcome with that of parametric analysis. For the parametric approach, the model accounts for banks clusters as group identification to data declaration and also the panel and mixed effect models. Therefore, it identified that using time-varying covariate accounts for the affected period as indicated above in the event of a split of failure time (see Table 5.6). Nonetheless, the panel estimations are not predicting the long-term cointegration of the covariates in the model. Consequently, it is not providing the future forecast to policy makers on the priority concerns area to strengthen and those to be addressed. As a result,

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next section will consider panel cointegration, impulse response function, and variance decomposition.

5.10 Summary

This section discusses the result of survival analysis. The chapter presents non-parametric analysis where the Islamic banks are found to have higher survival time analysis since only 29 banks found failed during the time frame of the study. Meanwhile, Non-GCC countries have longer period with lower survival rate compared to GCC banks. Moreover, in predicting failure recurrence possibilities through time split, the findings indicate that Islamic banks have the likelihood of lower failure reappearance at a particular period situation while holding other periods constant. Moreover, an extension to semi-parametric, parametric, survival panel and mixed effect models, conditioning financial and macroeconomic variables was used to predict the banks' survival. In a nutshell, consistently with previous studies (Pappas et al. 2016; Fiordelisi, & Mare, 2013), the findings of this study have explicitly explained that efficiency and revenues maximization increases banks survival and vice versa. In a similar way to Islamic financial view, equity capitalization absorbs unexpected losses, but hybrid capital and loss loans to impaired loans increase banks' chances to failure. Interestingly, the macroeconomic condition of a country determines banks' hazard and efficiency in allocating is desirable for banks' survival. The outcome of this analysis encourages further panel analysis to long-term and dynamic predictions for policy analysis.

CHAPTER SIX
RESULTS AND DISCUSSION: PANEL ANALYSIS

6.1 Introduction

The chapter focuses on the panel data analysis and discussions based on the country aggregate and bank-specific data. The analyses are divided into two major parts, and each of the section begins with preliminary overview analysis on the data. The country aggregate analysis was established to deal with the second and the third objectives of the study. However, the data accessed from BankScope is insufficient to account for other indicators considered in generating a *maqasid* index which stands as a proxy for *maqasid* Shariah objective. As a result, the study extended to use Islamic Banks Information System database for bank-specific data for generating the index. As such, for assessing the *maqasid* index, banks specific data had been used to explore the co-movement of the variables. After that, the study further ahead and estimate the cointegration test, IRF and VDC on the solvency, operational self-efficiency, outreach, and *maqasid* index.

6.2 Descriptive Analysis

The preceding chapter has explicated the techniques and methods of the panel data analysis. Meanwhile, this chapter begins with the descriptive and correlation analyses are presented to highlight some of the data attributes. Table 6.1 depicts the summary distribution of the data based on the mean, median, minimum, maximum and standard deviation of GCC and Non-GCC countries. The availability of data for longer period of the global Islamic banks' constraint the study to limit its sample. As a result, this present study considers banks with available data for at least 20 years in order to fulfill the established

required conditions for the macro panel (Baltagi, 2013). Base on this, the study select only five countries from GCC and four from Non-GCC countries with 100 and 80 observations respectively.

Table 6.1: Descriptive Statistics of Aggregate Panel

	Mean	Median	Maximum	Minimum	Std. Dev.	Obs.
GCC						
OSS	0.86277	0.71289	3.098788	0.032018	0.670037	100
SOL	12.9849	9.8824	46.28785	3.084205	9.057028	100
OUT	0.34235	0.10332	5.984618	0	0.891064	100
CAR	23.0454	18.43	80.58	3.09	17.4935	100
CFL	39.3354	21.205	351.99	3.14	67.51212	100
LADSTF	36.3889	34.21	131.71	10.5	19.63756	100
NI	531659	211838	2882593	-1223866	796640.9	100
ROAA	2.2324	1.975	8.43	-3.59	1.998742	100
GDP	111807	64243.9	392314.2	7528.459	117151	100
Non-GCC						
OSS	0.769	0.793	2.323	0.028	0.432	80
SOL	13.081	12.57	27.612	0.684	6.849	80
OUT	0.123	0.072	0.451	0.004	0.126	80
CAR	8.497	7.93	18.8	1.67	3.936	80
CFL	8.653	7.795	19.84	1.35	4.119	80
LADSTF	32.504	33.545	61.55	8.84	14.728	80
NI	377742	45405	4704990	-416269	887454.3	80
ROAA	0.699	0.69	2.89	-5.02	1.273	80
GDP	5.757	4.408	62.2	-6.609	7.831	80

OSS- operational self-sufficiency, SOL- solvency, OUT- outreach, CAR- capital and return to asset ratio (additive interaction, Agung, 2014), CFL-capital funds/liabilities, LADSTF-liquid asset/deposit and short term funding, NI- net income, ROAA- return on average asset, GDP-gross domestic product per capita. ***, **, *, donate significance of the level at 1%, 5%, & 10% respectively.

The dispersion of Net Income (NI) from the mean accounted for large amount compared to the other variables in the regions which revealed size variation of the banks within the sampled countries. The minimum negative values of the net income are signal for loss recorded by some of the banks in the GCC and Non-GCC countries which also affected their return on average asset. The study also uses GDP per capita as a control variable for the GCC and Non-GCC countries.

Table 6.2: Correlation

Correlation	CAR	NI	CFL	ROAA	LADSTF	OSS	OUT	SOL	GDP
GCC									
CAR	1.000								

NI	0.265	1.000							
	[0.008]	-----							
CFL	0.989	0.216	1.000						
	[0.000]	[0.031]	-----						
ROAA	0.692	0.452	0.610	1.000					
	[0.000]	[0.000]	[0.000]	-----					
LADSTF	0.110	-0.211	0.104	0.061	1.000				
	[0.277]	[0.035]	[0.301]	[0.550]	-----				
OSS	0.124	0.547	0.076	0.409	-0.019	1.000			
	[0.219]	[0.000]	[0.455]	[0.000]	[0.848]	-----			
OUT	0.001	0.504	0.013	-0.054	-0.182	0.374	1.000		
	[0.989]	[0.000]	[0.896]	[0.592]	[0.070]	[0.000]	-----		
SOL	0.829	0.349	0.808	0.593	0.152	0.212	-0.116	1.000	
	[0.000]	[0.000]	[0.000]	[0.000]	[0.131]	[0.034]	[0.252]	-----	
GDP	-0.348	0.091	-0.386	-0.027	-0.260	0.048	-0.203	-0.221	1.000
	[0.000]	[0.367]	[0.000]	[0.791]	[0.009]	[0.636]	[0.043]	[0.027]	-----
Non-GCC									
CAR	1.000								

NI	0.404	1.000							
	[0.000]	-----							
CFL	0.940	0.236	1.000						
	[0.000]	[0.035]	-----						
ROAA	0.729	0.727	0.547	1.000					
	[0.000]	[0.000]	[0.000]	-----					

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Table 6.2 (continue)

LADSTF	0.378	0.153	0.329	0.356	1.000				
	[0.001]	[0.176]	[0.003]	[0.001]	-----				
OSS	0.384	0.380	0.294	0.544	0.199	1.000			
	[0.000]	[0.001]	[0.008]	[0.000]	[0.077]	-----			
OUT	0.265	0.450	0.268	0.162	0.206	0.097	1.000		
	[0.017]	[0.000]	[0.016]	[0.150]	[0.067]	[0.393]	-----		
SOL	0.271	0.128	0.163	0.184	-0.088	-0.014	0.134	1.000	
	[0.015]	[0.260]	[0.148]	[0.103]	[0.437]	[0.901]	[0.237]	-----	
GDP	-0.276	0.519	-0.313	0.034	-0.339	0.026	0.133	-0.024	1.000
	[0.013]	[0.000]	[0.005]	[0.764]	[0.002]	[0.822]	[0.238]	[0.832]	-----

P-values are in parenthesis

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The correlation matrix among the variables measured their relational magnitude and directions. The Table 6.2 revealed that all variables have a positive association except GDP. The strong relation between CFL, SOL and CAR is not surprising since all the variables are derived from the banks' capital.

Despite, correlation matrix with a strong relation of 88, 95 and 92 percent was used to similar methodology (Zairy & Kassim, 2010), though, this study considers centering to reduce multicollinearity. The centering process is usually applied to reduce the effect of multicollinearity among highly correlated variables (Smith, & Sasaki, 1979; Kreft, De Leeuw, & Aiken, 1995; Disatnik, & Sivan, 2014). Subsequently, OUT in the GCC has lower relations with CAR, CFL, and ROAA and moderate to those variables in a Non-GCC panel.

Operational self-sufficiency is found to be positively and strongly related to net income which suggests that an increase in the banks' profit sustains their operational sufficiency. Similarly, outreach and net income have the positive relation which can also be interpreted through sufficiency in banks operations. The situation is highly significant in the Non-GCC countries. Furthermore, solvency is found to be positively significant to capital and return variables in the GCC and negatively significant to operational self- sufficiency in the Non-GCC countries. In other words, this implies that for GCC banks' capital buffer and profitability will increase their solvency, wheres, Non-GCC banks have to improve their operational efficiency in order to achieve longer sustenance which supported our findings on panel cointegration analysis.

	Level		First Order Difference			Level		First Order Difference	
	Constant	Constant + Trend	Constant	Constant + Trend		Constant	Constant + Trend	Constant	Constant + Trend
CAR					**CFL**				
Levin, Lin & Chu	-0.292	1.051	-2.257*	-2.088*		-0.429	0.857	-2.875**	-3.502**
Breitung t-stat		0.322		-4.301**			0.547		-3.649**
Im, Pesaran and Shin	-0.546	0.861	-2.926**	-2.069*		-0.576	1.003	-2.614**	-2.306*
ADF - Fisher Chi-square	10.264	6.353	26.647**	19.947*		10.304	5.779	24.237**	23.354**
PP - Fisher Chi-square	11.263	7.603	45.707**	35.928**		11.135	6.151	42.789**	34.625**
NI					**LADSTF**				
Levin, Lin & Chu	0.939	0.395	-3.296**	-4.565**		-1.948*	-1.559	-10.331**	-10.029**
Breitung t-stat		2.694		-3.063**			-0.848		-5.373**
Im, Pesaran and Shin	0.498	1.062	-2.451**	-3.002**		-1.093	0.203	-9.383**	-9.156**
ADF - Fisher Chi-square	9.454	5.98	25.226**	24.913**		13.155	9.03	78.453**	67.541**
PP - Fisher Chi-square	10.174	5.926	46.031**	33.914**		14.37	10.682	78.049**	75.376**
OSS					**OUT**				
Levin, Lin & Chu	-0.394	0.957	-4.429**	-4.011**		9.695	4.626	0.265	-2.887**
Breitung t-stat		-1.065		-5.214**			3.056		3.836
Im, Pesaran and Shin	-0.595	1.349	-3.685**	-3.035**		8.436	4.282	-0.001	-3.407**
ADF - Fisher Chi-square	10.202	4.049	32.687**	25.842**		3.861	7.298	32.891**	40.158**
PP - Fisher Chi-square	12.901	5.161	55.801**	43.716**		12.867	17.006	300.495**	46.443**
ROAA					**SOL**				
Levin, Lin & Chu	-0.318	1.186	-4.003**	-2.852**		-0.292	1.051	-2.257*	-2.088*
Breitung t-stat		-0.673		-4.343**			0.322		-4.301**

Table 6.3 (continue)

Im, Pesaran and Shin	-0.612	1.201	-3.485**	-1.917*	-0.546	0.861	-2.926**	-2.069*
ADF - Fisher Chi-square	9.874	4.336	29.738**	18.477*	10.264	6.353	26.647**	19.947*
PP - Fisher Chi-square	11.257	5.118	40.220**	26.441**	11.263	7.603	45.707**	35.928**
GDP								
Levin, Lin & Chu	-0.48	-1.228	-7.096***	-6.543***				
Breitung t-stat		-0.307		-4.970***				
Im, Pesaran and Shin	-0.705	-0.763	-5.332***	-4.002***				
ADF - Fisher Chi-square	16.909	12.234	44.214***	32.196***				
PP - Fisher Chi-square	16.534	11.634	45.196***	33.610***				

OSS- operational self-sufficiency, SOL- solvency, OUT- outreach, CAR- capital and return to asset ratio (additive interaction, Agung, 2014), CFL-capital funds/liabilities, LADSTF-liquid asset/deposit and short term funding, NI- net income, ROAA- return on average asset, GDP-gross domestic product per capita. ***, **, *, denote significance of the level at 1%, 5%, & 10% respectively.
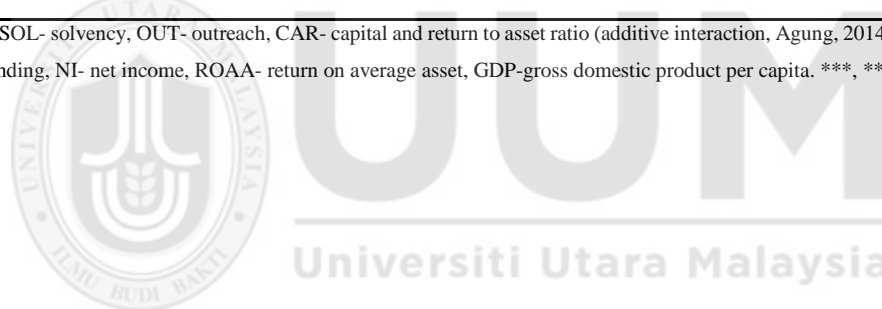
The additive interaction of capital and return on the asset is significant to all variables in the Non-GCC countries while found to be an insignificant relationship to liquidity, operational sufficiency, and outreach in the GCC countries. However, net income has a significant relationship with all variables in the two-panel matrix except for GDP per capita in the GCC countries, liquidity and operational sufficiency of the Non-GCC countries. On the other hand, CFL association to OSS and OUT is not significant in GCC, but found significant in Non-GCC panel, while SOL with CFL exhibit significant relationship in the panel of countries. The performance indicator of ROAA is also found significantly related to OSS in the both panels while SOL is only significant in GCC panel. Meanwhile, the financial outreach (OUT) of the banks are found significantly related to GDP per capita, and the GDP per capita is positively associated with the banks' capitalization and liquidity in the two panels.

6.3 Panel Unit Root for GCC Countries

The result of the panel unit root to the GCC countries have been established in Table 6.3. The above Tables 6.3 expressed based on the null hypothesis that assumes common (LLC and Breitung) and individual (IPS, ADF, and PP) unit root processes. Similarly, the tests were conducted using Modified Akaike Information Criteria (MAIC) with automatic maximum lag length selection. The modified information criteria were found to be flexible and sufficient for unit root test compared with the earlier AIC version of information criteria (Ng & Parron, 2001). In the same vein, Islamic banking data are often associated with negative values that can lead to negative moving average bias.

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Table 6.4: GCC Pedroni Residual Cointegration Test

	Intercept		Intercept +Trend		None	
	Statistic	Weighted Statistic	Statistic	Weighted Statistic	Statistic	Weighted Statistic
OSS CAR CFL NI LADSTF ROAA GDP						
Panel v-Statistic	-1.378	-1.557	-2.295	-2.446	-1.054	-1.373
Panel rho-Statistic	0.229	0.536	1.113	1.412	-0.204	0.175
Panel PP-Statistic	-6.164***	-5.318***	-5.564***	-5.264***	-5.817***	-4.707***
Panel ADF-Statistic	-5.915***	-4.853***	-4.984***	-4.183***	-5.724***	-4.586***
Group rho-Statistic	1.122		2.062		0.675	
Group PP-Statistic	-10.355***		-12.387***		-6.817***	
Group ADF-Statistic	-7.711***		-6.300***		-6.774***	
Conclusion	Cointegrated					
SOL CAR CFL NI LADSTF ROAA GDP						
Panel v-Statistic	-3.612	-3.616	-4.504	-4.505	-3.073	-3.089
Panel rho-Statistic	1.808	1.775	2.542	1.986	2.176	2.297
Panel PP-Statistic	-1.061	-0.886	-4.202***	-4.834***	-1.307	-0.921
Panel ADF-Statistic	-1.312*	-1.133	-3.441***	-4.018***	-1.760**	-1.308*
Group rho-Statistic	3.121		3.669		3.15	
Group PP-Statistic	-1.284*		-1.764**		-1.269	
Group ADF-Statistic	-3.110***		-2.139**		-2.215**	
Conclusion	Cointegrated					
OUT CAR CFL NI LADSTF ROAA GDP						
Panel v-Statistic	-2.936	-2.145	-3.861	-3.052	-2.394	-1.688
Panel rho-Statistic	1.423	1.458	2.355	2.269	0.92	0.917
Panel PP-Statistic	-7.750***	-6.103***	-8.770***	-7.177***	-9.406***	-7.015***
Panel ADF-Statistic	-4.682***	-4.059***	-4.133***	-3.920***	-5.352***	-4.634****
Group rho-Statistic	2.452		2.937		1.919	

Table 6.4 (continue)

Group PP-Statistic	-5.248***	-8.896***	-7.306***
Group ADF-Statistic	-2.729***	-3.074***	-3.463***
Conclusion	Cointegrated		

OSS- operational self-sufficiency, SOL- solvency, OUT- outreach, CAR- capital and return to asset ratio (additive interaction, Agung, 2014), CFL-capital funds/liabilities, LADSTF-liquid asset/deposit and short term funding, NI- net income, ROAA- return on average asset, GDP-gross domestic product per capita.

Meanwhile, a summary of the unit root test output is used for a comprehensive conclusion on the decision criteria for the stationarity. The unit root test exhibits that all the selected GCC panel variables are stationary after first difference. In conclusion, the null hypothesis that assumed the presence of unit root was rejected after first difference which allows the study to proceeds in the analysis to the next stage of testing Pedroni panel cointegration test. The integration of variables after first difference is an important assumption for panel cointegration test, and the variables co-movement are envisioned to predict the banks' sustenance in the long term.

6.4 Results of Panel Cointegration test: GCC Countries

The residual based cointegration test of Pedroni (2000, 2004) has been estimated on the sustainability determinants. The Pedroni panel cointegration has seven test (four within the dimension and three between dimensions). Though, within a dimension are estimated based on weighted and unweighted which accounted for eleven tests in some literature. Similarly, Pedroni test is found to be powerful since it considers individual intercept and deterministic and trend (Carlsson, Lyhagen & Österholm, 2007).

Table 6.4 presents the results of the test on the three different models of operational self-sufficiency, solvency, and outreach. The first model is tested on the relationship between operational self-sufficiency and the explanatory variables (CAR, CFL, NI, LADSTF, ROAA and GDP). The test in Table 6.4 shows that the null hypothesis of no cointegration in Pedroni (2000, 2004) is not supported in six out of eleven outcomes at one percent level of significance. Meanwhile, similar results in panel cointegration analysis had been reported in previous studies (Baltagi, 2013; Tang & Tan, 2015; Yusof, Bahlous, &

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Tursunov, 2015). The aggregated operational self-sufficiency of the five Islamic banks in the GCC countries has long-run co-movement with explanatory variables such as CAR, CFL, NI, LADSTF, ROAA, and GDP. The outcome on operational self-sufficiency is cointegrated at intercept, intercept and trend, and none. Consequently, cointegration was also concluded on the aggregate solvency of Islamic banks in the GCC countries at constant and trend. The result supports the prior findings (Rahim, Rahman, and Rosman 2013; Rosman, Abd Wahab, & Zainol, 2014) which state that the performance of GCC banks are better than Non-GCC banks and contradict the earlier findings (Alandejani, 2014). Moreover, outreach was also found supportive to long-run co-movement and is shown for the cointegration at constant, constant and trend, none. The result of the outreach explains the percentage of financing disbursed by the Islamic banks as a proportion of gross domestic product of each country. In essence, this implies that Islamic banks are expected to have support the longrun co-movement in the financing of business activities in the GCC countries.

6.5 Panel Unit Root for Non-GCC Countries

The result of the two group of the sample (GCC and Non-GCC) have the unique characteristic of accepting no cointegration at panel v-statistic, panel rho-statistic and group rho-statistic. In this case, cointegration can be concluded as exhibited in the panel data literature in the event where majority found supportive (see; Pedroni, 2004; Baltagi, 2013). Similarly, the frequency of the annual time observation (T=20) used in this study corresponds with the sample frame of the previous panel cointegration study (Pedroni, 2004). Non-GCC country model for cointegration test is formulated and assessed in similar directions with that of GCC countries for easy comparison. The analysis begins with panel

Table 6.5: Panel Unit Root for Non-GCC Countries

	Level		First Order Difference			Level		First Order Difference	
	Constant	Constant + Trend	Constant	Constant + Trend		Constant	Constant + Trend	Constant	Constant + Trend
CAR					**CFL**				
Levin, Lin & Chu	0.386	-1.028	-3.232**	-1.680*		-0.784	-1.356	-6.731**	-5.625**
Breitung t-stat		-0.874		-1.243			-0.347		-2.070*
Im, Pesaran and Shin	0.736	-0.891	-4.394**	-3.006**		0	-1.008	-5.519**	-4.242**
ADF - Fisher Chi-square	6.404	10.919	34.286**	24.196**		10.491	11.425	42.453**	31.964**
PP - Fisher Chi-square	9.109	12.339	68.521**	49.301**		10.445	11.398	56.751**	40.343**
LADSTF					**NI**				
Levin, Lin & Chu	-0.656	-1.186	-4.344**	-6.696**		1.869	-0.059	-3.945**	-3.262**
Breitung t-stat		0.056		-2.3633**			1.037		-1.898*
Im, Pesaran and Shin	0.207	-0.046	-3.206**	-4.922**		1.615	0.433	-3.717**	-2.647**
ADF - Fisher Chi-square	6.139	8.511	28.239**	34.001**		3.433	4.729	28.086**	20.459**
PP - Fisher Chi-square	9.415	8.537	55.955**	47.471**		4.7	3.672	41.531**	38.154**
OSS					**OUT**				
Levin, Lin & Chu	0.467	-0.112	-10.319**	-8.873**		0.688	-1.136	-3.199**	-5.230**
Breitung t-stat		-2.199*		-7.239**			2.337		-2.492**
Im, Pesaran and Shin	0.303	-0.693	-9.301**	-8.020**		0.498	0.686	-2.668**	-3.838**
ADF - Fisher Chi-square	4.789	12.512	69.479**	54.364**		5.766	10.001	24.067**	28.369**
PP - Fisher Chi-square	13.15	21.263**	196.629**	69.282**		5.795	10.121	42.581**	54.456**
SOL					**ROAA**				
Levin, Lin & Chu	0.386	-1.028	-3.232**	-1.680*		-0.726	-0.187	-3.590**	-2.137*
Breitung t-stat		-0.874		-1.243			-2.483**		-4.414**
Im, Pesaran and Shin	0.736	-0.891	-4.394**	-3.006**		-1.231	-0.779	-4.515**	-3.149**
ADF - Fisher Chi-square	6.404	10.919	34.286**	24.196**		12.372	9.745	34.239**	23.570**

Table 6.5 (continue)

PP - Fisher Chi-square	9.109	12.339	68.521**	49.301**	10.965	10.954	60.692**	48.367**
GDP								
Levin, Lin & Chu	-0.257	0.974	-0.979	-6.578***				
Breitung t-stat		0.32		-3.399***				
Im, Pesaran and Shin	-0.055	0.958	-2.292**	-5.157***				
ADF - Fisher Chi-square	8.621	0.977	19.795**	37.839***				
PP - Fisher Chi-square	16.224	0.046	80.295***	59.023***				

OSS- operational self-sufficiency, SOL- solvency, OUT- outreach, CAR- capital and return to asset ratio (additive interaction, Agung, 2014), CFL-capital funds/liabilities, LADSTF-liquid asset/deposit and short term funding, NI- net income, ROAA- return on average asset, GDP-gross domestic product per capita. * , **, *** donate significance at 10%, 5% & 1% respectively

unit root test and Pedroni (2000, 2004) eleven test for long-run co-movement. Table 6.5 depicts the unit root tests that was conducted based on modified Akaike information criteria with automatic maximum length lag selection, and all the variables are found to be integrated after first differenced.

6.6 Results of Panel Cointegration test: Non-GCC countries

The panel cointegration test of Non-GCC countries is conducted to compare with that of GCC banks' countries. Therefore, the study select the same variable for the each regional analysis. Table 6.6 presents the results of the three different models to the Non-GCC countries' banks sustainability components (operational self-sufficiency, solvency, and outreach). The first two models between OSS, SOL and the explanatory variables (CAR, CFL, NI, LADSTF, ROAA and GDP) are cointegrated at intercept with the trend. This implies that Islamic banks in the Non-GCC countries have long-term operational sufficiency and solvency. The findings supported the Islamic banks' solvent positions of the previous studies (Pappas et al. 2016; Cihák, & Hesse, 2010). However, outreach model failed to reject the null hypothesis of no cointegration among the series in the Non-GCC countries. There is insufficient evidence for the long-run relationship between the explanatory variables and the outreach despite their having all the series integrated at first order. The findings from the two sampled group (GCC and Non-GCC) have other policy implications since Islamic banks have two major objectives for its establishment. For the GCC countries, policymakers have to set monitoring measures that will guide the banks' to maintain financial outreach, while compliance enforcement of financial access has to be on the Non-GCC banks.

The results of the aggregate cointegration tests for GCC and Non-GCC countries have other implications to the literature and policymakers, especially to Islamic banking industry. In general, Islamic banks long-run sustainability is an integral function to capital structure,

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Table 6.6: Non-GCC Countries Pedroni Residual Cointegration Test

	Intercept		Intercept +Trend		None	
	Statistic	Weighted Statistic	Statistic	Weighted Statistic	Statistic	Weighted Statistic
OSS CAR CFL NI LADSTF ROAA GDP						
Panel v-Statistic	-1.597	-1.997	-2.463	-2.837	-1.51	-1.811
Panel rho-Statistic	1.306	1.459	1.882	2.022	0.819	0.968
Panel PP-Statistic	-5.028***	-5.723***	-5.920***	-7.666***	-2.217**	-2.293**
Panel ADF-Statistic	-2.879***	-2.997***	-2.698***	-3.056***	-2.243**	-2.275**
Group rho-Statistic	2.082		2.601		1.295	
Group PP-Statistic	-9.527***		-10.591***		-3.161***	
Group ADF-Statistic	-2.998***		-2.478***		-2.976***	
Conclusion	Cointegrated					
SOL CAR CFL NI LADSTF ROAA GDP						
Panel v-Statistic	-3.197	-3.235	-4.012	-4.03	-2.694	-2.768
Panel rho-Statistic	1.794	1.941	1.402	0.742	1.49	1.702
Panel PP-Statistic	0.875	0.748	-2.085**	-5.347***	0.56	0.454
Panel ADF-Statistic	1.455	1.198	-2.082**	-5.408***	1.037	2.608
Group rho-Statistic	2.349**		2.11		2.072	
Group PP-Statistic	-1.9		-2.412***		-0.503	
Group ADF-Statistic	0.571		-2.542***		-0.386	
Conclusion	Cointegrated					
OUT CAR CFL NI LADSTF ROAA GDP						
Panel v-Statistic	-0.663	-0.772	-1.459	-1.139	-0.427	-0.788
Panel rho-Statistic	1.901	1.591	2.614	2.456	1.451	1.188
Panel PP-Statistic	-0.038	-1.274	0.998	0.19	-0.365	-1.244
Panel ADF-Statistic	-0.027	-0.877	0.925	0.428	-0.336	-1.265

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Table 6.6 (continue)

Group rho-Statistic	2.452	3.191	2.036
Group PP-Statistic	-3.526***	-2.678***	-1.831**
Group ADF-Statistic	-1.602	-0.155	-1.25
Conclusion	No Cointegrated		

OSS- operational self-sufficiency, SOL- solvency, OUT- outreach, CAR- capital and return to asset ratio (additive interaction, Agung, 2014), CFL-capital funds/liabilities, LADSTF-liquid asset/deposit and short term funding, NI- net income, ROAA- return on average asset, GDP-gross domestic product per capita.

earning performance, liquidity and per capital growth. Specifically, the models have supported the relevance of equity reliance to capital structure in the Islamic banking long-run sustenance.

The findings contradict the earlier theory which indicates the irrelevance of capital structure (Modigliani & Miller 1958) and supported the recent banking sustainability study (Bogan 2012). Similarly, the co-movement of sustainability indicators especially solvency and operational efficiency with the capitalization and liquidity supports the earlier findings on Islamic banks (Khan 1986). The cointegration analysis provides an empirical support to the earlier findings which state that Islamic banks system is solvent (Khan 1986; Darrat 1988; Bashir & Darrat 1992; Bashir, Darrat & Suliman 1993; Hassan & Aldayel 1998). Similarly, the solvency of the banks in GCC and Non-GCC countries is indicating their financial and profitability ability is enough to operate quite distance from failure for a long period which supported the earlier findings of similar studies (Ghassan & Fachin 2016; Pappas et al. 2016). With this, policymakers have to strive ahead for Islamic banks to maintain the solvency ability and to extend it to societal sustenance through adherence with the *maqasid* objectives which can be deduced from Chapra model. The Chapra model of Islamic banks admonishes uplifting socio-economic well-being of the society and environmental protections (Dusuki, 2008). Consequently, operational self-sufficiency cointegration of the banks in the two regions exhibits better performance of Islamic banks despite the earlier conclusion of their inefficiency (Beck et al. 2013; Rahim, Rahman, and Rosman 2013; Rosman, Abd Wahab, & Zainol, 2014). The banks based on operational sufficiency index can operate sufficiently for a long period.

Meanwhile, outreach measures the ability of the banks to extend their financing for the support of entrepreneurial development. Therefore, the findings concerning outreach can still require the demand side to have a long-term settlement ability since disbursement of future financing depends on the previous repayment performance. In this scenario, the findings have divergently differ in the two regions. It is empirically clear that GCC countries have long-term outreach and Non-GCC countries are not. Therefore, GCC countries have to provide policies that will sustain the accessibility of financing to the core entrepreneurs. On the other hand, Non-GCC countries should be emphasizing on the measures that will ease outreach to finance in these countries.

According to Chapra school of thought, solvency and operational sufficiency are not enough without improving the socio-economic wellbeing of the society which determines through outreach and *maqasid* (Dusuki, 2008). Therefore, assessing *maqasid* index is of paramount importance. However, the indicators used for the index are insufficiently available in the BankScope database. Therefore, the present study explores IBIS for assessing *maqasid* index using bank level data.

6.7 Disaggregate Data of the Banks Specific

The disaggregated data of the banks' specific analysis selected one bank each from GCC and Non-GCC countries due to an insufficiency of data that covers at least 20 years. All the GCC countries are considered for the analysis excluding Oman due to insufficient data available, and the Non-GCC countries comprise of Bangladesh, Egypt, Jordan, Malaysia, and Turkey.

6.8 Descriptive of Bank Specific: GCC countries

The second analysis on cointegration is necessary for the study to achieve part of the second and third objectives that link to the *maqasid* index. As a result, the analysis begins with descriptive statistics which is presented in Table 6.7, while Table 6.8 covers the correlation analysis among the variables. Moreover, unit root test was conducted for the GCC and Non-GCC countries respectively. Also, cointegration, IRF and VDC of sustainability components (solvency, operational self-sufficiency, outreach, and *maqasid* index) had been analyzed to evaluate the shock response on each standard deviation effect for policy formulation.

Table 6.7: Descriptive analysis

	Mean	Median	Maximum	Minimum	Std. Dev.	Obs.
GCC						
SOL	7.188	5.701	14.772	1.849	3.189	100
OSS	1.259	1.482	2.053	0.072	0.635	100
OUT	4.90E-08	5.24E-08	5.78E-08	3.35E-08	7.20E-09	100
MI	0.049	0.037	0.089	0.026	0.021	100
ROA	0.675	1.132	3.798	-4.346	2.135	100
CIR	85.135	56.209	303.234	17.723	74.454	100
LCR	13.635	14.210	23.498	4.074	7.173	100
EQTA	14.994	13.741	28.404	8.377	5.538	100
Non-GCC						
SOL	10.744	10.743	15.055	6.484	2.225	100
OSS	1.560	1.164	4.418	0.049	1.285	100
OUT	1.73E-08	1.57E-08	3.42E-08	4.21E-09	1.03E-08	100
MI	0.057	0.062	0.069	0.038	0.010	100
ROA	1.664	1.782	2.749	0.569	0.700	100
CIR	53.233	52.843	81.250	22.636	17.624	100
LCR	26.953	25.534	43.410	19.236	6.697	100
EQTA	6.009	6.213	8.217	3.800	1.114	100

OSS- operational self-sufficiency, SOL- solvency, OUT- outreach, MI-*maqasid* index, ROA-return on asset, CIR- cost to income ratio, LCR-liquid asset ratio, EQTA-equity to total asset.

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Table 6.8: Correlations for GCC and Non-GCC

	SOL	OSS	OUT	MI	ROA	CIR	LCR	EQTA
GCC								
SOL	1							

OSS	0.138	1						
	[0.170]	-----						
OUT	-0.517	0.138	1					
	[0.000]	[0.170]	-----					
MI	-0.483	0.391	0.594	1				
	[0.000]	[0.000]	[0.000]	-----				
ROA	0.8	0.346	-0.424	-0.362	1			
	[0.000]	[0.000]	[0.000]	[0.000]	-----			
CIR	-0.356	-0.699	0.089	-0.056	-0.681	1		
	[0.000]	[0.000]	[0.380]	[0.582]	[0.000]	-----		
LCR	0.725	-0.442	-0.681	-0.711	0.424	0.089	1	
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.380]	-----	
EQTA	0.899	-0.156	-0.573	-0.62	0.632	-0.084	0.845	1
	[0.000]	[0.120]	[0.000]	[0.000]	[0.000]	[0.405]	[0.000]	-----
Non-GCC								
SOL	1							

OSS	0.202	1						
	[0.044]	-----						
OUT	0.907	0.147	1					
	[0.000]	[0.143]	-----					
MI	0.042	-0.809	0.111	1				
	[0.678]	[0.000]	[0.270]	-----				
ROA	0.776	0.595	0.768	-0.373	1			
	[0.000]	[0.000]	[0.000]	[0.000]	-----			

Table 6.8 (continue)

CIR	-0.215	-0.934	-0.084	0.795	-0.609	1		
	[0.032]	[0.000]	[0.405]	[0.000]	[0.000]	-----		
LCR	-0.88	-0.356	-0.812	0.081	-0.737	0.341	1	
	[0.000]	[0.000]	[0.000]	[0.422]	[0.000]	[0.001]	-----	
EQTA	0.923	0.047	0.791	0.179	0.531	-0.059	-0.758	1
	[0.000]	[0.645]	[0.000]	[0.075]	[0.000]	[0.562]	[0.000]	-----

P-values are in parenthesis

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The data for the bank specific analysis was selected based on an equal proportion of five banks each within the two groups (GCC and Non-GCC) of countries for 20 years each. Therefore, observation in Table 6.7 appears to be 100 (cross section of 5 multiply with the number of the observed years). The highest mean distribution is that of cost to income ratio for the two groups, and the lowest is that of outreach and *maqasid* index. Thus, an average of each ratio/index reflecting the size magnitude of the derived variables, and in some cases the dispersion within cross section reflect similar proportions. For instance, outreach and *maqasid* index are found to have the lower mean and standard deviation values. However, the return on asset of -4.346 indicating the loss reflection from one of the GCC countries' banks, while the lower positive return of asset of 0.569 was reported from the Non-GCC countries' banks. It is vividly at a particular time, one bank from GCC incurred loss while Non-GCC has lower return on the asset which might have the impact on their solvency position. The variation between GCC and Non-GCC descriptive measure reveals the differences in the business activities compositions.

Table 6.8 presents the correlation matrix of the GCC and Non-GCC groups of countries and the dyadic association among the variables. The variables are classified in three forms; strong, moderate and weak. However, some variables are derived from the same indicators which increase their likelihood of strong relationship. For instance, these include, solvency have other components of profitability (return on asset) and capitalization (equity) and total asset. Therefore, it is not surprising to have the strong relation to return on asset (0.8, and 0.77); equity to a total asset (0.899 and 0.923); liquidity to a total asset (0.725 and 0.88) for the GCC and Non-GCC respectively.

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Table 6.9: Unit Root Test

CIR	Level		First Order Difference		EQTA	Level		First Order Difference	
	Constant	Constant + Trend	Constant	Constant + Trend		Constant	Constant + Trend	Constant	Constant + Trend
Levin, Lin & Chu	0.262	-0.635	-3.868**	-4.005**		-0.944	-0.178	-3.976**	-5.932**
Breitung t-stat		0.639		-1.163			-0.386		-6.062**
Im, Pesaran and Shin	0.407	1.002	-3.388**	-3.113**		-1.077	0.247	-3.742**	-4.341**
ADF - Fisher Chi-square	6.462	4.304	32.264**	29.913**		13.644	10.086	35.089**	37.520**
PP - Fisher Chi-square	7.318	5.184	48.604**	46.454**		14.055	10.529	88.641**	56.046**
OUT					LCR				
Levin, Lin & Chu	-1.485	-0.504	-7.987**	-7.325**		0.895	-1.483	-5.316**	-8.704**
Breitung t-stat		-0.702		-2.103**			1.117		-4.999**
Im, Pesaran and Shin	-1.038	0.415	-5.734**	-4.444**		0.574	-0.367	-3.410**	-6.724**
ADF - Fisher Chi-square	12.675	7.220	51.254**	39.427**		7.146	16.426	36.145**	54.043**
PP - Fisher Chi-square	12.644	7.324	63.969**	61.933**		30.9748**	30.9742**	76.535**	70.284**
OSS					SOL				
Levin, Lin & Chu	0.609	-0.893	-6.225**	-6.560**		-1.371	-0.915	-5.664**	-6.087**
Breitung t-stat		0.168		-4.111**			-0.353		-5.8046**
Im, Pesaran and Shin	0.838	0.462	-4.409**	-4.248**		-1.633	-0.427	-4.458**	-4.812**
ADF - Fisher Chi-square	4.938	7.026	39.532**	35.983**		18.6001*	13.700	42.473**	41.570**
PP - Fisher Chi-square	9.047	9.560	56.356**	51.041**		19.4039*	13.890	116.016**	66.721**
ROA					MI				
Levin, Lin & Chu	0.320	0.423	-4.097**	-3.511**		-0.619	-1.706**	-10.318***	-9.292***
Breitung t-stat		0.751		-0.323			-2.376***		-7.523***

Table 6.9 (continue)

Im, Pesaran and Shin	-0.512	0.778	-3.042**	-1.945*		-0.013	-0.385	-8.438***	-6.984***
ADF - Fisher Chi-square	14.268	10.040	33.385**	24.186**		7.863	10.94	70.351***	53.434***
PP - Fisher Chi-square	17.115	10.637	289.187**	37.734**		10.504	15.359	108.727***	66.504***

OSS- operational self-sufficiency, SOL- solvency, OUT- outreach, MI-*maqasid* index, ROA-return on asset, CIR- cost to income ratio, LCR-liquid asset ratio, EQTA-equity to total asset

In the case of outreach and solvency, the strong relationships have been treated with cautions as each of them has been treated as the single model in cointegration. Likewise, operational self-sufficiency and *maqasid* index of the Non-GCC countries has been cautiously separated in modeling.

6.9 Panel Unit Root and Cointegration test

The unit root for the bank specific of the GCC countries exhibited integration after first difference except for the test of Fisher Chi-square on the liquidity to asset ratio and solvency. Similarly, the *maqasid* index also displays integration at the level in Levin, Lin, and Chu, and Breitung tests at constant and trend. Nonetheless, the majority of the variables shown integration after first difference which enable the study to conduct an extension of the analysis to panel cointegration test. The cointegration test of Pedroni is presented in Table 6.10 based on three different analysis (intercept, intercept, and trend, and none). The test for cointegration on the first model supports the previous test on the aggregate data in which long-run co-movement was established between the predictors (profitability-ROA, efficiency-CIR, liquidity-LCR, and capitalization-EQTA), and solvency within the GCC countries (see Table 6.4). The result in Table 6.10 reveals that solvency and operational self-sufficiency of the Islamic banks in the GCC countries have a long-term relationship with profitability (ROA), efficiency (CIR), liquidity (LCR), and capitalization (EQTA). These results support our prior findings and the earlier claims on the Islamic banks' solvency that could lead to financial sustenance (Khan 1986; Darrat 1988; Bashir & Darrat 1992; Bashir, Darrat & Suliman 1993; Hassan & Aldayel 1998; Samad, 1999; Al-Jarrah & Molyneux, 2005).

Table 6.10: Pedroni Residual Cointegration Test Bank specific GCC

	Intercept		Intercept +Trend		None	
	Statistic	Weighted Statistic	Statistic	Weighted Statistic	Statistic	Weighted Statistic
SOL ROA CIR LCR EQTA						
Panel v-Statistic	-0.044	-1.051	-1.226	-2.184	0.682	-0.464
Panel rho-Statistic	-0.271	0.403	0.726	1.345	-1.059	-0.009
Panel PP-Statistic	-10.690**	-7.969**	-9.442**	-6.637**	-9.705**	-6.448**
Panel ADF-Statistic	-7.107**	-4.395**	-7.334**	-4.378**	-7.777**	-4.936**
Group rho-Statistic	0.924		1.763		0.285	
Group PP-Statistic	-10.732**		-8.809**		-9.705**	
Group ADF-Statistic	-4.689**		-5.373**		-7.188**	
Conclusion	Cointegrated					
OSS ROA CIR LCR EQTA						
Panel v-Statistic	-1.083	-0.882	-1.649	-1.652	-1.776	-1.946
Panel rho-Statistic	0.31	0.429	1.256	1.344	1.041	1.121
Panel PP-Statistic	-3.835**	-2.916**	-5.621**	-4.452**	-0.519	0.149
Panel ADF-Statistic	-1.505	-1.059	-2.965**	-2.149*	-0.113	-1.107
Group rho-Statistic	1.282		2.085		2.215	
Group PP-Statistic	-5.304**		-7.182**		-2.166*	
Group ADF-Statistic	-1.817*		-2.895**		-1.741*	
Conclusion	Cointegrated					
OUT ROA CIR LCR EQTA						
Panel v-Statistic	-0.373	-0.961	-0.737	-1.226	-0.706	-1.382
Panel rho-Statistic	0.773	0.879	2.067	1.709	0.271	0.045
Panel PP-Statistic	-1.588	-0.773	-1.248	-0.535	-1.679*	-2.859**
Panel ADF-Statistic	-1.836*	-1.018	-1.680*	-1.378	-1.925*	-2.994**
Group rho-Statistic	1.881		2.836		1.279	
Group PP-Statistic	-0.571		-0.186		-2.534**	

Table 6.10 (continue)

Group ADF-Statistic	-1.331	-1.324	-2.389**
Conclusion	Cointegrated		

OSS- operational self-sufficiency, SOL- solvency, OUT- outreach, MI-*maqasid* index, ROA-return on asset, CIR- cost to income ratio, LCR-liquid asset ratio, EQTA-equity to total asset.

The findings on solvency and operational sufficiency indicate the fulfillment of Islamic banks towards institutional sustainability which is closer to Ismaili model (2002). The Chapra model of Islamic banking objectives prioritized more on the outreach and *maqasid* shariah. Therefore, the third and fourth model focused on the ability of Islamic banks to encourage entrepreneurial productivity through capital allocation and financial decision of outreach. As a result, the well-being of the society is expected to improve through the fulfillment of the Sharia objective. The findings of the cointegration on outreach are found not to be sufficient evidence to reject the null hypothesis of no cointegration in the intercept and intercept and trend analysis. Similarly, the fourth model on the *maqasid* index is cointegrated based on the priority of either intercept or intercept and trend.

It is empirically clear that *maqasid* Shariah objective based on the available index indicators has a long-term relationship with profitability, efficiency, liquidity and capitalization of Islamic banks. These findings support the ability of Islamic banks of having efforts to achieve Sharia objectivewhich make them different from conventional banks (Shamsudin and Mohammed 2015, Platonova et al. 2016). The third objective of the study focuses on the predicting future and short term behavior of the sustainability determinants (solvency, sufficiency outreach, and *maqasid* index). In this context, previous sustainability study had assessed the sustainability determinants as endogenous variables in the model (Nurmakhanova, et al. 2015).

Therefore, the similar mode of application has been adopted through different considerations in the methods of analysis. Invariably different from the study mentioned

above, IRF and VDC is deemed fit to our context in order to focus on the innovation that might lead to policy formulation and decisions towards sustainable banking. The findings of the cointegration in Table 6.11 established long-term co-movement between the *maqasid* index and the remaining sustainability components. It clear that *maqasid* index depends on the banks' performance since the index was developed on the banks' financial and non-financial ratios (Mohammed et al. 2008; Antonio et al. 2012; Ngalim & Ismail, 2014) as being discussed in chapter four.

6.10 The Result of IRF and VDC for GCC countries

The last main objective of this study is the dynamic relationships among the four sustainability components which are used in an attempt for policy recommendations to Islamic banks. Meanwhile, it is targeted to find the most influential variables that predict the short and long term dynamic horizon of the *maqasid* index. At such, using IRF and DVC is informative and presents the responsiveness of the *maqasid* index as a result of an error or shock in the system. Thus, this condition of response position interchange to each variable in the system. Figure 6.1 depicts the impulse response function of the GCC Islamic banks which determine the response of a variable as a result of one standard deviation innovation shock of other variables. Initially, the IRF was considered through multiple graphs, Cholesky ordering adjusted and analytical asymptotic for the standard error without period accumulation. Similarly, the default of ten-period split is maintained to predict the impact of the shock on the concerned variable at each of the periods. An innovation shock of one standard deviation of the endogenous variables (left to right diagonal boxes) to themselves causes positive adjustment in the short run horizon that show increase at

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Table 6.11: Pedroni Residual Cointegration Test

	Intercept		Intercept +Trend		None	
	Statistic	Weighted Statistic	Statistic	Weighted Statistic	Statistic	Weighted Statistic
MI ROA CIR LCR EQTA						
Panel v-Statistic	-1.022	-1.022	-1.527	-1.527	-1.391	-1.391
Panel rho-Statistic	-0.188	-0.188	0.792	0.792	0.557	0.557
Panel PP-Statistic	-2.817***	-2.817***	-6.339***	-6.339***	-0.609	-0.609
Panel ADF-Statistic	-2.842***	-2.842***	-5.052***	-5.052***	-0.711	-0.711
Group rho-Statistic	0.702		1.643		1.64	
Group PP-Statistic	-2.777***		-6.523***		-0.084	
Group ADF-Statistic	-2.809***		-5.073***		-0.221	
Conclusion	Cointegrated					
MI OSS SOL OUT						
Panel v-Statistic	-0.578	-1.270	-1.778	-1.892	-0.142	-0.653
Panel rho-Statistic	-0.452	0.619	0.552	0.626	-1.116	-0.241
Panel PP-Statistic	-5.040***	-2.085**	-7.352***	-6.512***	-4.502***	-2.544***
Panel ADF-Statistic	-5.308***	-3.804***	-3.743***	-3.342***	-4.390***	-3.495***
Group rho-Statistic	1.012		1.765		0.130	
Group PP-Statistic	-3.031***		-6.571***		-4.446***	
Group ADF-Statistic	-3.992***		-3.027***		-4.404***	
Conclusion	Cointegrated					

OSS- operational self-sufficiency, SOL- solvency, OUT- outreach, MI-*maqasid* index, ROA-return on asset, CIR- cost to income ratio, LCR-liquid asset ratio, EQTA-equity to total asset.
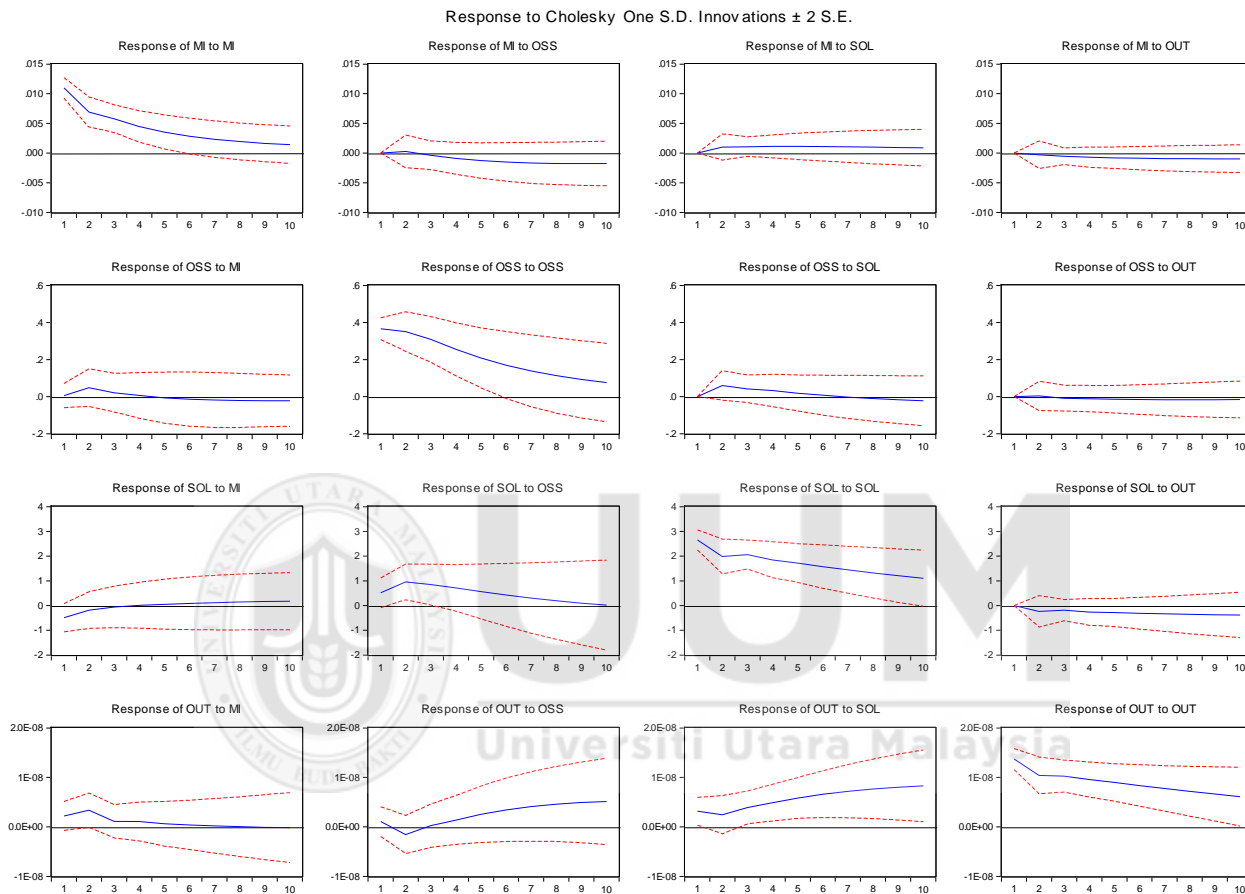
Figure 6.1: Impulse Response Functions for GCC Countries

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decreasing rate from period three up to the long run horizon (each variable to itself i.e. IM to IM; OSS to OSS, SOL to SOL and OUT to OUT).

Similarly, one shock in the operational self-sufficiency, solvency and outreach results to a change in the *maqasid* index from initial zero position to positive increase over a certain period where operational self-sufficiency and outreach becomes negative after period three, whereas solvency is positive. The results of the solvency to *maqasid* index supports the theoretical assertions in the Islamic finance which state that the Islamic banks have the potentials to achieve solvency and increase the well-being of the society through enhancing growth (Khan 1986; Darrat, 1988; Hassan & Aldayel, 1998; Shaukat, Hassan & Al-habashi, 2014). For instance, establishing justice and interest-free transaction with the declaration of truthfulness will reflect on their profit and loss participatory investment which is contributing to entrepreneurial enhancement (Mohammed et al. 2008; Antonio, 2012). Similarly, the public interest of social responsibilities (such as the distribution of zakat and educating people) and environmental protections is functionally attainable as banks performance and solvency increases (Platonova et al. 2016). Therefore, it is imperatively important for Islamic banks to enhance their solvency position to achieve *maqasid* Shariah objectives. The *maqasid* index at initial position is maintained to zero, then increase as solvency and operational efficiency changes. Thus, it is known from Islamic concept of wealth distributive justice that zakat is given after the annual net return on the business has been ascertained and reach the certain threshold (Ismail & Ahmad, 2015).

MI:					OSS:				
Period	MI	OSS	SOL	OUT	Period	MI	OSS	SOL	OUT
1	100.000	0.000	0.000	0.000	1	0.023	99.977	0.000	0.000
2	99.310	0.051	0.589	0.050	2	0.900	97.711	1.385	0.005
3	98.668	0.116	1.033	0.184	3	0.784	97.705	1.486	0.024
4	97.674	0.457	1.493	0.376	4	0.671	97.774	1.505	0.050
5	96.377	1.097	1.909	0.617	5	0.616	97.854	1.439	0.092
6	94.878	1.950	2.284	0.888	6	0.619	97.876	1.366	0.139
7	93.291	2.921	2.613	1.175	7	0.662	97.834	1.315	0.190
8	91.704	3.934	2.895	1.467	8	0.727	97.733	1.301	0.240
9	90.175	4.935	3.133	1.756	9	0.801	97.581	1.331	0.286
10	88.742	5.892	3.330	2.036	10	0.877	97.388	1.407	0.328
SOL:					OUT:				
Period	MI	OSS	SOL	OUT	Period	MI	OSS	SOL	OUT
1	3.237	3.469	93.295	0.000	1	2.334	0.535	4.870	92.261
2	2.241	9.426	87.872	0.460	2	4.823	1.072	4.781	89.324
3	1.625	10.820	87.018	0.537	3	3.809	0.795	6.833	88.562
4	1.323	11.155	86.768	0.755	4	3.222	0.955	9.584	86.238
5	1.154	10.922	86.946	0.978	5	2.712	1.710	12.812	82.766
6	1.067	10.484	87.209	1.240	6	2.315	2.877	16.159	78.650
7	1.031	9.984	87.459	1.526	7	2.002	4.265	19.432	74.301
8	1.031	9.498	87.637	1.835	8	1.758	5.707	22.520	70.016
9	1.057	9.064	87.718	2.160	9	1.566	7.094	25.374	65.966
10	1.103	8.703	87.695	2.499	10	1.414	8.365	27.984	62.237

OSS- operational self-sufficiency, SOL- solvency, OUT- outreach, MI-*maqasid* index,

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Therefore, for the matter of policy to the GCC countries, Islamic banks have to strengthen their institutional objectives in order have long-term fulfillment to *maqasid* Shariah.

Nonetheless, *maqasid* response as result of one outreach standard deviation shock has become negative at period four and consistently maintain up to the period ten. Furthermore, similar negative behavior has been exhibited in the response of solvency as result of changes in the outreach.

This reveals Islamic banks have the tradeoff behavior between outreach and solvency which is consistent with the finding of similar sustainability studies (Cull et al. 2007; Hermes et al. 2011; Kinde, 2012; Bos & Millone, 2015). This implies that financial outreach of the banks has tendencies to reduce their solvency through failure of the demand side to fulfill their obligations of repayment on time. Therefore, the banks can intensify monitoring and participatory financing to optimize the two objectives.

However, the result also reveals that the standard deviation shock in the outreach has the positive relation to *maqasid,* solvency, and operational sufficiency. With this, one can deduce that outreach performance affects sustainability determinants positively especially in the event that clients can repay and settle the amount in time (Khandker, et al. 1995). However, changes in the *maqasid* cause negative response on solvency index up to period two and become positive immediately after period three, whereas outreach continues to have negative relations. The adverse adjustments in this scenario only happened in the short run horizon, and long run horizon exhibited positive behavior. Therefore, Islamic banks

have to prioritize on the welfarist objective *maqasid* than outreach since outreach itself is one of the components of *maqasid*. Nonetheless, IRF is adequately not enough to be informative on the most important predictor in explaining the response for a given vector. Therefore, the study extended the analysis to variance decomposition with Cholesky ordering for ten periods and none standard error.

Table 6.12 shows the magnitude of each variable information contributed to the other variable within the vector as a result of exogenous shock in the system. In the short horizon, *maqasid* index accounts for 0.457 and 1.493 percent of forecast variance as a result of the shock in operational sufficiency and solvency respectively which reveals the higher influence of solvency in the short term. Comparatively, in the long horizon, operational sufficiency contributes higher than solvency at 5.892 percent against 3.330 percent. With this, outreach has less contributing influence both in the short and long term horizon. The results revealled that the impact of solvency and operational sufficiency on *maqasid* index determination is crucial which is logically sound that *maqasid* impact is being influenced by the banks' operational and solvency performance. At such, banks with higher distance to failure are expected to contribute more to societal well-being compared to those struggling to survive. Therefore, socially motivated Islamic banks have first to focus on solvency and operational self-sufficiency after that, then set target on *maqasid* fulfillment. The outcomes of Table 6.12 also reveal no sufficient association between operational sufficiency and outreach. Meanwhile, the findings reveal that solvency is the most influential factor to operational self-sufficiency throughout the split periods which supports

Table 6.13: Unit Root Test for Non-GCC countries

CIR	Level		First Order Difference		EQTA	Level		First Order Difference	
	Constant	Constant + Trend	Constant	Constant + Trend		Constant	Constant + Trend	Constant	Constant + Trend
Levin, Lin & Chu	-0.532	0.359	-2.756**	-2.584**		-0.118	-1.098	-7.145**	-5.547**
Breitung t-stat		-0.531		-3.885**			-1.71667*		-6.617**
Im, Pesaran and Shin	-0.305	0.903	-2.333**	-1.663*		-0.041	-0.634	-7.824**	-6.443**
ADF - Fisher Chi-square	10.325	5.936	23.353**	18.796*		8.769	10.788	65.123**	49.479**
PP - Fisher Chi-square	10.126	5.790	66.973**	53.0779**		11.542	13.301	72.853**	62.202**
OSS					**OUT**				
Levin, Lin & Chu	-3.002**	1.739	-2.659**	-2.793**		0.774	0.572	-6.169**	-4.379**
Breitung t-stat		1.611		-2.233*			1.489		-1.162
Im, Pesaran and Shin	-0.440	3.019	-2.232*	-1.686*		1.383	1.075	-5.996**	-5.639**
ADF - Fisher Chi-square	17.779	1.393	23.542**	18.180		9.671	5.471	50.091**	45.082**
PP - Fisher Chi-square	7.390	3.086	48.066**	44.447**		2.749	4.157	50.001**	51.172**
LCR					**ROA**				
Levin, Lin & Chu	1.747	1.150	-3.070**	-3.674**		0.593	0.458	-2.834**	-2.345**
Breitung t-stat		2.538		-1.080			0.302		-0.367
Im, Pesaran and Shin	0.735	1.149	-3.038**	-2.893**		0.697	0.950	-2.833**	-2.246*
ADF - Fisher Chi-square	10.115	8.846	29.618**	24.993**		9.342	6.120	28.303**	24.009**
PP - Fisher Chi-square	14.497	9.385	48.118**	35.869**		10.115	6.065	77.097**	62.393**
SOL					**MI**				
Levin, Lin & Chu	1.118	0.889	-4.240**	-5.547**		-0.596	-0.467	-6.553***	-6.570***
Breitung t-stat		-0.175		-3.800**			-1.157		-6.873***
Im, Pesaran and Shin	1.003	0.215	-4.656**	-5.291**		-0.299	0.829	-6.172***	-6.467***
ADF - Fisher Chi-square	8.454	7.920	39.385**	41.864**		10.095	4.219	54.285***	51.953***
PP - Fisher Chi-square	10.049	10.333	76.249**	63.539**		21.591	17.432	150.130***	86.196***

OSS- operational self-sufficiency, SOL- solvency, OUT- outreach, MI-*maqasid* index, ROA-return on asset, CIR- cost to income ratio, LCR-liquid asset ratio,

EQTA-equity to total asset

the prior expectations that solvent banks tend to be operationally efficient (Beck et al. 2013). However, operational self-sufficiency shocks contribute higher in short and long run positions to solvency which accounted up to 11.155 and 8.703 percent respectively. This result supports the argument that operational sufficiency improves solvency position of the banks, and in turn improves their *maqasid* index (Ismail, 2010). Lastly, outreach is most influenced by the solvency forecast variance throughout the projected periods. The result strongly supports that Islamic banks' financial decision and allocation to the real productive sector depend on their ability to achieve financial sufficiency and distance to failure (Ahmed, 2013). It is imperatively clear that solvency position of the Islamic banks has a greater influence on outreach and *maqasid* objective. In essence, the welfarist objectives are affected by the influence of the institutional objectives.

6.11 Panel Unit Root and Cointegration test

The pre-estimation test of the panel unit root for bank-specific to the Non-GCC countries is presented as a summary of five tests in Table 6.13. The outcomes of the unit root test reveal that all the series are integrated after first differenced except operational self-sufficiency (at LLC test) and capitalization ratio (at Breitung test). The unit root test considers MAIC for automatic lag length selection criteria. Table 6.14 present results of the panel cointegration tests of the Non-GCC countries. The first model reveals the empirical evidence that solvency has long-run co-movement with the financial performance, efficiency, liquidity and capitalization of the Islamic banks in the Non-GCC countries. It is therefore cleared that the result of this study on solvency and performance supports the previous studies (Darrat, 1988; Hassan & Aldayel, 1998; Ouerghi, 2014;

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Pappas et al. 2016). Thus, maintaining solvency position is the necessary condition for the maximizing the stakeholder's interest which profound in the Ismaili model of Islamic banks that is closer to the institutional concept of sustainability. Therefore, for Islamic banks to maintain solvency position, the predicting determinants (ROA, CIR, LCR, and EQTA) in the model have to be given prioritize attention. However, the second model that measures the operational self-sufficiency determinant reveals inverse outcomes to prior expectation. At this juncture, the result supports the earlier conclusion of the comparative study between conventional and Islamic banks which suggest that Islamic banks less cost effective (Beck et al. 2013). The operational self –sufficiency is an important component to institutional sustainability which measures the operational cost efficiency. Management efficiency in cost utilization is an integral component for sustaining the institution to survive longer period.

Therefore, Islamic banks in the Non-GCC have to improve strategies that will strengthen the operational self-sufficiency to coexist for the longer time. It is intuitively known that Chapra model of Islamic banks is the sufficient condition which extends to sustaining the well-being of the society. Sustaining society and environment through banks' capital allocation and the financial decision is a sufficient condition that extends beyond the banks' survival. The third model of the Non-GCC countries of the bank-specific data focused on the outreach position of the Islamic banks and supported the prior expectation on financial outreach.

Table 6.14: Pedroni Cointegration of Non-GCC countries

	Intercept		Intercept +Trend		None	
	Statistic	Weighted Statistic	Statistic	Weighted Statistic	Statistic	Weighted Statistic
SOL ROA CIR LCR EQTA						
Panel v-Statistic	-1.619	-1.614	-2.661	-2.701	-0.925	-1.027
Panel rho-Statistic	-0.929	-0.479	0.329	0.642	-1.527	-1.015
Panel PP-Statistic	-4.916**	-4.840**	-8.033**	-6.886**	-4.129**	-3.387**
Panel ADF-Statistic	-4.822**	-4.593**	-6.460**	-5.499**	-4.181**	-3.478**
Group rho-Statistic	0.239		1.357		-0.461	
Group PP-Statistic	-6.171**		-9.174**		-5.657**	
Group ADF-Statistic	-5.504**		-5.972**		-5.006**	
Conclusion	Cointegrated at intercept + trend					
OSS ROA CIR LCR EQTA						
Panel v-Statistic	-1.220	-1.347	-1.303	-2.215	-1.909	-1.76
Panel rho-Statistic	1.065	0.293	1.125	0.81	1.535	0.786
Panel PP-Statistic	0.177	-1.414	-0.552	-1.418	0.896	-0.466
Panel ADF-Statistic	0.221	-1.411	-0.523	-1.414	0.25	-1.41
Group rho-Statistic	1.359		1.789		1.281	
Group PP-Statistic	-0.724		-0.615		-0.725	
Group ADF-Statistic	-0.704		-0.571		-1.459	
Conclusion	No Cointegrated					
OUT ROA CIR LCR EQTA						
Panel v-Statistic	-1.186	-1.049	-2.227	-0.546	-1.858	-1.39
Panel rho-Statistic	-1.426	1.083	-0.949	0.78	1.543	1.275
Panel PP-Statistic	-7.464**	-1.874*	-9.059**	-3.600**	1.297	0.653
Panel ADF-Statistic	-7.322**	-2.151*	-9.059**	-5.441**	0.949	0.316
Group rho-Statistic	1.721		1.895		2.282	

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Table 6.14 (continue)

Group PP-Statistic	-2.322*		-3.628**		1.354	
Group ADF-Statistic	-0.998		-4.749**		0.974	
Conclusion	Cointegrated					
MI ROA CIR LCR EQTA						
Panel v-Statistic	1.874**	-1.193	1.07	-2.193	2.652	-1.359
Panel rho-Statistic	-1.573	-0.369	0.616	0.513	-2.151	-0.047
Panel PP-Statistic	-8.526***	-5.226***	-19.668***	-6.663***	-8.742	-1.697**
Panel ADF-Statistic	-5.541***	-2.762***	-6.116***	-3.237***	-5.92	-1.529
Group rho-Statistic	0.366		1.456		0.51	
Group PP-Statistic	-11.029***		-16.007***		-3.191***	
Group ADF-Statistic	-3.702***		-3.759***		-2.430***	
Conclusion	Cointegrated					
MI OSS SOL OUT						
Panel v-Statistic	-0.703	-0.626	-1.790	-1.546	-0.206	-1.412
Panel rho-Statistic	-3.163***	-1.196	-0.132	-0.050	-2.729***	0.052
Panel PP-Statistic	-7.371***	-3.804***	-23.231***	-5.490***	-5.496***	-0.865
Panel ADF-Statistic	1.310	-2.671***	-8.343***	-2.253**	-5.472***	-1.428
Group rho-Statistic	-0.430		0.908		0.610	
Group PP-Statistic	-4.025***		-9.104***		-1.275	
Group ADF-Statistic	-2.423***		-2.966***		-1.670**	
Conclusion	Cointegrated					

OSS- operational self-sufficiency, SOL- solvency, OUT- outreach, MI-*maqasid* index, ROA-return on asset, CIR- cost to income ratio, LCR-liquid asset ratio, EQTA-equity to total asset.

This suggests that Islamic banks' capitalization, managerial efficiency, liquidity and asset cushion ratio have long term co-movement with the financial outreach in the Non-GCC countries. Therefore, improvement in these indicators are expected to enhance the entrepreneurial financing and the growth in turn. As such, financial decision and capital allocation of the Non-GCC banks are outreaching public and serve as pre-condition for societal well-being development. Meanwhile, *maqasid* Shariah index has been utilized for this study and represents the fourth components of sustainability. The fourth model to Non-GCC is on the *maqasid* index against the predictors of the banks' specific variables which are presented in Table 6.14 to maintain the *maqasid* objective of Islamic banks. Cointegration will not suffice to provide evidence for the policy makers' decision on long-term strategies to sustainability, especially in the event of dynamic economic changes of a country. Therefore, the study uses IRF and VDC to forecast the dynamic changes as a result of one standard deviation innovation shock. Interestingly, the result established that *maqasid* index has long run relationship with the Islamic banks' profit performance, efficiency, liquidity, and capitalization. Zakat as the component of the *maqasid* index is a function of profitability which cannot be secured without efficiency in liquidity and capital management. With this, it is clear that management efficiency has to strengthened the results of IRF and VDC for Non-GCC countries.

The IRF and VDC can be estimated after the pre-conditions of unit root and cointegration have been satisfied. Therefore, Table 6.14 has reported the results of the cointegration among the sustainability components (*maqasid* index-MI, operational self-sufficiency-OSS, solvency-SOL, and outreach-OUT) which is counted for the fifth model in this

section. Since the *maqasid* index stands as the sufficient condition to Islamic banks, the study assumes that it will endogenously depend on the remaining determinants of sustainability. The result shows that there is long-run co-movement between *maqasid* index, operational self-sufficiency, solvency, and outreach. It is clear that operational sufficiency of the banks has an influence on their resources management and efficiency which can impact on their solvency position (Cull et al., 2007; Hartarska & Nadolnyak 2007; Bogan, 2012; Nurmakhanova, et al. 2015). Islamic banks are expected to provide financial access through outreach which has multiplier effect on the entrepreneurs' economies of scale, and in turn to the economic growth. In addition, *maqasid* Shariah considers other values beyond outreach that can improve the well-being of the society (Chapra, 1979; 1985; 1992; 2000; 2007; Siddiqi, 1983; 1985; Naqvi, 2003). These include educating individuals, the establishment of justice and public interest (Mohammed et al. 2008).

Figure 6.2 depicts the impulse response functions of the sustainability determinant for the Non-GCC countries. The response of *maqasid* index to operational self-sufficiency, solvency and outreach are positive, without much different from the horizontal origin line. The result is indicating that one standard deviation shock in any of the other three sustainability determinants does not influence greater difference to *maqasid* index throughout the split periods. The outcome contradicted the prior expectations which assume that *maqasid* index might cause greater changes of operational performance and solvency.

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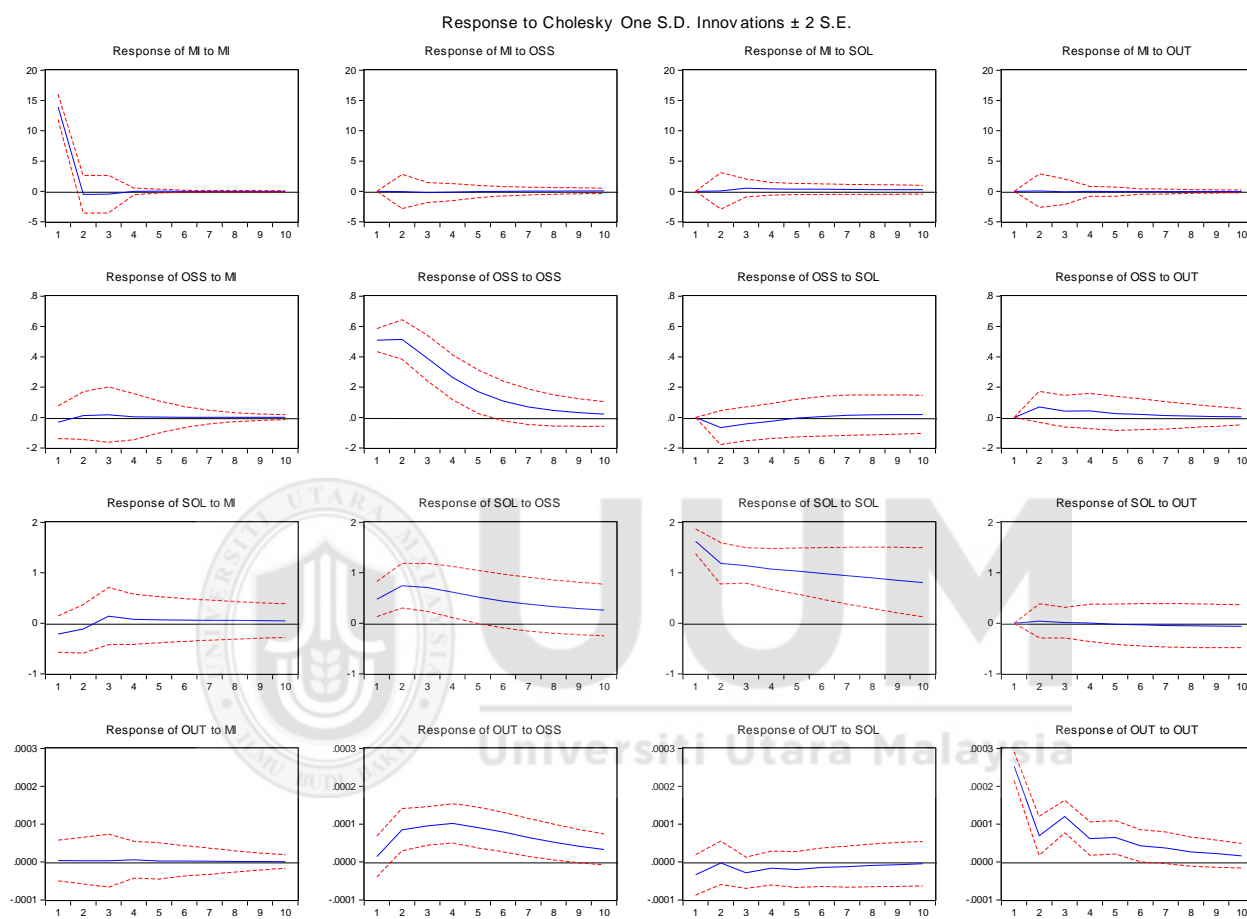
Figure 6.2: Impulse Response Function of Non-GCC

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Table 6.15: Variance Decomposition of Non-GCC Countries

MI:					OSS:				
Period	MI	OSS	SOL	OUT	Period	MI	OSS	SOL	OUT
1	100.000	0.000	0.000	0.000	1	0.380	99.620	0.000	0.000
2	99.991	0.001	0.002	0.006	2	0.214	98.053	0.825	0.908
3	99.818	0.019	0.154	0.009	3	0.214	97.945	0.892	0.949
4	99.723	0.027	0.242	0.009	4	0.197	97.821	0.884	1.098
5	99.645	0.027	0.318	0.010	5	0.191	97.813	0.852	1.144
6	99.582	0.027	0.380	0.010	6	0.188	97.785	0.845	1.181
7	99.526	0.028	0.435	0.011	7	0.188	97.753	0.863	1.196
8	99.477	0.030	0.482	0.011	8	0.187	97.710	0.898	1.205
9	99.433	0.032	0.523	0.011	9	0.187	97.663	0.942	1.208
10	99.394	0.035	0.560	0.012	10	0.187	97.614	0.989	1.209
SOL:					OUT:				
Period	MI	OSS	SOL	OUT	Period	MI	OSS	SOL	OUT
1	1.594	7.851	90.555	0.000	1	0.028	0.320	1.736	97.917
2	1.215	15.990	82.754	0.041	2	0.039	9.582	1.473	88.907
3	1.185	19.169	79.614	0.032	3	0.041	16.210	1.924	81.825
4	1.037	20.212	78.725	0.026	4	0.066	23.142	1.908	74.884
5	0.940	20.199	78.833	0.027	5	0.064	27.211	2.032	70.693
6	0.875	19.788	79.304	0.034	6	0.067	30.124	2.049	67.760
7	0.828	19.252	79.873	0.047	7	0.067	31.848	2.074	66.012
8	0.792	18.711	80.433	0.063	8	0.067	32.962	2.075	64.897
9	0.764	18.209	80.945	0.082	9	0.067	33.631	2.074	64.229
10	0.742	17.760	81.397	0.101	10	0.067	34.047	2.069	63.817

OSS- operational self-sufficiency, SOL- solvency, OUT- outreach, MI-*maqasid* index,

It is surprisingly not, since previous studies argued that Islamic banks are not sufficiently fulfilling the required needs from the *maqasid* Shariah objective (Asutay, 2007; Zaman & Asutay, 2009; Nor, 2012; Zaman, 2013; Jan 2013; Nor & Hashim, 2014). However, one standard deviation innovation shock in *maqasid* has impacted changes on the operational self-sufficiency and solvency position at period one from negative to a positive position. In contrast, the innovation shock on *maqasid* index does not change the signs of outreach. Certainly, this outcome has less theoretical implications, since *maqasid* and outreach are expected to improve well-being of the society based on different priorities.

The trade-off between solvency and outreach due to innovation shock in the long horizon supports one side of sustainability literature. As such, financial sustainability of the banks and outreach are found to be the trade-off in some of the previous studies (Oliveres-Polanco, 2005; Cull et al. 2007). On the other hand, there is a possibility of achieving both financial sustainability and outreach as efficiency increases (Bos & Millone, 2015). The assertion is that, the closer innovational shock on operational self-sufficiency has caused positive response to outreach up to long time horizon. Nonetheless, the standard deviation shock of the insolvency does not influence outreach to be positive even in the long horizon. Therefore, in this case, solvency fails to have trade-off relation with the outreach. In sum, one cannot ascertain the most influential variable to a vector specific without decomposition. As a result, the study extends the investigation to variance decomposition for policy recommendations.

6.12 The result of Variance Decomposition: Non-GCC countries

Table 6.15 presents the decomposition outcome of the four sustainability determinants in which each vector focused towards one variable. The Table presents that less than one percent forecast variance is recorded against *maqasid* index for both short and long horizon period among the determinants in the vector. Nevertheless, solvency contributed 0.318 and 0.560 percent in the short and long-run respectively. The findings are closer to that of GCC countries in which solvency is more influential to *maqasid* compared to other variables. Consequently, the results on operational self-sufficiency indicate closer pattern with that of a *maqasid* index, though outreach is the most influential determinant. The forecast variance as result of outreach innovation shock has accounted for 1.144 percent in the short-run and keep increasing up to 1.209 percent in the long-term horizon. The next important variable in this vector is the solvency and the last is the *maqasid* index. Therefore, strengthening outreach and solvency position will improve the operational self-sufficiency of the banks.

Furthermore, the results to solvency reveal that operational self-sufficiency has the highest influence compared to the other variables within the vector. The forecast variance of 20.212 percent was accounted at the period fourth and reduces to 17.760 percent in the long-run horizon. The immediate variable that is important to forecast solvency is the *maqasid* index and the least is outreach. Therefore, the hierarchical order for policymakers in sustaining distance to the failure of the Islamic banks has to begin with operational self-sufficiency. It was argued that banks with poor operational sufficiency likelihood of distress (Wheelock

& Wilson, 2000). On the vector of outreach, the forecast variance operational self-sufficiency is up to 23.142 percent in period four which considered as a short run horizon, and 34.047 percent in the tenth period. The next important to the forecast variance is solvency which documented 1.908 percent in the short horizon and 2.069 percent during long-period horizon. Meanwhile, *maqasid* index contributed less than one percent throughout the period of the analysis. Therefore, the purview of the decomposition demonstrating the influence of solvency with greater emphasis, followed by operational self-sufficiency and *maqasid* index.

6.13 Summary

This chapter analyzed the aggregate and disaggregate panel data extracted from GCC and Non-GCC countries. The first category of the chapter's results revealed that liquidity, earnings, and capitalization of Islamic banks coupled with per capita income of the respective countries are having long-term co-movement to sustainability components. For instance, the country aggregates analysis shown that solvency, operational sufficiency, and outreach are cointegrated with aforementioned financial and macroeconomic variables except for outreach in the Non-GCC countries. However, some of the indicators to the country aggregate data are insufficient to detail the analysis on the *maqasid* index which necessitated utilizing the disaggregate data for the bank country specific. At this level, the earnings, efficiency, liquidity and capitalization of Islamic banks are found cointegrated for the two regions with sustainability components except for operational self-sufficiency at Non-GCC countries. The sustainability components of solvency, operational efficiency,

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outreach, and *maqasid* index are also cointegrated within themselves which extend the analysis to IRF and VDC. The dynamic analysis of endogenous components of sustainability guides the study to certain policy predictions in the short and long-run horizons.

CHAPTER SEVEN
CONCLUSION AND RECOMMENDATIONS

7.1 Introduction

The past two chapters discussed results based on the survival and panel data analysis. The summary of the major findings, theoretical and policy implications is highlighted in this chapter and ended with conclusion and recommendations for future studies.

7.2 Summary of findings

This section discusses major findings with a specific focus on the objectives of the study. Table 7.1 presents a summary of findings coupled with the hypothetical statements that are derived from those objectives, which linked between the theoretical, conceptual framework, and methods of the analysis (see chapter four for details) in order to answer the research questions of the study. The level and extent of Islamic banks' survival in GCC and Non-GCC countries

First and foremost, the summary of findings centered on the three objectives posed to answer the research questions of the study. The first objective aim to compare the level and extent of Islamic banks' survival in the GCC and Non-GCC countries. The study employed non-parametric survival analysis of Kaplan-Meier survival estimate and Nelson-Aalen cumulative hazard estimate to compare the level of survival rate between GCC and Non-GCC countries. The analysis in this category begins with pooling the data for both GCC and Non-GCC countries, and find that 80 percent of the entire Islamic banks' sample can

survive above 25 years which is consistent with the existing literature (Pappas et al. 2016). Nonetheless, predictions beyond period 80 signalizing lower survival time for the entire sample of Islamic banks which can be addressed through strategizing to reduce the failure rate. The banks have to improve on prudential compliance and improve their performance to address the likelihood of future failure. Consequently, the comparative analysis between the level of survival rate between GCC and Non-GCC countries reveal other evidence. The Non-GCC banks have longer survival period ahead of the GCC countries with a lower survival rate of 43 percent at the end period of 90 compared to the 66 percent at period 57 of the GCC countries. The outcome reveals the proportionate failed-survived banks' ratio of Non-GCC outweighs that of GCC. The findings supported the hypothesis (H1$_{A1}$) that stated different survival rate between GCC and Non-GCC regions. Despite the short number of GCC countries compared to sampled Non-GCC countries, the descriptive analysis in Table 5.2 confirmed that GCC countries' Islamic banks have higher assets and liquidity compared to Non-GCC banks. Consistently, GCC Banks covers two-third of the entire Islamic banks' assets (Abedifar et al. 2014; Belanès, Ftiti, & Rym, 2015) and perform efficiently better than other Middle Easter and Asian Islamic banks (Rosman et al. 2014). Therefore, Non-GCC banks have to strengthen measures to reduce the banks' failure likelihood.

The second part of the first hypothesis is tested through five methods (H1$_{B1-B5}$). As a result, the study further investigates the extent of the Islamic banks' survival in all sample countries using parametric, semi-parametric and panel analysis with a time-varying covariate (recent) to control for distributional effect. Before that, the segment begins with

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the banks' failure recurrence likelihood, and find lower failure reappearance chances at a split time of the analysis. The finding supported the hypothesis $H1_{B1}$ which states Islamic banks in both GCC and Non-GCC countries can have higher survival than failure. The possible justification of this outcome is due to a lower number of failed banks compare to survived banks in the sample (i.e. 29 failed banks out of 170). Nonetheless, the models predict 3.6 percent chances of the failure recurrence difference between the beginning period of the analysis 1987 and most recent period of 2014. Though, the analysis of recurrence chances is not much informative on other banks activities apart from time risk exposure.

Therefore, the study also extended to conditional models of parametric, semi-parametric and survival panel analysis in order to answer hypotheses $H1_{B3-B5}$. Before then, the study finds that survived banks have significance mean of difference on assets and revenue variables with lower corresponding liabilities and expenses ratios, and supported hypothesis ($H1_{B2}$) that states Islamic banks' survival prevails than failure. The bank-specific variables are selected in line with the CAMEL theoretical position, and the study finds the results supported to hypothesis hypotheses $H1_{B3-B5}$ to Islamic banking survival. The result finds that Islamic banks survival will increase as they reduce the use of debt hybrid finance and adopt equity-based finance which confirmed other conclusions on the earlier studies (Wheelock & Wilson, 2000; Lewis, 2015). The finding supported the theoretical position of Islamic finance that equity-based finance absorbs financial crisis shock and possible bankruptcy (Khan 1986; Khan 2015).Therefore, the call for new capital structure models to Islamic financial institutions other than debt based postulated

framework is an opportunity for future studies. Similarly, the models depict that Islamic banks have to improve their distressed assets quality and reduce the non-interest liabilities in order to survive longer. Interestingly, the operating income of the banks expresses increase to banks survival chances while higher non-interest expenses increase the banks' possibilities to failure. Likewise, favorable real economics situations improve the banks' survival as an increase in per capita GDP and reduce failure possibilities of Islamic banks (also see, Wheelock 1995). These findings are consistent and supported hypotheses $H1_{B3-B5}$ to the three models (semi-parametric Cox, hazard parameterization and panel survival models). Therefore, Islamic banks are recommended to consistently supports equity-base finance which is closer to maqasid sharia fulfillment and real economic activities than debt-based financing.

7.2.1 The Long-run Cointegration of the Sustainability Components

The second objective is formulated to compare the GCC and Non-GCC's countries' Islamic banks long-run solvency, operational self-sufficiency, outreach, and maqasid objective in which the study hypothesized no difference between the two regions. Table 7.1 divide the second hypothesis into two stages; that is an aggregate panel and bank-country specific, the former is based on the sustainability components of solvency, operational self-sufficiency, and outreach, while the latter extended to maqasid index. To begin with the aggregate panel findings of the GCC countries Islamic banks reveal that the sustainability components of solvency, operational self-sufficiency and outreach are cointegrated with the capital adequacy, earnings, liquidity positions of the banks, and the

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macroeconomic indicators of GDP per capita. Similar findings are also found for the Non-GCC countries except the outreach which is not cointegrated. The aggregate supported hypotheses $H2_{C1-C5}$ explaining no difference in terms of long-run solvency and operational self-sufficiency between GCC and Non-GCC since they have all cointegrated in the two regions, whereas outreach that is not cointegrated in Non-GCC countries. Therefore, Islamic banks in the Non-GCC countries have to increase their outreach position in order to achieve their social objective. The second part of hypothesis two ($H2_{D1-D8}$) highlights on the GCC and Non-GCCs' banks-country specific analysis and conclude that earnings, efficiency, liquidity and capital adequacy are cointegrated with solvency, operational self-sufficiency, outreach, and maqasid index. The finding supported the second hypothesis $H2_{D1-D8}$ except on operational self-sufficiency of Non-GCC countries since it is not cointegrated. This means that Non-GCC banks have to improve their operation performance to be self-sufficient in order to hedge against failure likelihood.

In sum, the result of the survival analysis reveals that 11 out of 57 Islamic banks in the GCC countries failed. However, survived banks in the region are found to be sustainable based on the composite metric of analyses. On the comparative group of countries, the Non-GCC countries reported 18 out of 113 banks failed, but the survived banks based on the selected countries are found to be sustainable with a slight disagreement between the country aggregate and bank-country specific analysis. It is not surprising since the selected countries and banks vary based on the data availability for the two separate analysis. Interestingly, the two analysis for the Non-GCC countries concludes that the banks are solvent from failure and able to attain the maqasid objectives.

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Table 7.1: Summary of findings

	Methods/Sustainability components	Region/Status	Remarks
H1	***The level of Islamic banks survival is different in the GCC countries compare to Non-GCC countries.***		
A	Level of survival		
A1	Non-parametric approach	GCC	Supported
A2	Non-Parametric approach	Asia	supported
B	***The extent of Islamic banks survival in the GCC and Non-GCC countries can be higher than failure.***		
	Extent of survival		
B1	GLM and Exponential	GCC and Non-GCC	Supported
B2	Equality test (t-test) Means difference	Survive and failed	Supported*
B3	Semi-parametric Cox model	GCC and Non-GCC	Supported**
B4	Hazard Parameterization models	GCC and Non-GCC	Supported **
B5	Panel survival models	GCC and Non-GCC	Supported**
H2	***The GCC countries' Islamic banks have no difference compare to Islamic banks in the Non-GCC countries in terms of long-run solvency, operational self-sufficiency, outreach and maqasid -Sharia objective.***		
C	Panel analysis: Aggregate data		
C1	Solvency	GCC	Supported
C2	Operational self-sufficiency	GCC	Supported
C3	Outreach	GCC	Supported
C4	Solvency	Non-GCC	supported
C5	Operational self-sufficiency	Non-GCC	supported
C6	Outreach	Non-GCC	Not supported
D	Panel analysis: Bank-country specific data		
D1	Solvency	GCC	Supported

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Table 7.1 (continue)

D2	**Operational self-sufficiency**	**GCC**	**Supported**
D3	Outreach	GCC	Supported
D4	*Maqasid* index	GCC	Supported
D5	Solvency	Non-GCC	Supported
D6	Operational self-sufficiency	Non-GCC	Not supported
D7	Outreach	Non-GCC	Supported
D8	*Maqasid* index	Non-GCC	Supported
H3	*The dynamic relationship between solvency, operational self-sufficiency, outreach, and maqasid - Sharia index of the Islamic banks in the GCC countries is different compared to Islamic banks in the Non-GCC countries.*		
	Dynamic Analysis		
E1	IRF	GCC and Non-GCC	Supported***
E2	VDC	GCC and Non-GCC	Supported***

Note: GLM – generalized linear model; * For the GCC and Non-GCC, survived banks have higher mean difference, **predicts the conditional covariates that influences both survival and failure of the banks, IRF-Impulse response function, VDC-variance decomposition, *** there is different tradeoff between the sustainability components among the two regions

The disparities emerged from outreach and operational self-sufficiency which the group of Non-GCC countries have to strengthen them.

7.2.2 Dynamic Relationships of the Sustainability Components

The third objective is modeled to compare the dynamic relationship of the sustainability components between GCC countries' Islamic banks and Non-GCC. Therefore, the hypothesis $H3_{E1-E2}$ predicts the differences between the two regions' dynamic relationships of sustainability components.The dynamic analysis of IRF and VDC is conducted on the bank-country specific data in order to determine the influence of other components of sustainability on the maqasid index. The result of the IRF to GCC countries reveal the institutional components (solvency and operational sufficiency) influences maqasid Shariah objective. Correspondingly, similar outcomes revealed in VDC that outreach is not significantly contributing to the maqasid Shariah objective, solvency, and operational self-sufficiency. Therefore, Islamic banks in the regions have to strengthen their institutional components to achieve the maqasid objective. However, the negative relation between welfarist components (Maqasid and outreach) can impulse the banks to prioritize on the maqasid since it constitutes part of primary objectives of establishing the banks.

On the other hand, the IRF of the Non-GCC countries reveals that institutional components and outreach are not significantly influencing *maqasid* index. Nonetheless, the tradeoff between outreach and solvency predict banks in the Non-GCC have a higher institutional inclination, whereas, maqasid contributes negligibly to the institutional components such as solvency and operational self-sufficiency. Similarly, the findings of VDC reveals that

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outreach is mostly influenced the operational self-sufficiency and vice versa, whereas *maqasid* has the negligible effect on the outreach. In a nutshell, the findings on dynamic responsiveness of the sustainability components supported the last hypothesis $H3_{E1\text{-}E2}$ of differences between the GCC and Non-GCC countries Islamic banks. Since the result of the GCCs' banks show that institutional components influece maqasid index, while Non-GCCs' components are not significantly influencing it based on both IRF and VDC. Therefore, the Islamic banks in this group of countries have to strive ahead toward balancing the sustainability objectives (i.e. institutional and welfarist) since the models of Islamic banks advocate not only the institutional sustenance but, rather the socioeconomic wellbeing of the society through ethical investments that have a multiplier impact on society and environment.

7.3 Implications and Future Research Directions

The findings of this study have other several implications on the sustainability theory, managerial practices of the banks, and methodology. These implications are discussed based on the following headings:

7.3.1 Theoretical Implications

The Brundtland report theorized the concept of sustainability as an "uncompromising needs of the present and future generations' economic, social and environmental aspect of life." This study fundamentally extends the literal and conceptual definition of sustainability from the primary sources of Sharia. In a similar way, the sustainable banking and finance

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studies have bi-directional (i.e. institutional and welfarist) focus in the literature (Robinson 2001; McIntosh and Wydick 2005; Hermes, Lensink, and Meesters 2011; Nurmakhanova, Kretzschmar, and Fedhila 2015; Mia and Chandran 2015; Bhanot and Bapat 2015). Therefore, this study has been able to link the Islamic banking models (Ismaili and Chapra) with the concept of banking sustainability and extended the link with the fundamental sources of Sharia. In this respect, the conceptual deductions from Qur'an 2:282 has been used as the theoretical step for the Islamic institutional perspective of sustainability. Consequently, the findings on the solvency metric to the institutional sustainability and the extent of survival confirmed the early theoretical foundation that Islamic banks through equity mode financing are less prone to default risks. Nonetheless, any deviation from equity-base finance is liable to a failure of the banks.

The study elucidates the welfarist concept of sustainability from the theories of social and positive ethical network with a foundational link from the Qur'an 2:282, the concept of Ihsan and maqasid Shariah. The findings on the maqasid index have confirmed the theoretical connections between the Chapra model and the welfarist school of thought. The findings of this study present an insight on balance thought that relates the Islamic banking models and sustainability perspectives, which stands as one of it is original contributions. Curiously, the study diffuses to maqasid Shariah consideration which is the primary goals of establishing Islamic banks.

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7.3.2 Methodological Implications

The use of survival analysis provides opportunity for testing the strength of the banks against failure risk before predicting their future long-run survival. Currently, few studies (Pappas et al. 2016; Alandejani, 2014) applied survival analysis to Islamic banks studies, and they did not consider multiple stage of analysis. This study employed non-parametric, semi-parametric, parametric, survival panel and mixed effect analysis. Furthermore, this study is able to extend its modeling to concord the long-run prediction of the sustainability studies which has not been considered in the previous studies (Cull, Demirgüç-Kunt, and Morduch 2007; Hartarska and Nadolnyak 2007; Hermes and Lensink 2011; Ahmed 2013; Banerjee and Velamuri 2015; Marwa and Aziakpono 2015; Nurmakhanova, Kretzschmar, and Fedhila 2015; Mia and Chandran 2015; Bhanot and Bapat, 2015).

Moreover, Pappas et al. (2016) argue that Z-score measure can only be applicable to the conventional banks and have lesser strength to predict the survival position of the Islamic banks. The findings of this study from the two methodological application resolve the ambiguity in the literature that Islamic banks are solvent and survived to some extents. Furthermore, the application of dynamic analysis in prioritizing between short and long-run target, sustainability components (solvency, operational self-sufficiency, outreach and maqasid index) provide clear insight to policy makers towards directional strategies. Interestingly, the study contributed towards modeling process by controlling of time-varying covariate on the bank specific variables and allow the heterogeneity of the macroeconomic environment to take effect in the survival analysis. The applications of this

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procedure passed confirmatory stages through semi-parametric, parametric, survival panel and mixed analysis.

7.3.3 Policy Implications

Apart from theoretical and methodological implications that are derived from this study also finds that other managerial implications can influence policy decisions to Islamic banks. The findings predicted that Islamic banks in the GCC and Non-GCC countries have the likelihood of survival coupled with solvency attainment. However, continue growing of Islamic banking industry is alarming to it increase in complexity which requires other safeguarding regulations that will enhance their solvency position and outreaching public especially poor people. Therefore, legal and prudential guidelines and other liquidity management system are required. These can influence the policymakers' confidence in strategies for long-terms investment and other regulatory decisions on Islamic banks that will enhance their performance. Specifically contrasting previous studies on the social failure of Islamic banks, but, current evidence of this study reveals some interesting findings on the banks. Though, Islamic banking industry in the Non-GCC countries have to improve in the areas of outreach and operational self-sufficiency. In this regards, the regulators of those countries have to support Islamic banks to improve entrepreneurial outreach. At the same time, the top managerial cadre of the banks in the Non-GCC countries have to strive ahead to strengthen their operational efficiency which is part of the requirements for banks to be sustained. On the other hand, Islamic banks in the GCC countries found sustainable within the four metrics of sustainability components. The result

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is contrary to the assertion of previous studies (Beck et al. 2013; Alandejani, 2014) which states that Islamic banks are less solvent. Therefore, Islamic banks regulators and managers in the region are recommended to increase their efforts in maintaining the trends of sustainability through monitoring solvency, operational performance, outreach,Hanna and maqasid objective.

In general, the combined analysis of semi-parametric, parametric, survival panel and mixed-effect analyses have other practical implications to regulators and the entire Islamic banking industry. It is evidently clear from the findings of this study that equity rather than debt based finance to avert from failure risk, which leads to support the earlier literature (Wheelock & Wilson, 2000; Lewis, 2015). Moreover, the management of Islamic banks have to devise means for reducing overhead cost, provision of loans loss, and other liabilities for them to hedge against any failure likelihood. Meanwhile, the Islamic banks have to strategize on ways to increase assets based financing since GDP per capita and earnings increases survival chance of the Islamic banks. As a result, Islamic banks have to innovate and maintain entrepreneurial based products that have the multiplier effect on the citizens' disposable income. The regulatory authorities of Islamic banks in the GCC and Non-GCC countries need to focus on the measures that will strengthen the institutional and welfarist objectives in order to achieve the objective Sharia.

7.4 Limitations and Future Research Directions

Despite the study being able to provide new evidence to Islamic banking sustainability, it will not be an exception to other limitations that can serve as an opportunity for future

research. First of all, this study utilized a secondary source of data which constrained other investigations from other stakeholders of the banks (such as; regulators, customers, investors, bankers, and community). With this, future studies have the opportunity to apply holistic approach since the component of Quran (2:282) comprises other elements that require inputs from all stakeholders. The longitudinal data constraint and a limited number of 24 countries across the globe are considered as other shortcomings that can be overcomed in future studies. Moreover, some necessary components used in assessing Islamic banks' maqasid objectives are not commonly available in some of the banks' financial statements (Antonio, Sanrego, and Taufiq 2012). As such, Platonova et al. (2016) suggest the need of mandating Islamic banks to have a unified approach to financial reporting that will express the required needs for socio-economic and environmental disclosure. This will ease the difficulties faced in evaluating Islamic banks' objectives from the welfarist perspective. In this regards, future study can elaborate on the link between the environmental aspects of sustainability with Islamic banking activities which is not within the ambit of this study.

Furthermore, future studies have the opportunity to focus on the country specific analysis, rather than panel analysis, since data issue constrained the present study to apply time series. With this, alternative modeling can be applied such as; Structural Vector Autoregressive (SVAR) to policy analysis, and Accelerated Failure Time (AFT) on the survival analysis. Further studies can also avail the possibilities of incorporating maqasid index to the survival analysis. Consequently, the concept of Islamic banking sustainability nested within the founding models of Islamic banking which are close to institutional and

welfarist approach. Therefore, evaluating Islamic banking from the indicators of Sustainable Development Goals will provide fresh evidence towards societal well-being enhancement.

7.5 Conclusion

In line with the three objectives of this research, the link between the concept sustainability and the Islamic banking models have paved the way to the conceptual and analytical framework that guided the study to fulfill its required mandates. This study has explored new evidence on the levels and extent of survival from GCC and Non-GCC countries alike. Additionally, other discoveries from the primary sources of Sharia have sheded light to the other areas of the Islamic banking sustainability literature. Therefore, fulfillment of these objectives would serve as insight to the policy makers, practitioners, academicians, investors, and the general society to understand the current situations on the Islamic banking sustainability. Finally, it is expected that the recommendations of this study will serve as a contribution to Islamic banking regulators, practitioners, and non-governmental agencies in the field of Islamic banking sustainability.

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Appendix A

Maqasid index

Year	OW	EDTE	E1	RETE	E2	TRTE	E3	PETE	E4	M. Total	OW	PENIV	E5	FNTI	E6	IFTI	E7	M. Total	OW	NITA	E8	ZTA	E9	INETI	E10	M.Total	MI
		Educating individual										Establishing Justice								Public Interest							MI
1993	0.3	X	0.24	X	0.27	X	0.26	X	0.23	#VALUE!	0.41	X	0.3	X	0.32	X	0.38	#VALUE!	0.29	X	0.33	X	0.3	X	0.37	#VALUE!	#VALUE!
1994	0.3	X	0.24	X	0.27	X	0.26	X	0.23	#VALUE!	0.41	X	0.3	X	0.32	X	0.38	#VALUE!	0.29	X	0.33	X	0.3	X	0.37	#VALUE!	#VALUE!
1995	0.3	X	0.24	X	0.27	X	0.26	X	0.23	#VALUE!	0.41	X	0.3	X	0.32	X	0.38	#VALUE!	0.29	X	0.33	X	0.3	X	0.37	#VALUE!	#VALUE!
1996	0.3	X	0.24	X	0.27	X	0.26	X	0.23	#VALUE!	0.41	X	0.3	X	0.32	X	0.38	#VALUE!	0.29	X	0.33	X	0.3	X	0.37	#VALUE!	#VALUE!
1997	0.3	X	0.24	X	0.27	X	0.26	X	0.23	#VALUE!	0.41	X	0.3	X	0.32	X	0.38	#VALUE!	0.29	X	0.33	X	0.3	X	0.37	#VALUE!	#VALUE!
1998	0.3	X	0.24	X	0.27	X	0.26	X	0.23	#VALUE!	0.41	X	0.3	X	0.32	X	0.38	#VALUE!	0.29	X	0.33	X	0.3	X	0.37	#VALUE!	#VALUE!
1999	0.3	X	0.24	X	0.27	X	0.26	X	0.23	#VALUE!	0.41	X	0.3	X	0.32	X	0.38	#VALUE!	0.29	X	0.33	X	0.3	X	0.37	#VALUE!	#VALUE!
2000	0.3	X	0.24	X	0.27	X	0.26	X	0.23	#VALUE!	0.41	X	0.3	X	0.32	X	0.38	#VALUE!	0.29	X	0.33	X	0.3	X	0.37	#VALUE!	#VALUE!
2001	0.3	X	0.24	X	0.27	X	0.26	X	0.23	#VALUE!	0.41	X	0.3	X	0.32	X	0.38	#VALUE!	0.29	X	0.33	X	0.3	X	0.37	#VALUE!	#VALUE!
2002	0.3	X	0.24	X	0.27	X	0.26	X	0.23	#VALUE!	0.41	X	0.3	X	0.32	X	0.38	#VALUE!	0.29	X	0.33	X	0.3	X	0.37	#VALUE!	#VALUE!
2003	0.3	X	0.24	X	0.27	X	0.26	X	0.23	#VALUE!	0.41	X	0.3	X	0.32	X	0.38	#VALUE!	0.29	X	0.33	X	0.3	X	0.37	#VALUE!	#VALUE!
2004	0.3	X	0.24	X	0.27	X	0.26	X	0.23	#VALUE!	0.41	X	0.3	X	0.32	X	0.38	#VALUE!	0.29	X	0.33	X	0.3	X	0.37	#VALUE!	#VALUE!
2005	0.3	X	0.24	X	0.27	X	0.26	X	0.23	#VALUE!	0.41	X	0.3	X	0.32	X	0.38	#VALUE!	0.29	X	0.33	X	0.3	X	0.37	#VALUE!	#VALUE!
2006	0.3	X	0.24	X	0.27	X	0.26	X	0.23	#VALUE!	0.41	X	0.3	X	0.32	X	0.38	#VALUE!	0.29	X	0.33	X	0.3	X	0.37	#VALUE!	#VALUE!
2007	0.3	X	0.24	X	0.27	X	0.26	X	0.23	#VALUE!	0.41	X	0.3	X	0.32	X	0.38	#VALUE!	0.29	X	0.33	X	0.3	X	0.37	#VALUE!	#VALUE!
2008	0.3	X	0.24	X	0.27	X	0.26	X	0.23	#VALUE!	0.41	X	0.3	X	0.32	X	0.38	#VALUE!	0.29	X	0.33	X	0.3	X	0.37	#VALUE!	#VALUE!
2009	0.3	X	0.24	X	0.27	X	0.26	X	0.23	#VALUE!	0.41	X	0.3	X	0.32	X	0.38	#VALUE!	0.29	X	0.33	X	0.3	X	0.37	#VALUE!	#VALUE!
2010	0.3	X	0.24	X	0.27	X	0.26	X	0.23	#VALUE!	0.41	X	0.3	X	0.32	X	0.38	#VALUE!	0.29	X	0.33	X	0.3	X	0.37	#VALUE!	#VALUE!
2011	0.3	X	0.24	X	0.27	X	0.26	X	0.23	#VALUE!	0.41	X	0.3	X	0.32	X	0.38	#VALUE!	0.29	X	0.33	X	0.3	X	0.37	#VALUE!	#VALUE!
2012	0.3	X	0.24	X	0.27	X	0.26	X	0.23	#VALUE!	0.41	X	0.3	X	0.32	X	0.38	#VALUE!	0.29	X	0.33	X	0.3	X	0.37	#VALUE!	#VALUE!

Appendix B

Survival and Hazard function (GCC and Non-GCC)

Time	Beg. Total	Fail	Net lost	Survivor function	Std. Error	[95% Conf. Int.]	
NGCC							
1	113	1	0	0.9912	0.0088	0.9388	0.9987
2	112	1	0	0.9823	0.0124	0.9311	0.9955
4	111	0	1	0.9823	0.0124	0.9311	0.9955
5	110	3	5	0.9555	0.0194	0.8964	0.9812
6	102	1	0	0.9461	0.0214	0.884	0.9754
7	101	0	3	0.9461	0.0214	0.884	0.9754
8	98	0	3	0.9461	0.0214	0.884	0.9754
9	95	2	4	0.9262	0.0252	0.8577	0.9625
10	89	1	10	0.9158	0.0269	0.8442	0.9554
11	78	0	3	0.9158	0.0269	0.8442	0.9554
12	75	1	3	0.9036	0.0292	0.8274	0.9472
13	71	0	2	0.9036	0.0292	0.8274	0.9472
14	69	0	3	0.9036	0.0292	0.8274	0.9472
15	66	0	2	0.9036	0.0292	0.8274	0.9472
16	64	0	6	0.9036	0.0292	0.8274	0.9472
17	58	1	2	0.888	0.0326	0.8044	0.9373
18	55	0	3	0.888	0.0326	0.8044	0.9373
19	52	2	1	0.8539	0.0393	0.7561	0.9146
20	49	0	5	0.8539	0.0393	0.7561	0.9146
21	44	0	1	0.8539	0.0393	0.7561	0.9146
22	43	0	3	0.8539	0.0393	0.7561	0.9146
23	40	0	1	0.8539	0.0393	0.7561	0.9146
24	39	1	4	0.832	0.044	0.724	0.9005
25	34	0	1	0.832	0.044	0.724	0.9005
26	33	0	1	0.832	0.044	0.724	0.9005
28	32	0	2	0.832	0.044	0.724	0.9005
29	30	1	1	0.8042	0.0505	0.6817	0.8835
30	28	1	4	0.7755	0.0563	0.641	0.8648
31	23	0	2	0.7755	0.0563	0.641	0.8648
32	21	0	3	0.7755	0.0563	0.641	0.8648
33	18	0	1	0.7755	0.0563	0.641	0.8648
35	17	0	5	0.7755	0.0563	0.641	0.8648
37	12	0	1	0.7755	0.0563	0.641	0.8648
38	11	0	2	0.7755	0.0563	0.641	0.8648

40	9	0	2	0.7755	0.0563	0.641	0.8648
43	7	0	1	0.7755	0.0563	0.641	0.8648
50	6	1	0	0.6463	0.127	0.3483	0.8347
61	5	0	1	0.6463	0.127	0.3483	0.8347
62	4	0	1	0.6463	0.127	0.3483	0.8347
80	3	1	1	0.4308	0.1952	0.0892	0.7458
90	1	0	1	0.4308	0.1952	0.0892	0.7458
GCC							
5	57	0	1	1	.	.	.
6	56	0	1	1	.	.	.
7	55	1	4	0.9818	0.018	0.8779	0.9974
8	50	1	4	0.9622	0.0263	0.8569	0.9904
9	45	0	5	0.9622	0.0263	0.8569	0.9904
10	40	0	1	0.9622	0.0263	0.8569	0.9904
11	39	2	5	0.9128	0.0421	0.782	0.9668
12	32	1	1	0.8843	0.0495	0.7406	0.9509
13	30	0	1	0.8843	0.0495	0.7406	0.9509
15	29	1	0	0.8538	0.0564	0.6985	0.9328
16	28	1	2	0.8233	0.0621	0.6597	0.9132
18	25	0	3	0.8233	0.0621	0.6597	0.9132
19	22	2	1	0.7485	0.0757	0.563	0.8641
24	19	0	1	0.7485	0.0757	0.563	0.8641
28	18	1	1	0.7069	0.0822	0.5123	0.8354
31	16	1	1	0.6627	0.0881	0.4607	0.8038
32	14	0	1	0.6627	0.0881	0.4607	0.8038
33	13	0	1	0.6627	0.0881	0.4607	0.8038
35	12	0	1	0.6627	0.0881	0.4607	0.8038
36	11	0	1	0.6627	0.0881	0.4607	0.8038
38	10	0	2	0.6627	0.0881	0.4607	0.8038
39	8	0	1	0.6627	0.0881	0.4607	0.8038
40	7	0	4	0.6627	0.0881	0.4607	0.8038
42	3	0	1	0.6627	0.0881	0.4607	0.8038
43	2	0	1	0.6627	0.0881	0.4607	0.8038
57	1	0	1	0.6627	0.0881	0.4607	0.8038

Time	Beg. Total	Fail	Net lost	Nelson-Aalen Cum. Haz.	Std. Error	[95% Conf. Int.]	
NGCC							
1	113	1	0	0.0088	0.0088	0.0012	0.0628
2	112	1	0	0.0178	0.0126	0.0044	0.0711
4	111	0	1	0.0178	0.0126	0.0044	0.0711
5	110	3	5	0.0451	0.0201	0.0188	0.1082
6	102	1	0	0.0549	0.0224	0.0246	0.1222
7	101	0	3	0.0549	0.0224	0.0246	0.1222
8	98	0	3	0.0549	0.0224	0.0246	0.1222
9	95	2	4	0.0759	0.0269	0.0379	0.152
10	89	1	10	0.0871	0.0292	0.0452	0.1679
11	78	0	3	0.0871	0.0292	0.0452	0.1679
12	75	1	3	0.1005	0.0321	0.0538	0.1878
13	71	0	2	0.1005	0.0321	0.0538	0.1878
14	69	0	3	0.1005	0.0321	0.0538	0.1878
15	66	0	2	0.1005	0.0321	0.0538	0.1878
16	64	0	6	0.1005	0.0321	0.0538	0.1878
17	58	1	2	0.1177	0.0364	0.0642	0.2158
18	55	0	3	0.1177	0.0364	0.0642	0.2158
19	52	2	1	0.1562	0.0454	0.0883	0.2762
20	49	0	5	0.1562	0.0454	0.0883	0.2762
21	44	0	1	0.1562	0.0454	0.0883	0.2762
22	43	0	3	0.1562	0.0454	0.0883	0.2762
23	40	0	1	0.1562	0.0454	0.0883	0.2762
24	39	1	4	0.1818	0.0522	0.1036	0.3191
25	34	0	1	0.1818	0.0522	0.1036	0.3191
26	33	0	1	0.1818	0.0522	0.1036	0.3191
28	32	0	2	0.1818	0.0522	0.1036	0.3191
29	30	1	1	0.2152	0.0619	0.1224	0.3782
30	28	1	4	0.2509	0.0715	0.1435	0.4385
31	23	0	2	0.2509	0.0715	0.1435	0.4385
32	21	0	3	0.2509	0.0715	0.1435	0.4385
33	18	0	1	0.2509	0.0715	0.1435	0.4385
35	17	0	5	0.2509	0.0715	0.1435	0.4385
37	12	0	1	0.2509	0.0715	0.1435	0.4385
38	11	0	2	0.2509	0.0715	0.1435	0.4385
40	9	0	2	0.2509	0.0715	0.1435	0.4385

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43	7	0	1	0.2509	0.0715	0.1435	0.4385
50	6	1	0	0.4175	0.1813	0.1782	0.9781
61	5	0	1	0.4175	0.1813	0.1782	0.9781
62	4	0	1	0.4175	0.1813	0.1782	0.9781
80	3	1	1	0.7509	0.3795	0.2789	2.0218
90	1	0	1	0.7509	0.3795	0.2789	2.0218
GCC							
5	57	0	1	0	0	.	.
6	56	0	1	0	0	.	.
7	55	1	4	0.0182	0.0182	0.0026	0.1291
8	50	1	4	0.0382	0.027	0.0095	0.1529
9	45	0	5	0.0382	0.027	0.0095	0.1529
10	40	0	1	0.0382	0.027	0.0095	0.1529
11	39	2	5	0.0895	0.0452	0.0332	0.241
12	32	1	1	0.1207	0.055	0.0494	0.2947
13	30	0	1	0.1207	0.055	0.0494	0.2947
15	29	1	0	0.1552	0.0649	0.0684	0.3522
16	28	1	2	0.1909	0.0741	0.0892	0.4084
18	25	0	3	0.1909	0.0741	0.0892	0.4084
19	22	2	1	0.2818	0.0981	0.1425	0.5574
24	19	0	1	0.2818	0.0981	0.1425	0.5574
28	18	1	1	0.3374	0.1127	0.1753	0.6494
31	16	1	1	0.3999	0.1289	0.2126	0.7521
32	14	0	1	0.3999	0.1289	0.2126	0.7521
33	13	0	1	0.3999	0.1289	0.2126	0.7521
35	12	0	1	0.3999	0.1289	0.2126	0.7521
36	11	0	1	0.3999	0.1289	0.2126	0.7521
38	10	0	2	0.3999	0.1289	0.2126	0.7521
39	8	0	1	0.3999	0.1289	0.2126	0.7521
40	7	0	4	0.3999	0.1289	0.2126	0.7521
42	3	0	1	0.3999	0.1289	0.2126	0.7521
43	2	0	1	0.3999	0.1289	0.2126	0.7521
57	1	0	1	0.3999	0.1289	0.2126	0.7521

Appendix C

Survival and Hazard function (Four regions)

Time	Beg. Total	Fail	Net lost	Survivor function	Std. Error	[95% Conf. Int.]	
GCC							
5	57	0	1	1	.	.	.
6	56	0	1	1	.	.	.
7	55	1	4	0.9818	0.018	0.8779	0.9974
8	50	1	4	0.9622	0.0263	0.8569	0.9904
9	45	0	5	0.9622	0.0263	0.8569	0.9904
10	40	0	1	0.9622	0.0263	0.8569	0.9904
11	39	2	5	0.9128	0.0421	0.782	0.9668
12	32	1	1	0.8843	0.0495	0.7406	0.9509
13	30	0	1	0.8843	0.0495	0.7406	0.9509
15	29	1	0	0.8538	0.0564	0.6985	0.9328
16	28	1	2	0.8233	0.0621	0.6597	0.9132
18	25	0	3	0.8233	0.0621	0.6597	0.9132
19	22	2	1	0.7485	0.0757	0.563	0.8641
24	19	0	1	0.7485	0.0757	0.563	0.8641
28	18	1	1	0.7069	0.0822	0.5123	0.8354
31	16	1	1	0.6627	0.0881	0.4607	0.8038
32	14	0	1	0.6627	0.0881	0.4607	0.8038
33	13	0	1	0.6627	0.0881	0.4607	0.8038
35	12	0	1	0.6627	0.0881	0.4607	0.8038
36	11	0	1	0.6627	0.0881	0.4607	0.8038
38	10	0	2	0.6627	0.0881	0.4607	0.8038
39	8	0	1	0.6627	0.0881	0.4607	0.8038
40	7	0	4	0.6627	0.0881	0.4607	0.8038
42	3	0	1	0.6627	0.0881	0.4607	0.8038
43	2	0	1	0.6627	0.0881	0.4607	0.8038
57	1	0	1	0.6627	0.0881	0.4607	0.8038
Asia							
4	50	0	1	1	.	.	.
5	49	1	4	0.9796	0.0202	0.8638	0.9971
7	44	0	2	0.9796	0.0202	0.8638	0.9971
8	42	0	3	0.9796	0.0202	0.8638	0.9971
9	39	0	1	0.9796	0.0202	0.8638	0.9971

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10	38	0	7	0.9796	0.0202	0.8638	0.9971
12	31	1	2	0.948	0.0367	0.8015	0.9872
13	28	0	1	0.948	0.0367	0.8015	0.9872
14	27	0	2	0.948	0.0367	0.8015	0.9872
16	25	0	5	0.948	0.0367	0.8015	0.9872
18	20	0	1	0.948	0.0367	0.8015	0.9872
19	19	2	0	0.8482	0.0744	0.6264	0.9437
20	17	0	3	0.8482	0.0744	0.6264	0.9437
21	14	0	1	0.8482	0.0744	0.6264	0.9437
22	13	0	2	0.8482	0.0744	0.6264	0.9437
24	11	0	2	0.8482	0.0744	0.6264	0.9437
25	9	0	1	0.8482	0.0744	0.6264	0.9437
28	8	0	2	0.8482	0.0744	0.6264	0.9437
30	6	0	1	0.8482	0.0744	0.6264	0.9437
32	5	0	2	0.8482	0.0744	0.6264	0.9437
40	3	0	1	0.8482	0.0744	0.6264	0.9437
43	2	0	1	0.8482	0.0744	0.6264	0.9437
61	1	0	1	0.8482	0.0744	0.6264	0.9437

MENA

1	35	1	0	0.9714	0.0282	0.814	0.9959
2	34	1	0	0.9429	0.0392	0.7903	0.9854
5	33	2	1	0.8857	0.0538	0.7236	0.9555
9	30	1	2	0.8562	0.0595	0.6883	0.9375
10	27	0	1	0.8562	0.0595	0.6883	0.9375
11	26	0	1	0.8562	0.0595	0.6883	0.9375
12	25	0	1	0.8562	0.0595	0.6883	0.9375
15	24	0	1	0.8562	0.0595	0.6883	0.9375
17	23	0	2	0.8562	0.0595	0.6883	0.9375
18	21	0	2	0.8562	0.0595	0.6883	0.9375
20	19	0	2	0.8562	0.0595	0.6883	0.9375
22	17	0	1	0.8562	0.0595	0.6883	0.9375
24	16	1	1	0.8027	0.0762	0.5992	0.91
29	14	1	1	0.7453	0.0897	0.5189	0.8766
30	12	1	2	0.6832	0.1015	0.4413	0.8375
31	9	0	2	0.6832	0.1015	0.4413	0.8375
32	7	0	1	0.6832	0.1015	0.4413	0.8375
33	6	0	1	0.6832	0.1015	0.4413	0.8375
35	5	0	1	0.6832	0.1015	0.4413	0.8375
37	4	0	1	0.6832	0.1015	0.4413	0.8375
38	3	0	2	0.6832	0.1015	0.4413	0.8375

Time	Beg. Total	Fail	Net lost		Std. Error	[95% Conf. Int.]	
40	1	0	1	0.6832	0.1015	0.4413	0.8375
Others							
6	28	1	0	0.9643	0.0351	0.7724	0.9949
7	27	0	1	0.9643	0.0351	0.7724	0.9949
9	26	1	1	0.9272	0.0496	0.7389	0.9813
10	24	1	2	0.8886	0.0607	0.6927	0.9627
11	21	0	2	0.8886	0.0607	0.6927	0.9627
13	19	0	1	0.8886	0.0607	0.6927	0.9627
14	18	0	1	0.8886	0.0607	0.6927	0.9627
15	17	0	1	0.8886	0.0607	0.6927	0.9627
16	16	0	1	0.8886	0.0607	0.6927	0.9627
17	15	1	0	0.8293	0.0806	0.596	0.9346
19	14	0	1	0.8293	0.0806	0.596	0.9346
23	13	0	1	0.8293	0.0806	0.596	0.9346
24	12	0	1	0.8293	0.0806	0.596	0.9346
26	11	0	1	0.8293	0.0806	0.596	0.9346
30	10	0	1	0.8293	0.0806	0.596	0.9346
35	9	0	4	0.8293	0.0806	0.596	0.9346
50	5	1	0	0.6635	0.1617	0.2685	0.8798
62	4	0	1	0.6635	0.1617	0.2685	0.8798
80	3	1	1	0.4423	0.2103	0.0775	0.7709
90	1	0	1	0.4423	0.2103	0.0775	0.7709

Time	Beg. Total	Fail	Net lost	Nelson-Aalen Cum. Haz.	Std. Error	[95% Conf. Int.]	
GCC							
5	57	0	1	0	0	.	.
6	56	0	1	0	0	.	.
7	55	1	4	0.0182	0.0182	0.0026	0.1291
8	50	1	4	0.0382	0.027	0.0095	0.1529
9	45	0	5	0.0382	0.027	0.0095	0.1529
10	40	0	1	0.0382	0.027	0.0095	0.1529
11	39	2	5	0.0895	0.0452	0.0332	0.241
12	32	1	1	0.1207	0.055	0.0494	0.2947
13	30	0	1	0.1207	0.055	0.0494	0.2947
15	29	1	0	0.1552	0.0649	0.0684	0.3522

16	28	1	2	0.1909	0.0741	0.0892	0.4084
18	25	0	3	0.1909	0.0741	0.0892	0.4084
19	22	2	1	0.2818	0.0981	0.1425	0.5574
24	19	0	1	0.2818	0.0981	0.1425	0.5574
28	18	1	1	0.3374	0.1127	0.1753	0.6494
31	16	1	1	0.3999	0.1289	0.2126	0.7521
32	14	0	1	0.3999	0.1289	0.2126	0.7521
33	13	0	1	0.3999	0.1289	0.2126	0.7521
35	12	0	1	0.3999	0.1289	0.2126	0.7521
36	11	0	1	0.3999	0.1289	0.2126	0.7521
38	10	0	2	0.3999	0.1289	0.2126	0.7521
39	8	0	1	0.3999	0.1289	0.2126	0.7521
40	7	0	4	0.3999	0.1289	0.2126	0.7521
42	3	0	1	0.3999	0.1289	0.2126	0.7521
43	2	0	1	0.3999	0.1289	0.2126	0.7521
57	1	0	1	0.3999	0.1289	0.2126	0.7521
Asia							
4	50	0	1	0	0	.	.
5	49	1	4	0.0204	0.0204	0.0029	0.1449
7	44	0	2	0.0204	0.0204	0.0029	0.1449
8	42	0	3	0.0204	0.0204	0.0029	0.1449
9	39	0	1	0.0204	0.0204	0.0029	0.1449
10	38	0	7	0.0204	0.0204	0.0029	0.1449
12	31	1	2	0.0527	0.0382	0.0127	0.218
13	28	0	1	0.0527	0.0382	0.0127	0.218
14	27	0	2	0.0527	0.0382	0.0127	0.218
16	25	0	5	0.0527	0.0382	0.0127	0.218
18	20	0	1	0.0527	0.0382	0.0127	0.218
19	19	2	0	0.1579	0.0836	0.0559	0.446
20	17	0	3	0.1579	0.0836	0.0559	0.446
21	14	0	1	0.1579	0.0836	0.0559	0.446
22	13	0	2	0.1579	0.0836	0.0559	0.446
24	11	0	2	0.1579	0.0836	0.0559	0.446
25	9	0	1	0.1579	0.0836	0.0559	0.446
28	8	0	2	0.1579	0.0836	0.0559	0.446
30	6	0	1	0.1579	0.0836	0.0559	0.446
32	5	0	2	0.1579	0.0836	0.0559	0.446
40	3	0	1	0.1579	0.0836	0.0559	0.446
43	2	0	1	0.1579	0.0836	0.0559	0.446
61	1	0	1	0.1579	0.0836	0.0559	0.446

MENA

1	35	1	0	0.0286	0.0286	0.004	0.2028
2	34	1	0	0.058	0.041	0.0145	0.2319
5	33	2	1	0.1186	0.0593	0.0445	0.3161
9	30	1	2	0.1519	0.068	0.0632	0.3654
10	27	0	1	0.1519	0.068	0.0632	0.3654
11	26	0	1	0.1519	0.068	0.0632	0.3654
12	25	0	1	0.1519	0.068	0.0632	0.3654
15	24	0	1	0.1519	0.068	0.0632	0.3654
17	23	0	2	0.1519	0.068	0.0632	0.3654
18	21	0	2	0.1519	0.068	0.0632	0.3654
20	19	0	2	0.1519	0.068	0.0632	0.3654
22	17	0	1	0.1519	0.068	0.0632	0.3654
24	16	1	1	0.2144	0.0924	0.0922	0.4989
29	14	1	1	0.2859	0.1168	0.1284	0.6366
30	12	1	2	0.3692	0.1435	0.1724	0.7907
31	9	0	2	0.3692	0.1435	0.1724	0.7907
32	7	0	1	0.3692	0.1435	0.1724	0.7907
33	6	0	1	0.3692	0.1435	0.1724	0.7907
35	5	0	1	0.3692	0.1435	0.1724	0.7907
37	4	0	1	0.3692	0.1435	0.1724	0.7907
38	3	0	2	0.3692	0.1435	0.1724	0.7907
40	1	0	1	0.3692	0.1435	0.1724	0.7907

Others

6	28	1	0	0.0357	0.0357	0.005	0.2535
7	27	0	1	0.0357	0.0357	0.005	0.2535
9	26	1	1	0.0742	0.0525	0.0185	0.2969
10	24	1	2	0.1158	0.067	0.0373	0.36
11	21	0	2	0.1158	0.067	0.0373	0.36
13	19	0	1	0.1158	0.067	0.0373	0.36
14	18	0	1	0.1158	0.067	0.0373	0.36
15	17	0	1	0.1158	0.067	0.0373	0.36
16	16	0	1	0.1158	0.067	0.0373	0.36
17	15	1	0	0.1825	0.0945	0.0661	0.5037
19	14	0	1	0.1825	0.0945	0.0661	0.5037
23	13	0	1	0.1825	0.0945	0.0661	0.5037
24	12	0	1	0.1825	0.0945	0.0661	0.5037
26	11	0	1	0.1825	0.0945	0.0661	0.5037
30	10	0	1	0.1825	0.0945	0.0661	0.5037
35	9	0	4	0.1825	0.0945	0.0661	0.5037

50	5	1	0	0.3825	0.2212	0.1231	1.1883
62	4	0	1	0.3825	0.2212	0.1231	1.1883
80	3	1	1	0.7158	0.4001	0.2394	2.1405
90	1	0	1	0.7158	0.4001	0.2394	2.1405

Appendix D

Split time (GLS and EXP)

VARIABLES	GLS	EXP
1bn.split_time	0.000618***	0.000618***
	(0.000897)	(0.000897)
2.split_time	0.000176***	0.000176***
	(0.000255)	(0.000256)
3.split_time	0	0
	(6.52e-08)	(4.30e-08)
4.split_time	0	0
	(5.47e-08)	(3.60e-08)
5.split_time	0.000366***	0.000366***
	(0.000455)	(0.000455)
6.split_time	0.000147***	0.000147***
	(0.000219)	(0.000219)
7.split_time	0.000101***	0.000101***
	(0.000147)	(0.000147)
8.split_time	0.000107***	0.000107***
	(0.000156)	(0.000156)
9.split_time	0.000255***	0.000255***
	(0.000333)	(0.000333)
10.split_time	0.000161***	0.000161***
	(0.000239)	(0.000239)
11.split_time	0.000341***	0.000341***
	(0.000433)	(0.000433)
12.split_time	0.000443***	0.000443***
	(0.000555)	(0.000555)
13.split_time	0	0
	(6.13e-08)	(6.83e-08)
14.split_time	0	0
	(7.68e-08)	(7.76e-08)
15.split_time	0.000218***	0.000219***
	(0.000316)	(0.000316)
16.split_time	0.000199***	0.000199***
	(0.000286)	(0.000286)
17.split_time	0.000259***	0.000259***
	(0.000376)	(0.000376)
18.split_time	6.31e-11	0
	(9.87e-08)	(9.80e-08)
19.split_time	0.00106***	0.00106***
	(0.00110)	(0.00110)
20.split_time	7.00e-11	0
	(1.13e-07)	(8.86e-08)
21.split_time	7.38e-11	0
	(1.28e-07)	(7.30e-08)
22.split_time	6.70e-11	0
	(1.11e-07)	(1.13e-07)
23.split_time	5.97e-11	0
	(1.03e-07)	(7.84e-08)
24.split_time	0.000327***	0.000327***
	(0.000478)	(0.000478)
25.split_time	5.84e-11	0
	(1.08e-07)	(1.32e-07)
26.split_time	5.49e-11	0
	(1.00e-07)	(1.24e-07)
27.split_time	5.17e-11	0
	(9.28e-08)	(1.08e-07)
28.split_time	0.000289***	0.000289***
	(0.000424)	(0.000424)
29.split_time	0.000296***	0.000296***
	(0.000427)	(0.000427)

30.split_time	0.000272***	0.000272***
	(0.000397)	(0.000397)
31.split_time	0.000307***	0.000307***
	(0.000458)	(0.000458)
32.split_time	0	0
	(7.60e-08)	(9.78e-08)
33.split_time	0	0
	(7.75e-08)	(4.83e-08)
34.split_time	0	0
	(7.81e-08)	(4.88e-08)
35.split_time	0	0
	(7.14e-08)	(4.48e-08)
36.split_time	0	0
	(8.95e-08)	(1.58e-07)
37.split_time	0	0
	(8.48e-08)	(1.52e-07)
38.split_time	0	0
	(8.24e-08)	(1.60e-07)
39.split_time	0	0
	(1.08e-07)	(6.48e-08)
40.split_time	0	1.19e-10
	(1.20e-07)	(3.03e-07)
41.split_time	0	0
	(1.92e-07)	(1.12e-07)
42.split_time	0	0
	(1.84e-07)	(1.08e-07)
43.split_time	0	0
	(2.25e-07)	(1.31e-07)
44.split_time	9.03e-11	0
	(9.03e-07)	(5.69e-07)
45.split_time	7.56e-11	0
	(7.56e-07)	(4.76e-07)
46.split_time	8.70e-11	4.25e-10
	(6.15e-07)	(1.90e-06)
47.split_time	1.03e-10	3.36e-10
	(5.96e-07)	(1.42e-06)
48.split_time	7.44e-11	0
	(4.30e-07)	(2.57e-07)
49.split_time	5.74e-11	0
	(3.31e-07)	(1.96e-07)
50.split_time	0.00351***	0.00351***
	(0.00517)	(0.00517)
51.split_time	6.12e-11	0
	(4.33e-07)	(2.59e-07)
52.split_time	5.23e-11	0
	(3.70e-07)	(2.23e-07)
53.split_time	0	0
	(3.37e-07)	(2.05e-07)
54.split_time	0	0
	(3.02e-07)	(1.84e-07)
55.split_time	0	0
	(2.66e-07)	(1.65e-07)
56.split_time	0	0
	(2.41e-07)	(1.50e-07)
57.split_time	0	0
	(2.22e-07)	(1.39e-07)
58.split_time	5.01e-11	3.59e-10
	(3.55e-07)	(1.34e-06)
59.split_time	0	0
	(2.12e-07)	(1.33e-07)
60.split_time	0	0
	(1.97e-07)	(1.24e-07)
61.split_time	0	0
	(1.90e-07)	(1.20e-07)
62.split_time	0	0
	(2.69e-07)	(1.70e-07)
64.split_time	6.14e-11	6.81e-10

	(6.14e-07)	(3.09e-06)
65.split_time	2.12e-10	0
	(2.12e-06)	(1.34e-06)
66.split_time	1.71e-10	0
	(1.71e-06)	(1.08e-06)
67.split_time	1.60e-10	0
	(1.60e-06)	(1.01e-06)
68.split_time	1.34e-10	0
	(1.34e-06)	(8.42e-07)
69.split_time	1.24e-10	0
	(1.24e-06)	(7.84e-07)
70.split_time	1.05e-10	5.76e-10
	(7.46e-07)	(2.26e-06)
71.split_time	1.57e-10	0
	(1.11e-06)	(6.49e-07)
72.split_time	1.27e-10	0
	(9.01e-07)	(5.33e-07)
73.split_time	1.22e-10	4.70e-10
	(7.06e-07)	(1.70e-06)
74.split_time	9.47e-11	0
	(5.47e-07)	(3.29e-07)
75.split_time	8.15e-11	0
	(4.71e-07)	(2.82e-07)
76.split_time	6.93e-11	0
	(4.00e-07)	(2.40e-07)
77.split_time	6.19e-11	0
	(3.57e-07)	(2.13e-07)
78.split_time	5.43e-11	0
	(3.13e-07)	(1.89e-07)
79.split_time	0	0
	(2.70e-07)	(1.63e-07)
80.split_time	0.00305***	0.00305***
	(0.00453)	(0.00453)
81.split_time	6.79e-11	0
	(6.79e-07)	(4.28e-07)
82.split_time	5.30e-11	0
	(5.30e-07)	(3.34e-07)
83.split_time	0	0
	(4.43e-07)	(2.79e-07)
84.split_time	0	0
	(3.84e-07)	(2.42e-07)
85.split_time	0	0
	(3.33e-07)	(2.10e-07)
86.split_time	0	0
	(3.22e-07)	(2.03e-07)
87.split_time	0	0
	(2.89e-07)	(1.82e-07)
88.split_time	0	0
	(2.79e-07)	(1.76e-07)
89.split_time	0	0
	(2.69e-07)	(1.70e-07)
90.split_time	0	0
	(2.60e-07)	(1.64e-07)
recently	1.036***	1.036***
	(0.00852)	(0.00852)
_t		
Observations	1,476	1,476

seEform in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix E
Semi-parametric

```
Cox regression -- Breslow method for ties


No. of subjects =        1,455              Number of obs    =       1,455
No. of failures =           28
Time at risk     =        3454
LR chi2(10)      =       45.00
Log likelihood  =  -176.19469              Prob > chi2      =      0.0000


------------------------------------------------------------------------------
_t | Haz. Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
recent |   1.047515   .0135904     3.58   0.000      1.021214    1.074493
onil1  |   1.001555   .0005655     2.75   0.006      1.000447    1.002664
enl1   |   .9987477   .0005145    -2.43   0.015      .9977398    .9997566
nlta1  |    .999433   .0005058    -1.12   0.262      .9984423    1.000425
lli1   |   1.005148   .0025357     2.04   0.042      1.000191    1.010131
tcr1   |   1.001664   .0014006     1.19   0.234      .9989226    1.004413
ooia1  |    .9972033   .0012286    -2.27   0.023      .9947983    .9996142
niea1  |   1.001955   .0009934     1.97   0.049      1.00001     1.003903
gdpp3  |    .4670574   .1617789    -2.20   0.028      .2368819    .9208918
inf3   |   .9956917   .0035523    -1.21   0.226      .9887536    1.002678
------------------------------------------------------------------------------


Shared of 2
Stratified Cox regr. -- Breslow method for ties


No. of subjects =        1,455              Number of obs    =       1,455
No. of failures =           28
Time at risk     =        3454
LR chi2(10)      =       45.08
Log likelihood  =   -157.2026              Prob > chi2      =      0.0000


------------------------------------------------------------------------------
_t | Haz. Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
recent |   1.048848   .0140347     3.56   0.000      1.021698    1.076719
onil1  |    1.00152   .0005635     2.70   0.007      1.000416    1.002625
enl1   |   .9988457   .000524     -2.20   0.028      .9978192    .9998732
nlta1  |    .999452   .0005224    -1.05   0.294      .9984288    1.000476
lli1   |   1.005104   .002548      2.01   0.045      1.000123    1.010111
```

```
tcr1  |   1.001588   .0014018      1.13   0.257     .9988446    1.00434
ooia1 |    .996942   .0012858     -2.37   0.018      .994425   .9994654
niea1 |   1.002021   .0010107      2.00   0.045     1.000042   1.004003
gdpp3 |   .4371716   .1653015     -2.19   0.029     .2083527   .9172858
inf3  |   .9954825   .0036137     -1.25   0.212     .9884249   1.002591
-------------------------------------------------------------------------------
```

Stratified by groupy

Shared of 4

Stratified Cox regr. -- Breslow method for ties

```
No. of subjects =         1,455              Number of obs    =       1,455
No. of failures =            28
Time at risk    =          3454
LR chi2(10)     =         49.44
Log likelihood  =   -136.62442              Prob > chi2      =      0.0000
```

```
-------------------------------------------------------------------------------
  _t | Haz. Ratio   Std. Err.      z     P>|z|     [95% Conf. Interval]
-------+-----------------------------------------------------------------------
recent |   1.047015   .0142055      3.39   0.001      1.01954   1.075231
onil1  |   1.001609   .0005834      2.76   0.006     1.000467   1.002753
enl1   |   .9989276   .0005219     -2.05   0.040     .9979053    .999951
nlta1  |   .9991644   .0005456     -1.53   0.126     .9980956   1.000234
lli1   |   1.004855   .0026007      1.87   0.061     .9997708   1.009965
tcr1   |   1.001337   .0013924      0.96   0.337     .9986115    1.00407
ooia1  |    .997058   .0013339     -2.20   0.028      .994447   .9996758
niea1  |    1.00212   .0010342      2.05   0.040     1.000095    1.00415
gdpp3  |   .0800754   .0868735     -2.33   0.020     .0095507   .6713737
inf3   |   .9980842   .0035078     -0.55   0.585     .9912326   1.004983
-------------------------------------------------------------------------------
```

Stratified by group

Efron

```
Cox regression -- Efron method for ties

No. of subjects =        1,455                Number of obs    =        1,455
No. of failures =           28
Time at risk    =         3454
LR chi2(10)     =        46.44
Log likelihood  =  -175.24895                 Prob > chi2      =       0.0000


-------------------------------------------------------------------------------
 _t | Haz. Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
recent |   1.048526    .0135997     3.65   0.000     1.022207    1.075522
 onil1 |   1.001634    .000573      2.85   0.004     1.000512    1.002758
  enl1 |   .9987205    .0005145    -2.49   0.013     .9977126    .9997295
 nlta1 |   .9993834    .0005073    -1.22   0.224     .9983896    1.000378
  lli1 |   1.005267    .0025459     2.07   0.038     1.000289    1.010269
  tcr1 |   1.001671    .0014059     1.19   0.234     .998919     1.00443
 ooia1 |   .9970706    .0012314    -2.38   0.018     .99466      .999487
 niea1 |   1.002066    .0010045     2.06   0.040     1.000099    1.004037
 gdpp3 |   .4557899    .1575385    -2.27   0.023     .231503     .8973723
  inf3 |   .9955828    .0035445    -1.24   0.214     .98866      1.002554
-------------------------------------------------------------------------------
```

340

Appendix F
Parameterization

Weibull Distribution

```
------------------------------------------------------------------------------
        _t | Haz. Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-----------+------------------------------------------------------------------
    recent |   1.048525    .0108676     4.57   0.000     1.027439    1.070043
     onil1 |   1.001566    .0005597     2.80   0.005     1.000469    1.002663
      enl1 |   .9987991    .0005213    -2.30   0.021     .9977779    .9998215
     nlta1 |   .9993971    .0005133    -1.17   0.240     .9983915    1.000404
      lli1 |   1.005233    .0025463     2.06   0.039     1.000255    1.010236
      tcr1 |   1.001729    .0013929     1.24   0.214     .9990024    1.004462
     ooia1 |   .9970454     .001244    -2.37   0.018     .9946102    .9994865
     niea1 |    1.00208    .0010085     2.06   0.039     1.000106    1.004059
     gdpp3 |   .4518342    .1603631    -2.24   0.025     .2253586    .9059078
      inf3 |    .995641    .0034173    -1.27   0.203     .9889657    1.002361
     _cons |   2.12e-06    4.30e-06    -6.45   0.000     4.00e-08    .0001124
-----------+------------------------------------------------------------------
     /ln_p |    .113253    .1678959     0.67   0.500    -.2158169    .4423228
-----------+------------------------------------------------------------------
         p |   1.119915    .1880291                      .8058828    1.556318
       1/p |   .8929248    .1499184                      .6425422    1.240875
------------------------------------------------------------------------------
```

Exponential Distribution

```
------------------------------------------------------------------------------
        _t | Haz. Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-----------+------------------------------------------------------------------
    recent |    1.05001    .0108255     4.73   0.000     1.029005    1.071443
     onil1 |   1.001566    .0005583     2.81   0.005     1.000472    1.002661
      enl1 |   .9987709    .0005155    -2.38   0.017      .997761    .9997819
     nlta1 |   .9993976     .000507    -1.19   0.235     .9984045    1.000392
      lli1 |   1.005324    .0025464     2.10   0.036     1.000345    1.010327
      tcr1 |   1.001757    .0014014     1.25   0.209     .9990143    1.004508
     ooia1 |   .9971489    .0012259    -2.32   0.020     .9947491    .9995546
     niea1 |    1.00201    .0009948     2.02   0.043     1.000062    1.003962
     gdpp3 |   .4577511    .1591532    -2.25   0.025     .2315684     .904856
      inf3 |   .9956195     .003465    -1.26   0.207     .9888514    1.002434
     _cons |   2.55e-06    5.15e-06    -6.38   0.000     4.86e-08    .0001337
------------------------------------------------------------------------------
```

Gompertz Distribution

```
-------------------------------------------------------------------------------
        _t |  Haz. Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-----------+-------------------------------------------------------------------
    recent |    1.04937    .0109302     4.63   0.000     1.028165    1.071013
     onil1 |   1.001573    .0005596     2.81   0.005     1.000477    1.002671
      enl1 |   .9987835    .0005185    -2.34   0.019     .9977678    .9998003
     nlta1 |   .9993891    .0005115    -1.19   0.232     .9983872    1.000392
      lli1 |   1.005284    .0025458     2.08   0.037     1.000307    1.010286
      tcr1 |   1.001714    .0014025     1.22   0.221     .9989694    1.004467
     ooia1 |   .9970929    .0012422    -2.34   0.019     .9946613    .9995305
     niea1 |   1.002047    .0010054     2.04   0.042     1.000078     1.00402
     gdpp3 |   .4481827     .160789    -2.24   0.025     .2218605    .9053787
      inf3 |   .9956808    .0034348    -1.25   0.210     .9889714    1.002436
     _cons |   2.61e-06    5.26e-06    -6.38   0.000     5.03e-08    .0001356
-----------+-------------------------------------------------------------------
    /gamma |   .0048753    .0136206     0.36   0.720    -.0218207    .0315712
```

Appendix G

Panel Survival

```
Random-effects Weibull regression          Number of obs    =       1,455
Group variable:           bankid           Number of groups =         167
                                           Obs per group:
                                                         min =           1
                                                         avg =         8.7
                                                         max =          27
Integration method: mvaghermite            Integration pts. =          12

                                           Wald chi2(10)    =       45.08
Log likelihood = -52.320675                Prob > chi2      =      0.0000
------------------------------------------------------------------------------
         _t | Haz. Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
     recent |   1.048521    .0108672     4.57   0.000     1.027437    1.070038
      onil1 |   1.001566    .0005597     2.80   0.005     1.000469    1.002663
       enl1 |   .9987989    .0005213    -2.30   0.021     .9977776    .9998212
      nlta1 |   .9993971    .0005133    -1.17   0.240     .9983914    1.000404
       lli1 |   1.005233    .0025462     2.06   0.039     1.000255    1.010236
       tcr1 |   1.001729     .001393     1.24   0.214     .9990024    1.004463
      ooia1 |   .9970428    .0012443    -2.37   0.018      .994607    .9994846
      niea1 |   1.002084    .0010087     2.07   0.039     1.000109    1.004063
       inf3 |   .9956416    .0034173    -1.27   0.203     .9889662    1.002362
      gdpp3 |   .4522185    .1604133    -2.24   0.025     .2256346    .9063396
      _cons |   2.55e-06    5.15e-06    -6.45   0.000     3.99e-08    .0001123
------------+-----------------------------------------------------------------
      /ln_p |   .1133424    .1678811     0.68   0.500    -.2156985    .4423833
------------+-----------------------------------------------------------------
   /sigma2_u |   1.80e-30    3.05e-15                    .            .
------------------------------------------------------------------------------

Mixed-effects Weibull regression           Number of obs    =       1,455
Group variable:           bankid           Number of groups =         167
                                           Obs per group:
                                                         min =           1
                                                         avg =         8.7
                                                         max =          27
Integration method: mvaghermite            Integration pts. =           7

                                           Wald chi2(10)    =       45.08
Log likelihood = -52.320675                Prob > chi2      =      0.0000
------------------------------------------------------------------------------
         _t | Haz. Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
     recent |   1.048521    .0108672     4.57   0.000     1.027437    1.070038
      onil1 |   1.001566    .0005597     2.80   0.005     1.000469    1.002663
       enl1 |   .9987989    .0005213    -2.30   0.021     .9977776    .9998212
      nlta1 |   .9993971    .0005133    -1.17   0.240     .9983914    1.000404
       lli1 |   1.005233    .0025462     2.06   0.039     1.000255    1.010236
       tcr1 |   1.001729     .001393     1.24   0.214     .9990024    1.004463
      ooia1 |   .9970428    .0012443    -2.37   0.018      .994607    .9994846
      niea1 |   1.002084    .0010087     2.07   0.039     1.000109    1.004063
       inf3 |   .9956416    .0034173    -1.27   0.203     .9889662    1.002362
      gdpp3 |   .4522185    .1604133    -2.24   0.025     .2256346    .9063396
      _cons |   2.61e-06    5.26e-06    -6.45   0.000     3.99e-08    .0001123
------------+-----------------------------------------------------------------
      /ln_p |   .1133424    .1678811     0.68   0.500    -.2156985    .4423833
------------+-----------------------------------------------------------------
bankid      |
   var(_cons)|   3.36e-32    7.25e-16                    .            .
------------------------------------------------------------------------------
```