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Abstract

The aim of this paper is to investigate the causal relationship between financial development and economic growth in GCC countries for the period 1980-2010. To this end we use a multivariate vector autoregressive (VAR) framework by including investment as an additional variable to the finance and growth nexus. Our empirical analysis is based on a modified version of the Granger non-causality test by applying the Toda and Yamamoto procedure. The overall empirical results reveal that financial development contributes significantly to economic growth in the GCC context. Our results could be of great interest for policymakers since the financial sector could play a crucial role in lowering the dependence of the governments to oil revenues and could contribute significantly to spur economic growth.

1. Introduction

The relationship between finance and growth nexus was firstly analyzed by the pioneering work of Schumpeter (1911) and later developed by the works of Gurley and Shaw (1955), Goldsmith (1969), Mckinnon (1973) and Shaw (1973). Since, this question has received a great deal of attention by scholars (Demetriades and Hussein, 1996; Arestis and Demetriades, 1997; Luintel and Khan, 1999; Levine *et al* (1999); Levine and Zervos, 1996 and 1998; Beck *et al,* 2000; Esso, 2010; Odhiambo, 2010 and 2011; Bangake and Eggoh, 2011). To investigate this relationship, economists and researchers have used different methods of estimation (VAR, VECM, ECT, ARDL, Panel Cointegration, GMM, etc) but their results diverge from one study to another. Today, despite the vast empirical literature, though contributing immensely to explaining the financial development-growth nexus, the debate remains neither unanimous nor conclusive. Empirical results show that financial deepening boosts economic growth in some countries and it does not have any potential effects in some other countries.   For example, the works of McKinnon (1973), Shaw (1973) and Levine (1993, 1997, 1998) reveal the importance of financial sector as a driver of economic development. Economic growth in an advanced economy depends on the degree of development of its financial sector. A modern financial sector is capable to collects domestic savings and mobilizes foreign capital for productive investments. Moreover, it is capable to transforms unexploited projects into productive projects. The pioneering works of Goldsmith (1969), McKinnon (1973) and Shaw (1973) suggest a positive relationship between financial sector developments of economic growth. They opine that inefficient financial system and a poor capital markets discourage foreign investors because of

the lack of liquidity and high transaction costs. In this case, the local economy became unattractive and investment activities remain weak.

In the other hand, several studies conducted by Demirguç-Kunt and Detragiache (1998), Fisher and Chenard (1997), and Plihon and Miotti (1997) suggest the opposite recommendation. These studies show that the development of stock market has a slight consequence to economic growth. Further, economists of the "Neo-Structualist School" have argued that the relationship between financial market development and economic growth is even negative. These authors have especially focuses their studies on the consequences of the implementation of liberalization program on the real economic activities and they severely criticized the supporters of financial repression school. For example Laizoz (2006) argued that liberalization of financial markets might have adverse effects on growth if curb markets are more and more effective than official money market in financing investment. In another perspective, Jeanneney and Kpodar (2004) have studied the relationship between financial development and financial instability. They found that the stimulation of the banking system and financial market development in a context of financial openness, led in most cases to banking and financial crises followed by a slowdown in economic growth.

Despite the huge amount of literature analyzing finance and growth nexus, there is no study until this day, to the best of our knowledge, which analyzed this question for the GCC context[1]. Hence, the aim of this paper is to enrich the available literature. We are interested to develop the issue for GCC countries for many reasons. First, during the past decade GCC countries have been witnessing an unprecedented economic performance thanks to the windfall of oil revenues. The growth was on par with other emerging markets with an average rates exceeding 5-6% and much faster than advanced economies. Second, GCC governments have adopted development

3

strategies that prioritize the modernization of their financial systems within a large economic diversification plan. Third, the region as a whole has become a hub of finance (notably center of Islamic finance) and the preferred destination of international financial companies. The GCC banking sector has proven its resilience to the global risks and uncertainties and total assets at GCC banks reached USD 1.6trn by end-2012, with a year on year growth of 10.3% (GIC 2013). Forth, the overall infrastructure of all countries of GCC is becoming very close to that of advanced economies and this make doing business in the region very comfortable. For all these reasons, we think that studying the GCC context with the use of recent data which involves the recent reforms is crucial to draw some policy implications especially in the current period in which all GCC countries members are preparing to move toward a monetary union.

Unlike numerous studies, which have used bivariate and trivariate frameworks to test the causality between financial deepening and economic growth, in this paper we use multivariate procedure by employing four variables. We employ the Toda and Yamamoto's (1995) procedure which is a different causality testing to the basic. The choice of this methodology allows us to obtain consistent results and to better study the dynamic linkage between all the variables. With the use of a reliable model, the results could be very useful for policymakers to draw effective policy recommendations. Our paper investigates the causal relationship between the growth rate of financial sector indicators, M2 and credit to private sector as a share of GDP, and investment with and economic growth in multivariate systems for GCC countries. Overall results reveal that financial deepening lead to economic growth in GCC countries. However, further reforms are needed as the share of financial sector in total government revenues remains insignificant.

The remainder of the paper is organized as follows: section two describes the methodology and data, section three presents the empirical results and section four concludes.

4

2.   Data and Methodology

 We use several indictors that reflect the financial development in GCC region. First, the ratio of broad Money (M2) to GDP is the most commonly used measure of financial development which indicates the degree of financial intermediation and shows the real size of the financial sector of the country (see Calderon and Liu, 2003; King and Levine, 1993a and 1993b). A higher ratio of M2 to GDP indicates a larger financial sector and a bigger financial intermediation. If the financial sector rises faster than the real sector of the economy, this ratio will increase permanently. The second indicator is the ratio of private sector credits to GDP. This ratio is considered as one of the most relevant indicators of the magnitude and the extent of financial intermediation. This proxy gives an idea on the dynamic of lending-investment activity. It is in line with the McKinnon-Shaw inside money model where financial intermediation is responsible of the quality and quantity of capital accumulation and therefore of economic growth (Demetriades and Hussein, 1996; Arestis and Demetriades, 1997; Luintel and Khan, 1999; Liang and Teng, 2006). We also use gross fixed capital formation to GDP ratio which reflects the evolution of investment activities during the time. Generally speaking, a well-developed financial sector promotes investment activities. It is worth recalling that during the past decade GCC countries have been experiencing huge inflows of foreign resources. The paper intends to reveal the possible complementary role of investment in this finance and growth relationship. This study is relevant because detecting the suitable direction of causality has important policy implications for development strategies in GCC countries. Finally, as a proxy of economic growth we use the GDP per capita.

It is very important to notice that there are several controversies relating to each of these proxies as measures of financial development (Wolde-Rufael 2009). Thus, there is no single aggregate measure that would be sufficient to capture most aspects of financial development (Ang, 2008).

The time series data is annually, it covers the period from 1980 to 2010[2]. The main source of our data is the World Bank's World Development Indicators (WDI). All the variables are in real term and they are all transformed into log form to reduce the problem of heteroscedasticity as it compresses the scale in which the variables are measured, thereby reducing a tenfold difference between two values to a twofold difference (Gujarati, 1995).

2.1. Panel Unit root tests

The unit root tests have to be performed to test whether variables involved in the model are stationary or not. The basic and commonly used tests are Dickey–Fuller (DF) and the Augmented Dickey–Fuller (F-ADF). However, empirical literature reveals that these tests could suffer from weak power in rejecting the null hypothesis pointing at non-stationarity as well as limiting distributions which are complex and opaque. To avoid these problems, we used in this study more consistent panel unit root tests such as Levin and Chu (LLC, 2002), Im, Pesaran and Shin (IPS, 2003) and finally Breitung (2000).

2.2. Toda-Yamamoto procedure

The most popular method used for testing causality among variables is the Granger causality test (Granger 1969). However, the econometrics literature provided considerable criticism of procedure mainly because it requires the series data to be stationary and integrated. To resolve

this constraint Toda and Yamamoto (1995) suggested a new technique by modifying the standard Granger causality test on the series data in levels which is robust to the existence of unit roots. Toda and Yamamoto employ the basic VAR by the use of a Modified Wald test for restrictions on the parameters of the VAR (k) model and estimate a VAR [$k+dmax$], where k is the lag order of VAR and *dmax* is the maximal order of integration for the series in the system. This method is easy to process and more relevant than the basic Granger test. The advantage of using the Toda and Yamamoto procedure is that it improves the power of Granger-causality test (Rimbaldi and Doran 1996). Moreover, it does not require knowledge of cointegration properties of the model. The multivariate framework of our case study can be expressed as follows:

$$\ln GDP_t = \alpha_1 + \sum_{i=1}^{k+d\,\max} \beta_{1i} \ln GDP_{t-i} + \sum_{i=1}^{k+d\,\max} \beta_{1i} \ln M2_{t-i} + \sum_{i=1}^{k+d\,\max} \beta_{1i} \ln DCPS_{t-1} + \sum_{i=1}^{k+d\,\max} \beta_{1i} \ln INV_{t-i} + \mu_{1t} \tag{1}$$

$$\tag{2}$$

$$\ln M2_t = \alpha_2 + \sum_{i=1}^{k+d\,\max} \beta_{2i} \ln GDP_{t-i} + \sum_{i=1}^{k+d\,\max} \beta_{2,i} \ln M2_{t-i} + \sum_{i=1}^{k+d\,\max} \beta_{2,i} \ln DCPS_{t-1} + \sum_{i=1}^{k+d\,\max} \beta_{2i} \ln INV_{t-i} + \mu_{2t}$$

$$\tag{3}$$

$$\ln INV_t = \alpha_3 + \sum_{i=1}^{k+d\,\max} \beta_{3i} \ln GDP_{t-i} + \sum_{i=1}^{k+d\,\max} \beta_{3i} \ln M2_{t-i} + \sum_{i=1}^{k+d\,\max} \beta_{3i} \ln DCPS_{t-1} + \sum_{i=1}^{k+d\,\max} \beta_{3i} \ln INV_{t-i} + \mu_{3t}$$

$$\tag{4}$$

$$\ln DCPS_t = \alpha_4 + \sum_{i=1}^{k+d\,\max} \beta_{4i} \ln GDP_{t-i} + \sum_{i=1}^{k+d\,\max} \beta_{4i} \ln M2_{t-i} + \sum_{i=1}^{k+d\,\max} \beta_{4i} \ln DCPS_{t-1} + \sum_{i=1}^{k+d\,\max} \beta_{4i} \ln INV_{t-i} + \mu_4$$

Where lnGDP is the logarithm of real gross domestic per capita, lnM2 is the logarithm of broad money to GDP, lnDCPS is the logarithm of total credit to private sector to GDP ratio and lnINV is the logarithm of Gross Fixed Capital Formation to GDP ratio.

To summarize the theoretical framework, Toda-Yamamoto method is conducted in two steps. The first step consists in determining the lag length (k) of VAR model and the maximum order of integration (d) of the time series variables in the system. After the selection of optimum lag

7

length VAR (k) and the order of integration *dmax*, a level VAR is estimated with a total of [$k+dmax$] lags. The second step requests the application the standard Wald tests on the first (k) VAR coefficient matrix to make Granger causal inference using a chi square (χ^2) distribution.

3. Empirical results

3.1. Panel Unit root tests

This study uses the panel unit root test of the variables by five standard method tests for panel data including Levin and Chu test, (LLC, 2002), the Im, Pesaran and Shin (IPS, 2003)) test, the Fisher-Type test by ADF and PP-test (Maddala and Wu (1999) and finally Breitung (2000) test.

The results are displayed in Table 1. They show that the test statistics for the log levels of lnGDP, lnM2, lnDCPS and lnINV are statistically insignificant. When we apply the panel unit root tests to the first difference of the five variables, all four tests reject the joint null hypothesis for each variable at the 1 per cent level. Thus, from all of the tests, the panel unit roots tests indicate that each variable is integrated of order one.

Table 1: Panel Unit Root Tests

	LLC		IPS		ADF		PP		BR	
	Level	1st	Level	1st	Level	1st	Level	1st	Level	1st
lnGDP	2.802	-7.480	5.759	-6.621	8.120	63.267	6.384	94.398	0.120	-5.706
	(0.998)	(0.000)	(1.000)	(0.000)	(0.776)	(0.000)	(0.896)	(0.000)	(0.548)	(0.000)
lnDCPS	-1.525	-4.645	-0.992	-6.136	17.9396	59.349	13.155	79.549	-1.788	-2.407
	(0.063)	(0.000)	(0.160)	(0.000)	(0.117)	(0.000)	(0.358)	(0.000)	(0.037)	(0.008)
lnM2	2.120	-5.632	-4.277	-5.970	1.787	58.269	1.019	103.709	-0.677	-4.554
	(0.983)	(0.000)	(0.000)	(0.000)	(0.999)	(0.000)	(1.000)	(0.000)	(0.249)	(0.000)
lnINV	-0.044	-9.830	-1.644	-8.648	5.090	87.256	4.243	143.435	-2.408	-7.255
	(0.482)	(0.000)	(0.051)	(0.000)	(0.955)	(0.000)	(0.979)	(0.000)	(0.080)	(0.000)

Note: (.) represent p-values.

In the next step, it is necessary to determine the optimal lag length k in order to determine the order of integration in the series (*dmax*). The result of selecting optimal lag length of VAR based

on the sequential modified LR test statistic (LR), Final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SC) and Hannan-Quinn information criterion (HQ) lag selection criteria indicates that lag order of VAR (k) is 2. The Granger non-causality test consists now in augmenting the VAR by the maximum order of integration of the series (*dmax*).

3.2. The Granger non-causality tests

We perform the Toda and Yamamato (1995) procedure to examine the direction of causality. The results of these tests are presented in Table 2.

Table 2: Results of the Toda and Yamamato estimation

Dependent variable	lnGDPC		lnM2		lnDCPS		lnINV	
	Chi^2	*p*-value	Chi^2	*p*-value	Chi^2	*p*-value	Chi^2	*p*-value
lnGDP	-	-	8.864	0.003***	8.364	0.0038***	6.757	0.009***
lnM2	15.640	0.000***	-	-	3.710	0.054*	7.508	0.006***
lnDCPS	3.071	0.079*	0.337	0.561	-	-	0.668	0.413
lnINV	0.681	0.408	3.551	0.050**	0.374	0.540	-	-

Note: ***, ** and *, denote significant levels at 1%, 5% and 10% respectively for rejecting the hypothesis of no-Granger causality.

Several conclusions could be drawn from table 2. The most important one appears in the GDP equation which indicates that all the three variables of the model Granger cause economic growth at a1 % level of significance. Thus, the null hypothesis that financial development does not Granger-cause economic growth in GCC region is rejected in all the cases. Here we can confirm that the several reforms and efforts undertaken by GCC countries during the past decade

9

were fruitful to the financial sector and the economy as a whole. It is worth mentioning that the GCC region has become the hub of finance, especially for Islamic finance and the preferred destination for international companies. The banking sector continues to grow even in period of global financial crisis. The banking sectors in the GCC countries were buttressed by high profits and capital buffers in the run-up to the 2008-09 global recession and international financial crisis (Al Hassan et al 2010). Since the past few years the GCC banking sector becomes robust with assets increasing by 11 percent in 2012 to $1.47 trillion.

The table 2 shows an evidence of a bi-directional Granger causality running between broad money growth (lnM2) to investment ratio (lnINV). This shows the interaction between the size of financial intermediation in the region and its role in financing the economy. Otherwise, when money supply increases, liquidity increases too and becomes available which in turn would be used in investment projects and activities. The existence of a unidirectional causal relationship running from DCPS to lnM2 supports this conclusion.

The table 2 reveals the existence of another bidirectional relationship running between lnM2 to economic growth. This shows that when the economy is prosperous; an increase in Gdp is followed by an increase in money supply to satisfy the needs of the economy. Moreover, when money supply increases, economic growth improves.

Further Table 2 shows evidences of the existence of a third bidirectional causal relationship running between lnDCPS to economic growth. A private sector credit to GDP is considered as one of the appropriate indicator of the magnitude and the extent of financial intermediation. In GCC region, credit to private sector boosted massively the economy during the past decade. Following windfalls of oil revenues, gross domestic products of GCC countries

recorded a high level which in turn facilitated the credit conditions. Thanks to availability of liquidity, all GCC countries have witnessed a boom in real estate sector and construction and a huge spending in infrastructure.

4. Conclusion

The broad aim of this paper is to examine the causality between financial development and economic growth in a multivariate system using the Toda and Yamamoto methodology in the GCC countries for the period 1980-2010. The empirical results reveal a positive relationship between finance and growth nexus. This shows that the various reforms undertaken by GCC governments were successful. Financial sector begins to impact positively the GCC economies through allocation of credits and financing small and medium enterprises as well as large companies. Recently, GCC financial market has been experiencing a buoyant growth and has become a key player of growth. Thanks to high oil prices, liquidity of banks has increased significantly and this contributes to the dynamics of the economy while the several countries are facing a slowdown. These results could be useful for policymakers for at least two reasons. First, because they show the effective role of financial sector in spurring economic growth and creating employment. Therefore, policymakers should undertake further reforms which aim at enhancing the effectiveness of the financial institutions and to ensure the financial stability. Second, our results show the crucial role of the financial sector in lowering the dependency of the governments to oil revenues. Here, it is worth recalling that on average; oil revenues represent more than 75% of the total government revenues of all the six countries. Thus, a well-developed financial sector could be considered as the best step toward a diversification of the GCC economies.

Endnotes

[1] The GCC includes the six following countries: Bahrain, Oman, Kuwait, Qatar, United Arab Emirates and Saudi Arabia.
[2] Unfortunately, this is the longest available data for GCC countries.

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