

Degree of Financial Development and Economic Growth in Qatar: Cointegration and Causality Analysis

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Abstract

Utilizing the cointegration technique and Granger causality test based on the Error Correction Model (ECM), this study empirically investigates the long-run relationship and the direction of causality between the financial development and economic growth in Qatar over the period 1990–2012. The financial development is measured by three alternative indicators: a broad money supply (M2) to GDP ratio, bank credit to the private sector as ratio to GDP, and domestic credit provided by bank sector as ratio to GDP. The economic growth is measured by the growth rate of real GDP. The results suggest that a positive long-run equilibrium relationship exists between all three financial development indicators and the growth rate of real GDP. The causality test results indicate that in the long-run, there is a bidirectional causal relationship between the broad money supply to the GDP ratio and the growth rate of real GDP as well as a unidirectional causality, which runs from domestic credit provided by the bank sector as a percentage of GDP to the growth rate of real GDP. However, a causality relationship does not exist between bank credits to the private sector ratio to GDP and economic growth. In the short-run, the findings show a unidirectional causality running from the growth rate of real GDP to domestic credit provided by the banking sector. However, no causal relationship between the growth rate of real GDP and the other two financial development indicators has been found.

Keywords: economic growth, financial development, cointegration, Error Correction model, real GDP

1. Introduction

During the past few decades, one major focus of many economic researchers has been the impact of financial development on economic growth. A large number of empirical studies have documented a positive relationship between financial development and economic growth, while some other studies showed a weak or negative relationship between them (e.g., Gregorio & Guidotti, 1995; Harris, 1997; Levine & Zervos, 1998).

This paper focuses on the specific question of whether the financial intermediation development did improve economic growth in the case of Qatar, the fastest growing and the highest per capita income country of the Gulf Cooperation Council Countries (GCC). In the empirical literature, there is a disagreement among researchers as to whether financial development is associated with higher GDP growth. More specifically, there is still a debate about how financial development affects economic growth if relationship between variables exist. This in turn has produced a large amount of literature on the finance and economic growth nexus, both theoretical and empirical (e.g., Pagano, 1993; Levine, 1997; Levine, 2005; Čihák, 2012).

The early studies which discussed this issue and suggested positive and significant relationship between financial development and economic growth were by Schumpeter (1911), Gurley and Shaw (1967), Goldsmith (1969), Mckinnon (1973), and Fry (1978). Moreover, other studies showed that financial development can improve efficiency via enhanced availability of finance to sustain potentially beneficial projects which had previously been excluded or via better information regarding projects to be financed (Greenwood & Jovanovic, 1990; King & Levine, 1993a; Rajan & Zingales, 1998). In contrast, some empirical evidence showed either a weak or insignificant relationship between financial development and economic growth (Harris, 1997, Deidda & Fattouh, 2002).

Many theoretical models are available to use for researchers to see how finance influences economic growth through different channels. Financial system can contribute to economic growth in three ways. The first way is

by creating incentive for accumulation of physical and human capital. The second way is by allocating capital to the most productive activities. The third way is by decreasing the amount of resources used in the process of intermediation (Montiel, 2003). Five different financial intermediaries play important roles in enhancing economic efficiency and ultimately growth. These functions which are differentiated by Levine (1997) include saving mobilization, allocating of resources, monitoring of managers and control over corporate governance, easing the exchange of goods and services and lastly facilitating risk management. Accordingly, each of these financial functions may influence saving and investment decisions and hasten economic growth.

In economic literature, the linkages between financial development and economic growth can be classified into four hypothesis which can be summarized as follows. The first hypothesis is “demand following” (growth-led finance), where financial development has no affect on the growth of output and may be affected by other sectors of the economy. The second hypothesis is “supply leading” (finance-led growth) where financial intermediation supports and sustains the process of growth. The third hypothesis is the feedback relationship. And the independent relationship between variables is the last hypothesis (Al-yousif, 2007).

Nowadays, Qatar has become one of the biggest exporters of natural gas since it started exporting natural gas in 1997. The export of natural gas has continued to rise through the years until it reached 77 million tons per year in 2011. As a result, the Qatari economy has witnessed an enormous increase of GDP. For example, in 1990, the GDP was QR 26.9 billion and then ten year later in 2000, it jumped to QR 64.8 billion, continuing its strong growth until it reached QR 629.7 billion in 2011 (See Appendices A, and B).

In the financial sector, foreign assets of the Qatar central bank increased sharply, which was the main driver of the sharp expansion in primary liquidity. Consequently, monetary growth accelerated during 2012. The total assets/liabilities of the Qatar central bank increased from QR 66.5 billion in 2011 to QR 161.2 billion in the year after. In addition, broad money supply (M2) accelerated to QR 71.1 billion in 2012 compared with QR 45.3 billion in the previous year. In the case of Qatari commercial banks, total assets increased from QR 694.3 billion in 2011 to QR816.6 billion in the year after. Domestic credit indicate a rise from QR 376.7 billion in 2011 to QR 476.9 billion in 2012. Moreover, total bank deposits achieved a high increase of about 26 percent from QR 363.6 billion in 2011 to QR 458.1 billion at the end of 2012. Similarly, credit facilities to GDP ratio witnessed a growth from 51 percent in 2002 to 68.1 percent in 2012, while the credit to private sector increased from 27.1 percent to 37 percent during the same period, reflecting the crucial role and relative importance of credit during the previous period (Central Bank of Qatar, 2012).

As mentioned earlier, because the Qatari economy has recorded the fastest growth in GDP in the Middle East in last two decades, it is important to study this type of unique oil-gas based economy to see if the high growth of GDP affects the financial sector positively and in turn if financial sector development helps to sustain economic development.

The objective of this study is to examine the long-run relationship between financial development measured by three types of financial indicators and economic growth as measured by growth rate of real GDP, and then to look at the causality relationship between these variables using the Cointegration and Error Correction Model (ECM). The rest of this study is organized as follows: Section 2 presents the literature review and Section 3 describes the data used and explains the study methodology. The empirical results are reported and analyzed in section 4. Finally, Section 5 presents the conclusion and discusses implications of the results.

2. Literature Review

Several empirical studies have attempted to investigate the relationship between financial intermediation and economic growth by using different types of econometrics techniques. In an earlier study, Goldsmith (1969) examined the correlation between financial intermediation and economic growth for thirty-five countries over the period 1860-1963. In this study, he observed a parallelism between financial development and economic growth.

Mckinnon (1973), and Shaw (1973) the pioneers of financial liberalization, argued that government restrictions on the banking system such as interest rate ceiling and direct credits negatively affect the development of the financial sector and harm economic growth. Consequently, they call for the liberalization of the financial system and for less government intervention in controlling and imposing a ceiling on interest rates.

King and Levine (1993a) conducted a study to examine the role of financial development on long-run economic growth for eighty countries during the period covering 1960–1989. In this study, they used four different measures for financial deepening and four different measures of economic growth to test the correlation between these variables. The results indicated that a significant correlation exists between all indicators of financial

deepening and the measures of economic growth.

By using data from three South Asian Countries, India, Pakistan, and Sri Lanka, Ahmed and Ansari (1998) examined the nexus between financial development and economic growth. The study indicated that the governments in these countries were able to promote economic growth by encouraging financial development.

In addition, the long-run relationship between financial development and economic growth was studied by Gregorio and Guidotti (1995), who used both a cross-section and panel analysis. In their study, they found a positive relationship between variables across the countries using cross-countries data and a negative relationship across countries from the panel data analysis.

Demetriades and Hussein (1996) investigated the causal link between financial development and real GDP for sixteen countries for the period of 1960–1990. The results showed very little support for the view that finance is a leading sector in the process of economic development, but in quite a few countries they found that economic growth causes financial development.

By using annual data from 1976 to 1993, Levine and Zervos (1998) tested the relationship of measures of stock market development and banking development to economic growth for forty-seven countries. Their findings showed a positive correlation between both stock market liquidity and banking development and economic growth.

Another study of the relationship between financial intermediation and economic growth was conducted for members of the Southern African Development Community by Allen and Ndikumana (2000). In their paper they used different indicators of financial development and the panel data approach. Their results indicated that there was a positive correlation between financial intermediation and economic growth, especially in regression analysis that used pooled data.

An attempt to determine the causal relationship between financial development and economic growth for Turkey was undertaken by Kar and Pentecost (2000) using five alternative proxies for financial development. The results indicated that the directions of causality between financial development and economic growth is sensitive to the choice of measurement for financial development.

Al-Tammam (2005) investigated the short-run and the long-run relationship and causality between financial development and economic growth in Kuwait, Oman, and Saudi Arabia by using different econometrics techniques. The results of the cointegration test indicated a long-run relationship between financial development indicators and economic growth for all three countries. The results of the causality test indicated that, in the long-run, the causality runs from economic growth to financial development in all countries, while in the short-run the causality runs from financial development to economic growth in the case of Oman and Saudi Arabia.

Wolde-Rufael (2009) examines the causal relationship between financial development and economic growth in Kenya for the period of 1966–2005 using a Quadivariate Vector Autoregressive (VAR) technique and modified version of the Granger causality test according to Toda and Yamamdo methods. In this study, he used four proxies for financial development which are money supply, liquid liabilities, domestic bank credit to private sector and total domestic credit provided by the bank sector as percentage of GDP. The results showed Granger causality running both from domestic bank credit to the private sector, liquid liabilities, and total domestic credit provided by the bank sector to economic growth and vice versa.

Another test of the link between financial development and economic performance in Mauritius comes from Seetanah (2008). In this study, he found that financial development has been contributing to the output of the economy in both the short and the long-run.

By utilizing the Autoregressive Distributed Lag (ARDL) methods to cointegration and the Error Correction Model (ECM), Mahran (2012) examined the relationship between financial intermediation and economic growth in Saudi Arabia for the period of 1968–2010. The findings of the study showed that the financial intermediation has negatively impacted the long-run real GDP.

Bojanic (2012) used annual time series data for the period of 1940–2010 to test the relationship between financial development and trade openness with economic growth in Bolivia. The cointegration test, standard Granger Causality test, and Error Correction Model have were employed to analyze the relationship between variables. The empirical results showed that the long-run equilibrium relationship exists, and the direction of causality runs from both the indicator of financial development and trade openness to economic growth.

Using a similar econometrics approach, Al-Malkawi et al. (2012) studied the relationship between financial

development and economic growth in the United Arab Emirates. The study was carried out using two indicators to measure the level of financial development and it used annual data from 1974 to 2008. The results indicated a significant negative relationship between financial development as measured by M2/GDP and economic growth. Also, the results suggest a bidirectional causality between the two variables.

Using quarterly data for the period from 2000: 1–2010: 4, Abduh et al. (2012) investigated the short and the long run relationship between both Islamic and conventional financial development with the economic growth in the Bahrain dual financial system. In their study, they applied the cointegration test and the Vector Error Correction Model (VECM). The results indicated a significant positive relationship between Islamic finance deepening and economic growth in the long run. A bidirectional relationship between Islamic finance and economic growth exists. Also, the conventional finance in Bahrain has a significant relationship with economic growth both in the short and the long run.

Ali (2013) examined the long-run relationship and short-run dynamic linkages between financial development and economic growth in Sudan during the period of 1970–2011. He used three different indicators to measure the level of financial development. The results of the long run showed that credit to the private sector and liquid liabilities exert positive effects while money supply as a percentage of GDP affects real per capita GDP negatively. Also he found that the relation of the liquid liabilities and money supply with real per capita GDP is insignificant and credit to the private sector is the only indicator that affects the economy in Sudan in the long-run.

In a more recent study, Adusei (2013) examined the relationship between financial development and economic growth in Ghana during the period of 1971–2010. He employed different econometric techniques, which are Cointegration, Fully-Modified Ordinary Least Square, Error Correction Model, and Generalized Method of Moments. The results suggest that financial development undermines economic growth in Ghana.

The above literature showed investigation of the relationship between financial development and economic growth by using either single countries or groups of countries, different time periods, and different methodologies. Most of the studies indicated a significant relationship between variables (e.g., King & Levine 1993a, 1993b; Gregorio & Guidotti, 1995; Levine & Zervos, 1998; Allen & Ndikumana, 2000; Al-Tammam, 2005; Abduh et al., 2012; Bojanic, 2012), while few studies came up with either weak, negative or insignificant relationships (e.g., Mahran, 2012; Al-Malkawi et al., 2012; Ali, 2013).

Finally, although a quite a lot of research has discussed the relationship between financial development and economic growth, especially in Gulf Cooperation Council Countries (GCC), none of the above-mentioned studies have tested the effects of financial development on economic growth in Qatar, which is the fastest growing and richest member of the GCC countries. Accordingly, we try to fill the gaps in the literature in this study.

3. Data Description and Methodology

This study employs annual time series data covering a twenty-three period from 1990–2012 in order to investigate the role of financial intermediations, as measured by different financial indicators, on economic growth in Qatar. The literature has identified several indicators to measure the effects of financial development on economic growth (See King & Levine, 1993a, 1993b; Demetriades & Hussein, 1996; Levine, 1997; Levine et al., 2000).

In this study, we use the three measures of financial intermediation that are more widely used in the literature. The first measure of financial development is broad money supply (M2) to GDP ratio (MGDP). This indicator has become a standard measure of the financial depth and size of the financial intermediary sector. So an increase of broad money stock (M2) may give an indication of a financial deepening improvement in the economy (King & Levine, 1993a, 1993b; Murinde & Eng, 1994; Gregorio & Guidotti, 1995; Agung & Ford, 1998; Odhiambo, 2008; Mahran, 2012).

Another measure of financial development used in this study is bank credit to the private sector as a ratio of GDP (CPS). This measure represents the important role played by financial intermediaries in financing the private sector. This measure of financial development is more directly linked to economic growth. It excludes loans issued to the government sector and credit issued by the central bank (King & Levine, 1993a; Demetriades & Hussein, 1996; Luintel & Khan, 1999). In addition, total domestic credit provided by the banking sector as ratio of GDP (DC) is the third indicator of the financial intermediary activity (Liang & Teng, 2006; Wolde-Rufael, 2009).

In the empirical literature, there are other factors associated with economic growth, such as inflation rate, and

trade openness. Therefore, we have included the following three control variables in our analysis. These variables are the size of government expenditure measured by government consumption expenditure as percentage of GDP (GOV), the inflation rate (INF), and the trade openness (TOPN) calculated as total trade (export plus import) as ratio of GDP. These variables are robust determinants of economic growth (King & Levine, 1993b; Al-Tammam, 2005; Al-Malkawi et al., 2012).

The effects of government expenditure on economic growth could be either positive or negative. Some empirical research showed this to exert a positive impact on the level of economic growth, while other studies suggested a negative relationship between them because of the crowding-out effect on private investment and inflationary pressure it may create. In the literature, the size of government expenditure and the inflation rate, are used as macroeconomic stability indicators (Fischer, 1993; Levine et al.; 2000; Mahran, 2012). A high inflation rate creates distortions in economic activity and reduces investment in productive enterprises, thereby affecting economic growth negatively. In this study, the inflation rate in the Qatar economy is used. Total trade/GDP which measures the degree of openness of the economy, is another important control variable that is commonly used in such types of models and it can have either positive or negative effects on economic growth depending on the net effects, which can only be determined empirically. Economic growth can be enhanced by trade openness when it is facilitated by technology transfer and innovation.

To analyze the relationship between financial development and economic growth in Qatar, the model utilized by King and Levine (1993a, b), has been followed. Three versions of the model were employed for each financial development indicator.

The natural Logarithm form, common in the literature, is used for each series. The data was obtained from World Development Indicators published by the World Bank and Central Bank of Qatar. Accordingly, the three general models used are as follows:

$$\ln GDP_t = \alpha_0 + \alpha_1 \ln INF_t + \alpha_2 \ln GOV_t + \alpha_3 \ln TOPN_t + \alpha_4 \ln MGDPT_t + \varepsilon_t \quad (1)$$

$$\ln GDP_t = \alpha_0 + \alpha_1 \ln INF_t + \alpha_2 \ln GOV_t + \alpha_3 \ln TOPN_t + \alpha_4 \ln CPS_t + \varepsilon_t \quad (2)$$

$$\ln GDP_t = \alpha_0 + \alpha_1 \ln INF_t + \alpha_2 \ln GOV_t + \alpha_3 \ln TOPN_t + \alpha_4 \ln DC_t + \varepsilon_t \quad (3)$$

Where, $\ln GDP_t$ is the economic growth rate of GDP as the dependent variable in all three models ((1), (2), (3)). $\ln INF_t$ is the log of the inflation rate. $\ln GOV_t$ is the log of government consumption expenditure as a percentage of GDP. $\ln TOPN_t$ is the log of total trade as a percentage of GDP. $\ln MGDPT_t$ in equation 1, is the first financial indicator measured by the log of M2 as a percentage of GDP. $\ln CPS_t$ in equation 2, is the second financial indicator measured by the log of bank credit to the private sector ratio of GDP. $\ln DC_t$ in equation 3, is the third financial indicator measured by the log of the ratio of total domestic credit provided by the bank sector to GDP.

The statistical methods used to examine the empirical relationship are the Augmented Dickey-Fuller (ADF) unit root test, the Johansen cointegration technique, and the Error Correction Model.

3.1 Unit Root Test

The literature has established that most macroeconomic time series variables are known to be nonstationary or contain a stochastic trend. The use of nonstationary variables may lead to spurious regression and misleading results (Greene, 2000). Using the cointegration technique requires, a unit root test to test the property of the data, specifically to determine whether the data are stationary. Most studies use ADF and PP (Phillips-Perron) tests for determining the order of integration of variables. A variable is said to be stationary if it does not have unit root, i.e. it is integrated of order zero $I(0)$. Similarly, if a variable is nonstationary on its level form but is stationary in its first difference form, it is integrated of order one $I(1)$. The ADF tests are based on the following model:

With constant and no trend

$$\Delta y_t = \alpha + \rho y_{t-1} + \sum_{i=1}^p \delta \Delta y_{t-i} + e_t \quad (4)$$

Where y_t is the series being tested, α is a constant, t represent a time series, and ρ is the lag truncation parameter. The ADF is achieved under the assumption that a unit root exists, the null hypothesis of the unit root is ($\rho=0$) and the alternative hypothesis states the series are stationary where ($\rho<0$). If the null hypothesis is not rejected, the considered variable is nonstationary, but if the null hypothesis is rejected then the variable is considered to be stationary (Maddala & Kim, 1998).

3.2 Cointegration Test

This study utilized the cointegration approach, which was introduced by Engel and Granger (1987) and then

developed by Stock and Watson (1988), Johansen (1988) and Johansen and Juselius (1990). The cointegration test states that if two variables or more are found to be nonstationary, then the linear combination of these variables may be stationary. Or equivalently, a vector of variables which all achieve stationary state after differencing, could have linear combinations which are stationary in level (Engel and Granger, 1987). In the present context, the Johansen technique is applied for performing the cointegration test to examine the long-run relationship between education and economic growth. Currently, the Johansen technique has been found to be the most reliable and is better for small sample properties. The Johansen method can be expressed as follows:

$$y_t = A_1 y_{t-1} + \dots + A_p y_{t-p} + \beta x_t + \varepsilon_t \quad (5)$$

where y_t is a k vector of nonstationary I(1) variables, x_t is d vector of deterministic variables, and ε_t is a vector of innovations.

The equation (5) can be rewritten as:

$$\Delta y_t = \Pi y_{t-1} + \sum_{j=1}^{p-1} \Gamma_j \Delta y_{t-j} + \beta x_t + \varepsilon_t \quad (6)$$

where

$$\Pi = \sum_{i=1}^p A_i - I \quad \text{and} \quad \Gamma_i = -\sum_{j=i+1}^p A_j$$

If the coefficient matrix Π has reduced rank $r \times k$, then there exist $k \times r$ matrices α and β , each with rank r such that $\Pi = \alpha\beta$ and βx_t is I(0), r is the number of cointegrating relations and each column of β is the cointegration vector.

The Johansen method has two tests which are used to determine the number of cointegrating vectors. The first test is the maximum eigenvalue test:

$$\lambda_{max} = -T \ln(1 - \lambda_{r+1})$$

This test evaluates the null hypothesis of r cointegrating vectors against the alternative hypothesis of $r+1$ cointegrating vectors.

The second test is the trace test:

$$\lambda_{trace} = -T \sum_{i=r+1}^n \ln(1 - \lambda_i)$$

This test evaluates the null hypothesis of at most r cointegrating vectors against the general hypothesis of k cointegrating vectors.

3.3 Error Correction Model

Granger (1988) pointed out that if there exists a cointegration vector among integration variables, there is a possibility of causality among these variables in at least one direction. Engel and Granger (1987) provided a test of causality which takes into account the information provided by the cointegrated properties of variables. The model can be expressed as an Error Correction Model (ECM) and is formulated as follows:

$$\Delta y = \alpha_1 + \beta_1 ECT_{t-1} + \sum_{i=1}^n \delta_i \Delta y_{t-i} + \sum_{i=1}^n \gamma_i \Delta x_{t-i} + \varepsilon_{1t} \quad (7)$$

$$\Delta x = \alpha_2 + \beta_2 ECT_{t-1} + \sum_{i=1}^n \mu_i \Delta y_{t-i} + \sum_{i=1}^n \lambda_i \Delta x_{t-i} + \varepsilon_{2t} \quad (8)$$

where the ECT_{t-1} is the error correction term lagged one period and it represents the disequilibrium residuals of a cointegration equation.

The source of causation is the ECT_{t-1} in equation (7) and (8). The coefficient of the ECT_{t-1} represents how fast deviation from the long-run equilibrium is eliminated following change in each variables. For example if β_1 is zero, then y does not responds to a deviation from the long-run equilibrium in the previous period.

The ECM is suitable for detection of the direction of the causality when the variables are cointegrated. Either by using the statistical significance of the t-tests of the lagged-error correction terms or the F-test to the joint significance of coefficients of the lags of each independent variable, we can detect the evidence of Granger causality.

4. Empirical Results and Discussion

In this section, the empirical result will be presented and the findings will be analyzed based on the methodology explained in the earlier section. Interpretations of these findings will help in analyzing the effects of financial intermediations on economic growth. Annual data for the period 1990–2012 on the growth rate of real GDP, inflation rate, government consumption expenditure as percentage of GDP, total trade openness as ratio of GDP,

broad money supply (M2) as a percentage of GDP (MGDP), bank credit to the private sector as a ratio of GDP (CPS), and total domestic credit provided by the banking sector as ratio of GDP (DC) will be discussed. We used the natural logarithms for all variables in the empirical examination.

4.1 Unit Root Test Result

In order to implement the cointegration test between the time series, it is necessary to establish that the variables are integrated of the same order $I(1)$. Accordingly, the Augmented-Dickey Fuller (ADF) Unit Root Test was used with constant for all variables in their levels and then in their first difference using one lag based on the Schwarz Information Criterion (SIC).

The Augmented-Dickey Fuller (ADF) test results are shown in Table 1. Comparing the ADF t-value of the level series with 1% and 5% critical value, the results suggest that all variables under study are nonstationary in their levels and stationary in their first difference. Therefore, the variables are integrated at $I(1)$.

4.2 Johansen and Juselius Cointegration Test Result

Since the result in the previous section shows that all variables in our models are integrated of the same order $I(1)$, the next step is to estimate the long-run equilibrium relationship among the various sets of variables using the Johansen and Juselius cointegration test. Therefore, the long-run equilibrium relationship is attained by using both, the trace statistic and the max eigenvalue statistic.

The results for trace and max eigenvalue statistics are reported in Table 2 through 4. Table 2 summarizes the results of the Johansen and Juselius cointegration test using broad money supply to GDP ($\ln\text{MGDP}$) as the financial indicator. Thus, both the trace and max eigenvalue tests reveal that there are two cointegrating equation vectors in the system at 5% level of significance. Based on trace statistics, the null hypotheses of “no cointegration” and “at most one cointegration equation” are rejected at the 5% level of significance since the trace statistic is 45.69, which is greater than the corresponding critical value of 40.17, and the null hypothesis of “at most two cointegration” is not rejected at 5% level of significance. In the case of max eigenvalue statistic, the null hypotheses of “no cointegration” and “at most one cointegration equation” are rejected at the 5% level of significance, where the max eigenvalue statistic 28.91 is greater than the critical value of at 5% level 24.15. Accordingly, it is clear that there is a long-run relationship between $\ln\text{RGDP}$ and other variables ($\ln\text{INF}$, $\ln\text{GOV}$, $\ln\text{TOPN}$, and $\ln\text{MGDP}$)

In addition, the findings of the Johansen and Juselius cointegration test indicate that cointegration exists among the variables in the case of using bank credit to the private sector ration to GDP ($\ln\text{CPS}$) as a measure of financial development (Table 3). The trace and max eigenvalue statistics of the Johansen Juselius cointegration test were found to be greater than critical values at 5% level of significance, implying the existence of the long-run relationship between $\ln\text{RGDP}$ and $\ln\text{INF}$, $\ln\text{GOV}$, $\ln\text{TOPN}$, and $\ln\text{CPS}$.

As a final point, Table 4 reports the Johansen and Juselius multivariate cointegration test using domestic credit provided by the banking sector to GDP ($\ln\text{DC}$) as a financial indicator. A long-run relationship between $\ln\text{RGDP}$ and other variables exists. The result is derived from the fact that there are two cointegration equations at 5% level of significance. The null hypotheses of “no cointegration” and “at most one cointegration equation” are rejected at the 5% significance level, where the trace statistic 59.36 is greater than the critical value at 5% i.e. 47.85, and where the max eigenvalue statistic 38.36 exceeds the critical value at 5% i.e. 27.58.

4.3 Causality Test Results Based on the Error Correction Model

The cointegration test in the last section shows that there is a long-run relationship between variables, but it does not indicate the causality of this relationship. Granger (1988) suggests that the causal relationship between cointegrated variables should be examined within the framework of the error correction model. The ECM test can detect the direction of Granger causality in the sense that the ECM can capture both the short and the long-run relationship. The t-statistics on the error correction term indicate the existence of the long-run causality, while the probability value χ^2 indicate the presence of a short-run causality. In this section, only the direction relationship between each financial indicator ($\ln\text{MGDP}$, $\ln\text{CPS}$, and $\ln\text{DC}$) and economic growth ($\ln\text{RGDP}$) will be analyzed.

Table 5 shows the causal relationship result for both the short and long-run relationship in the case of $\ln\text{MGDP}$. By comparing the sign of the error correction term with the sign of cointegration equation and the t-statistics in the same table, the result shows that $\ln\text{RGDP}$ and $\ln\text{MGDP}$ are statistically significant at 1% level of significance and have the correct sign, indicating the in the case of disequilibrium these variables will adjust to return to the long-run equilibrium. This result suggests a bidirectional long-run causal relationship between $\ln\text{MGDP}$ and $\ln\text{RGDP}$. The short-run causal relationship between $\ln\text{RGDP}$ and $\ln\text{MGDP}$ reflected in the p-value

of the Wald test show a causal relationship between these variables.

As Table 6 illustrated, in the case of lnCPS, the result shows that the error correction term in both lnRGDP and lnCPS are not significant at 1% level of significance, indicating that the long-run causality between these variables does not exist. Also, the findings suggest that there is no causal relationship between lnRDGP and lnCPS in the short-run.

For the lnDC as a financial indicator, the results of the causality test show that the error correction terms are statistically significant at 1% for lnRGDP and have the correct sign, while the error correction terms are statistically insignificant at 1% for lnDC. Therefore, there is a unidirectional causality run from lnDC to lnRGDP in the long-run. On the other hand, there is only a unidirectional causality in short-run running from lnRGDP to lnDC.

Table 1. ADF unit root test on series

Variable	ADF Test Statistics		
	Level	First Difference	Result
lnRGDP	-1.629	-4.760	I(1)*
lnINF	-1.545	-3.737	I(1)**
lnGOV	-1.514	-5.400	I(1)*
lnTOPN	-2.520	-4.882	I(1)*
lnMGDP	-1.820	-3.950	I(1)*
lnCPS	-2.249	-5.203	I(1)*
lnDC	-2.087	-5.632	I(1)*

Note. Critical value for the level of the variable at 1% and 5% are -3.769 and -3.004, respectively. Critical value for the first difference of the variable at 1% and 5% are -3.788 and -3.012, respectively.

*, **, denotes significance level at 1% and 5%.

I(1) stationary after first differencing.

Table 2. Johansen and juselius cointegration test result using lnMGDP as financial indicator

(Trace Statistic)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	Critical Value 5%	Probability **
None *	0.861	87.242	60.061	0.0001
At most 1 *	0.747	45.695	40.174	0.012
At most 2	0.300	16.778	24.275	0.325
At most 3	0.245	9.274	12.320	0.153
At most 4	0.147	3.347	4.129	0.079
(Maximum Eigenvalue Statistic)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	Critical Value 5%	Probability **
None *	0.861	41.547	30.439	0.0014
At most 1 *	0.747	28.916	24.159	0.0105
At most 2	0.300	7.504	17.797	0.759
At most 3	0.254	5.926	11.224	0.358
At most 4	0.147	3.347	4.129	0.798

Note. Trace test indicate 2 cointegrating equations at the 0.05 level.

* denotes rejection of the hypothesis at the 0.05 level. ** Mackinnon-Haug-Michelis (1999) P-value.

Table 3. Johansen and Juselius cointegration test result using lnCPS as financial indicator

(Trace Statistic)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	Critical Value 5%	Probability **
None *	0.940	106.80	60.061	0.000
At most 1 *	0.7809	53.101	40.147	0.001
At most 2	0.500	23.464	24.275	0.063
At most 3	0.303	10.264	12.320	0.107
At most 4	0.163	3.393	4.129	0.077
(Maximum Eigenvalue Statistic)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	Critical Value 5%	Probability **
None *	0.940	53.704	30.439	0.000
At most 1 *	0.789	29.636	24.159	0.008
At most 2	0.500	13.199	17.797	0.215
At most 3	0.303	6.871	11.224	0.260
At most 4	0.163	3.393	4.129	0.077

Note. Trace test indicate 2 cointegrating equations at the 0.05 level.

* denotes rejection of the hypothesis at the 0.05 level. ** Mackinnon-Haug-Michelis (1999) P-value.

Table 4. Johansen and Juselius cointegration test result using lnDC as financial indicator

(Trace Statistic)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	Critical Value 5%	Probability **
None *	0.916	109.09	69.818	0.000
At most 1 *	0.853	59.361	47.856	0.002
At most 2	0.461	21.000	29.797	0.357
At most 3	0.275	8.615	15.494	0.402
At most 4	0.102	2.163	3.841	0.141
(Maximum Eigenvalue Statistic)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	Critical Value 5%	Probability **
None *	0.916	49.737	33.876	0.000
At most 1 *	0.853	38.361	27.584	0.001
At most 2	0.461	12.384	21.131	0.510
At most 3	0.272	6.451	14.264	0.555
At most 4	0.102	2.163	3.841	0.141

Note. Trace test indicate 2 cointegrating equations at the 0.05 level.

* denotes rejection of the hypothesis at the 0.05 level. ** Mackinnon-Haug-Michelis (1999) P-value.

Table 5. Granger causality test result based in ECM for lnMGDP as financial indicator

Variables	Short Run Causality (p-value)		Adjustment Coefficient (ECT_{t-1})	
	Chi-Sq	p-value	ECT_{t-1}	t-stat
$\Delta \ln \text{RGDP}$	0.122	0.726	-0.072	-3.054*
$\Delta \ln \text{INF}$	1.583	0.985	-0.371	-1.849
$\Delta \ln \text{GOV}$	0.123	0.725	0.038	1.077
$\Delta \ln \text{TOPN}$	0.006	0.796	0.157	3.330*
$\Delta \ln \text{MGDP}$	0.008	0.927	0.093	3.612*

Table 6. Granger causality test result based in ECM for lnCPS as financial indicator

Variables	Short Run Causality (p-value)		Adjustement Coefficient (ECT_{t-1})	
	Chi-Sq	p-value	ECT_{t-1}	t-stat
$\Delta \ln \text{RGDP}$	0.066	0.796	-0.001	-0.217
$\Delta \ln \text{INF}$	0.148	0.699	0.053	1.05
$\Delta \ln \text{GOV}$	1.825	0.176	-0.036	-4.026*
$\Delta \ln \text{TOPN}$	0.200	0.654	-0.003	-0.219
$\Delta \ln \text{CPS}$	0.557	0.455	-0.012	-1.961

Table 7. Granger causality test result based in ECM for lnDC as financial indicator

Variables	Short Run Causality (p-value)		Adjustement Coefficient (ECT_{t-1})	
	Chi-Sq	p-value	ECT_{t-1}	t-stat
$\Delta \ln \text{RGDP}$	2.911	0.087*	-0.023	1.997*
$\Delta \ln \text{INF}$	0.336	0.561	0.124	1.199
$\Delta \ln \text{GOV}$	0.006	0.935	0.009	0.339
$\Delta \ln \text{TOPN}$	0.011	0.915	0.007	0.265
$\Delta \ln \text{DC}$	0.385	0.534	0.030	1.628

5. Summary and Conclusion

The purpose of this study was to determine whether financial intermediations measured by three different types of indicators which are broad money supply (M2) as percentage of GDP, bank credit to the private sector as percentage of GDP, and domestic credit provided by the bank sector as percentage of GDP, have a short and long-run relationship with economic growth measured by the growth rate of real GDP in Qatar. Many studies were conducted to explore the relationship and the direction of causality between economic growth and different indicators of financial intermediations both theoretically and empirically. The outcomes of these studies vary greatly regarding the direction of causal relationship between variables. Some of these studies found that financial development enhances economic growth supporting the “supply leading hypothesis”. On the other hand, other studies support the point of view of the “demand following hypothesis”, which is to reject the direction of causal relationship run from financial development to economic growth. Since the effect of financial development on economic growth is a controversial issue, this relationship is still open to investigation.

To be able to investigate the short and long-run relationship and causal relationship between financial intermediation and economic growth, this study included an extensive empirical analysis by utilizing the techniques of cointegration and Error Correction Model. The annual data used are the growth rate of real GDP ($\ln \text{RGDP}$) and three financial development indicators ($\ln \text{MGDP}$, $\ln \text{CPS}$, and $\ln \text{DC}$) from 1990 to 2012. The results of the empirical investigation can be summarized as follows:

First, the cointegration analysis indicate that a positive long-run equilibrium relationship exists between all three financial development indicators and the growth rate of real GDP.

Second, the direction of causality was examined through the use of the error correction model (ECM). The causality test results indicate that in the long-run, there is a bidirectional causal relationship between the broad money supply to GDP and the growth rate of real GDP. The result also shows that the long-run causality does not exist between bank credits to the private sector ratio to GDP and economic growth. However, the findings suggest that unidirectional causality runs from domestic credit provided by the bank sector as percentage of GDP to the growth rate of real GDP. The evidence supports both “demand following” and “supply leading” hypotheses in the case of broad money supply as a financial development indicator. Regarding the domestic credit provided by the banks sector, the “supply leading” hypothesis is supported. Nevertheless, the results support neither the “demand following” nor “supply leading” hypothesis in the case of bank credit to the private sector as a financial development indicator.

Third, in the short run, the result of the casualty test indicates unidirectional causality running from the growth rate of real GDP to domestic credit provided by the banks sector. However, the findings suggest that there is no causal relationship between the growth rate of real GDP and the two other financial development indicators.

The findings from this study have implications for policy makers in both the financial and real sectors. The first implication is that new policies should be designed to encourage further investment in the financial system. Therefore, it is necessary to encourage financial innovation, competitiveness, and a high level of efficiency of

local banks. Another suggestion is that the Gulf Cooperation Council Countries should move toward greater economic integration, especially the monetary union to derive maximum gains from financial intermediation and to achieve a greater level of development in their financial systems by using the European Union and Euro Zone as a model. Finally, since Qatar is so heavily dependent on energy export, government policy should be directed to diversifying the economy through expansion to other sectors (e.g., petro-chemical industry, and tourism), which will engender the growth of the financial sector, which will in turn boost economic development.

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References

- Abduh, M., Brahim, S., & Omar, M. (2012). A Study on finance-growth nexus in dual financial system countries: Evidence from Bahrain. *World Apply Sciences Journal*, 20(8), 1166–1174.
- Adusei, M. (2013). Financial development and economic growth: Evidence from Ghana. *The International Journal of Business and Finance Research*, 7(5), 61–76.
- Agung, F., & Ford, J. (1998). *Financial development, liberalization and economic development in Indonesia, 1966–1996: Cointegration and causality*. University of Birmingham, Department Of Economics Discussion Paper No: 98–12.
- Ahmed, S., & Ansari, M. (1998). Financial sector development and economic growth: The South Asian experience. *Journal of Asian Economics*, 9(3), 503–517. [http://dx.doi.org/10.1016/S1049-0078\(99\)80100-6](http://dx.doi.org/10.1016/S1049-0078(99)80100-6)
- Ali, A. (2013). Financial intermediation and economic growth in Sudan: An empirical investigation, 1970–2011. *British Journal of Economics, Management & Trade*, 3(4), 332–358.
- Allen, D., & Ndikumana, L. (2000). Financial intermediation and economic growth in Southern Africa. *Journal of African Economies*, 9(2), 132–160. <http://dx.doi.org/10.1093/jae/9.2.132>
- Al-Malkawi, H., Marashdeh, H., & Abdullah, N. (2012). Financial development and economic growth in the UAE: Empirical assessment using ARDL approach to cointegration. *International Journal of Economics and Finance*, 4(5), 105–115. <http://dx.doi.org/10.5539/ijef.v4n5p105>
- Al-Tammam, M. (2005). *Causality between financial development and economic growth: The case of Kuwait, Oman, and Saudi Arabia*. Ph.D. Dissertation, Colorado State University.
- Al-yousif, Y. (2002). Financial development and economic growth: Another look at the evidence from development countries. *Review of Financial Economics*, 11, 131–150. [http://dx.doi.org/10.1016/S1058-3300\(02\)00039-3](http://dx.doi.org/10.1016/S1058-3300(02)00039-3)
- Bojanic, A. (2012). The impact of financial development and trade on the economic growth of Bolivia. *Journal of Applied Economics*, XV(1), 51–70. [http://dx.doi.org/10.1016/S1514-0326\(12\)60003-8](http://dx.doi.org/10.1016/S1514-0326(12)60003-8)
- Central Bank of Qatar. (2012). *The Thirty Sixth Annual Report*. Qatar.
- Čihák, M., Demirgüç-Kunt, A., Feyen, E., & Levine, R. (2012). *Benchmarking financial systems around the world*. World Bank Policy Research Working Paper, No. 6175.
- Deidda, L., & Fattouh, B. (2002). Non-linearity between finance and growth. *Economics Letters*, 74(3), 339–345. [http://dx.doi.org/10.1016/S0165-1765\(01\)00571-7](http://dx.doi.org/10.1016/S0165-1765(01)00571-7)
- Demetriades, P. O., & Hussein, K. A. (1996). Does financial development cause conomic growth: Time-series evidence from 16 countries. *Journal of Development Economics*, 51(2), 387–411. [http://dx.doi.org/10.1016/S0304-3878\(96\)00421-X](http://dx.doi.org/10.1016/S0304-3878(96)00421-X)
- Engel, R. F., & Granger, C. W. J. (1987). Cointegration and error correction: Representation, estimation and testing. *Econometrica*, 55, 215–276. <http://dx.doi.org/10.2307/1913236>
- Fischer, S. (1993). The role of macroeconomic factors in growth. *Journal of Monetary Economics*, 32, 485–512. [http://dx.doi.org/10.1016/0304-3932\(93\)90027-D](http://dx.doi.org/10.1016/0304-3932(93)90027-D)
- Fry, M. (1978). Money and capital or financial deeping in economic development. *Jornal of Money, Credit and Banking*, 10(4), 464–475. <http://dx.doi.org/10.2307/1991576>
- Goldsmith, R. W. (1969). *Financial structure and development*. New Haven: Yale University Press.
- Granger, C. W. J. (1988). Causality, cointegration, and control. *Journal of Economic Dynamics and Control*, 12, 551–559. [http://dx.doi.org/10.1016/0165-1889\(88\)90055-3](http://dx.doi.org/10.1016/0165-1889(88)90055-3)

- Greene, W. (2000). *Econometric Analysis* (4th ed.). Upper Saddle River, N.J.: Prentice Hall.
- Gregorio, J., & Guidotti, P. (1995). Financial development and economic growth. *World Development*, 23(12), 433–438. [http://dx.doi.org/10.1016/0305-750X\(94\)00132-I](http://dx.doi.org/10.1016/0305-750X(94)00132-I)
- Gurly, J., & Shaw, E. (1967). Financial structure and economic growth. *Economics Development and Culture Change*, 34, 333–346.
- Harris, R. D. (1997). Stock market and development: A re-assessment. *European Economic Review*, 41(1), 139–146. [http://dx.doi.org/10.1016/S0014-2921\(96\)00021-9](http://dx.doi.org/10.1016/S0014-2921(96)00021-9)
- Johansen, S. (1988). Statistical analysis for cointegration vector. *Journal of Economic Dynamics and Control*, 12, 231–254. [http://dx.doi.org/10.1016/0165-1889\(88\)90041-3](http://dx.doi.org/10.1016/0165-1889(88)90041-3)
- Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration with applications to the demand for money. *Oxford Bulletin of Economics and Statistics*, 52, 169–210. <http://dx.doi.org/10.1111/j.1468-0084.1990.mp52002003.x>
- Kar, M., & Pentecost, E. (2000). *Financial development and economic growth in Turkey: Further evidence on the causality issue*. Department of Economics, Loughborough University, Loughborough.
- King, R. G., & Levine, R. (1993a). Finance and growth: Schumpeter might Be Right. *Quarterly Journal of Economics*, 108(3), 717–737. <http://dx.doi.org/10.2307/2118406>
- King, R. G., & Levine, R. (1993b). Finance, entrepreneurship and growth: Theory and evidence. *Journal of Monetary Economics*, 32(3), 513–542. [http://www.doi:10.1016/0304-3932\(93\)90028-E](http://www.doi:10.1016/0304-3932(93)90028-E)
- Levine, R. (1997). Financial development and economic growth. *Journal of Economic Literature*, 35(2), 688–726.
- Levine, R. (2005). Financial and growth: Theory and evidence. In P. Aghion & S. Durlauf (Eds.), *Handbook of Economic Growth* (1st ed., Vol 1, pp. 865–934).
- Levine, R., & Zervos, S. (1998). Stock markets, banks, and economic growth. *American Economic Review*, 88, 537–558.
- Levine, R., Loayza, N., & Beck, T. (2000). Financial intermediation and growth: Causality and causes. *Journal of Monetary Economics*, 46(1), 31–77. [http://dx.doi.org/10.1016/S0304-3932\(00\)00017-9](http://dx.doi.org/10.1016/S0304-3932(00)00017-9)
- Liang, O., & Teng, J. (2006). Financial development and economic growth: Evidence from China. *China Economic Review*, 17, 395–411. <http://dx.doi.org/10.1016/j.chieco.2005.09.003>
- Luintel, K., & Khan, M. (1999). A Quantitative reassessment of the finance-growth nexus: Evidence from a Multivariate VAR. *Journal of Development Economics*, 60, 381–405. [http://dx.doi.org/10.1016/S0304-3878\(99\)00045-0](http://dx.doi.org/10.1016/S0304-3878(99)00045-0)
- MacKinnon, J., Haug, A., & Michelis, L. (1999). Numerical distribution functions of likelihood ratio tests for co-integration. *Journal of Applied Econometrics*, 14, 563–577. [http://dx.doi.org/10.1002/\(SICI\)1099-1255\(199909/10\)14:5<563::AID-JAE530>3.0.CO;2-R](http://dx.doi.org/10.1002/(SICI)1099-1255(199909/10)14:5<563::AID-JAE530>3.0.CO;2-R)
- Maddala, G., & Kim, I. (1998). *Unit root cointegration and structural change*. Cambridge, UK: Cambridge University Press.
- Mahrn, H. (2012). Financial intermediation and economic growth in Saudi Arabia: An empirical analysis. 1968–2010. *Modern Economy*, 3, 626–640. <http://dx.doi.org/10.4236/me.2012.35082>
- McKinnon, R. I. (1973). *Money and capital in economic development*. Washington: The Brookings Institution.
- Montiel, P. J. (2003). *Macroeconomics in emerging market*. Cambridge University Press. <http://dx.doi.org/10.1017/CBO9780511615870>
- Murinde, V., & Eng, F. (1994). Financial development and economic growth in Singapore: Demand-Following or supply-leading. *Applied Financial Economics*, 4(6), 391–404. <http://dx.doi.org/10.1080/758518671>
- Odhiambo, N. (2008). Financial depth, saving and economic growth in Kenya: A Dynamic causal relationship. *Economic Model*, 25(4), 704–814. <http://dx.doi.org/10.1016/j.econmod.2007.10.009>
- Pagano, M. (1993). Financial market and growth: An overview. *European Economic Review*, 37(2–3), 613–622. [http://dx.doi.org/10.1016/0014-2921\(93\)90051-B](http://dx.doi.org/10.1016/0014-2921(93)90051-B)
- Rajan, R., & Zingales, L. (1998). Financial development and growth. *American Economic Review*, 88(3), 559–586.

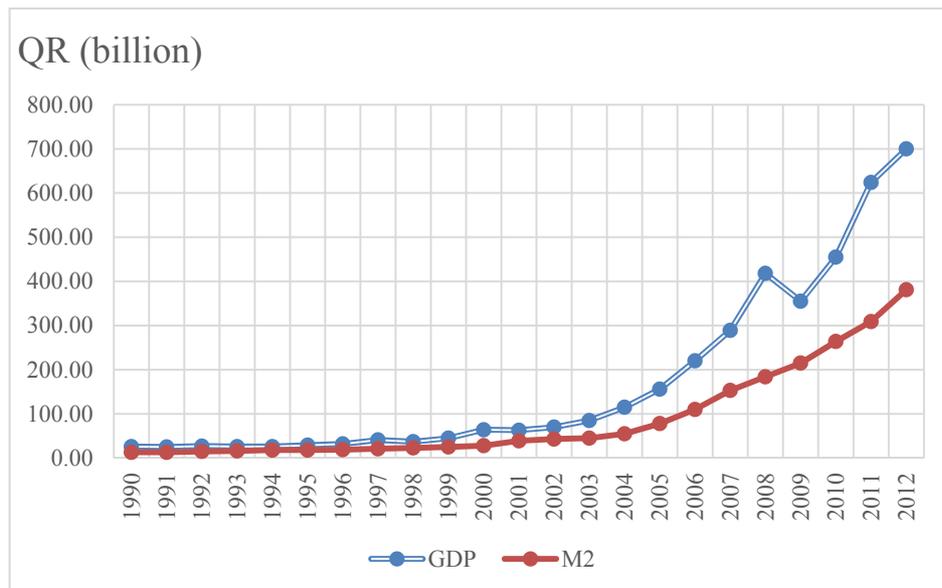
- Schumpeter, J. A. (1911). *The theory of economics development*. Cambridge, M.A.: Harvard University Press.
- Seetanah, B. (2008). Financial development and economic growth: An ARDL approach for the case of the small island state of Mauritius. *Applied Economics Letters*, 15, 809–813. <http://dx.doi.org/10.1080/13504850600770889>
- Shaw, E. S. (1973). *Financial deepening in economic development*. New York: Oxford University Press.
- Stock, J., & Watson, M. (1988). Testing for common trends. *Journal of American Statistical Association*, 8, 1097–1107. <http://dx.doi.org/10.1080/01621459.1988.10478707>
- Wolde-Rufael, Y. (2009). Re-examining the financial development and economic growth nexus in Kenya. *Economic Modelling*, 26, 1140–1146. <http://dx.doi.org/10.1016/j.econmod.2009.05.002>
- World Bank. (2014). World Development Indicators. Washington, DC.

Appendix A. Conditions of gulf cooperation council countries

Member Country	Population (Million)	Per Capita GNI (US dollars)	GDP (Billion US dollars)		
			1990	2000	2011
Qatar	1.9	80,440	7.4	17.8	173
Kuwait	2.8	48,900	18.4	37.7	176.6
UAE	7.9	40,760	51	104	360
Oman	2.8	19,260	11.7	19.9	71.8
Saudi Arabia	28.1	17,820	117	188	577
Bahrain	1.3	15,920	4.2	8.0	22.9

Note. Source: The little Data Book, 2013, The World Bank. 1 US dollar = 3.64 QR.

Appendix B. Growth of GDP and M2 in qatar 1990–2012



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