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Twinkle, Twinkle, Little Star, How Wonder Islamic Finance: Up Above the World So High, Like a Diamond in the Sky

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Abstract. This study investigates empirically into the acclaimed positive role played financial market leading growth, with evidence from the MENA Islamic finance. Utilising, several econometric techniques models, such as unit root test, co-integration test and formal tests of ARDL framework developed by Granger causality and quarterly MENA data for the period 2000:1- 2014:2. Empirical findings revealed that both Engle-Granger and Johansen co-integration test support the view that there is a short and long-run relationship between financial Islamic banking development and economic growth in MENA. On the other hand, there was no evidence to support the view that financial Islamic banking development in MENA is a leading sector in the process of the country's economic development. In particular, the causality relationship between RGDP growth and finance of Islamic banks in MENA is a bi-directional long-run granger causality, which reflects positively growth contribution of financial Islamic banking development in the economic development. Higher development in the financial Islamic banking causes higher real economic growth. High economic growth in turn promotes development in the financial Islamic banking.

This study's results will be useful in reaching policy decisions to develop financial Islamic banking to increase economic growth in developing countries or/ emerging economies, in general, and within MENA, in particular. Furthermore, providing empirical evidence regarding this critical issue within specific emerging economies will add to the literature on financial Islamic banking related to the role of Islamic finance development and its influence on economic growth and, thus, initiate an exciting topic for research as it is one of the pioneering studies of Islamic finance.

Keywords: Time series, ARDL, ECM, Unit roots, Co-integration, Granger Causality Models, Islamic Finance, Economic Growth, MENA

JEL Classifications: C22, C32, C33, F43, G10, G20, G21, N25, O16, Z12

1. Introduction

In recent years, a considerable growth of global Islamic banking assets over the last four decades of establishment has been recorded with more than 500 Islamic institutions working in more than 75 countries, are expected to reach U.S $ 2.7 trillion by 2015 (Kumar, 2010), up from the $1.3 trillion of assets held in 2011 (WIBC, 2013). For the period of the Islamic 'golden age' after the death of Muhammad in 632AD, a great development of Islam occurred throughout the Arabic nations and in large parts of the three continents, Asia, Africa and Europe (Masoud, 2014). During the Middle Ages, and in particular during the 19th century, most Muslim countries fell under the control of the colonialisation period[1], Islamic finance was abandoned and was displaced by Western financial systems; hence, the institutionalisation of Islamic finance in the form of banks and financial market could not be achieved (Baldwin and Wilson, 1988; Wilson, 1995; Vogel and Hayes, 1998; Wilson, 2002). It was only in 1940s that the commercial banks played a vital role in the economies of the Muslims world. In this case, however, the Muslim scholars discourses and an attempt to provide an alternative system to capitalist and socialist systems (Hamid, 2006) a consensus was reached on interest being similar to *riba,* as stipulated in the *Quran*.

One of the earliest Islamic social banks as a private idea to help farmers was found in the 1950s in Pakistan. In Egypt, where the Islamic savings bank that was based on the profit sharing, introduced in 1963 in the Egyptian town of Mit Ghamr, and the Nasser Social Bank in 1971 (Lewis and Algaoud, 2001). In Malaysia, Muslims established Tabung Haji, or the Malaysian Pilgrimage Fund Board, was also established in the year 1963 (Khir et al., 2008). This was followed by the Islamic Development Bank (IDB) was established by Saudi Arabia in 1975, that is suggested by the conference of finance ministers of Islamic countries held in Jeddah, Saudi Arabia in 1973 (Iqbal and Molyneux, 2005). In Dubai first Islamic Bank was established in 1975. The bank was

[1] Western colonial powers (France in North Africa, Britain and France in the Middle East, Britain in the Indian sub-continent and Britain and The Netherlands in South-East Asia), and thus the existing financial scheme which complied with *Sharia* was effectively replaced by the capitalist system (Masoud, 2014).

licensed through a conventional central bank whereby it worked in the existing conventional framework with institutional, legal, statutory and regulatory constraints. Later, several other Islamic banks were established with a few banks operating in amended, conventional banking laws (Elgari, 2010). The first commercial banks in a number of other countries with their establishment years are stated as follows: in Bahrain the first Islamic bank was established in 1978, in Malaysia in 1983, Bank Islam Malaysia Berhad (BIMB); Bank Muamalat in Indonesia in 1991, and Meezan Bank in Pakistan in 2002. Furthermore, Islamic banks have been spread and practiced worldwide during the final decades of the last century (see Table 1).

The purpose of this paper is to explore empirically the relation between financial Islamic banking development (FIBD) and economic growth (EG) in MENA countries is tested by using quarterly panel data of these selected Islamic countries over the period 2000:1- 2014:2. Data of real gross domestic product (RGDP) growth, total finance of Islamic bank's (IBFIN) and total gross capital formation (GCF), based on data concerning a group of 10 MENA Islamic countries. The aim of this research is to determine the most appropriate model within the Islamic financial framework for the continued availability and compatibility to test the validity of the theoretical findings in the development process. To achieve this aim, the objective of this research is to narrow the gap in an econometric framework that draws on the literature by investigative the long-run relationships between Islamic financial development and economic growth, particularly in MENA countries. Accordingly, to investigate the long-run causality the following hypotheses are considered:

H_1: There is relationship between Islamic financial development and economic growth.

H_2: Islamic financial development leads to economic growth.

H_3: Economic growth leads to Islamic financial development.

The key research questions incorporating both of these hypotheses and objective are: *What is the relationship between Islamic financial development and economic growth in the long-run in selected countries of MENA? Does Islamic financial development have significant effect on these countries' economic growth in the long-run? Does economic growth in the long-run lead to Islamic development in selected countries of MENA?*. To answer the study questions, the theoretical framework and variables are then empirically modified based on policy implications for MENA countries and other countries with likely accounting structure. Providing evidence of causality will influence the degree of urgency attached to policy reforms designed to promote finance growth relationship. In their turn, using the bound testing approach of co-integration and error correction models (ECMs), developed within an autoregressive distributed lag (ARDL) and vector autoregressive model (VAR) framework by Pesaran and Shin (1995), Pesaran et al. (1996) and Narayan (2004).

It is hoped, however, that this research will stimulate the financial Islamic banking development and economic growth in MENA countries in particular, as well as other comparable nations. Achieving these goals, and others, remains dependent on serious and comprehensive restructuring programmes. Its results provide relevant empirical knowledge to help identify potential policy reform recommendations for the MENA economy and for other developing countries with similar economic structures. Future research is needed to meet up-to-date information regarding the nature of Islamic finance banking with decision makers and finance scholars to understand the advantages of Islamic finance in enhancing economic growth.

2. Theory and Literature Review

The empirical literature on the issue of causality between financial development and economic growth remains, however, very limited and current empirical literature in this work has completely ignored the financial development. This may be attributed to the scarcity of long-run time series for both national accounts and financial development particularly in developing countries. The

first study on the causality issue between financial development and economic growth as shown in the survey by Demetriades and Hussein (1996) is that of Gupta (1987). By Gupta (1987) was the first to test empirical causal link relationship between financial development and economic growth. By the early 1990s where the data was available it was not in the form of an extensive empirical study until King and Levine (1993 a, b) developed Goldsmith's work, which had used a cross-section of 80 countries during the 1960-1989 period. They found that the initial measure of financial development is significantly correlated within further growth rate of real GDP per capita, real per capita physical capital and productivity. Accordingly, they argued that financial development is a good predictor of future economic growth rate but the other financial agencies are not considered; for instance the financial market. They also indicate that financial development is a good predictor for long-run economic growth over the next ten to thirty year period.

Similar to the studies on the conventional banks' growth, most studies on Islamic development framework is also investigating the relationship between Islamic financial development (IFD) and economic growth (EG). Thus, meant that economic growth caused Islamic banking institutions to change and develop. The studies that examine the role of IFD in EG are not too many. However, the Islamic finance system was established according to principles inferred from the *Holy Quran*, along with the teachings of *Sunna*. This framework provides guidelines for people to follow the principles of the *Holy Quran* and the *Sunna* in their decision-making in all aspects of life (Masoud, 2014). Therefore, Islamic finance under *Sharia* (or Islamic law) has to observe the prohibitions of (1) prohibition against *riba*, i.e. interest on loans; (2) *gharar*, i.e. avoidable uncertainty in transactions; (3) *maysir*, i.e. gambling. The early models of an Islamic economy assumed a replacement of interest-bearing loans and deposits by a system of profit and loss sharing both in the financing and the deposit business of Islamic bank. With respect to interest, Islamic banking financial products should be disassociated from the prohibited (known as *riba*). *Riba* is an Arabic word can be interpreted as "increase", excess, or "usury", and while many

discussions have aroused in determining its literal meaning, it is generally accepted that it means “interest” (Khan, 2008).

Particular with regards to the role of the IFD and EG, researches from Farahani and Dastan (2013), Hassanudin et al. (2013), Abduh and Chowdury (2012), Abduh and Omar (2012) and Furqani and Mulyany (2009), were among the limited articles that can be referred. Farahani and Dastan (2013) used quarterly data from Iran and Indonesia during the (2000:1-2010:4) period to examine the short and long-run nexus of IFD and EG of economic output. They found that a bi-directional relation in both short and long-run between IBD and EG. Hassanudin et al. (2013) investigated the relationship between IFD and EG in Bahrain by employing the co-integration test and VECM. For Islamic finance, the results show a strong long-run relation with bi-directional causality, while it is unidirectional causality running from EG to conventional finance. Consequently, Abduh and Chowdhury (2012) investigated the relation between IFD and EG in Bangladesh using total financing and total deposits of Islamic banks as measures of IFD and GDP as an EG measure. The results show a positive and significant short and long-run relationship between IFD and EG. Abduh and Omar (2012) examined the short and the long-run relationships between IFD and EG in Indonesia using quarterly data (2003:1-2010:2). They utilised bound testing approach of co-integration and error correction models, developed within an autoregressive distributed lag (ARDL) framework. The key findings show that the relation appears to be bi-directional for both short and the long-run terms. Furthermore, Furqani and Mulyany (2009) examined the dynamic interactions between IFD and EG by employing the co-integration test and Vector Error Correction Model (VECM). They found that in the long-run, there is evidence of a bidirectional relationship between Islamic bank and fixed investment and there is evidence to support demand following hypothesis of GDP and Islamic bank, where increase in GDP causes Islamic banking to develop and not vice versa. On the other hand, findings of Majid and Kassim (2010) are in favor of the supply-leading view.

Since, this research concentrates on the MENA Islamic economy. Al-Awad and Harb (2005) examined the link between financial development and the stock market in Middle East countries during the 1969-2000 period, using panel co-integration with time series methodologies. They found that, in the long-term, financial development and economic growth seem to be related to some level of growth but, in the short-term, it demonstrates that causality runs from economic growth to financial development. They suggest that neighbouring countries should adopt measures to reduce financial repression and to help increase financial development; this view is supported by Lucas (1988). Furthermore, recent studies by Goaied and Sassi (2011) explored the nexus of the financial Islamic banking development and economic growth in some countries in the MENA. The results show insignificant relation between FIBD and EG across MENA countries. In this study, therefore, aims to investigate the relationship between financial Islamic banking development (FIBD) and economic growth (EG) in the selected countries from MENA for a reasonable time so adequate number of data can be collected. The study selects the most significant countries from MENA in which Islamic finance has a footprint referring to those limited number of studies.

3. Data and Measurement

In this paper, the quarterly time series data from (2000:1- 2014:2) of the real gross domestic product (RGDP) growth, total finance of Islamic bank's (IBFIN) and total gross capital formation (GCF) in 10 MENA Islamic countries were used (see Table 1). These countries include (Bahrain, Egypt, Jordan, Kuwait, Palestine, Qatar, Saudi Arabia, Sudan, U.A.E, and Yemen)[2] were chosen based on data availability to ensure that our sample represents a spectrum of MENA and developed financial Islamic banking, and more consistent results. Data set is extracted from International Monetary Fund's (IMF), International Financial Statistics (IFS), World Development Indicators (WDI), Datastream which contains several sources for MENA financial data, MSCI Barra, and Monthly

[2] For Libya is not included, a significant problem for a serious and statistically significant analysis is the short histories of their Islamic banking and finance.

Statistical Bulletin of MENA Banks. To eliminate local currency effect, all databases of MENA Islamic banks' financing variables and RGDP are expressed in US dollar terms.

Table 1. Sample of MENA Islamic Banks Universe

Country	Banks in Sample	Date of Establishment*
Bahrain	Bahrain Islamic Bank	1978
	Al Baraka Islamic Bank	1984
	Citi Islamic Investment Bank	1996
	ABC Islamic Bank	1998
Egypt	Nasser Social Bank	1971
	Faisal Islamic Bank	1977
	National Bank for Development	1980
Jordan	Jordan Islamic Bank	1978
Kuwait	Kuwait International Bank	1973
	Kuwait Finance House	1977
Palestine	Palestine Islamic Bank	1995
Qatar	Qatar Islamic Bank	1982
	Qatar International Islamic Bank	1990
Saudi Arabia	Al Rajhi Bank	1957
	Bank Aljazira	1975
	Islamic Development Bank	1975
Sudan	Faisal Islamic Bank	1977
	Tadamon Islamic Bank	1981
	The Sudanese Islamic Bank	1982
	The Western Sudan Islamic Bank	1983
U.A.E	Dubai Islamic Bank	1975
	Sharjah Islamic Bank	1976
	Abu Dhabi Islamic Bank	1997
Yemen	Saba Islamic Bank	1996
MENA Region	24	

Note: MENA Islamic banks' established after 2000 is not included due to the sample range is Q1:2000 up to Q4:2014, which comprises 56 observations.
Source: Authors, 2014.

4. Econometric Techniques and Empirical Results

4.1 Model Specification

The aim of this sub-section is to present and provide empirical technique evidence of the long-run causality relation between financial Islamic banking development (FIBD) and economic growth (EG) and to see the dynamic causal link between Islamic finance and economic growth. We employ the potential formwork model that can be written as follows:

Financing Model (1):

$$LRGDP_t = \alpha_0 + \alpha_1 LIBFIN_t + \varepsilon_t$$
$$LIBFIN_t = \beta_0 + \beta_1 LRGDP_t + \varepsilon_t \quad (1, a,b)$$

Capital Model (2):

$$LRGDP_t = \gamma_0 + \gamma_1 LGCF_t + \varepsilon_t$$
$$LGCF_t = \theta_0 + \theta_1 LRGDP_t + \varepsilon_t \quad (2, a,b)$$

where, LRGDP is the natural logarithm of MENA real GDP as an indicator of MENA (EG). LIBFIN, LGCF are the natural logarithm of total financing and total gross capital formation of MENA Islamic banks respectively as a measure of FIBD. $(\alpha, \beta, \gamma, \theta)$ are coefficients to be determined and ε_t error terms.

4.2 Econometric Model Techniques

Typically, econometric model techniques are fitted using three sequential steps. The first one concerns to test the stationarity of RGDP, FIN and GFCF series; second, to detect the existence of co-integration relation between the variables; third, to analyse the Granger causality between EG and FIBD in MENA countries. These techniques are modified to develop the proposed research framework, as the following.

4.2.1 Unit Root Test Identification

The pre-testing for unit roots i.e. the investigation must first establish that series of interest are non-stationary. In other words, the unite root tests are aimed at the establishing the order of integration of each variable. Both the Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) unit root tests are herein used to investigate the stationary status of each variable. However, the publications of Granger and Newbold (1974), Dickey and Fuller (1979, 1981), Nelson and Plosser (1982), Engle and Granger (1987) and Johansen (1988, 1995) have changed the way we think about all time series under concerned should not contain unit root (stationary). Although discussion of trends and their significance in economic time series can be traced to Yule (1926) and Kendall (1954), until the 1970s and, 80s the field remained mostly a curiosity. Nelson and Plosser (1982) states that almost all macroeconomic time series typically have a unit root. Thus, by taking first differences the null hypothesis of non-stationarity is rejected for most of the variables. If a series have unit root this leads to produce spurious result (Granger and Newbold, 1974). The early approach to testing for the degree of integration and stationary was called Augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1979, 1981). This approach tests for the t-statistic in equation (3) having a value of one or a value less than one.

$$\Delta Y_t = \mu + \gamma t + \alpha y_{t-1} + \sum_{i=0}^{\infty} \beta_i \Delta y_{t-i} + \varepsilon_t \quad \varepsilon_t \approx iid\,(0, \sigma^2) \tag{3}$$

A summary of the unit root tests using the hypothesis tested is given below in Table 2. The hypothesis tested:

$H_0 : \alpha = 0$ (contains a unit root, the data are not stationary).

$H_1 : \alpha < 0$ (does not contains a unit root, the data are stationary).

where Δ is the first-difference operator, and ε_t is assumed to be white-noise innovation. y is a stationary series and integrated of order zero (a random walk with drift). The test examines the negativity of the parameter α based on its regression t-test. Dickey & Fuller (1979, 1981) derived the asymptotic distribution of the statistics. Moreover, the distribution theory supporting the

test assumes the errors are statistically independent (serially uncorrelated) and have a constant variance.

Table 2. Unit Root Test with the Empirical Results

Authors	Unit Root Hypothesis
Breitung (2000)	H_0: No unit root H_1: unit root
Hadri (2000)	H_0: No unit root H_1: unit root
Levin et al. (2002)	H_0: No unit root H_1: unit root
Im et al. (2003)	H_0: No unit root H_1: Some cross-sections without a unit root
Maddala and Wu, Fisher-ADF (1999)	H_0: No unit root H_1: Some cross-sections without a unit root
Maddala and Wu, Fisher-PP (1999)	H_0: No unit root H_1: Some cross-sections without a unit root
Pesaran and Smith (2003)	H_0: No unit root H_1: Some cross-sections without a unit root

Source: Authors, 2014.

Phillips and Perron (1988) propose a non-parametric method of controlling for higher-order serial correlation in series. The test allows for the fairly mild assumptions concerning the distribution of errors i.e. it allows the distribution to be independently identically normally distributed (NIID) (Rao, 1994). Although, in theory, the pp test is known to be superior, Stock (2001) has shown that the ADF test performs better in practice. Cheung and Lai (1994, 1997 and 1998) and Martinez (1999) however, have shown that the pp test yields more favourable evidence than the ADF test. The pp test can be determined as in Eq.4:

$$\Delta Y_t = \eta_0 + \eta_1 t + \alpha y_{t-1} + \nu_t \quad (4)$$

The hypothesis tested:

$H_0 : \alpha = 0$ (contains a unit root, the data are not stationary).

$H_1 : \alpha < 0$ (does not contains a unit root, the data are stationary).

Consequently, we use both tests conducted for up to three-lag length around a non-zero mean and around a linear trend to arrive at any conclusions. The results of the unit root tests for the series of financial Islamic banking development indicators and RGDP growth are presented in Table (3). The second and third columns report tests of stationary about a non-zero mean. And then test stationary about deterministic linear time trend. The results of these tests are reported in the fourth and fifth columns of the Table (3). The reported results indicate the presence of a unit root in log levels of all variables i.e., the null hypothesis that each of time series has a unit root cannot be rejected at the five-*percent* level for both tests. Therefore, as showing from the bottom half of Table (3), there is no evidence from either test to support a unit root in first difference of all the variables (both tests reject the null hypothesis at the five-*percent* level). This indicates that the series of all the variables are non-stationary at 5 *percent* level of significance and thus any causal inferences from the two series in levels are invalid. In addition, these results are broadly consistent with the hypothesis that ball the variables under investigation are individually integrated of order one $I(1)$.

Table 3. Results for ADF/PP Unit Roots Test

Variables	Stationary around a non-zero mean		Stationary around a linear trend	
	ADF	PP	ADF	PP
Panel A: Level	*t*=2000:1-2014:2			
Ln(IBFIN)	-3.293	-2.882	-3.179	-2.424
Ln(GDP)	-2.151	-1.679	-3.065	-2.214
Ln(GCF)	-3.238	-2.441	-3.498	-2.725
Panel B: 1St Difference	*t*=2000:1-2014:2			
Ln(IBFIN)	-3.079	-5.633		
Ln(GDP)	-4.823	-5.012		
Ln(GCF)	-3.386	-5.331		
1% Critical Value	-3.957	-3.920	-4.542	-4.587
5% Critical Value	-3.045	-3.040	-3.684	-3.689
10% Critical Value	-2.662	-2.677	-3.266	-3.272

Notice: The variables are as defined in the text. The null hypothesis tested is that the relevant series contains a unit root against the alternative that it does not. The optimal lags for the ADF tests were selected based on optimising Akaike's information Criteria AIC, using a range of lags. PP is the Phillips-Perron test.

Source: Authors calculation, 2014.

Given the above observations, the study proceeds and formally tests the existence of the long-run relationship between the variables before we proceed with co-integration test. Since the co-integration test is sensitive to the lag structure of VAR model, optimal lag length needs to be determined before conducting the test. Based on the Akaike Information Criterion (AIC) (Akaike, 1973) and the Schwarz Information Criteria (SIC) (Schwarz, 1978) test which minimises AIC-SIC values is selected; lag 1 is suggested as the optimal lag length. Results of the optimal lag length test are presented in Table 4. The combination of the smallest value of AIC-SIC is used to determine the optimal number of lags to be included in the model. Indeed, Cheung and Lai (1993: 322) showed that AIC-SIC values perform poorly in the presence of moving average dependence.

Table 4. Coefficient Estimates of Optimal Lags Length for Different Order of VAR

Lags length in the VAR	Financing Model (1)		Capital Model (2)	
	AIC Criterion	SIC Criterion	AIC Criterion	SIC Criterion
0	2.0351	2.0901	1.7057	1.7810
1	-4.5908*	-4.2970*	-4.7518*	-4.3902*
2	-4.4486	-3.8669	-4.6593	-4.0824
3	-4.4905	-3.7289	-4.6603	-4.1899

Note: * indicates the selected lag order.

Source: Authors calculation, 2014.

4.2.2 Co-integration Test

The Johansen procedures focus on the rank of matrix $\alpha\beta'$, which determines the number of distinct co-integrating vectors. Johansen and Juselives (1990) and Johansen (1991) describe two likelihood ratio tests, trace and maximal Eigenvalue test, which provide the co-integration vectors and estimate the long-run parameter matrix $\alpha\beta'$. The trace test based on the stochastic matrix and is defined as represented by equation (5) and (6).

$$\lambda_{trace}(r) = -T \sum_{i=(r+1)}^{p} \log(1 - \hat{\lambda}_i) \tag{5}$$

For $r = 0,1 \ldots p-1$, where T is the number of useable observations and $\hat{\lambda}_i$ is the estimated value of the characteristic roots. The null hypothesis of this test is that the number of distinct co-integrating vectors is less than or equal to r ($i.e.$, no co-integration vector) (against the alternative $r > 0$ (one or more co-integrating vectors). The test rejects the null hypothesis if the Eigenvalue test statistics exceeds the respective critical value. In other words, a rejection of the null hypothesis means that there are more than (r) co-integrated relations. The second test, which is the so-called maximal-Eigenvalue test, is based on the following:

$$\lambda_{\max}(r, r+1) = -T \sum_{i=(r+1)}^{p} \log(1 - \hat{\lambda}_{r+1}) \tag{6}$$

For $r = 0,1 \ldots p-1$, where T is the number of useable observations; r is the number of co-integrating vectors and $\hat{\lambda}_{r+1}$ is the estimated value of the characteristic roots (called Eigenvalues) from the estimated $\alpha\beta'$ matrix. Based on the equation (6), we can also compute the maximum Eigenvalue statistic from the trace statistic as:

$$\lambda_{\max}(r, r+1) = \lambda_{trace}(r) - \lambda_{trace}(r+1) \tag{7}$$

This statistic tests the null hypothesis that the number of co-integration vectors is r against specific alternative of $(r+1)$ co-integrating vectors. The distribution of these statics depends on the number of no-stationary components ($i.e.$, the

number of variables we are testing for co-integration) defined by $(n - r)$. If the null hypothesis for both statistics is rejected, this indicates that there is one co-integrated. Before applying JJ-cointegration tests, we need to determine the lag length p in VER model. In addition p should be high enough order to ensure that the residuals are serial uncorrelated and normally distributed.

Results of the JJ-cointegration tests are presented in Table 5. The JJ-cointegration tests are based on maximum-likelihood estimates of a vector autoregressive model of (Johansen and Juselives, 1990; Johansen, 1991). This test identifies the number of stationary long-run relations that exist among an integrated time series. The JJ-cointegration test results are reported in Table (5). We first conducted a bivariate co-integration test on financial Islamic banking development (FIBD) and economic growth (EG) in MENA countries from 2000:1 to 2014:2. Table (5) reports results of this test, which included both maximum Eigenvalue and the trace statistics and the corresponding λ values. Since, the JJ-cointegration procedure is sensitive to the choice of the lag length in VAR; we selected a lag length based, as mentioned in sub-section (4.2.1), on the Akaik's information criterion (AIC). Using this lag specification, diagnostic checking tests for normality and absence of serial correlation were performed on the residuals of each equation in VAR. the results of these tests (not reported here) indicate that this lag length left the residuals approximately in an independently identically normal distribution.

The JJ-cointegration test results under both the maximum Eigenvalue and trace statistics indicate the existence of a long-run relation between the two measures of financial Islamic banking development (FIBD) (IBFIN & GCF), and real gross domestic product (RGDP) growth. The trace statistics reject the null hypotheses of r = 0 between RGDP and IBFIN; while RGDP and GCF in favour of the general alternative hypothesis of r = 1. On the other hand, the null hypotheses of r = 1 and r = 2 could not be rejected at 5 *percent* level of significance. Similarly, the maximum Eigenvalue test rejects the null hypothesis of no co-integrating vector r = 0 at 5 *percent* level of significance in favour of a specific alternative

hypothesis that there is one co-integrating vector r = 1. Nevertheless, the null hypothesis of r = 1 and r = 2 could not be rejected at the 5 *percent* level of significance. The finding that the variables are co-integrated implies the existence of long-run Granger causality in at least one direction (Granger, 1988). The Eigenvalue test, tests the null hypothesis of *r* versus *r+1* co-integrating relationships. This test rejects the null hypothesis if the Eigenvalue test statistics exceeds the respective critical value.

Table 5. The JJ-Cointegration Tests Result (VAR, 3lags)

Model	Hypothesis		Trace Test Statics $\lambda_{trace}(r) = -T \sum_{i=(r+1)}^{p} \log(1-\hat{\lambda}_i)$			Maximum Eigenvalue Statics $\lambda_{\max}(r_1, r+1) = -T \sum_{i=(r+1)}^{p} \log(1-\hat{\lambda}_{r+1})$			Eigenvalue $\hat{\lambda}_i$
				Critical Values			Critical Values		**t=**2000:1-2014:2
	H_0	H_1	Statistics	1%	5%	Statistics	1%	5%	
Financing (IBFIN)	$r = 0$	$r \geq 1$	48.472*	20.03	15.39	46.763*	18.60	14.06	0.627
	$r \leq 1$	$r = 2$	9.709	6.64	3.75	9.708	6.64	3.75	0.198
Capital (GCF)	$r = 0$	$r \geq 1$	55.194*	20.02	15.40	49.785	18.63	14.07	0.854
	$r \leq 1$	$r = 2$	14.209*	6.65	3.74	14.209*	6.65	3.74	0.356

Notice: H_0 and H_1 are the null and alternative hypotheses, respectively. λ , is the corresponding value. *denote significance at 5%. The Johansen Co-integration tests were performed with lag lengths (k=2) based on the Akaike's Information (AIC) criterion. Using these lag lengths, the residuals in each of the VAR equations were checked for normality and absence of serial correlation. *r* is the number of co-integration vectors.

Source: Authors calculation, 2014.

Consequently, the co-integrating relationship can be regarded as a long-run equilibrium state and short-run dynamics of the variables can be viewed as fluctuations around this equilibrium. Hence the short-run movements of the variables are characterised by the dynamic interaction among them with feedback going from one variable to the other, or both ways, depending on the

direction of causality. The co-integrating vectors indicate the direction in which the system should be moved to reach this long-run equilibriums state. The error-correction term indicates how far the variables are away from their long-run equilibrium path. Thus, since they are co-integrated, in each short-run period the real per capita real GDP growth and the financial Islamic banking development indicator are adjusting to their long-run equilibrium relationship.

4.2.3 Granger Causality Test

In time series econometrics variables are often defined according to forecasting principles exploiting the idea that a cause must precede its effect in time, which was first introduced in Granger (1969). Tests of Granger causality (Granger (1969), Granger (1980), Granger (1988)) have become a standard step when analysing linear systems of time series. In light of a still growing interest in dynamics of financial data recent work on causality also addresses the issue of second order causality and/or causality in variance (Granger et al., 1986; Engle et al., 1990; Cheung and Ng, 1996; Comte and Liebermann, 2000), or between macroeconomic time series (Granger et al., 1986).

Here, these models are estimated depending on an Autoregressive Distributed Lag (ARDL) approach by Pesaran and Shin (1999), where this procedure allows us to apply the model regardless of the stationarity of the variables. The results of this approach are equivalent to the results of the Error-Correction Models (ECM) (Hassler and Wolters, 2006). The ARDL method does not involve pre-testing variables, which is particularly problematic in the unit root co-integration literatures where the power of the unit root tests is typically very low and there is a switch in the distribution function of the test statistics, therefore, obviating uncertainty (Narayan, 2004). The advantage of ARDL over the ECM is that it can be applied irrespective of whether the regressors are purely $I(0)$, purely $I(1)$, or mixed.

The ARDL models are formed by an autoregressive part and a regression with distributed lags over a set of other variables, developed by Pesaran and Shin (1999) and Pesaran et al. (2001), is also known as the ARDL bounds test. The main ARDL advantage is that it is not necessary for testing the unit root of the variables, where the ARDL can be applied irrespective whether regressors stationary in level or *I*(0), stationary in first difference or *I*(1), or stationary in both *I*(0) or *I*(1), which make it preferable over other methods in estimating the long-run co-integration relationships. Following Pesaran and Shin (1997) and Pesaran et al. (2001), the ARDL approach to co-integration involves estimating the conditional error correction (ECM) version of the ARDL (*p,q*) model and its model to investigate the long-run causality in this study is divided into two models:

Financing Model (1):

1- IBFIN does not Granger causes RGDP if $H_0 : \alpha_2 = 0$ against the alternative $H_1 : \alpha_2 \neq 0$ IBFIN Granger causes RGDP, which is defended as:

$$\Delta InRGDP_t = \alpha_0 + \sum_{i=1}^{p} \alpha_1 \Delta InRGDP_{t-i} + \sum_{i=1}^{p} \alpha_2 \Delta InIBFIN_{t-i} + \delta_1 ECT_{t-1} + \nu_t \quad (8)$$

2- RGDP does not Granger causes IBFIN if $H_0 : \beta_2 = 0$ against the alternative $H_1 : \beta_2 \neq 0$, RGDP Granger causes IBFIN as follows:

$$\Delta InIBFIN_t = \beta_0 + \sum_{i=1}^{p} \beta_1 \Delta InIBFIN_{t-i} + \sum_{i=1}^{p} \beta_2 \Delta InRGDP_{t-i} + \delta_2 ECT_{t-1} + \nu_t \quad (9)$$

Capital Model (2):

3- GCF does not Granger causes IBFIN if $H_0 : \gamma_2 = 0$ against the alternative $H_1 : \beta_2 \neq 0$, GCF Granger causes RGDP as follows:

$$\Delta InRGDP_t = \gamma_0 + \sum_{i=1}^{p} \gamma_1 \Delta InRGDP_{t-i} + \sum_{i=1}^{p} \gamma_2 \Delta InGCF_{t-i} + \delta_3 ECT_{t-1} + \nu_t \quad (10)$$

4- RGDP does not Granger causes GCF if $H_0 : \theta_2 = 0$ against the alternative $H_1 : \beta_2 \neq 0$, RGDP Granger causes GCF as follows:

$$\Delta InGCF_t = \theta_0 + \sum_{i=1}^{p} \theta_1 \Delta InGCF_{t-i} + \sum_{i=1}^{p} \theta_2 \Delta InRGDP_{t-i} + \delta_4 ECT_{t-1} + \nu_t \quad (11)$$

where Δ is the first-difference operator, $InRGDP$ is natural logarithm of real GDP. $InIBFIN$ and $InGCF$ are natural logarithm of total finance of Islamic bank's and total gross capital formation of MENA countries respectively. Error correction term with lagged parameter ECT is an adaptive parameter measuring derived from the long-run co-integrated relationship, which must be stationary. ν_t is the uncorrelated white-noise residual. p_i (i=1, 2,…, n) represents the various optimal lag lengths. The magnitude and statistical significance of (δ's) in each ECT equations implies long-run causal relationship and measures the tendencies of each variable to return to the equilibrium. Although the individual ($\alpha_1, \alpha_2; \beta_1, \beta_2; \gamma_1, \gamma_2; \theta_1, \theta_2$) coefficients relating to be captured through to the short-run dynamics of the model's convergence to equilibrium. Hence, the statistical significance of the coefficient associated with ECT provides us with evidence for an EC device that drives the variables back to their long-run relationship. Consequently, all variables are expressed in logarithms and are not seasonally adjusted.

Given the results of the co-integration tests, we conduct ARDL model based causality tests using the Engle-Granger vectors, for the pairs of the two procedures shows evidence of co-integration, otherwise the causality test is conducted using first-differenced VARs. We use two statistical tests to examine the direction of causality: F-tests applied to test the dynamic exogenous terms in the ARDL, and t-tests applied to test the coefficients of the error-correction terms in the ARDL. For the financial Islamic banking development indicators for which any of these techniques shows clear evidence that they are not co-integrated with real gross domestic product (RGDP) growth we conduct causality tests using first-differenced VARs applying one type of statistical test, F-tests. Table (6) reports the results of Granger-causality tests based on the financing and capital models results in MENA region.

The calculated F-statistic p-value negatively correlated for equations (8) and (9) are (-1.119) and (-0.662) at the 5 *percent* level of significance respectively. The coefficient on the ECT for the RGDP (Eq.8) is negative and statistically significant at 5 *percent* level in which its t-value equals to (-3.941) with a magnitude equals to (-0.209) implying that adjustment coefficients are fairly low and deviations from the long-run equilibrium are eliminated slowly. Alternatively, the coefficient on the ECT in the IBFIN (Eq.9) equal to (-2.849) with t-value of (-0.078) is however statistically significant at 5 *percent* level of significance implying that adjustment coefficient is fairly high and deviations from the long-run equilibrium are eliminated rapidly with higher rate of correction relative to RGDP equation ECT. It is interesting to note that, with both procedures, the Granger-causality tests are in favour of the hypothesis that the long-run granger causality relationship between financial Islamic banking development and growth appears to be bi-directional in MENA countries.

From Table (6), the calculated F-statistics p-value for capital model are negatively correlated for equations (10) and (11) are (-0.709) and (0.623) at the 5 *percent* level of insignificance respectively. The coefficient on the error-correction term (ECT) for the RGDP (Eq.10) is statistically negative and insignificant at 5 *percent* level in which its t-value equals to (-1.670) and its magnitude is equal to (-3.126) implying that there is no long-run causality from GCF to RGDP. Although, the coefficient on the error-correction term (ECT) in the GCF (Eq.11) equal to (-0.463) with t-value of (-4.323) is however statistically negative and significant at 5 *percent* level of significance implying that there is unidirectional long-run causality between *Ln*RGDP and *Ln*GCF running from RGDP to GCF. Furthermore, the results show that the coefficients on lagged terms for both models are statistically insignificant event at both 5 *percent* and 10 *percent* level of significance. These imply that there is no short-run causality between real gross domestic product (RGDP) growth and the two measures of financial Islamic banking development (FIBD) (IBFIN & GCF). It is useful to mention that these results appears consistent with a number of previous empirical findings of Furqania and Mulyany (2009) in the case of Malaysia, Abduh and Chowdhury

(2012) for Bangladesh, Farahani and Hossein (2012) in the case of Iran and Indonesia, and Hassanudin et al. (2013) in the Bahrain; besides others.

Table 6. Causality Tests Results Based on ARDL

Financing Model "Depended Variables"	Equation	F-statistics (*P*-value)		*t*-statistics
		LnRGDP	*LnIBFIN*	*ECM*
LnRGDP	8	-	-0.525	-0.209*
			(-1.119)	(-3.941)
LnIBFIN	9	-0.229	-	-0.078*
		(-0.662)		(-2.849)
Capital Model "Depended Variables"		*LnRGDP*	*Ln**GCF***	*ECM*
LnRGDP	10	-	0.652	-1.670*
			(-0.709)	(-3.126)
*Ln**GCF***	11	0.581	-	-0.463*
		(0.623)		(-4.323)

Notice: Asterisks (*) denotes statistical significance at 5%.

Source: Authors calculation, 2014.

As can be seen from Table (6), for each of the models development indicators the Engle-Granger based causality tests reject the hypothesis of non-causality from each of these indicators to RGDP growth under both possible sources of causation (the error-correction term and the lagged dynamic term) at the 5 *percent* level of significance. Complementary to that, the ECM coefficients for all equations tested are significant and negatively correlated. This shows the evidence of causality in at least one direction. The overall ECM coefficients indicate low rate of convergence to equilibrium. Despite this argument, it is possible to make the following two main contributions. First, a simple model of the null hypothesis of finance that "*IBFIN* does not Granger cause *RGDP*" and "*RGDP* does not Granger cause *IBFIN*" were rejected. Another challenge to finance, the null hypotheses of deposits model that "*RGDP* does not Granger cause *RGDP*" was rejected, while, the null hypothesis of "*GCF* does not Granger

cause *RGDP*' was not rejected. Second, the evidence supports the view that the relation long-run causality between financial Islamic banking development and growth in MENA region is a bi-directional. Thus, reflecting a positive contribution of FIBD in financing the status and features of MENA region where most are relatively well in the areas of regulation and supervision as well as in financial openness, the relation appears to be unidirectional relations between *RGDP* and *GCF* running from *RGDP* to *GCF* need to improve liquidity and open their operations to foreign investors that FIBD in MENA countries can suffer from the problems of its economic performance.

4.2.4 Variance Decompositions

Variance decomposition (VDC) analysis indicates the percentages of a variable's forecast error variance attributable to its own innovations and innovations in other variables. Thus, therefore, it is used to quantify the contribution of a particular variable that determines the Islamic financial development in accounting for fluctuation in growth in MENA in explaining variations in the other business activity variables. Meanwhile, VDC analysis can be captures the relative importance of estimation results of the VAR in order to estimate relative strength of the variables of interest to shocks in other variables. The ordering of the variables for the VDC in this study is based on the Cholesky decomposition method to order the variables by orthogonalsing the shocks of each variable to the other variables (Lutkepohl, 1991), which suggests the following order of the variables: RGDP, IBFIN and GCF. Results of the VDC method are displayed in Table 7. As before, the lag length of the VAR model is set to 1. In all cases, the results are reported over 10 year's horizon in order to analyse the persistence of the shocks. Meanwhile, the fraction of Islamic financing forecast error variance attributable to variations in growth is 40.90 *percent*, the fraction of real income growth and *Mudarabah* investment capital forecast error variance attributable to variations in the Islamic financial deepening are approximately 61.89 and 1.62 *percent*, respectively. Accordingly, the variations of the *Mudarabah* investment

capital and the real growth rate are the most significant variables that influence the Islamic banking growth in the long-run.

Table 7. Results of Variance Decompositions (VDC) Analysis

Period	Variance Decomposition of			
	S.E.	Growth (IBFIN)	*Mudarabah* (GCF)	Growth (GDP)
1	0.008	99.000	0.000	0.000
2	0.010	94.345	0.053	5.704
3	0.012	83.394	0.129	21.598
4	0.016	71.442	0.455	32.362
5	0.021	67.805	0.789	38.460
6	0.028	58.407	1.198	44.356
7	0.032	50.895	1.302	49.099
8	0.036	47.392	1.497	55.213
9	0.039	44.421	1.562	58.776
10	0.042	40.897	1.623	61.887

Source: Authors calculation, 2014.

5. Conclusion and Recommendation

This paper employs with the relationship between financial Islamic banking development and economic growth for MENA countries, using quarterly data for the period (2000:1- 2014:2). We have attempted to investigate empirically the long-run granger causality effects within the context of ARDL framework to co-integration involves estimating the conditional error correction (ECM). In particular, we have attempted to answer the following question: is the *Islamic financial development* a leading sector in the process of economic development of *MENA*? Or is it a two-way causation? The causality issue was investigated using recent time-series techniques and utilising IBFIN and GCF as a measure of FIBD, while RGDP used as an indicator of EG.

Interestingly, this study has found evidence that there is a bi-directional long-run granger causality relationship between (RGDP) growth and IBFIN which reflects positively growth contribution of FIBD in the economic development

progress. Although, Islamic banking will not be able to contribute fully to economic growth if the economy is not growing well, hence a positive economic growth will help spur Islamic banking growth further. Additionally, the relation appears to be unidirectional long-run granger causality relations between RGDP growth and GCF that runs from RGDP to GCF, which need to improve liquidity and open their operations to foreign investors that FIBD in MENA countries can suffer from the problems of its economic performance. The *Mudarabah* based investment capital accounts make it more important for the Islamic banks to keep funds invested to generate returns for themselves and for their depositors in order to stay competitive. Essentially, with regarding to short-run causality there is no evidence for significant relationship between FIBD and EG.

Overall, the findings in this study have important policy implication for MENA and other developing countries that a similar economic structure. The evidence indicates that economic development plays a significant role in Islamic financial development. Prime Minister David Cameron said "*I want London to stand alongside Dubai and Kuala Lumpur as one of the great capitals of Islamic finance anywhere in the world*". As a result of the Islamic finance around the world, regulation is rising and is creating new challenges that need managing. Further concerns mentioned by the Financial Secretary to the Treasury Sajid Javid MP include *"[…] almost every international Islamic contract will touch London- or a London-based firm- in some way"* (Gorka, 2014). Thus, it is important to liberalise the economy when undertaking financial liberalisation and in order to promote the development of the Islamic financial market, MENA can encourage economic growth by means of the appropriate policies. Further research is needed in order to provide a clear understanding of the framework that managers face under current regulatory rules in the banking system and Islamic financial securities in general. There is also a need to identify remedies for the developing regulatory framework in order to improve current practices.

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