FINANCE AND GROWTH: EXPERIENCES OF SELECTED MUSLIM COUNTRIES

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ABSTRACT

The financial sector, the money and capital market has developed so much to the extent that it has been said as being in the transition continuously and there is always a demand for it. The financial system keeps changing and within a year, various types of new financial tools being introduced in the market. Moreover, the size of transaction taking place is so large, that it could affects the economy positively. If financial development causes economic growth, this is in line with the "supply-leading" views, whereas if economic growth that causes financial development then it is suitable with the "demand-following" views. Focusing on OIC countries, the study aims to investigate the impact of financial development on economic growth or vice versa, in respective countries. In particular, the study analyzes the relationship between financial development (measured by credit to the private sector or deposit liabilities) and per capita real gross domestic product (GDP) using the widely adopted Granger causality test and the more recent Toda and Yamamoto's (1995) non-causality test to establish the direction of causation between the two variables, besides other controlled variables. Additionally, we adopt an innovation accounting by simulating variance decompositions (VDC) and impulse response functions (IRF) for further inferences. Data collected are ranging from 1960-2005 for each country and only countries which have sufficient data (minimum of 30 years) are selected and used in the analysis. Base on this, we select the following countries in this study: Bahrain, Egypt, Iran, Jordan, Kuwait, Libya, Malaysia, Pakistan, and Saudi Arabia. The results of study indicate that majority of Muslim countries' financial development is attributable to their economic growth or economic

performance. This is mainly support the "demand-following" views that economic growth causes financial development.

Keywords: Financial development, economic growth, causality tests, impulse response functions

INTRODUCTION

The relationship between finance and economic growth is among the subject of interest in the area of economic research and development program. Past literatures and even the existing literature have been trying to analyze the impact of finance towards economic growth from different angles. This is due to the fact that financial sector, the money and capital market has developed so much to the extent that it has been said as being in the transition continuously and there is always a demand for it. The financial system keeps changing and within a year, various types of new financial tools being introduced in the market. Moreover, the size of transaction taking place is so large, that it could affects the economy positively.

With regards to the notion of which causes which, the study by Al-Yousif (2002) mentioned that either direction of causality between financial development and economic growth could occurs. If financial development causes economic growth, this is in line with the "supply-leading" views, whereas if economic growth that causes financial development then it is suitable with the "demand-following" views. Nevertheless, there is also a third view where there exist bidirectional causality relationship between financial development and economic growth. This view is proven by studies of Demetrides and Hussein (1996) and Greenwood and Smith (1997). Apart from that, there is also a possibility that none causality relationship exists between these variables. One evidence is found in the study by Lucas (1988).

Thus, economists give a special highlight and try to explain the relationship of both, financial development and economic growth. Where an accurate measures of the impact, could lead to a better economic decision and policies of a nation. Huang (2005) proved that financial development have a positive results to growth given that, the size of the impact depends on the characteristic of a nation, its policy and institutional quality. Looking at financial development alone,

Outreville (1999) performed a study based on cross sectional data of 57 developing countries and concluded that if financial development was to be considered in promoting the economic growth, it relied too much on the human capital and socio-political stability of a nation.

Based on analysis of the Granger causality within the vector error correction model (VECM), Choong et.al (2005) looked at the perspective of the stock market. They come into conclusion that the stock market development Granger causes economic growth, yet just like the precaution given by Huang (2005) and Outreville (1999), they stated that the causal relationship depends heavily on a nation's monetary policy. So the impact always depends on the size and policy of a nation. Discussing the experienced of Bangladesh, using the same method of Granger causality, Salah-uddin (2009) proved that in Bangladesh, there is no such long run relationship between economic growth and financial development. Interestingly, the result is in contrast, for the short run. With regards to Lesotho, a study on this African economy by Aziakpono (2003) indicated that, there is a weak relationship of financial development and economic growth in Lesotho. In fact, the macroeconomic variables also could not explain the growth in per capita GDP. This is due to the size of Lesotho as a small nation, and its economic growth is much more influenced by the external dependence and moreover, the role of its institutional and structural factors. Further, Acharya et.al (2009) studied the relationship between finance and growth in India. Using a panel cointegration, and Fully Modified Ordinary Least Squares (FMOLS), they concluded that in India, there is a long run relationship between financial development and economic growth.

Analyzing previous literature, the observation is that much of the work in the past concentrated on the cross sectional country data which understate or overstate the result of the causality test or the study just base on a single country. Furthermore, the application in most studies using Granger causality was hardly supported by other alternative methods of analysis and studies of Muslim countries on this issue are very scanty. Using a time series analysis on selected OIC countries, this present study uses the vector autoregression (VAR) approach to look at relationship between financial development and economic growth using Granger causality test complemented by Toda and Yamamoto non-causality test. Moreover, to strengthen the findings, we adopt Impulse Response Functions (IRF) and Variance

Decomposition (VDC) analyses. The major differentiating factor of this study is to look at the issue on each selected OIC countries using a time series analysis.

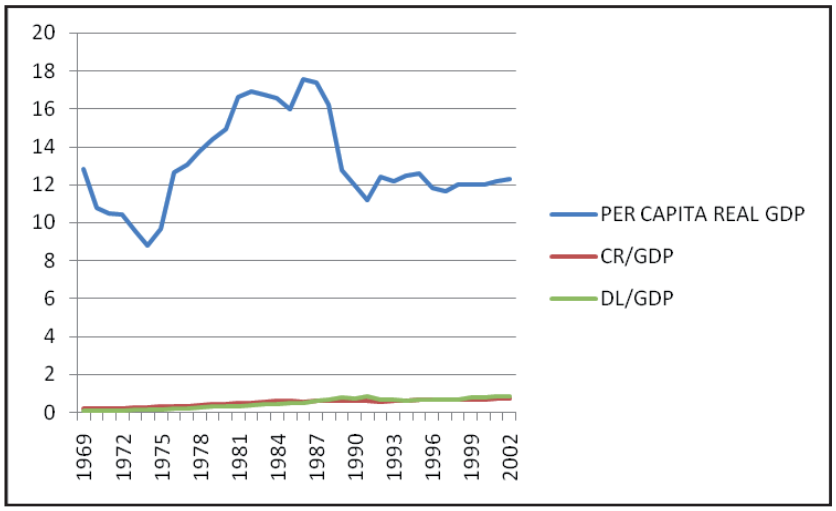
This study is organized as follows. Following the introduction in section 1, Section 2 provides background of the study, Section 3 reviews data and empirical method, Section 4 presents and analyzes the empirical results and Section 5 concludes.

BACKGROUND

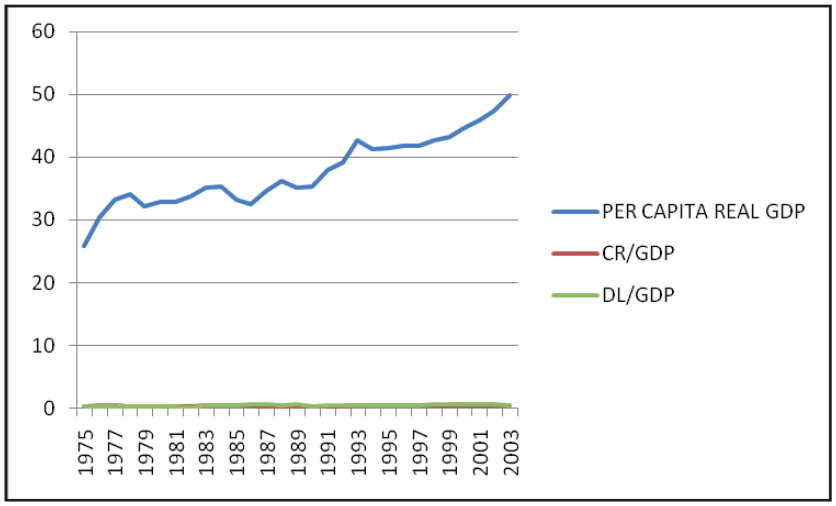
The Organisation of Islamic Cooperation (OIC)is an international organisation consisting of 57 member states. The organisation attempts to be the collective voice of the Muslim world and attempts to safeguard the interests and ensure the progress and well-being of Muslims. The OIC has a permanent delegation to the United Nations, and describes itself as the second largest international organisation after the United Nations. According to its charter, the OIC aims to preserve Islamic social and economic values; promote solidarity amongst member states; increase cooperation in social, economic, cultural, scientific, and political areas; uphold international peace and security; and advance education, particularly in the fields of science and technology.

The OIC members have a combined GDP (at PPP) of USD10,140,000,000,000. Turkey had the highest GDP in 2010 among OIC members at USD729 billion at nominal exchange rates.The richest country on the basis of GDP per capita is Qatar at USD 103,204 per capita. Figure 1 displays the OIC countries' (selected in the present study) trend of economic growth and financial development, generally from 1969 until 2002. The economic growth is measured by using per capita real GDP and financial development is measured by credit to the private sector (expressed as ratio of GDP) or/and deposit liabilities (also expressed as ratio of GDP). It could be observed that financial development in almost all countries slowly increased in spite of volatility of economic growth in some countries. In Egypt, Bahrain and Malaysia, both economic growth and financial development increased hand in hand. Although the financial development might contribute to the overall economic performance of the countries, a formal test of the relationship is worth to be conducted to empirically prove the hypothesis.

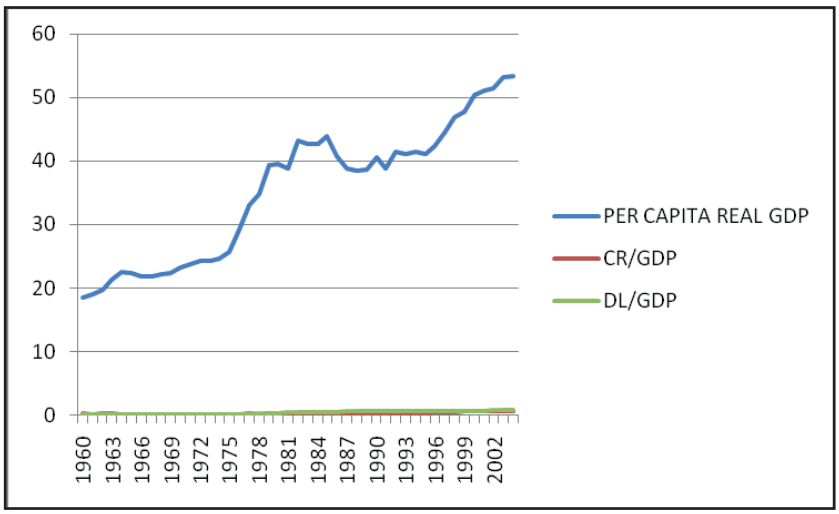
Figure 1: Economic Growth and Financial Development Movements of the Selected Muslim Countries in Study



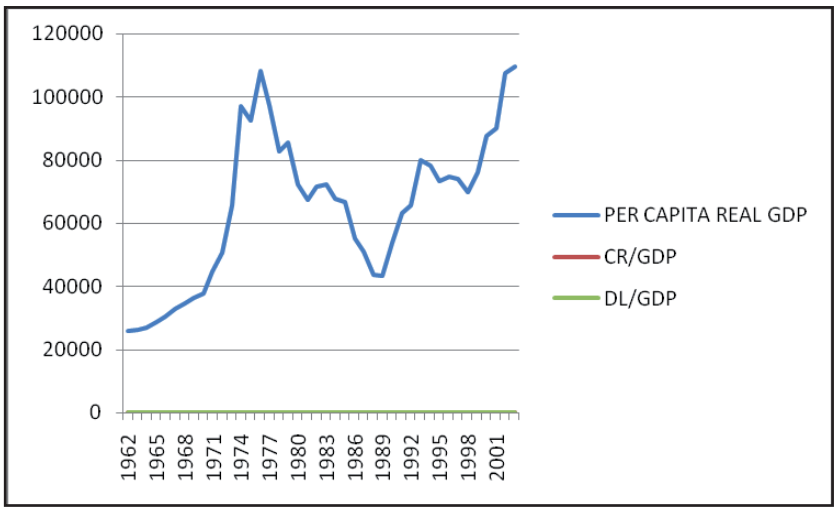
Bahrain



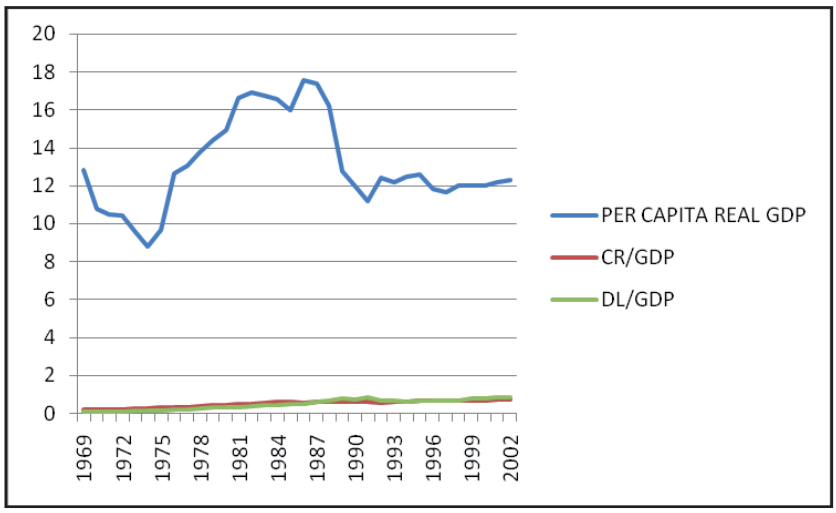
Egypt



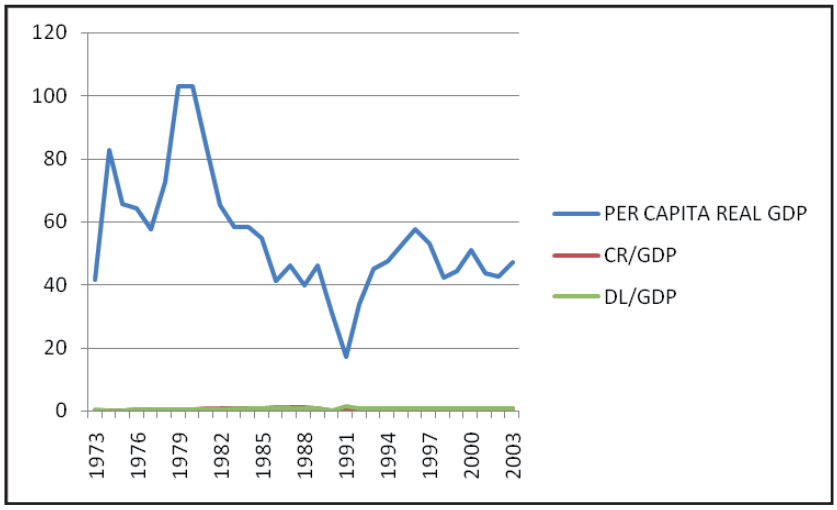
Iran



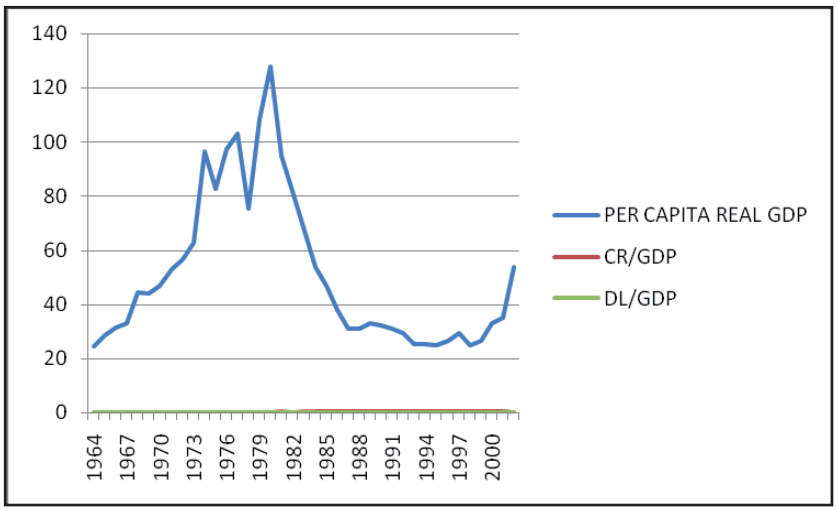
Jordan



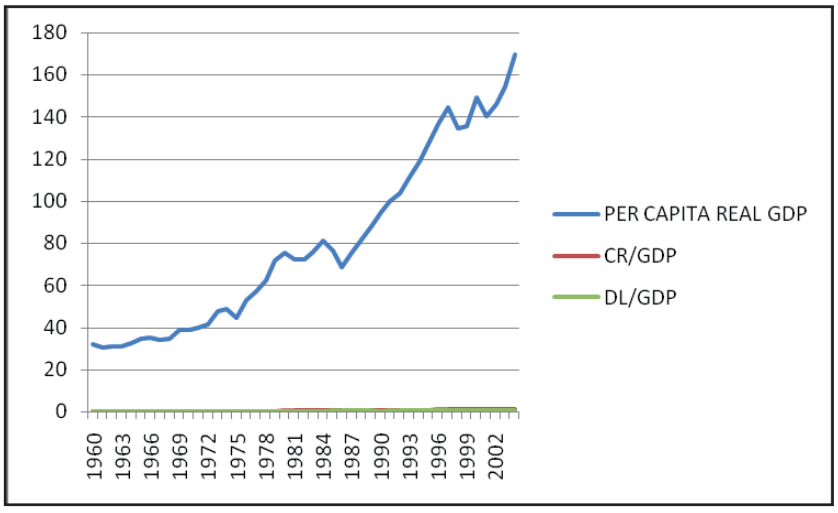
Kuwait



Libya



Malaysia



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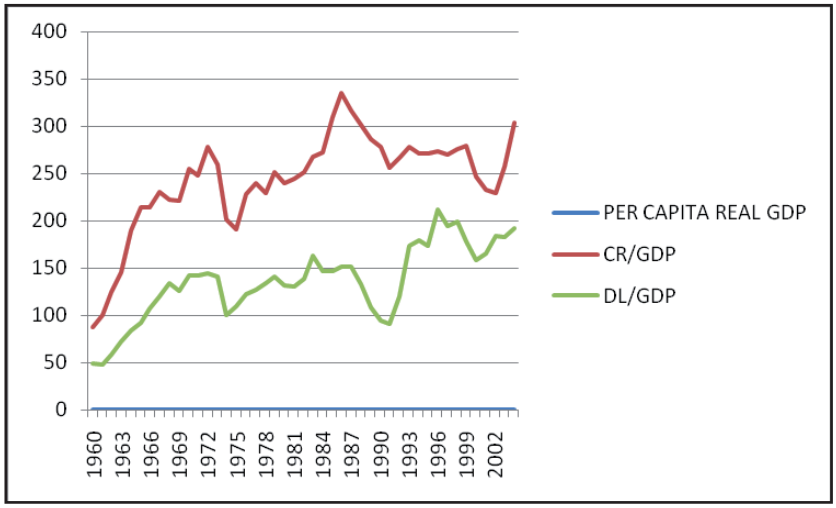
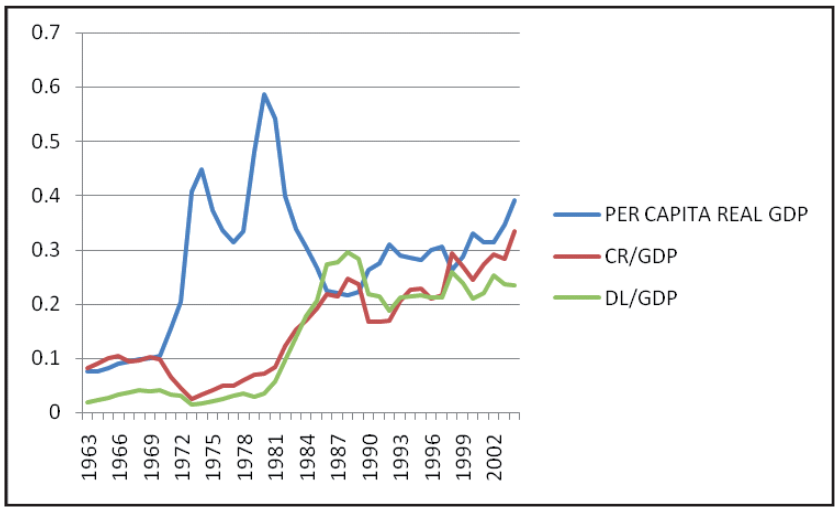


Saudi Arabia



Recently, the global financial and economic crisis of 2008-09 has brought to the forefront a wide range of issues concerning the stability and soundness of the conventional financial system. Islamic finance is emerging as an alternative source of finance in addressing the major development challenges faced by many OIC countries. The global market for Islamic financial services, as measured by the total volume of Shariah compliant assets, is estimated to have reached US$ 1.1 trillion at end of2011. OIC countries, with a collective share of 98 percent in these assets, continue to be the main actors in the industry's impressive growth story. This could also be the factor contributing to increasing trend of financial development in these countries.

DATA AND EMPIRICAL METHOD

For the analysis, the current study adopts yearly data of OIC countries available from the IMF International Financial Statistics (IFS) database. The time series data are ranging from 1960-2005 and only countries with sufficient data availability (minimum of 30 years) are selected and used for estimation. Thus, out of 51 OIC countries available in the *IMF International Financial Statistics* (IFS) database; only nine OIC countries; namely Bahrain, Egypt, Iran, Jordan, Kuwait, Libya, Malaysia, Pakistan and Saudi Arabia are selected with sufficient number of observations to be used for the purpose of this study.

For models development, the variables of interest are 1) economic growth, measured by per capita real GDP; 2) financial development, measured by two proxies either credit to the private sector (expressed as ratio of GDP) or deposit liabilities (also expressed as ratio of GDP); 3) investment, measured by the fixed capital formation as a ratio of GDP, and 4) inflation, measured by the consumer price index (CPI). The variables are expressed in logarithmic form denoted by 'ln' and Δ indicates the first difference operator.

With regards to the methodology, the properties of stationarity of the variables are checked first using the Augmented Dickey Fuller (ADF) and the Phillips-Perron (PP) tests (Dickey and Fuller, 1981; Phillips and Perron, 1988). A time series is said to be integrated of order d, [I(d)] if it requires differencing d times to achieve stationarity.

The next step is to select the optimumlag (k) which will be used in the causality models. The respective lag length, k is chosen based on the lag length criteria. This is important as if there are too

many lagged terms, it will consume the degrees of freedom while if there is too little lagged terms, it will lead to model misspecification.

This study basically implements the widely used Granger causality test and the more recent Toda and Yamamoto's (1995) non-causality test to establish the direction of causation between the variables, particularly, financial development and economic growth, besides other controlled variables. Generally, the Granger causality models are as following:

$$\Delta \ln gdp_t = \alpha_1 + \sum_{i=1}^{k} \beta_i \Delta \ln gdp_{t-i} + \sum_{i=1}^{k} \phi_i \Delta \ln fin_{t-i} + \sum_{i=1}^{k} \delta_i \Delta \ln inv_{t-i} + \sum_{i=1}^{k} \rho_i \Delta \ln cpi_i + Dcrisis + \upsilon_t \quad (1)$$

$$\Delta \ln fin_t = \alpha_1 + \sum_{i=1}^{k} \theta_i \Delta \ln gdp_{i-i} + \sum_{i=1}^{k} \mu_i \Delta \ln fin_{t-i} + \sum_{i=1}^{k} \delta_i \Delta \ln inv_{t-i} + \sum_{i=1}^{k} \rho_i \Delta \ln cpi_i + Dcrisis + \upsilon_t \quad (2)$$

where lngdp = per capita real GDP ; ln*fin* is financial development variable (either ln*cre* = credit to private sector as ratio to GDP or ln*dep* = deposit liabilities as ratio to GDP) ; ln*inv*= fixed capital formation as ratio to GDP ; and ln*cpi*= consumer price index. *Dcrisis* is dummy variable for the 1997 and 2008 financial and economic crises (0= non-crises periods and 1=during crises periods), Δ is first-difference operator and *k* is the optimal lag length. The focus of analysis in equation 1 is basically on financial development variable (either ln*cre* or ln*dep*) as it is perceived that financial development might contribute to the growth of the economy. In equation 2, the focus variable is ln*gdp* as it is also perceived that good economic performance is crucial for the financial development of a country. The test, therefore, amounts to testing the significance of null hypotheses $\phi_i = 0$ and $\theta_i = 0$. From equation (1), financial development "Granger-causes" real GDP per capita if its null hypothesis is rejected and from equation (2), real GDP per capita "Granger-causes" financial development if its null hypothesis is rejected. Unidirectional causality will occur between two variables if either null hypothesis of equation (1) or (2) is rejected. Bidirectional causality existed if both null hypotheses are rejected and no causality existed if neither null hypothesis of equation (1) nor equation (2) is rejected.

Besides the Granger causality test, we also employ the augmented level VAR approach suggested by Toda and Yamamoto (1995) to check the causal nexus between the variables. Unlike the Granger test, the Toda-Yamamoto (T&Y) approach to causality does not require a priori knowledge of the variables' cointegration properties. Econometrically, it circumvents the problem of pre-testing bias associated with Granger test. So long as the order of integration of the process does not exceed the true lag length of the model, the approach is applicable in the absence of cointegration and/or of the stability and rank conditions (Toda and Yamamoto, 1995). As for Toda and Yamamoto's (1995) non-causality test, the following specifications are estimated:

$$\ln gdp_t = \alpha_1 + \sum_{i=1}^{k+d-\max} \beta_i \ln gdp_{t-i} + \sum_{i=1}^{k+d-\max} \phi_i^* \ln fin_{t-i} + \sum_{i=1}^{k+d-\max} \delta_i \ln inv_{t-i} + \sum_{i=1}^{k+d-\max} \rho_i \ln cpi_i + Dcrisis + \upsilon_t \quad (3)$$

$$\ln fin_t = \alpha_1 + \sum_{i=1}^{k+d-\max} \theta_i^* \ln gdp_{t-i} + \sum_{i=1}^{k+d-\max} \mu_i \ln fin_{t-i} + \sum_{i=1}^{k+d-\max} \delta_i \ln inv_{t-i} + \sum_{i=1}^{k+d-\max} \rho_i \ln cpi_i + Dcrisis + \upsilon_t \quad (4)$$

where*d-max* is the maximal order of integration suspected in the system. The null hypotheses that $\phi_i^* = 0$ and $\theta_i^* = 0$ are tested based on a modified Wald test statistic for parameter restrictions, which is shown to be asymptotically Chi-square distributed. The null hypothesis set for equation (3) is $\phi_i^* = 0 \forall_i \leq k$ and for equation (4) is $\theta_i^* = 0 \forall_i \leq k$ From equation (3), financial development causes real GDP per capita if its null hypothesis is rejected and from equation (4), real GDP per capita causes financial development if its null hypothesis is rejected. Unidirectional causality will occur between two variables if either null hypothesis of equation (3) or (4) is rejected. Bidirectional causality existed if both null hypotheses are rejected and no causality existed if neither null hypothesis of equation (3) nor equation (4) is rejected.

Furthermore, we adopt an innovation accounting by simulating variance decompositions (VDC) and impulse response functions (IRF) for further inferences. VDC and IRF serve as tools for evaluating the dynamic interactions and strength of causal relations among variables in the system. The VDC indicate the percentages of a variable's forecast error variance attributable to its own innovations and innovations in

other variables. Thus, from the VDC, we can measure the relative importance of financial development fluctuation in accounting for the variations in real GDP. Moreover, the IRF trace the directional responses of a variable to a one standard deviation shock of another variable. This means that we can observe the direction, magnitude and persistence of economic growth to variation in the financial development, vice versa.

EMPIRICAL FINDINGS

As a preliminary step, we first subject each variable to Augmented Dickey Fuller (ADF) and Phillip-Perron (P-P) unit root tests. The results of the tests are displayed on Table 1. It is found that most of the variables (ln*gdp*, ln*cre*, ln*dep*, ln*inv* and ln*cpi*) are significant or integrated at order one I(1). The null hypothesis that there is a unit root is rejected at first difference. Thus, at first difference most of the variables are stationary. In case where it is not stationary, or stationary at level, the variable will be dropped from the VAR estimation.

Table 1: Unit Root Tests Results

Country/ years	Variable	ADF test statistic (with trend and Intercept)		PP test statistic (with trend and Intercept)	
		Level	First Difference	Level	First Difference
Bahrain (1975-2003)	Lngdp	-3.189	-4.981***	-3.880**	-10.316***
	Lncre	-2.232	-5.370***	-2.324	-5.370***
	Lndep	-4.212**	-4.810***	-4.354***	-14.308***
	Lninv	-2.679	-4.087**	-2.633	-4.087**
	Lncpi	-1.712	-2.456	-0.732	-2.489
Egypt (1960-2004)	Lngdp	-2.340	-3.339*	-1.754	-5.150***
	Lncre	-2.483	-6.855***	-2.470	-6.854***
	Lndep	-3.584**	-4.984***	-1.316	-5.049***
	Lninv	-1.418	-5.776***	-1.775	-5.825***
	Lncpi	-2.398	-2.562	-2.189	-2.428

Iran (1962-2003)	Lngdp	-4.098**	-3.658**	-1.864	-4.402***
	Lncre	-2.063	-4.281***	-1.989	-4.281***
	Lndep	-2.107	-4.191**	-2.110	-6.130***
	Lninv	-1.808	-1.547	-2.773	-5.822***
	Lncpi	-3.070	-3.482*	-3.325*	-3.257***
Jordan (1969-2002)	Lngdp	-1.999	-4.317***	-1.539	-4.293***
	Lncre	-1.516	-6.067***	-1.516	-6.500***
	Lndep	-1.372	-4.015**	-1.558	-6.535***
	Lninv	-2.245	-6.279***	-1.855	-6.281***
	Lncpi	-1.557	-3.933**	-0.496	-2.995
Kuwait (1960-2005)	Lngdp	-2.711	-5.147***	-2.757	-5.668***
	Lncre	-1.286	-6.252***	-1.230	-6.542***
	Lndep	-3.072	-6.508***	-3.133	-6.674***
	Lninv	-2.868	-4.668***	-2.882	-11.339***
	Lncpi	-3.508*	-4.707***	-3.322*	-7.428***
Libya (1964-2002)	Lngdp	-2.326	-0.608	-1.997	-4.982***
	Lncre	0.970	-4.020**	-0.506	-9.042***
	Lndep	-1.090	-5.260***	-1.205	-5.260***
	Lninv	-2.377	-6.044***	-2.448	-6.131***
	Lncpi	-0.327	-4.692***	-0.672	-4.880***
Malaysia (1960-2005)	Lngdp	-3.141	-5.775***	-3.256*	-6.287***
	Lncre	-1.939	-2.848	-1.939	-8.093***
	Lndep	-1.681	-5.831***	-1.742	-7.504***
	Lninv	-1.719	-4.634***	-0.973	-4.506***
	Lncpi	-2.847	-2.467	-1.958	-3.440*
Pakistan (1960-2005)	Lngdp	-1.171	-6.130***	-1.245	-6.131***
	Lncre	-4.354***	-3.985**	-4.364***	-4.180**
	Lndep	-3.958**	-4.954***	-2.806	-4.965***
	Lninv	-3.185	-4.889***	-2.910	-6.154***
	Lncpi	-3.663**	-2.129	-2.535	-2.609

Saudi Arabia (1963-2005)	Lngdp	-2.473	-3.690**	-1.640	-3.401*
	Lncre	-2.393	-3.821**	-1.829	-4.239***
	Lndep	-1.793	-4.151**	-1.601	-4.151**
	Lninv	-2.228	-4.080**	-2.329	-5.949***
	Lncpi	-1.463	-3.401*	-1.063	-2.375

*Note: ***, **, and * denote significance at 1%, 5% and 10% respectively.*

Next, the maximum lag length, k, is choosen based on the lag length criteria. Since there is a maximum of 4 endogenous variables (ln*gdp*, ln*dep* or ln*cre*, ln*inv* and ln*cpi*), most of the time, the lag length choose is 1 or 2 (less than 4) taking into consideration the loss in degrees of freedom. The results for the causality tests performed in this study are summarized in Table 2.

Table 2 also displays results of both causality tests, Granger and Toda and Yamamoto.It could be concluded from the Granger causality test that there exist bidirectional causality between economic growth and financial development in Egypt, Jordan and Malaysia. In the case of Egypt and Jordan, bidirectional causality between the two variables is proven by Toda and Yamamoto test where the null-hypotheses of financial development (ln*cre*) not causes economic growth (ln*gdp*) and economic growth (ln*gdp*) not causes financial development (ln*cre*) are rejected at standard significance levels (1 percent, 5 percent and 10 percent). As of Malaysia, the bidirectional causality is proven by Granger causality test when both null hypotheses of no causality are rejected at 1 percent significant level. Comparing the three countries, based on degree of significance of the chi-squared statistics, we could infer that the bidirectional causality between financial development and economic growth are stronger in Malaysia and Jordan than in Egypt. In general, it could infer that all these countries have both 'demand-following and 'supply leading' relationships as regard to financial development and economic growth.

With regards to unidirectional causality, Iran and Kuwait proved to have a 'demand-following' relationship where their economic growth promotes the development in financial sector. This relationship is proven by both Granger causality test and Toda Yamamoto non-causality test with chi-squared statistics significant at 1 percent level. As of Kuwait, the relationship is only proved by Granger causality test.

Moreover, in case of Iran, it is interesting to see that the subsequent effect from the economic growth on financial development is that financial development tends to promote investment to the country. This could be seen from the direction of causality from lncre to lninv which are significant at 10 % in both causality tests. Thus, the advancements and developments in financial sector of Iran are crucial in promoting her investment.

Table 2: Results of Causality Tests

Country	Variables	Lag length (k)	Granger Causality	χ^2 statistic	T&Y non-causality	χ^2 statistic
Bahrain	lngdp, lncre, lninv.	1	None	-	None	-
Egypt	lngdp, lncre, lninv.	2	Δlncre Δlngdp Δlninv Δlngdp	4.98* 8.40**	lncre ↔ lngdp lninv lngdp	5.41*,4.85* 4.78*
Iran	lngdp, lncre, lninv.	2	Δlngdp Δlncre Δlngdp Δlninv Δlncre Δlninv	9.96*** 18.13*** 5.52*	lngdp lncre lngdp lninv lncre lninv	10.45*** 14.31*** 4.85*
Jordan	lngdp, lncre, lninv, lncpi.	2	Δlncre Δlngdp Δlncpi Δlngdp Δlncre Δlncpi	4.72* 6.97** 10.05***	lncre ↔ lngdp lncpi lngdp lncre lncpi	10.98***, 7.54** 5.35* 7.01**
Kuwait	lngdp, lncre, lninv.	1	Δlngdp Δlncre Δlninv Δlncre	3.14* 2.76*	None	-
Libya	lngdp, lndep, lninv, lncpi.	1	None	-	None	-

Malaysia	lngdp, lncre, lninv, lncpi.	2	Δlncre↔ Δlngdp Δlngdp Δlncpi Δlncre Δlncpi	9.27***, 16.18*** 15.89*** 6.18**	lngdp lncre lngdp lncpi	12.15*** 16.89***
Pakistan	lngdp, lndep, lninv.	1	None	-	None	-
Saudi	lngdp, lncre, lninv, lncpi.	2	Δlncpi Δlngdp Δlncpi Δlninv	4.69*, 5.43* 15.38***	None	-

Notes: 1. The above table displays the chi-squared statistics of causality test which are significant at 1%, 5% and 10% levels only.
2. ↔ indicates a bidirectional causality relationship
3. indicates a unidirectional causality relationship

Further, both causality tests results suggest that there is no direct, neither uni nor bi-directional, relationship between financial development and economic growth for Bahrain, Libya, Pakistan and Saudi Arabia.

For further inferences, we compute variance decompositions and impulse response functions from estimated VAR. The results of impulse response functions (IRF) and variance decomposition (VDC) of variables real GDP and financial development (ln*cre* or ln*dep*) are displayed on Figure 1 and Table 3, respectively. From Figure 2, the IRF of Bahrain shows that ln*cre* does not react significantly to lngdp innovation. Similarly, the response of lng*dp* to innovation of lncre is also insignificant. As for Egypt, the IRF shows that ln*cre* responses significantly to innovation of lngdp for almost 5 years before it subsides to zero. The initial response is negative and then follows later by positive response. The response of lng*dp* to ln*cre* innovation is basically positive for almost 8 years before it subsides to zero. Significant response of ln*cre* to lng*dp* innovation is also obvious from IRF of Iran. The response started with negative direction and ended

with positive direction which implies the importance of economic growth to financial development. The response, however, lasts for almost 4 years. On the other hand, response of ln*gdp* to innovation of ln*cre* is not significant. For Jordan, the response of ln*cre* to ln*gdp* innovation is mostly positive and lasts longer for almost 9 years. Similarly, response of ln*gdp* to ln*cre* innovation is also positive and lasts for almost similar years. As of Kuwait, response of ln*cre* to ln*gdp* is significant with negative direction for 2 years before it turns to positive direction. Again, this signifies the importance of economic growth to financial development at least after 2 years since 1960 in Kuwait. However, the response of ln*gdp* to ln*cre* innovation is found to be not significant. For Libya, the response of ln*dep* to ln*gdp* innovation is only significant for 3 years but with negative direction. On the other hand, the response of ln*gdp* to innovation in ln*dep* is traced to be insignificant. In the case of Malaysia, response of ln*cre* to ln*gdp* innovation is mostly positive and significant and lasts for almost 6 years before it subsides to zero. This signifies the importance economic growth in having financial development in the country. The response of ln*gdp* to ln*cre* innovation is also significant. However, the response direction is only positive on the sixth year as it was negative earlier for short period of time (2-3 years). As of Pakistan, both responses of ln*dep* to ln*gdp* innovation and ln*gdp* to ln*dep* innovation are not significant. Similar to Bahrain and probably Libya, the financial development of the country is not contributed by her economic performance and the economic performance of the country is also not contributed by her financial development. Finally, for Saudi Arabia, the response of ln*cre* to innovation of ln*gdp* is significant but with negative direction for 2 years (since 1963) and followed by positive direction from year 4 to year 10, before it subsides to zero. Response of ln*gdp* to ln*cre* innovation, however, is not significant at all.

As discussed earlier, the variance decomposition is an alternative method to IRF for examining the effects of shocks to the dependent variables. It determines how much of the forecast error variance for any variable in a system is explained by innovations to each explanatory variable, over a series of time horizons. Usually own series shocks explain most of the error variance, although the shock will also affect other variables in the system. From Table 3, the VDC substantiates the significant role played by financial development (ln*cre*) in accounting for fluctuations in economic growth (ln*gdp*) in

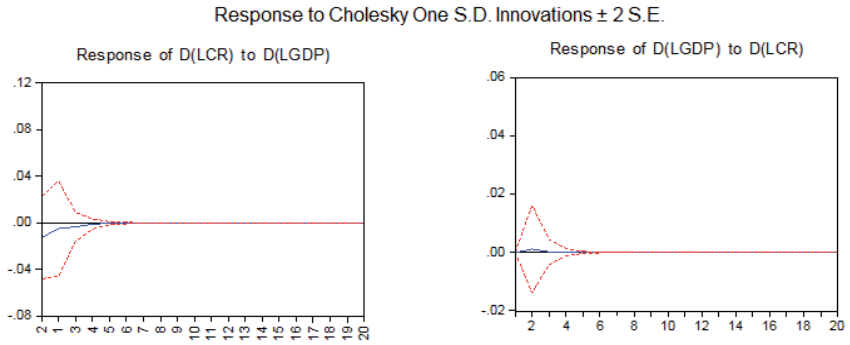
two countries, Egypt and Malaysia, with the fraction of ln*gdp* forecast error variance attributable to variation in ln*cre* more than 10percent. The similar fraction of ln*gdp* forecast error variance attributable to variation in ln*cre* in Jordan and Saudi Arabia are between 7 to 9 percent, with 8.5 percent in Jordan and 7.6% in Saudi Arabia for long time horizon (up to year 20). On the other hand, the percentage of ln*gdp* forecast variance explained by innovation in ln*cre* is very small which less than 10 percent though at longer time horizon for Kuwait, Iran, Libya and Pakistan. Thus, the VDC results also highly support the importance of financial development to economic growth in Egypt and Malaysia and to some extent, for Jordan and Saudi Arabia, but not for other countries in study.

Looking at the ln*cre* forecast error variance attributable to variation in ln*gdp*, results of six countries are found to signify the importance of economic growth to financial development. Those are Egypt, Iran, Jordan, Kuwait, Malaysia and Saudi Arabia. For Egypt, Malaysia, Jordon, Iran and Kuwait, the VDC results fully support the previous findings using causality tests. However, for Saudi Arabia, the VDC results add to the previous findings that in this country too, the economic growth is substantially important to her financial development. As of Pakistan, the forecast error variance on ln*cre* due to innovation in ln*gdp* is less than 10 percent with 6.2 percent in year 20 and as for Bahrain and Libya, the forecast error variance for both countries are even lower than 5 percent. These results indicate the independence of these countries' financial development from their economic performance.

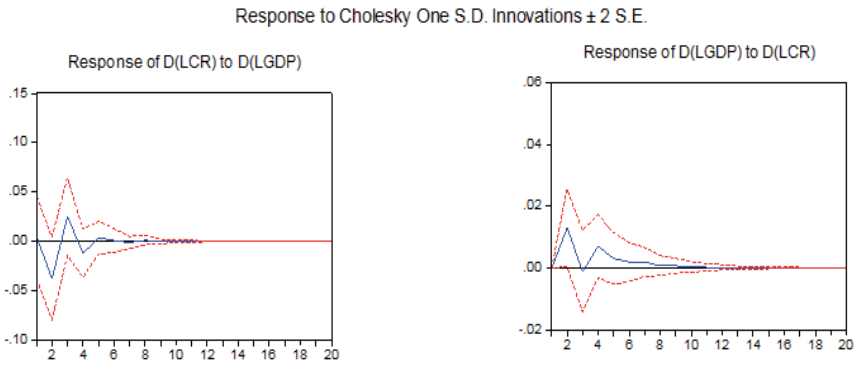
Overall, it could be concluded that, based on the selected sample countries in the study, majority of Muslim countries' financial development is attributable to their economic growth or economic performance. This mainly supports the "demand-following" views. Nonetheless, financial development could also be an important factor in promoting economic growth as proven by most previous studies, in particular, for countries such as Egypt, Malaysia and to some extent Jordan and Saudi Arabia which are experiencingfast development of their financial sector.

Figure 2: Impulse Response Functions

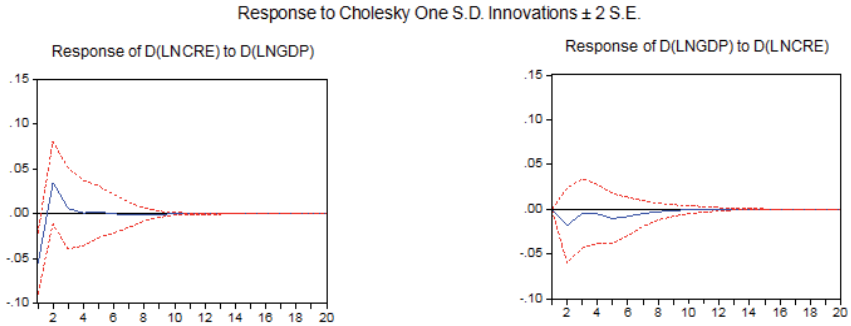
Bahrain



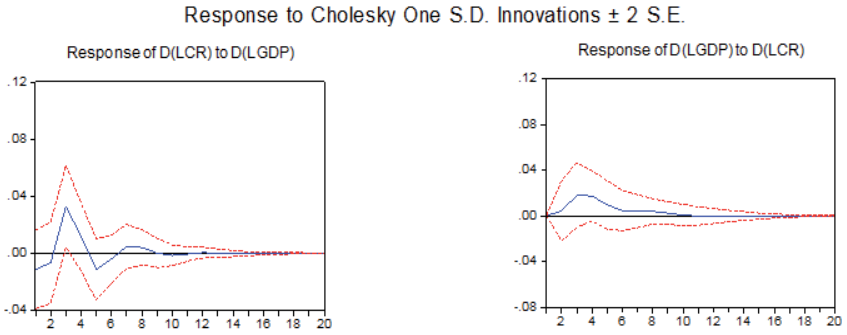
Egypt



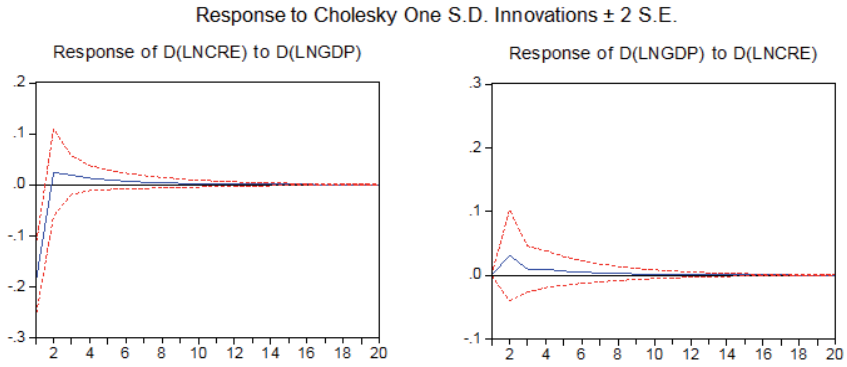
Iran



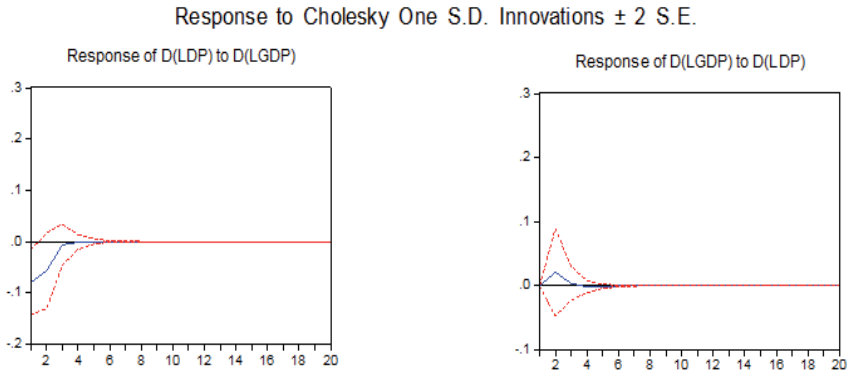
Jordan



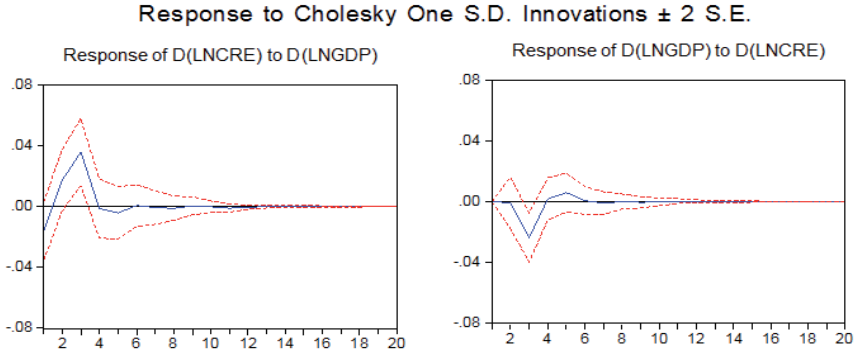
Kuwait



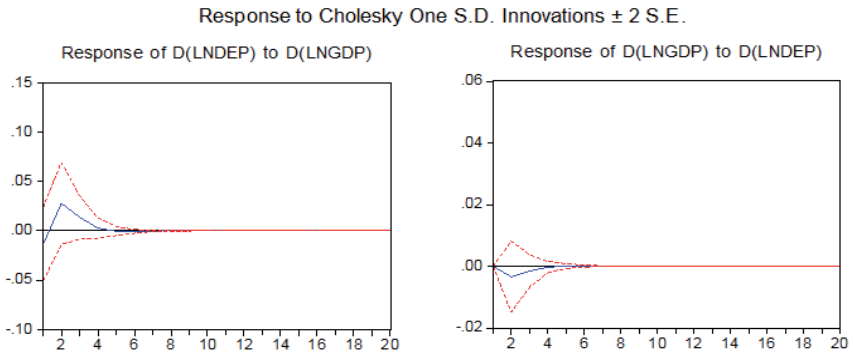
Libya



Malaysia



Pakistan



Saudi Arabia

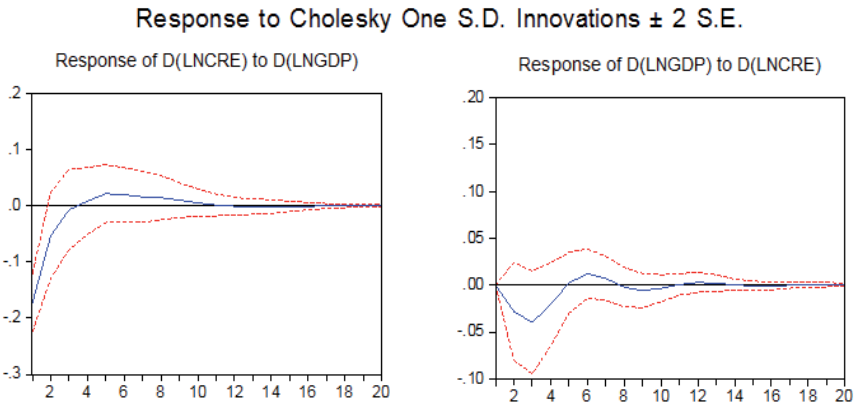


Table 3: Variance Decomposition

Bahrain

Variance Decomposition of D(LGDP):

Period	S.E.	D(LGDP)	D(LINV)	D(LCR)
1	0.038849	100.0000	0.000000	0.000000
2	0.039949	97.00101	2.911338	0.087650
4	0.040036	96.69278	3.218019	0.089203
6	0.040036	96.69069	3.220112	0.089202
8	0.040036	96.69067	3.220128	0.089201
10	0.040036	96.69067	3.220128	0.089201
12	0.040036	96.69067	3.220128	0.089201
16	0.040036	96.69067	3.220128	0.089201
20	0.040036	96.69067	3.220128	0.089201

Variance Decomposition of D(LCR):

Period	S.E.	D(LGDP)	D(LINV)	D(LCR)
1	0.106075	0.199033	44.50621	55.29476
2	0.106980	1.548223	43.95165	54.50012
4	0.107117	1.643645	43.99599	54.36037
6	0.107119	1.644142	43.99663	54.35923
8	0.107119	1.644146	43.99663	54.35922
10	0.107119	1.644146	43.99663	54.35922
12	0.107119	1.644146	43.99663	54.35922
16	0.107119	1.644146	43.99663	54.35922
20	0.107119	1.644146	43.99663	54.35922

Egypt

Variance Decomposition of D(LGDP):

Period	S.E.	D(LGDP)	D(LINV)	D(LCR)
1	0.037499	100.0000	0.000000	0.000000
2	0.042587	77.68778	12.99260	9.319626
4	0.047506	63.84338	26.43902	9.717608
6	0.048086	62.45489	27.48821	10.05690
8	0.048166	62.25276	27.53075	10.21649
10	0.048177	62.22772	27.53399	10.23828
12	0.048179	62.22420	27.53523	10.24057
16	0.048179	62.22360	27.53547	10.24093
20	0.048179	62.22358	27.53548	10.24094

Variance Decomposition of D(LCR):

Period	S.E.	D(LGDP)	D(LINV)	D(LCR)
1	0.135327	0.098552	21.08247	78.81898
2	0.140556	7.354812	19.57911	73.06607
4	0.145346	10.63535	18.69982	70.66483
6	0.145583	10.66641	18.78044	70.55316
8	0.145603	10.67665	18.78606	70.53729
10	0.145605	10.67721	18.78602	70.53677
12	0.145605	10.67723	18.78603	70.53673
16	0.145605	10.67724	18.78603	70.53673
20	0.145605	10.67724	18.78603	70.53673

Table 3: Variance Decomposition (*continue)*

Iran

Variance Decomposition of D(LNGDP):

Period	S.E.	D(LNGDP)	D(LNINV)	D(LNCRE)
1	0.118882	100.0000	0.000000	0.000000
2	0.125751	94.22132	3.717198	2.061480
4	0.134302	90.91117	7.018636	2.070189
6	0.135255	89.99671	7.031270	2.972016
8	0.135369	89.84790	7.020548	3.131555
10	0.135377	89.83687	7.020206	3.142928
12	0.135377	89.83678	7.020212	3.143008
16	0.135378	89.83677	7.020219	3.143009
20	0.135378	89.83677	7.020219	3.143009

Variance Decomposition of D(LNCRE):

Period	S.E.	D(LNGDP)	D(LNINV)	D(LNCRE)
1	0.113014	24.48812	1.593697	73.91818
2	0.136943	23.22542	1.180904	75.59368
4	0.139357	22.60722	1.377310	76.01547
6	0.139432	22.60645	1.393363	76.00019
8	0.139446	22.61482	1.394904	75.99027
10	0.139448	22.61586	1.395696	75.98844
12	0.139448	22.61587	1.395711	75.98842
16	0.139448	22.61586	1.395712	75.98843
20	0.139448	22.61586	1.395712	75.98843

Jordan

Variance Decomposition of D(LGDP):

Period	S.E.	D(LGDP)	D(LINV)	D(LCR)	D(LCPI)
1	0.068826	100.0000	0.000000	0.000000	0.000000
2	0.077850	81.34857	11.33124	0.297417	7.022775
4	0.087773	66.53843	14.76341	8.398856	10.29931
6	0.094516	59.01396	23.06541	8.492545	9.428088
8	0.096065	57.22009	24.90191	8.541754	9.336247
10	0.096638	56.55787	25.62293	8.497720	9.321477
12	0.096687	56.50640	25.69098	8.490247	9.312372
16	0.096695	56.50057	25.69315	8.494101	9.312183
20	0.096700	56.49525	25.69854	8.494284	9.311926

Variance Decomposition of D(LCR):

Period	S.E.	D(LGDP)	D(LINV)	D(LCR)	D(LCPI)
1	0.077082	2.108493	1.795196	96.09631	0.000000
2	0.078970	2.705396	5.110841	92.18350	0.000260
4	0.091852	16.47192	13.35156	68.98960	1.186928
6	0.094781	17.03379	14.62014	66.25658	2.089482
8	0.095791	17.11650	15.85633	64.90435	2.122814
10	0.095861	17.11317	15.93753	64.81835	2.130950
12	0.095886	17.10875	15.97028	64.78636	2.134612
16	0.095891	17.10936	15.97221	64.78274	2.135684
20	0.095893	17.10890	15.97399	64.78121	2.135906

Table 3: Variance Decomposition (*continue)*

Kuwait

Variance Decomposition of D(LNGDP):				
Period	S.E.	D(LNGDP)	D(LNCRE)	D(LNINV)
1	0.221392	100.0000	0.000000	0.000000
2	0.223975	97.86429	1.914978	0.220731
4	0.225104	97.03535	2.235215	0.729438
6	0.225394	96.83260	2.351678	0.815725
8	0.225476	96.77536	2.385140	0.839502
10	0.225500	96.75910	2.394653	0.846246
12	0.225507	96.75448	2.397358	0.848163
16	0.225509	96.75279	2.398345	0.848864
20	0.225509	96.75265	2.398425	0.848920

Variance Decomposition of D(LNCRE):				
Period	S.E.	D(LNGDP)	D(LNCRE)	D(LNINV)
1	0.227207	73.30117	26.69883	0.000000
2	0.239992	66.69066	24.39654	8.912802
4	0.245421	64.62788	25.81063	9.561495
6	0.246936	64.06301	26.09128	9.845707
8	0.247366	63.90442	26.16834	9.927236
10	0.247488	63.85952	26.19014	9.950345
12	0.247522	63.84677	26.19633	9.956908
16	0.247535	63.84211	26.19859	9.959304
20	0.247536	63.84173	26.19877	9.959498

Libya

Variance Decomposition of D(LGDP):

Period	S.E.	D(LGDP)	D(LINV)	D(LDP)	D(LCPI)
1	0.187862	100.0000	0.000000	0.000000	0.000000
2	0.196929	92.78434	3.695774	1.149756	2.370128
4	0.197845	92.04066	3.695219	1.177194	3.086926
6	0.197852	92.03436	3.695917	1.179276	3.090447
8	0.197852	92.03434	3.695923	1.179287	3.090447
10	0.197852	92.03434	3.695923	1.179287	3.090447
12	0.197852	92.03434	3.695923	1.179287	3.090447
16	0.197852	92.03434	3.695923	1.179287	3.090447
20	0.197852	92.03434	3.695923	1.179287	3.090447

Variance Decomposition of D(LDP):

Period	S.E.	D(LGDP)	D(LINV)	D(LDP)	D(LCPI)
1	0.198250	16.03316	0.208420	83.75842	0.000000
2	0.207922	22.08848	0.492183	76.41675	1.002586
4	0.208968	21.96327	0.724598	75.70321	1.608921
6	0.208977	21.96175	0.724780	75.69844	1.615035
8	0.208977	21.96174	0.724787	75.69843	1.615038
10	0.208977	21.96174	0.724787	75.69843	1.615038
12	0.208977	21.96174	0.724787	75.69843	1.615038
16	0.208977	21.96174	0.724787	75.69843	1.615038
20	0.208977	21.96174	0.724787	75.69843	1.615038

Table 3: Variance Decomposition (*continue)*

Malaysia

Variance Decomposition of D(LNGDP):					
Period	S.E.	D(LNGDP)	D(LNCRE)	D(LNINV)	D(LNCPI)
1	0.055540	100.0000	0.000000	0.000000	0.000000
2	0.056073	98.50702	0.015869	0.691092	0.786024
4	0.068717	72.70341	11.84404	6.176295	9.276258
6	0.070083	70.06898	12.13025	7.056302	10.74447
8	0.070147	69.96559	12.12479	7.163029	10.74659
10	0.070171	69.95921	12.11972	7.172890	10.74819
12	0.070178	69.95145	12.12319	7.173897	10.75148
16	0.070179	69.94894	12.12333	7.174684	10.75305
20	0.070179	69.94891	12.12333	7.174716	10.75305

Variance Decomposition of D(LNCRE):					
Period	S.E.	D(LNGDP)	D(LNCRE)	D(LNINV)	D(LNCPI)
1	0.063134	6.529515	93.47148	0.000000	0.000000
2	0.070354	11.40651	76.36112	3.796841	8.435531
4	0.082412	27.42935	62.15529	2.844114	7.571239
6	0.085158	25.92492	59.34376	4.367260	10.36406
8	0.085359	25.82322	59.17161	4.422708	10.58246
10	0.085369	25.82159	59.16006	4.437900	10.58045
12	0.085376	25.83061	59.15106	4.438086	10.58025
16	0.085378	25.82994	59.14981	4.439121	10.58113
20	0.085378	25.82993	59.14976	4.439137	10.58117

Pakistan

Variance Decomposition of D(LNGDP):				
Period	S.E.	D(LNGDP)	D(LNDEP)	D(LNINV)
1	0.040056	100.0000	0.000000	0.000000
2	0.040320	99.22448	0.709112	0.066411
4	0.040362	99.04742	0.852683	0.099897
6	0.040362	99.04559	0.853159	0.101247
8	0.040362	99.04555	0.853191	0.101262
10	0.040362	99.04555	0.853192	0.101262
12	0.040362	99.04555	0.853192	0.101262
16	0.040362	99.04555	0.853192	0.101262
20	0.040362	99.04555	0.853192	0.101262

Variance Decomposition of D(LNDEP):				
Period	S.E.	D(LNGDP)	D(LNDEP)	D(LNINV)
1	0.122078	1.237844	98.76216	0.000000
2	0.133835	5.343729	90.07149	4.584783
4	0.135387	6.267469	88.12315	5.609383
6	0.135408	6.268208	88.12163	5.610164
8	0.135408	6.268420	88.12118	5.610402
10	0.135408	6.268421	88.12118	5.610403
12	0.135408	6.268421	88.12118	5.610403
16	0.135408	6.268421	88.12118	5.610403
20	0.135408	6.268421	88.12118	5.610403

Table 3: Variance Decomposition (*continue)*

Saudi Arabia

Variance Decomposition of D(LNGDP):

Period	S.E.	D(LNGDP)	D(LNCRE)	D(LNINV)	D(LNCPI)
1	0.155006	100.0000	0.000000	0.000000	0.000000
2	0.183624	86.74496	2.358091	4.863720	6.033225
4	0.196217	79.25661	7.305402	6.192422	7.245571
6	0.199713	77.58756	7.449388	6.270565	8.692487
8	0.200394	77.31715	7.538602	6.265821	8.878427
10	0.200746	77.11356	7.627107	6.275483	8.983849
12	0.200950	77.06872	7.633817	6.281982	9.015482
16	0.200992	77.04823	7.646512	6.283021	9.022237
20	0.200997	77.04620	7.646875	6.283053	9.023873

Variance Decomposition of D(LNCRE):

Period	S.E.	D(LNGDP)	D(LNCRE)	D(LNINV)	D(LNCPI)
1	0.202764	72.99223	27.00777	0.000000	0.000000
2	0.222259	66.47137	29.57785	3.904669	0.046103
4	0.223704	65.86365	29.43052	4.622063	0.083763
6	0.226316	66.01972	28.83090	4.604514	0.544864
8	0.227701	66.12609	28.58793	4.668560	0.617417
10	0.228083	66.15289	28.56106	4.669526	0.616523
12	0.228099	66.14867	28.56488	4.669733	0.616715
16	0.228116	66.14953	28.56202	4.670759	0.617689
20	0.228117	66.14968	28.56183	4.670752	0.617745

CONCLUSION

The current study aims to investigate the impact of financial development on economic growth or vice versa, in selected OIC countries. The methodology used was to test the finance-growth nexus in each country using the widely adopted Granger causality test and the more recent Toda and Yamamoto's (1995) non-causality test to establish the direction of causation between the two variables, besides other controlled variables. Additionally, we adopt an innovation accounting by simulating variance decompositions (VDC) and impulse response functions (IRF) for further inferences.

The study has proven that level of financial development of a country has nothing to do with the direction of causation between financial development and economic growth in the country itself. Report by Creane et.al (2003) of IMF on MENA countries once ranked Bahrain, Jordan, Kuwait and Saudi Arabia as among those countries which are having high level of financial development. Meanwhile, Egypt and Pakistan fall under category of medium level and Iran as well as Libya are among those who are having low level of financial development. Yet, when causality tests are conducted in the current study, the findings have not shown that countries with high level of financial development have got causality relation with economic growth. This is true in the case of Bahrain and Kuwait. In the case of Egypt, our findings are consistent with a study by Abu Bader and Abu-Qarn (2005) which found that financial development Granger-causes growth in Egypt either through increasing investment efficiency or through increasing resources for investment. However, our study also finds that causality direction do exist from economic growth to financial development using Toda and Yamamoto non-causality test. These additional findings substantiate the importance of economic growth to financial development as people demand more financial services when their income increases. Thus, in this case as well as other countries such as Malaysia, Iran, Jordan, Kuwait and Saudi Arabia, to have a well-developed financial sector, it is time to look beyond existing determinants of financial development: appropriate macroeconomic policies, competition within financial sector, a strong and transparent institutional and legal framework for financial services activities or prudential regulations and supervision. A well-developed financial sector must also be supported by good economic performance

as demand for financial services is largely depending on the standard of living of the users.

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