Financial development and economic growth: an empirical evidence from the GCC countries using static and dynamic panel data

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Abstract This paper contributes to the existing empirics of finance-growth nexus of all GCC countries with new results based on a larger dataset and longer time period 1975–2012, incorporating additional control variables, FDI, interaction term of FDI & financial development variables, and oil production. We employed four estimation techniques, Pooled OLS, Fixed effect estimation, Random effect estimation, and the system GMM estimation and used static and dynamic panel data. We obtain a robust finding of consistently a positive effect of financial sector development (FSD) on economic growth of GCC region with implication that a substantial improvement in FSD was in place. The results indicate that FDI, Fixed capital formation and oil production contribute positively to the economic growth of this region. The study results signify for a continuity of the on-going financial reform process, supervision & monitoring exercises to bring hitherto more dividends to the GCC economies.

Keywords Financial development · Economic growth · Panel data · GCC countries · System GMM

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1 Introduction

The fundamental relationship between financial sector and economic growth runs as follows. Financial sector mobilizes & pools savings, and eventually allocates them to various capital needs. It makes necessary information available prior to prospective investments. It monitors investments and exerts corporate governance. It facilitates trade & commerce, diversification and management risk, and finally, it does ease the exchange of goods and services through various financial instruments. All these measures aim to promote efficient capital allocation for productivity improvement (Levine 1997). Financial sector is a vehicle to diversify and share risks to induce capital allocation towards high risky projects with high expected returns that results in productivity improvement and economic growth (Greenwood and Jovanovic 1990). The impact of the above functions on economic growth depends on the level, composition and efficiency of the financial sector. Given the above impetus of the relationship between FSD and economic growth, this paper addresses this relationship for the GCC countries.

Since the groundbreaking work of King and Levine (1993a) on finance-growth nexus, a large number of studies examined this relationship applying an array of econometric techniques. Except few studies of several variants on the Middle East and North African (MENA) countries, hardly any systematic studies on the finance-growth nexus of the Gulf cooperation Council (GCC) countries is available in the literature using the most appropriate estimation techniques that address the endogeneity issue; some studies are sporadic and country specific (available only for Saudi Arabia and UAE). Since all these studies are limited in terms of data coverage and econometric techniques used, the findings are inconsistent either with positive results or negative results or no results at all. For instance, Marashdeh and Al-Malkawi (2014) using ARDL approach for Saudi Arabia found positive impact of FSD on growth, and similarly with Ibrahim (2013) using a fully modified ordinary least squares (FMOLS) method for Saudi Arabia. The studies that found no influence of FSD on economic growth is Grassa and Gazdar (2014) and Omran and Bolbol (2003). The former used OLS, panel data and GLS techniques for GCC countries (except Oman) and the latter used OLS for Arab countries including the GCC countries to get their results. Malkawi et al. (2012) using an ARDL approach found a negative effect of the financial sector on the economic growth of UAE.

The GCC countries are oil dependent. They commonly share high dependency on hydrocarbons (as share of oil and gas revenues to total fiscal and export revenues) and its share to GDP. Also they share common structural policy changes with reduced dependency on hydrocarbon sector to diversify their economy ensuring private non-oil sector development, and all other services sectors to create employment opportunities for the GCC nationals. They enjoy a favorable platform with necessary financial means to implement necessary economic reform and structural changes to assist the private sector development and economic diversification. Its financial sector is largely bank based, and instruments are mostly short term maturities. Banks in the GCC countries are well capitalized and profitable. Financial markets are underdeveloped except few significant developments of stock markets, but not in all the GCC countries. Companies in the GCC countries rely on bank financing irrespective of it being either bilateral or syndicated. The financial sector, especially the GCC credit growth increased manifold;

personal loans for consumption increased dynamically; retail banking developed throughout the GCC region due to favorable demographics, making revenue diversification of the financial institutions in the GCC region (Sturn et al. 2008). Also there is a loan expansion throughout the Gulf region along with better and adequate liquidity in GCC banking measured by M2. High energy prices and increased hydrocarbons production are feeding through the non-oil sector with higher liquidity. Thus, higher growth in GCC money supply enables the private sector to expand economic activities (Stubing 2014). Bank lending was driven by infrastructure development & manufacturing.

Given the above financial developments, it is legitimate to investigate their impact on economic growth in the GCC region. Other motivations relate to the inconsistent and inconclusive results shown above on the finance-growth nexus of the GCC countries. Our first objective is to examine whether or not FSD of the GCC countries contributes to their economic growth. The second objective is to explore the role of foreign direct investment (FDI) and the interaction between FSD and FDI while examining the finance-growth nexus of the GCC countries. The second objective relates to an ambiguous link found in the literature between FDI and economic growth across countries. One group of studies focused on the exogenous effect of FDI on economic growth without considering the importance of FSD, while other group stressed on the importance of FSD on economic growth without taking account of FDI, and yet another group examined the role of FSD and FDI simultaneously considering FSD instrumental to assist FDI to impact positively on economic growth. Further, with few exceptions, majority of the studies did not consider the interactions between FDI and financial development while examining the finance-growth nexus (Lee and Chang 2009). To achieve the second objective, we treat the FDI and the interaction variables as control variables to provide evidence if any, whether or not FDI and the interaction term of it with FSD contributes to the economic growth of the GCC countries.

Our study focuses on a longer data period: 1975 to 2012 stressing the point that most financial sector development took place in the last 15 to 20 years. Unlike any previous studies in the GCC countries, four estimation techniques (Pooled OLS, fixed effect estimation, random effect estimation, and the system GMM estimation approaches) are used to estimate the empirical model in order to see whether our results on finance-growth nexus are robust.

The study results indicate that FSD contributed positively and significantly to the economic growth of the GCC region. This signifies that FSD reforms and supervision in the GCC countries during the study period was a strong catalyst to promoting their economic growth. FDI also contributed to the economic growth of the GCC countries. Fixed capital formation and oil production were important contributing factors to the economic growth of this region.

This paper proceeds as follows. In section 2 we present a brief overview of the relevant literature on the finance-growth relationship in general, historically and the GCC countries in particular. Then the paper discusses the empirical model in section 3 inclusive of the FSD indicators and controlled variables employed in the study followed by the methodology of this study. The nature of data and their sources, and results of the econometric works are explained in section 4. Finally, the conclusions of the study are presented in section 5.

2 Literature review

Except few regularity only those studies relevant to the present study are briefly discussed with particular attention to the issue raised, relevant econometric methodology applied and related GCC country studies either as a group or as an individual GCC country. The finance-growth nexus starts with the classic thinking and writings of Bagehot (1873), and later on with Schumpeter (1912) and then recently with few major studies. Disagreement however, exists even among few Nobel Prize winners: Gerald Meier, Dudley Seers, Merton Miller and Robert Lucas. For more details, see Meier and Seers (1984), Lucas (1988) and Miller (1998). Disputes also still remain among the economists about the channels and direction of causality: supply side versus demand sided argument (Robinson 1952) and the empirics of finance-growth nexus.

The current momentum of research owes to the pioneering works of the supply side argument by Gurley and Shaw (1955), Goldsmith (1969), Shaw (1973) and McKinnon (1973). The assertion is countries with developed financial system tend to witness faster economic growth (with higher level productivity and higher per capita income) than otherwise with poorly developed financial system (Levine 2003). The seminal contribution started with Goldsmith (1969). King and Levine (1993a) improved upon Goldsmith's work with a larger sample size by introducing additional control variables, and found positive influence for each of the financial variables relating to all indicators of economic growth under alternative econometric modeling. King and Levine (1993b) also confirmed the above results under the alternative econometric methodologies.

Levine (1998) introduced the legal factor as an instrumental variable (IV) uncorrelated with economic growth beyond its link with finance and other growth determinants to overcome the biased results using simple OLS estimation applied in cross-country regression. Accordingly, both Levine (1999) and Levine et al. (2000) used the legal determinants of banking developments as instrumental variables for financial intermediation indicators to control for simultaneity bias. Their papers did not find positive impact of financial development on economic growth due to simultaneity bias on a sample of 71 countries, but they found the exogenous component of financial (banking) developments to strongly relate to (i) per capita income growth, (ii) productivity improvement and (iii) capital formation. Levine et al. (2000) used generalized methods of moments (GMM) estimators for a data set: 1960–1995, each averaged over 75-year periods, and found stronger evidence of financial development in affecting economic growth positively. Rousseau and Watchel (2000) applying same technique to a dynamic panel data set found the exogenous components of bank and stock market development contributing to economic growth. Beck et al. (2000) also found the effect on growth through productivity growth, and not through capital accumulation, and their relationship was linear. Beck and Levine (2004) also applying the same techniques, found significantly positive effect of both stock market and bank based measures on economic growth free from biases induced by simultaneity, omitted variables or unobserved country specific effects. Rioja and Valev (2004a) also found the effect to growth by enhancing productivity growth only for industrial countries; and for developing countries by increasing capital accumulation. Rioja and Valev (2004b) found the above relationship stronger for rich countries and weaker for low income countries.

Arcand et al. (2012) examined the threshold level of financial development contributing to economic growth and beyond which it found the detrimental impact. They found that countries with a very large financial sector, the relationship between financial depth and economic growth disappeared. Cecchetti and Kharroubi (2012) observed that the size of financial sector had a U-shaped effect on productivity growth, a result was found for 50 countries for the period: 1980–2009. This means a limit to growth beyond which any further increase in the size of financial sector negatively contributed to total factor productivity (TFP) growth.

2.1 Studies on the GCC countries

Very few studies are available in the literature directly on the finance-growth nexus of GCC region. Omran and Bolbol (2003) for example, using OLS technique examined the interactive role of FSD, such as bank-based and equity market indicators with FDI on economic growth for the period: 1975–1999 in Arab countries. They found the interaction term of FDI and FSD affecting economic growth positively only at a given threshold level of financial sector development in host Arab inclusive of the GCC countries. However, they found no exogenous effect of commercial bank assets (as a share of total commercial and central bank assets) on economic growth. Market based indicators, value traded and turnover ratio, affected the economic growth negatively with a significant independent effect on economic growth (p. 244).

Mosesov and Sahwneh (2005) using a standard OLS estimation technique studied the finance-growth nexus in UAE for the period: 1973–2003. They found a statistically significant negative impact of M2 on economic growth (without oil prices) and a negative impact but statistically no different from zero (with oil prices). They found a negative but not statistically significant impact of credit to private sector on growth, and finally, a positive effect of domestic assets of resident banks with no statistical significance. Malkawi et al. (2012) used ARDL approach to co-integration using two measures of financial development for the period: 1974 to 2008 for UAE. Their measures relate to the size of financial intermediaries: the monetization ratio, (M2/GDP) and second measure is credit provided to private sector as percentage of GDP. They found both measures to negatively affect the economic growth in UAE with statistical significance. They did not find either the demand followed or supply-led hypothesis to finance-growth nexus in UAE.

Ibrahim (2013) used a fully modified ordinary least squares (FMOLS) approach to study the effect of financial development (measured by bank credits to the private sector) and stock market development (measured by general stock market index) on economic growth in Saudi Arabia for the period: 1989–2008. He found a significantly positive effect of domestic credit on economic growth in the long run but an insignificantly negative effect in the short run. Stock market development had an insignificant positive impact on economic growth in the long run but an insignificant negative impact in the short run. Marashdeh and Al-Malkawi (2014) applied an ARDL approach to examine the long run impact of financial deepening on the economic growth of Saudi Arabia for a period: 1970 to 2010. They found a positive and statistically significant impact of financial depth measured by M2 as a percentage of GDP on economic growth with no short run bidirectional relationship between these variables: financial depth and economic growth.

The first systematic study of the finance growth nexus on the GCC countries (except Qatar) is Sbeiti et al. (2013). They used a panel regression for 1974–2003 data sets inclusive of two financial measures: bank-based and market based variables and a few standard controlled variables. They applied fixed effect/random effect technique. The study found a positive impact of both market based and bank based financial measures on economic growth. Grassa and Gazdar (2014) used OLS, panel data and GLS techniques to study the finance-growth nexus for the GCC countries except Oman for a period of 1996 to 2011, and found that overall FSD did not affect the economic growth in the GCC countries: Conventional banking sector negatively affected the economic growth insignificantly, while Islamic banking sector development affected the growth positively and significantly.

Since the above results on the finance-growth nexus are mixed for both the GCC countries as a whole and for specific GCC country in particular, there is a further need of a more systematic econometric study to investigate the validity of the assertion that FSD affects the economic growth in the GCC countries. The discussions in Section 3 and Section 4 aim at that end.

3 Empirical model and methodology

3.1 Empirical model

As discussed above, the present study is an attempt to examine whether FSD contributes to the economic growth of the GCC countries. It also attempts to study the role of FDI on the growth of these countries. Additionally, we examine whether the level of FSD and FDI together contributes to the enhancement of the growth of the GCC countries (that is, whether the interaction between FSD and FDI contributes to economic growth). To examine all these issues we employ a panel data model that is similar to a typical growth model. Specifically, the model is as follows:

$$Y_{it} = \alpha FD_{it} + \beta X_{it} + \mu_i + \eta_t + u_{it} \qquad (1)$$

Where Y_{it} is the growth rate of real GDP per capita for country i in period t, FD_{it} is the logarithm of financial development variable for country i in period t, and all other independent variables (control variables) are captured by the vector X_{it}; μ_i is a country specific effect and η_t is a fixed time effect, u_{it} is a random error term that captures all other variables. In the dynamic version of the model the vector X_{it} also includes the lagged dependent variable.

3.2 Financial development indicators

Financial development is generally defined as the improvement of the quality and quantity of financial intermediary services. Improvement is revealed in financial indicators through transactions between financial institutions and non-financial economic entities, including outstanding bank loans and the money supply. In this study two indicators that measure FSD of a country are employed; the first indicator is the financial intermediation ratio (DC), which is the total domestic credit available to the private sector from banks as a percentage of GDP. The second indicator is the

monetization index (M2) which is the broad money supply as a percentage of GDP. The DC variable is used to measure the financial depth while M2 measures the real size of the financial sector of the country. The DC variable represents the actual resources that are channeled to the private sector by commercial banks, whereas a higher value of the M2 variable indicates a larger financial sector, and a bigger financial intermediation. The financial development variable is usually expected to have a positive effect on economic growth.[1]

3.3 Controlled variables

We controlled for the effects of diverse variables deemed by the literature as potential determinants of economic growth and included some additional variable considered to be important to contribute to the economic growth of the GCC countries (for instance, oil production). Specifically, our analysis includes initial GDP per capita (IGDPC), foreign direct investment (FDI), a variable representing the interaction of FDI and FSD, trade openness (Trade), government expenditures (GE), gross fixed capital formation (I), inflation rate (Inf) and oil production (Oil) as our control variables. A brief description and the expected sign of these variables are presented in Table 1.

3.4 Methodology

The relationship between FSD and economic growth is studied based on Eq. (1). The coefficients of Eq. (1) are estimated by making use of four different estimation techniques: Pooled OLS, fixed effect estimation, random effect estimation, and system GMM. The first three estimation techniques were employed to estimate the static version of the model, while the system GMM is employed to estimate the dynamic version of Eq. (1).

Pooled OLS ignores any heterogeneity among the countries involved. Additionally, since most of the variables under study are likely to be endogenous, the OLS estimators are more likely to be inconsistent. While Fixed and Random effect estimation deals with the heterogeneity issue, these estimation approaches, however, do not deal with the endogeneity issue, in particular, when Eq. (1) includes the lagged dependent variable. The results based on Pooled OLS, fixed effect model and random effect model should therefore be interpreted with caution since it is weakened by endogeneity. Our presentation here is basically for the purpose of testing the robustness of the results to those obtained with the system GMM estimator.

The system GMM approach deals with the problem of omitted unobserved variables by taking first differences. It also tackles the issue of endogeneity and reverse causality by using lagged values of the independent variables as instruments. Consequently, we can reliably examine the impact of exogenous component of financial development on economic growth for the GCC countries. This system estimator approach has been widely used recently in growth regressions. Bond et al. (2001) and Hauk and Wacziarg (2009) pointed out that the system GMM estimators should be employed for growth regressions to generate consistent and efficient parameter estimates. The system GMM

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[1] This study does not employ the stock market development as an indicator of FSD due to non-availability of a consistent stock market data set for all the GCC countries for a longer time span.

Table 1 Brief description of control variables

The variable	Description
IGDPC	The logarithm of initial real GDP per capita; this variable will provide evidence of any convergence effects. The expected sign of the variable is negative.
FDI	Foreign direct investment; the expected sign of the variable is positive.
INTERACT = FSD*FDI (FSD is either DC or M2)	This variable is used to capture the role of FSD in enhancing the contributions of FDI on economic growth. This variable is expected to have a positive sign.
Trade	Trade openness is the ratio of the sum of exports and imports to GDP. There is no conclusive sign for this variable although a positive sign is more likely than otherwise.
GE	Government final consumption expenditure as a ratio of GDP. It captures the size of the government. It may either have a positive or a negative sign depending upon the type of government spending.
I	Gross fixed capital formation as a percentage of GDP. This variable is expected to have a positive sign.
Inf	Inflation rate. This variable is expected to have a negative sign.
Oil	Oil production (average daily production per year) of a country as a ratio of GDP. This variable is expected to have a positive sign.

deals with the shortcomings of the standard GMM estimator. Further details of the system GMM approach can be found in Arellano and Bover (1995) and Blundell and Bond (1998).

Few tests are conducted to find out which of the estimation techniques (among Pooled OLS, Fixed and Random effects) provides the most appropriate coefficient estimates. The F-test was carried out to test the validity of the fixed effect estimation relative to the pooled OLS and the Hausman test was conducted to see the appropriateness of the fixed vs. random effect estimation approaches. For all the estimation approaches, we used robust estimators to deal with the existence of possible heteroscedasticity and autocorrelation problems.

In applying the system GMM estimation technique, we conducted two specification tests suggested by Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998). One is the Sargent test for the over-identification restrictions to test the overall validity of the instruments (the null hypothesis is: the instruments are valid) and the second one is a second-order serial correlation test conducted in the first differenced residuals to examine the hypothesis that the error term is not serially correlated. It is to be noted that the GMM estimator is consistent when the lagged values of the explanatory variables are valid instruments as well as when the autocorrelation test confirms the adequacy of the model specification.

4 Data and results

4.1 Data

Our panel data set includes all six GCC countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates). The period of study is from 1975 to 2012. A

Table 2 Descriptive statistics of all variables in all GCC countries for the period 1975–2012

Variable	Mean	Stan. Dev.	Minimum	Maximum	Observation
GDPCG	2.255	5.002	−11.088	16.253	48
DC	3.472	0.536	1.609	4.417	48
M2	3.811	0.463	2.777	4.809	48
FDI	1.739	2.264	−1.206	9.683	48
Trade	4.429	0.285	3.908	5.193	48
GE	2.968	0.424	1.926	4.286	48
I	3.133	0.247	2.659	3.658	48
Oil	13.17	0.247	12.49	13.68	48
Inf.	4.158	3.986	−1.729	15.41	48
IGDPC	10.08	0.641	8.766	11.20	47
DC*FDI	6.273	8.600	−4.457	37.16	48
M2*FDI	6.804	9.272	−4.749	41.35	48

Except the growth rate of GDP, FDI and inflation rate, all other variables are in logarithm form

common practice in the growth literature is to use a 5-year non-overlapping average data to account for the business-cycle fluctuations if there were any. This averaging of the data also deals with the missing data problem usually prevalent in developing countries. We, therefore, have eight observations for each country: 1975–1979, 1980–1984, 1985–1989, 1990–1994, 1995–1999, 2000–2004, 2005–2009 and 2010–2012 (the last period includes an average of 3 years only). Most of the data set is obtained from the World Bank Indicators. Any data not available from this source were collected from the UNCTAD-STAT.

All the variables, except the growth rate of real GDP, inflation rate and FDI are in the logarithm form. The FDI data obtained from the World Bank Indicator is the net foreign direct investment and some of these values are negative (even after taking a 5 year average). Therefore, to avoid losing any more values we decided not to take the natural log of this variable. Inflation rate is based on the percentage change in CPI (if the data on CPI were not available, the GDP deflator was used to compute the inflation rate).

4.2 Results

The descriptive statistics of all the variables used in this study are reported in Table 2 while Table 3 provides a correlation matrix of these variables.[2]

Table 2 presents descriptive statistics for the variables used in the analysis. The monetization ratio, M2, ranges from 2.78 to 4.81 % of GDP with an average of 3.81 %. The financial intermediation ratio, DC, ranges from 1.61 to 4.42 % of GDP with an average of 3.47 %. The average of government expenditures (GE) is about 2.97 % with a range from 1.93 to 4.29 % of GDP. The variables trade openness (Trade) and Oil both have averages of 4.43 and 13.17 %, respectively. The standard deviations range from

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[2] To conserve space the correlation matrix with DC is not reported here.

Table 3 Correlation matrix of all variables in all GCC countries for the period 1975–2012

	GDPCG	M2	FDI	M2*FDI	Trade	GE	I	Oil	Inf	IGDPC
GDPCG	1.000									
M2	0.198	1.000								
FDI	0.240	0.170	1.000							
M2*FDI	0.243	0.226	0.995	1.000						
Trade	0.092	0.186	0.356	0.374	1.000					
GE	0.073	0.128	−0.282	−0.286	−0.553	1.000				
I	0.233	−0.396	0.297	0.263	0.352	−0.337	1.000			
Oil	0.147	0.049	0.298	0.308	0.879	−0.649	0.268	1.000		
Inf	0.033	−0.300	0.065	0.033	0.379	−0.438	0.327	0.513	1.000	
IGDPC	−0.102	0.073	−0.141	−0.129	−0.061	−0.234	0.058	0.058	0.153	1.000

0.247 % (the least volatile) with Oil production, and to 9.27 % with interaction term, M2*FDI (the most volatile).

Table 3 reveals a positive association between FSD and economic growth. In fact it indicates a positive association of economic growth with all but one variable, the initial GDP per capita. However, the bivariate association shown in this table needs to be analyzed with caution as it ignores the impact of all other variables on economic growth in examining the association between FSD and economic growth; besides, it ignores other issues as well (such as the endogeneity of the regressors, and the direction of causation, etc.).

Tables 4, 5, 6 and 7 provide results for the pooled OLS, fixed effect, random effect and the system GMM estimation methods, respectively. The possibility of severe multicolinearity owing to strong correlation between FDI and the interaction term (M2*FDI or DC*FDI), and between Trade and Oil (see Table 3) has made us to report the results in following style: (i) with all variables included in regression, (ii) after dropping only the interaction term from regression, and finally, (iii) after dropping both the interaction term and Oil variable from regression.

Table 4 shows the results of the pooled OLS estimation. It demonstrates that FSD (measured by money supply as a percentage of GDP or domestic credit as a percentage of GDP) had a positive and significant impact on economic growth during the study period. However, the level of FDI and the interaction term did not contribute to the economic growth of the GCC countries.

Additionally, the results show that trade openness had a negative impact on economic growth in all cases with few results are highly significant. These results are not unlikely since the theoretical literature does not specify any conclusive sign of this variable although a positive sign is more likely than otherwise. Several literature surveys emphasize that the effect of trade can be ambiguous (Grossman and Helpman 1991, and Narayan and Narayan 2013). Some other literature suggest that trade openness does not play a significant role if certain conditions for the skilled human capital are not met (Mhadhbi 2014). In other cases, trade openness may impact growth negatively for some countries usually specialized either in low quality products or when a country exports a small set of products or sells its goods to a small number of

Table 4 Regression results using the pooled OLS estimation

Variables	M2 (All)	M2 (Excl. Interaction)	M2 (Excl. Interaction & Oil)	DC (All)	DC (Excl. Interaction)	DC (Excl. Interaction & Oil)
IGDPC	−1.927	−1.784*	−1.228	−1.033	−0.994	−0.692
	(0.125)	(0.096)	(0.233)	(0.372)	(0.371)	(0.531)
DC				3.382*	3.758*	3.278
				(0.092)	(0.088)	(0.109)
M2	5.378***	5.892***	4.554**			
	(0.002)	(0.007)	(0.037)			
FDI	−2.544	0.131	0.211	−0.952	0.316	0.340
	(0.630)	(0.684)	(0.69)	(0.841)	(0.305)	(0.262)
FDI*DC				0.341		
				(0.786)		
FDI*M2	0.661					
	(0.603)					
Trade	−18.251***	−17.471***	−3.573	−14.095**	−13.728*	−2.398
	(0.007)	(0.004)	(0.353)	(0.031)	(0.028)	(0.501)
GE	3.203	3.109	1.246	5.636**	5.502**	3.438
	(0.201)	(0.209)	(0.623)	(0.039)	(0.036)	(0.130)
I	13.375**	12.723***	9.246*	10.816**	10.546**	8.153*
	(0.011)	(0.006)	(0.055)	(0.035)	(0.027)	(0.089)
Oil	19.816***	19.823***		17.402**	17.013**	
	(0.008)	(0.005)		(0.02)	(0.021)	
Inf	0.071	0.020	0.198	0.008	0.008	0.180
	(0.788)	(0.926)	(0.359)	(0.974)	(0.974)	(0.470)
Constant	−230.64***	−235.29***	−20.699	−216.90**	−213.93**	−28.573
	(0.008)	(0.005)	(0.296)	(0.014)	(0.013)	(0.145)
Observations	47	47	47	47	47	47
R-Squared	0.3726	0.3656	0.2246	0.3152	0.3127	0.2045

Figures in parenthesis are p-values.*, **, *** indicate significant at 10, 5 and 1 % level, respectively

destination markets. This particular notion has particularly important implications for developing countries such as the GCC countries, as all of these countries are specialized in exporting mostly one good: oil.

The government expenditure in the GCC countries demonstrated a significant positive impact on economic growth when used with DC in regression as a financial indicator. However, it did not show significantly positive impact on economic growth when oil is excluded from the regression. This result is not surprising; it is rather expected because, the GCC countries benefited largely from the unprecedented increase in oil price given its oil production in various years to increase their government expenditure in manifolds. Further, the provision of infrastructure through massive public sector investment was a complement to reinforce the impact of DC variable on economic growth. Interestingly, government expenditure did not show any impact

Table 5 Regression results using the fixed effect estimation

Variables	M2 (All)	M2 (Excl. Interaction)	M2 (Excl. Interaction & Oil)	DC (All)	DC (Excl. Interaction)	DC (Excl. Interaction & Oil)
IGDPC	−4.717*	−4.627**	−4.481**	−5.049*	−4.641**	−4.575**
	(0.051)	(0.028)	(0.045)	(0.074)	(0.046)	(0.048)
DC				1.673	0.979	0.901
				(0.166)	(0.528)	(0.469)
M2	2.385	2.235	1.834			
	(0.387)	(0.463)	(0.415)			
FDI	0.862	0.137*	0.147	2.281	0.201*	0.200*
	(0.851)	(0.097)	(0.162)	(0.638)	(0.082)	(0.091)
FDI*DC				−0.564		
				(0.666)		
FDI*M2	−0.181					
	(0.874)					
Trade	−19.324	−18.891	−15.361**	−17.943	−16.336	−14.968**
	(0.174))	(0.214)	(0.010)	(0.126)	(0.228)	(0.015)
GE	−2.967	−2.962	−3.720*	−2.724	−2.609	−2.975**
	(0.242)	(0.245)	(0.059)	(0.339)	(0.362)	(0.042)
I	11.283**	11.481**	10.852**	10.624*	11.183**	10.927**
	(0.031)	(0.013)	(0.014)	(0.040)	(0.016)	(0.019)
Oil	4.421	4.147		1.901	1.647	
	(0.697)	(0.740)		(0.840)	(0.877)	
Inf	0.359	0.356	0.353	0.412	0.347	0.347
	(0.287)	(0.284)	(0.278)	(0.264)	(0.333)	(0.326)
Constant	40.026	40.797	84.036**	74.714	67.495	84.611*
	(0.747)	(0.752)	(0.049)	(0.497)	(0.524)	(0.057)
Observations	47	47	47	47	47	47
R-Squared	0.3838	0.3833	0.3793	0.3774	0.3699	0.3692
F-Value Restricted	4.05***	4.29***	6.82***	4.89***	4.94***	6.95***

Figures in parenthesis are p-values. *, **, *** indicate significant at 10, 5 and 1 % level, respectively. F-restricted provides test for the presence/absence of the fixed effects

on economic growth when used with M2 as a financial indicator; this might be due to government spending in the GCC countries not achieving the required allocative efficiency, and hence, no positive impact on economic growth (Nelson and Singh 1994; Devarajan et al. 1996 and Easterly and Levine 1997).

The study found a positive and significant influence of gross fixed capital formation on economic growth. As expected, oil production in the GCC countries played an important role in their economic growth. Table 4 shows that the log of the initial GDP per capita had a negative and significant effect on economic growth during the study period. This is predicated by the Solow-Swan theory. It also confirms the convergence

Table 6 Regression results using the random effect estimation

Variables	M2 (All)	M2 (Excl. Interaction)	M2 (Excl. Interaction & Oil)	DC (All)	DC (Excl. Interaction)	DC (Excl. Interaction & Oil)
IGDPC	−1.927***	−1.784*	−1.228	−1.033	−0.994	−0.692
	(.003)	(0.017)	(0.346)	(0.277)	(0.314)	(0.624)
DC				3.382*	3.758**	3.278**
				(0.080)	(0.044)	(0.039)
M2	5.378***	5.892***	4.554***			
	(0.007)	(0.009)	(0.006)			
FDI	−2.544	0.131	0.211	−0.952	0.316	0.340***
	(0.639)	(0.660)	(0.111)	(0.866)	(0.215)	(0.009)
FDI*DC				0.341		
				(0.817)		
FDI*M2	0.661					
	(0.614)					
Trade	−18.251**	−17.471**	−3.573	−14.094*	−13.728*	−2.398
	(0.018)	(0.021)	(0.361)	(0.069)	(0.080)	(0.516)
GE	3.203*	3.109*	1.246	5.636***	5.502***	3.438
	(0.069)	(0.079)	(0.701)	(0.002)	(0.003)	(0.224)
I	13.375**	12.743**	9.246	10.816	10.546*	8.153
	(0.021)	(0.018)	(0.131)	(0.101)	(0.093)	(0.202)
Oil	19.816***	19.823***		17.402***	17.013**	
	(0.002)	(0.003)		(0.006)	(0.018)	
Inf	0.071	0.020	0.198	0.008	0.008	0.180
	(0.791)	(0.920)	(0.279)	(0.972)	(0.973)	(0.461)
Constant	−230.64***	−235.29***	−20.699	−216.90***	−213.93***	−28.574
	(0.002)	(0.002)	(0.535)	(0.003)	(0.007)	(0.265)
Observations	47	47	47	47	47	47
R-Squared	0.3726	0.3656	0.2246	0.3152	0.3127	0.2045
Hausman Test	19.96**	23.58***	18.87***	35.39***	35.60***	130.38***

Figures in parenthesis are *p*-values. *, **, *** indicate significant at 10, 5 and 1 % level, respectively

effect which implies that the less developed countries grow at a higher rate than the developed countries. The above table demonstrates no impact of inflation rate on the economic growth of the GCC countries.

Table 5 provides the results for the fixed effect estimation approach. It shows the FSD, the interaction term, the FDI and oil production variables do not contribute to the economic growth of the GCC countries, while the gross fixed capital formation has a positive and significant influence on the economic growth. It is to be noted that the signs of the FSD and FDI variables are found to be positive. The impact of trade openness and government expenditures on economic growth depends on the type of model being specified. These two variables contribute significantly to the economic growth when the model excludes the interaction term and oil variables (these two

Table 7 Regression results using the system GMM estimation

Variables	M2 (All)	M2 (Excl. Interaction)	M2 (Excl. Interaction & Oil)	DC (All)	DC (Excl. Interaction)	DC (Excl. Interaction & Oil)
IGDPC	−1.187	−1.135	−0.301	−0.811	−0.742	−0.553
	0.109	(0.135)	(0.828)	(0.523)	(0.525)	(0.690)
DC				8.533***	7.089***	6.956***
				(0.000)	(0.002)	(0.003)
M2	7.147**	6.805**	5.648**			
	(0.017)	(0.018)	(0.018)			
FDI	1.929	0.3778***	0.342***	4.529	0.542***	0.534***
	(0.632)	(0.007)	(0.007)	(0.232)	(0.002)	(0.002)
FDI*DC				−1.066		
				(0.273)		
FDI*M2	−0.380					
	(0.694)					
Trade	−20.626***	−20.869***	−8.675**	−12.871***	−14.874***	−8.852***
	(0.000)	(0.000)	(0.023)	(0.000)	(0.000)	(0.001)
GE	0.847	0.0964	−1.173	2.692**	3.459**	2.052*
	(0.473)	(0.355)	(0.594)	(0.036)	(0.010)	(0.088)
I	13.289***	13.589***	11.061***	11.788***	12.223***	11.351***
	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.002)
Oil	16.762***	16.856***		4.939**	8.741***	
	(0.000)	(0.000)		(0.049)	(0.008)	
Inf	−0.313*	−0.283**	−0.114	−0.237***	−0.263***	−0.164**
	(0.089)	(0.032)	(0.540)	(0.009)	(0.007)	(0.039)
Constant	−185.55***	−187.38***	−10.074	−73.797**	−113.85***	−20.458
	(0.000)	(0.000)	(0.636)	(0.015)	(0.001)	(0.247)
Observations	42	42	42	42	42	42
Wald-Stat	150.99***	940.53***	847.41***	65.88***	77.17***	40.35***
P-value (Wald)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Sargent Test P-value	0.8671	0.8618	0.8697	0.9569	0.9594	0.9632
AR(2) P-value	0.3322	0.2849	0.2812	0.1284	0.1369	0.1595

Figures in parenthesis are *p*-values. *, **, *** indicate significant at 10 %, 5 % and 1 % level, respectively

variables were found to have high correlation with FDI and trade openness, respectively). The F-test indicates the presence of a fixed effect confirming the heterogeneity of the GCC countries.

Table 6 provides the results of the random effect estimation approach. These results are supportive to the results obtained earlier in Table 4. This reinforces the previous finding that FSD played an important role in the economic growth of the GCC countries. The results also show that FDI has a significantly positive impact on

economic growth. However, the combined effect of FSD & FDI interaction term on economic growth was not significant. Evidently, this was the case in Tables 4 and 5. Oil production and fixed capital formation also contributed positively to the growth of the GCC countries. Government expenditures show a positive influence on growth in most of the cases. The Hausman test however, indicates that the fixed effect estimation approach is more appropriate than the random effect estimation.

As discussed above, the three estimation techniques used so far, do not take into account the endogeneity of the regressors, and therefore, the results based on these approaches should be interpreted with caution. The system GMM is used to deal with this problem. Table 7 shows the results of the system GMM estimation approach. As mentioned above, the system GMM provides consistent estimates if the model specifications pass the tests of instruments validity and serial correlation.

Both the Sargent test and the autocorrelation test confirm the appropriateness of the model. The null hypothesis of the valid instruments could not be rejected and the second-order autocorrelation test indicates the absence of any serial correlation in the first-differenced residuals.

The results in Table 7 support the key results found in Tables 4 and 6 earlier (i.e., the estimation results of the pooled OLS and the random effect regression models). These results signify that FSD played an important role in the economic growth of the GCC region. Additionally, the interaction of the FSD and FDI did not contribute to the economic growth of the GCC countries when both interaction term and FDI variables were included simultaneously, in the model. After dropping the interaction term from the model (because of severe multi-co linearity between the interaction term and FDI) the results show that FDI contributed positively and significantly to the economic growth of the GCC countries during the study period. Fixed capital formation positively affected the economic growth of the GCC countries, while trade openness negatively influenced the economic growth in the region. Further, the oil production played a vital role in the economic growth of the GCC countries, while inflation rate had a detrimental influence on the economic growth in most of the cases.

In summary, our findings demonstrate the evidence that FSD positively and significantly affected the economic growth of the GCC countries over the sample period. The three out of four estimation methods confirmed this finding (with the exception of the fixed effect estimation). Since, the fixed effect estimation method did not deal with the endogeneity issue, we consider the results of the fixed effect estimation not reliable. Although the pooled OLS and the random effect estimations ignored the endogeniety issue, however, the results based on these estimations were confirmed by the system GMM estimation method.

While three models out of four models indicated that FDI affected positively and significantly the economic growth of the GCC countries (the effect was more pronounced and vigilant with the system GMM estimator), none of the four estimation techniques demonstrated any impact of the interaction term of FDI and FSD on economic growth. The reasons behind such result are that the level of FSD was not sufficient enough to attract FDI during the study period, and so, the combined insignificant effect of interaction term on economic growth was not unlikely. Our findings support Omran and Bolbol (2003), who examined the interactive role of FDI and FSD in impacting economic growth. Using bank-based and equity market indicators with FDI as interaction terms, they found that FDI affected economic growth

positively at a given threshold level of FSD in host Arab countries including the GCC countries. Comparing their results with ours, it may be asserted that the threshold level of FSD was not well established in the GCC countries during the study period for the FDI flows and operations to be effectively embedded with FSD and promote economic growth in the GCC countries.

Fixed capital formation and oil production contributed positively to the region's economic growth. Additionally, trade openness showed a negative impact on the economic growth while government expenditures displayed some positive effect on growth. Inflation rate played a negative role in the region's economic growth. However, this was significant only when system GMM technique was employed.

The above results confirm the findings of some influential studies that examined the financial development (FSD) and economic growth (for instance, King and Levine (1993a), Levine and Zervos (1996), Levine (1997), Beck et al. (2000) and Levine et al. (2000)). Sbeiti et al. (2013) using a panel regression for 1974–2003 data found a similar conclusion for the GCC countries (their study did not employ all the GCC countries, however). Some studies that employed data for individual GCC countries also found similar results [for instance, Marashdeh and Al-Malkawi (2014) using ARDL approach for Saudi Arabia, Ibrahim (2013) using a modified ordinary least squares (FMOLS) method also for Saudi Arabia]. However, the findings of the present study contradict the findings of many other studies that examined this relationship for the GCC countries. For instance, Grassa and Gazdar (2014) and Omran and Bolbol (2003) did not find any influence of FSD on the economic growth of the GCC countries while Malkawi et al. (2012) using an ARDL approach found a negative effect of the financial sector on the economic growth of the UAE.

The above differences in findings are not unlikely and they may relate to the following reasons,

1. This study uses the most recent data (from 1975 to 2012). Most of the FSD in the GCC countries have taken place during the last 15 to 20 years. Our results therefore, have taken into account these latest financial developments and their impact on the economic growth of the GCC countries.
2. Present study employed four estimation techniques including the system GMM approach that takes into account the endogeneity of the regressors unlike all other studies (the study has employed both the static and the dynamic panel data).
3. The study employed a large number of control variables (including FDI, Oil production, trade openness, government expenditure, fixed capital formation and Inflation). Other studies may have suffered from omitting important variable problem.
4. Unlike other studies on the GCC countries, the present study has taken 5-year averages to smooth out the business cycle fluctuations. More likely than NOT that those other studies might have suffered from business cycle fluctuations.

5 Conclusions

As mentioned in the literature review, very few studies systematically explored the finance-growth nexus for the GCC countries. In this paper, we have investigated

whether or not FSD contributed positively to the economic growth of the GCC countries during the sample period from 1975 to 2012. Additionally, we explored whether FDI played any role in the economic growth of the region, and whether FSD of these countries were strong enough to attract FDI and consequently, the joint influence of FSD & FDI combined was positive to the growth of the GCC countries.

We employed two indicators of FSD commonly used in the literature; the money supply (M2), as a percentage of GDP, and domestic credit (DC) provided by the banks to the private sector as a ratio of GDP. We used four estimation techniques to estimate our empirical model. This includes pooled OLS, fixed effect estimation, random effect estimation and the system GMM estimation approaches. With the exception of the fixed effect estimation, all other three estimation approaches provided the evidence that FSD contributed positively and significantly to the economic growth of the GCC region. The implication of this finding is that FSD reforms and supervision in the GCC countries during the study period was a strong catalyst to promoting their economic growth. Therefore, the continuity of the on-going financial reform process, supervision and monitoring exercises should bring hitherto more dividends to the GCC economies in upcoming years.

Our results also indicate that FDI contributed to the growth of the GCC countries. This was far more significantly positive when the system GMM estimation was used. However, the interaction term of FSD and FDI did not contribute to their economic growth. Fixed capital formation and oil production were important contributing factors to the economic growth of this region. Trade openness did not show a positive influence on the economic growth of the GCC countries during the study period. This result is not unlikely since a significant number of studies suggest that trade openness may impact growth negatively for countries which usually specialize either in low quality products or when a country exports a small set of products or sells its products to a small number of destination markets. All these results have important implications for developing countries such as the GCC countries, as the GCC economies are relatively more dependent on commodity export, particularly the oil.

The study results suggest a major role for the governments of the GCC countries in designing appropriate monetary and fiscal policies to take the advantage of the positive association between FSD and economic growth, and between fixed capital formation and economic growth. The main policy implication of this study demands that the economic and financial policy makers in the GCC countries should strengthen the relevant components of the financial sector to continuously improve their intermediation process such that the mobilization and pooling of savings and other financial resources are expedited well enough to allocate them efficiently to various capital needs with necessary and proper monitoring, diversification and management of risk. All these measures ultimately would assure the inherent goal to productivity improvement in the private sectors of the GCC countries. In addition, the GCC governments must work on the development and consolidation of financial regulations and macroeconomic policies to ensure a stable and conducive macroeconomic environment. The GCC countries should continuously strengthen necessary efforts to develop a well diversified export – oriented industries, and broaden their industrial base to enhance their labor productivity. The follow suit of the latter polices will create opportunities for more FDI to the region, and hence a more positive impact of FDI on economic growth in the region.

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