

Financial Development, Trade Openness and Economic Growth: Evidence from Sultanate of Oman (1972-2012)

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Abstract

There is a huge debate on the impact of financial development and trade openness on the economic growth. Accordingly, this study investigated the role of financial development, trade openness on economic growth in a small and open country i.e., Sultanate of Oman during the period 1972-2012. We apply the recently developed econometric techniques: namely the unit root tests for stationarity, Johansen and Juselius (JJ) for cointegration in VAR framework and Granger causality test for causal relationships in addition, variance decomposition analyses (VDC) based on VAR results is computed in order to address the question of causality between trade openness, financial development and economic growth beyond the selected time span. The Granger causality test indicates unidirectional causality from economic growth to financial development, while empirical results derived from VDCs show that trade openness shock is the most important source of shock to GDP and financial development. Indicating unidirectional causality running from trade openness to the other two series. Shock to trade openness is important sources of variability for its own at first, but this self-effect diminishes in a very small portion. Our finding indicates that economic policies aimed at trade openness have a statistically significant impact on financial development and economic growth.

Keywords: Financial Development, Trade Openness, Economic Growth, VAR, Variance Decomposition, Impulse Response Function, Sultanate of Oman

1. Introduction

Link between trade openness and economic growth, and financial development and economic growth are the subject of an enormous number of both theoretical and empirical literatures. The conventional wisdom is that strong link between financial markets development and trade openness opens up a further channel by which financial systems and real sectors may interact in more efficient way. Advanced and smoothly financial systems may constitute a comparative advantage for real sectors that heavily rely on external financing (Kletzer and Bardhan, (1987); Beck, (2003). On the other hand, trade openness has been considered one of the main contributors to economic growth. Export expansion can increase productivity, offering greater economies of scale. Exports are likely to alleviate foreign exchange constraints and can thereby provide greater access to global markets. As argued by Melina et al (2004); and Svaleryd and Vlachos (2002). Financial markets help to efficiently direct the flow of savings and investment in the economy in ways that enhance the physical and human capital accumulation and the production. Therefore, well-developed, and better operating financial markets play an important role in achieving economic efficiency. By contrast, developing countries, with poorly developed financial markets, instruments, and financial institutions, find their effort to raise capital is more costly and may lower the return on savings or investments and the production of goods and services Demirgüç and Levine (2001). According to Do and Levchenko (2004) openness to trade will affect demand for external finance, and thus financial depth, in the trading countries. In richer countries, trade should be associated with faster financial development. Edwards & Lederman (1989) find that countries that liberalize their international trade and become more open will tend to grow faster, especially in the developing world. Moreover, in the developing countries the opening of goods and service markets seems to be a precondition for financial development. In turn, financial development allows developing countries to encourage the country's trade openness.

1.1 Importance of the Study

The above debate confirms the strong relationship between trade openness, financial development and economic growth. The objective of this study empirically investigates the possible co-integration and the causal link between financial development, trade openness and economic growth in Sultanate of Oman by using time series data from 1972 to 2012. This research adds three main contributions to the on-going literature on growth, trade and finance: (i) It studies the collective impact of trade openness and financial development on economic growth in Oman. (ii) It employs recent econometric techniques of causality in VAR framework as well as variance decomposition analysis. And, (iii) It uses an updated and relatively long set of data and an alternative measure to

the commonly used measure of financial development.

1.2 Objectives of Study

The main objectives of this study are to:

- (i) find the relationship between financial development, trade openness and economic growth in Sultanate of Oman during the period 1972-2012.
- (ii) add to the existing literature of financial development, trade openness and economic growth.
- (iii) highlight the economic growth of Sultanate of Oman as an oil exporting country.

1.3 Hypothesis of the Study

In order to achieve our aim we can make the following hypotheses.

H1: Financial development increases and causes the economic growth.

H2: Trade openness has positive relation with gross domestic product in long run.

H3: Financial development has negative relation with trade openness

The remainder of this paper is organized as follows. Section two presents statement of the problem and rationale of the study, while the third section gives a brief overview of Omani's economy, while Section four presents a summary of empirical literature on the subject. Sections five describe our empirical methodology and data sources. The results are presented in Section six; and Concluding remarks follow in Section seven.

2 Statement of the Problem and Rationale of the study

Trade liberalization is often considered as a significant tool for increasing economic growth in the world economies. Exports of those countries have greatly liberalized their economies, and consequently these countries have also experienced the fastest growth of GDP. Since the relationship between trade liberalization and economic growth has extensively been analyzed in the world, it remained controversial among policy makers and economists based on empirical findings (Chaudhry and Imran, 2009). Many questions were raised about the relationship between trade and growth in developing countries (Kruger, 1997). However, there is a great consensus that trade policy openness and higher ratios of trade volume to GDP were positively related with economic growth. Many developing countries are liberalizing their economies to become attractive destination for foreign capital inflows. Openness of trade regime can increase the investment and efficiency of investment and also can increase the market size in these countries. There has been extensive research studies done on the topic of financial development and economic growth since the start of 20th century. Most of the research works revealed the significance of financial development for the economic growth of the countries all over the world. Some of the contemporary research conducted on the various regions advocates that the financial depth can induce economic growth and benefits. Although many studies have focused the developing countries to explore relationships between growth and financial development but there are very few studies available with respect to the Oil based nations of Middle Eastern region. (Najeeb and Nasir 2014).

Therefore, Sultanate of Oman as most of other developing countries has liberalized its trade and financial sectors in order to achieve high rate of economic growth. The main argument for this policy is that both trade and financial liberalization policies increase efficiency in the production process and positively influence economic growth. This specific research is conducted in the distinctive settings of Sultanate of Oman, an economy with high oil dependency and strong financial regulations. The national income in the country also fluctuates with the change in oil prices overtime, so it is interesting to see the tri-variate relationship in such a setup with unique characteristics. Many studies determined the dynamic relationship of financial development, trade openness (globalization) and economic growth by using the concept of Granger causality to determine its direction as well as the Toda and Yamamoto method to test for Granger.

2. Oman Economy – overview

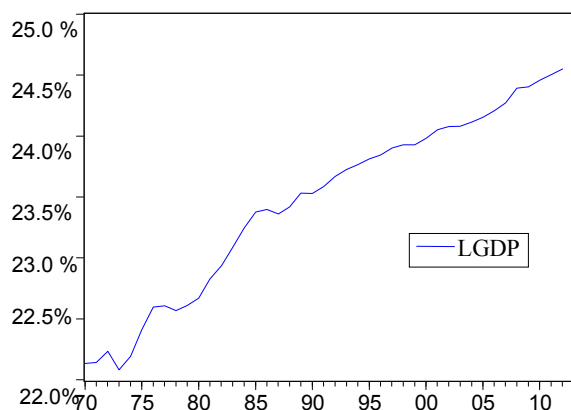
Oman's real GDP expanded steadily over the past four decades, with an estimated growth rate of 5.9 percent during the period 1970- 2012. According to the figures reported in table 1, in real terms, Oman's GDP grew by 8.4%, up from the 6.4% in the second period. The highest growth rate was reached during the period 1980-1990. As illustrated in Chart 1, GDP in Oman decreased sharply from the period 1980-1990 to 1990-2000, from a growth rate of 8.4% to 4.4%. This is a consequence of the global crisis which has a notable impact on most of the GCC.

Table 1: Annual growth rate of GDP and the oil shares

period	GDP Growth Rate	Share of Oil Sector in GDP
1970-1980	6.4	59.65
1980-1990	8.4	42.19
1990-2000	4.4	31.90
2000-2012	4.9	37.78
1970-2012	5.9	42.27

Oil sector continue to dominate Oman economy. In fact the contribution of oil sector during the whole period amounted to 42.27%. However, the share of oil in the GDP has been declining (table 1).

Figure 1: Oman GDP during the period 1970-2012



A sustained growth process in Oman was a manifestation of an improved diversification of the economy, since 2001, reflected in terms of increase in the contribution of non-oil sectors to GDP growth. Oman has liberalized and extensively deregulated foreign trade. After accession to the WTO in 2000, the government encouraged foreign trade and investment and introduced industrial regulations and labor laws. In order to attract more foreign investment, the new tax system, which came into force in January 2010, removed the differences between domestic and foreign companies by establishing a fixed tax rate on profits Nadira, (2006). The Omani financial sector, supervised by the Central Bank of Oman (CBO), which was established in 1974, has transformed substantially in recent years. The Muscat Securities Market (MSM) was established in 1989. During the period under consideration, an influential new chapter in Omani banking history came in May 2011 with a royal decree approving the establishment of Islamic banks BTI Oman Country Report (2014).

3 Literature Review

The relationship between financial development, globalization and economic growth is an important matter of discussion in economic literature. And, therefore, the relationship between trade openness and financial development has been a subject matter for a substantial body of empirical work. Their nexus is usually investigated in the empirical literature in two different lines: The first line of the existing empirical research attempt to separately examine the importance of trade openness or financial development on economic growth. The second line of the empirical works examines the relationship between trade openness and the financial development collectively. With regard to methods haven used to determine the importance of financial development and/or trade openness to economic growth, there are two main methods. The first one employs simple or multiple regressions, while the second method employs the causality technique. Recently, most of studies have attended to focus on VAR and VEC models and cointegration approach. Our review of literature is limited to studies that focus on the joint impact of both variables on economic growth.

Islam, et al., (2014) implement the autoregressive distributed lag (ARDL) bounds testing, supplemented by the Johansen-Juselius (JJ) approaches to cointegration to explore a long-run relationship among energy use, economic growth, financial development, capital, and trade openness in Australia. They also apply the vector error correction model (VECM) to understand the short-run dynamics. The study covers the period, from 1965 till 2009, and is hallmarked by major shocks across the globe which can potentially cause structural break in the series. The Granger causality test shows bidirectional causality between energy consumption and economic growth; financial development and energy consumption. Similarly, Yazdi and Shakouri (2014) examine the long-run cointegrating and short-run dynamic relationship among carbon emissions, energy consumption, economic growth, urbanization, financial development and openness to trade in Iran by using Auto Regressive

Distributed Lag (ARDL) testing approach of cointegration. The direction of causal relationship between the series is examined by VECM Granger causality approach. Empirical results for Iran over the period between 1975 and 2011 suggest an evidence of a long-run relationship between the variables in Iran.

Menyaha, et al., (2014), examines the causal relationship between financial development and economic growth for 21 African countries within a framework which also accounts for international trade. They develop a financial development index based on four different financial development indicators and apply the panel bootstrapped approach to Granger causality. The empirical results show limited support for the finance-led growth and the trade-led growth hypotheses. The results imply that recent attempts at financial development and trade liberalization do not seem to have made a significant impact on growth. On the other hand, Polat et al., (2013) revisit the impact of financial development on economic growth in South Africa by incorporating trade openness in the production function. Their study covers the period of 1970-2011. They apply the Bayer-Hanck combined cointegration approach to examine the long-run relationship between the variables. Their results indicate that financial development stimulates economic growth. Capital use adds in economic growth but trade openness impedes economic growth. The demand-side hypothesis is validated in South Africa.

Arouri et al (2013), attempted to explore the relationship between financial development, economic growth and trade openness in case of Bangladesh over the period 1975Q1-2011Q4. The ARDL bounds testing approach to cointegration and the innovative accounting approach for causality are used. Our results show that financial development, trade openness and economic growth are linked over the long-run. They find evidence in favor of the supply-side hypothesis while financial development and economic growth cause exports.

Lacheheb, et al. (2013) examine the relationship between openness, financial development, and economic growth in Algeria using the autoregressive distributed lag (ARDL) cointegration framework for the period of 1980 to 2010. The results based on the bounds testing procedure confirm that a long-run relationship between openness, financial development, and economic growth exist. Importantly, the results of their study reveal that, openness has a significantly positive effect on economic growth. Broad money which is a proxy for financial development is positive but insignificantly related to economic growth. Also, both labour force and gross capital formation are insignificant. These findings suggest a dire need for financial reforms in Algeria in order to improve efficiency in the financial sector so as to stimulate saving/investment and thus, long-term economic growth.

Shahbaz et al., (2013) examine the linkages among economic growth, energy consumption, financial development, trade openness and CO₂ emissions in Indonesia over the period of 1975Q1–2011Q4. ARDL approach was used for testing long-run relationship between the series in the presence of structural breaks. The causality between the concerned variables is examined by the VECM Granger causality technique and robustness of causal analysis is tested by innovative accounting approach (IAA). The empirical findings indicate that economic growth and energy consumption increase CO₂ emissions, while financial development and trade openness compact it. As for China, Shahbaz, et al., (2013) investigate the relationship between economic growth financial development, international trade, energy use, and capital as important factors of production function for the period of 1971–2011. The ARDL bounds testing approach to cointegration was applied to examine long-run relationship among the series while stationarity properties of the variables was tested by applying structural break test. Their finding confirmed long-run relationship among the variables. The results showed that energy use, financial development, capital, exports, imports and international trade have positive impact on economic growth.

Moving to Iran, Tash and Sheidaei (2012) analyze the joint impact of trade liberalization and financial development on economic growth in Iran, using endogenous growth theory. The annual data employed covered the period of 1966-2010. In this study, principal component analysis is applied to make better indexes for trade liberalization, financial development and the joint effects of both. The empirical findings obtained from Johansen co-integration procedure signify a positive relationship between trade liberalization, financial development and the joint impact on economic growth in Iran.

A study by Shaheen et al (2011), utilizes the autoregressive-distributed lag (ARDL) approach for cointegration and Granger causality test, to explore the long run equilibrium relationship and the possible direction of causality between international trade, financial development and economic growth for the Pakistan economy. Result explores a long run relationship between the variables. In case of Pakistan, economy supply leading hypothesis is accepted. Moreover, unidirectional causality is observed from international trade to economic growth and from financial development to international trade. On the other hand, Chimobi (2010) investigate financial

development, trade openness and Economic Growth nexus in Nigeria. The period covered was 1970-2005. The econometric methodology employed was the cointegration and Granger causality to test for the long-run relationship among the variables but there were no cointegrating relations between Growth, trade openness and the three measures of financial development. The Granger-causality empirical findings suggest that trade openness and financial development does have causal impact on economic growth. Conversely growth has causal impact on trade and financial development, show support for growth-led trade but no support for trade-led growth.

Hanh (2010), investigate the linkages among financial development, financial openness and trade openness in twenty-nine Asian developing countries over the period 1994-2008. Employing the Pedroni co-integration technique, the research provides a number of major findings. The first one supports an evidence of bidirectional causality between trade openness and financial development/openness. The second one suggests that the relationship between financial development and financial openness is heterogeneous, as well as its variation across different measures. In Turkey, Kar, et al., (2008) try to empirically estimate the joint impacts of trade liberalization and financial development on economic growth for the period 1963-2005. Instead of using common proxies for the issue, principal components analysis is employed to develop better measures (indexes) for trade liberalization, financial development and the joint effects of both. The empirical results obtained from the Johansen co-integration procedure show that trade liberalization, financial development and the joint impacts of both positively contributed to economic growth.

In summary, despite the truly enormous amount of research that has been undertaken on Financial Development and economic growth there remain serious methodological issues. We could n't find any study that related to Sultanate of Oman, therefore, further studies are required in this field.

4. Methodology

For testing the causal relationships among trade openness, financial development and economic growth in Oman, the Engle-Granger-causality test in Vector Auto regression (VAR) framework is employed. Nevertheless, this approach has some prerequisites they must be satisfied (unit root test and cointegration) in order to avoid invalid conclusions. In addition the variance decomposition analyses (VDC) based on is used is employed. The plan of this study follows the following steps: (i) Description of data, (ii) Examine the stationarity of our time series; (iii) Construct three-variable VAR model; (iv) Johansen cointegration test; (v) Causality test; (vi) VAR stability; and (vii) Dynamic simulation.

4.1 Data and variable definition

The data we have employed for Oman economy are annual observations covering the period 1972–2012. The variables are measured as follows: The annually data on the economic growth is proxy by real GDP in local currency (Years 1988-1989=100). For trade openness we used the most common measure used in the literature, which is the ratio of total trade to GDP, Gupta (1984), King & Levine (1993), Murinde & Eng (1994), Siddiki (2002), and Yucel (2009)). In the literature the most common measures for financial development are the M2 to GDP ratio or the Domestic credit to private sector (% of GDP). In this study the second measure is used. This indicator measures the quality and quantity of the investment financed by the banking sector many researchers used this indicator as a proxy for financial sector development (King & Levine (1993), Mazur and Alexander (2001), Shan (2005), Acaravci, & Acaravci (2007), Eatzaz, & Malik (2009), Anwar et al (2011), Ogunyiola (2013). Data for our variables obtained from the World Development Indicators (WDI), On-line, 2014 (www.worldbank.org). All the variables are expressed in natural logarithm for the usual statistical reasons.

4.2 Stationarity Test:

Financial and economic times series are often non stationary in nature; they exhibit stochastic trends and need to be checked for stationarity in order to avoid spurious analysis. We therefore, employ Augmented Dickey Fuller ((hereafter, ADF) test, but since the ADF test is low power in small sample (Cheung and Lai, 1995, 1997), we also applied the Phillip Perron (hereafter, PP) test and Ng and Perron (hereafter, NP) (2001) test to ascertain the stationarity of variables in the study.¹

4.3 Cointegration test

The second stage involves testing for the existence of a long-run equilibrium relationship between trade

¹ Kwiatkowski et al. (1992) and Cheung and Chinn (1997) pointed out that a joint-testing unit root procedure can substantially increase the robustness of the results.

openness, financial development and economic growth, within a multivariate framework. Cointegration naturally arises in economics and finance. In economics, cointegration is most often associated with economic theories that imply equilibrium relationships between time series variables. However, for conducting the cointegration analysis there are various techniques. Econometric literature has abundant econometric techniques to examine cointegration relationships. The most popular approaches are the well-known residual based approach proposed by Engle and Granger (1987) and the maximum likelihood-based approach proposed by Johansen and Julius (1990). In performing the cointegration technique, we need to determine the order of integration for each variable. However, both of the approaches require that the variables have the same order of integration. Johansen-Juselius introduce two statistics for determining the number of cointegrating vectors. These are known as max and trace tests.

4.4 Model Specification and Causality Testing

In the literature, there are perhaps two broad types of econometric techniques regarding the trade openness, financial development and economic growth nexus: first one is the traditional OLS regression, and the other is the cointegration and Granger no-causality approach based on VAR or VECM models. To estimate the econometric model, the theory of co-integration has been used for this purpose. It seems efficient to test the relationships between study variables and empirically validate the results obtained after carrying out the statistical tests applied to the model. Engle and Granger (1987) presented the theory of co-integration in which a stationary linear combination can be interpreted as a relationship of long-term equilibrium between the variables studied. This research utilizes the second technique. Checking for cointegration properties of the series of interest prior to testing for causality is therefore an important first step. Then if the variables are cointegrated, an Error Correction model should be used. VAR model is used when there is no cointegration among the variables and it is estimated using time series that have been transformed to their stationary values. The formulation of VAR model with three variables to be tested would be:

$$GDP_t = \beta_0 + \sum_{k=1}^k GDP_{t-k} \beta_k + \sum_{k=1}^k OP_{t-k} \gamma_k + \sum_{k=1}^k FD_{t-k} \theta_k + \varepsilon_t \dots \dots \dots (1)$$

$$OP_t = \beta_0 + \sum_{k=1}^k GDP_{t-k} \beta_k + \sum_{k=1}^k OP_{t-k} \gamma_k + \sum_{k=1}^k FD_{t-k} \theta_k + \varepsilon_t \dots \dots \dots (2)$$

$$FD_t = \beta_0 + \sum_{k=1}^k GDP_{t-k} \beta_k + \sum_{k=1}^k OP_{t-k} \gamma_k + \sum_{k=1}^k FD_{t-k} \theta_k + \varepsilon_t \dots \dots \dots (3)$$

Each equation would be tested using Wald test. For example if the null hypothesis of $H_0 = \gamma_1 = \gamma_2 = \dots = \gamma_k = 0$ could not be rejected in the first equation, it mean that OP does not Granger cause GDP.

4.5 VAR Stability

CUSUM and CUSUM SQ tests are applied to examine the stability of the long-run coefficient together with short run dynamic (Pearson and Pearson, 1997). The test is proposed by Brown, Durbin and Evans (1975) to assess the parameters constancy. The test is applied to the residuals of all variables in the VAR model. If the plot of the CUSUM statistics lies within the critical bound of 95% level of significance represented by a pair of straight lines drawn at 95% level of significance the null hypothesis relating to all coefficients in the VAR model cannot be rejected. If any of the lines is crossed. The null hypothesis of coefficient constancy at 95% level of significance will be rejected, implying that the recursive residuals have zero expected value. A CUSUM-SQ test is based on the square recursive residuals; a similar procedure is followed to perform the test. Other testes would be performed such as: VAR residual serial correlation LM test; VAR residual normality; and Stability or stationary of estimate.

4.6 Dynamic Simulation

Based on the VAR models estimation, variance decomposition analyses (VDC) is computed in order to address the question of causality between trade openness, financial development and economic growth beyond the selected time span. Variance decomposition show how much a given variable changes under the impact of its own shock and the shock of other variables. Sims (1980) notes that if a variable is truly exogenous with respect to the other variables in the system, own innovations will explain the entire variable's forecast error variance. Therefore, the variance decomposition defines the relative importance of each random innovation in affecting the variables concerned in the VAR. If FD and OP cannot explain any of the forecast error variance of GDP at all forecast horizons, then GDP is said to be exogenous. If they can explain part of the forecast error variance of GDP at all forecast horizons, then GDP is said to be endogenous.

5. Results and Discussions

Our aim in this study is to establish whether there is causality relationship between trade openness, financial development and growth of Gross domestic product (GDP) Oman economy. The data for the analysis consist of annual observations for the period 1972-2012. 5.1 Testing for Stationarity: The unit root tests are important in identifying the stationary trend of a time series data. It is vital to apply unit root test in order to avoid specious results as non-stationary data invalidate the normal statistical tests. This research applied two tests of unit root data which is the Augmented Dickey-Fuller test (ADF) and the Phillips- Perron (PP) and Ng-perron test statistics to observe the integrated order and stationary behaviour of data. To investigate stationarity properties of the variables under consideration (GDP, financial development and trade openness) we carry out a univariate analysis for testing the presence of a unit root.

Table 2: Unit Root Estimation

Variables	Specification		ADF	PP	Ng-Perron	
	Constant	Constant & trend			MZa(K)	MZt(K)
<i>GDP</i>	√		-1.297(0)	-2.955 (2)	0.702(1)	0.502 (1)
<i>D(GDP)</i>	√		-5.489*(0)	-5.801*(3)	-4.658(0)	-1.4890)
<i>TOP</i>	√		-1.535(0)	-1.535*(0)	-4.364(0)	-1.476 (0)
<i>D(TOP)</i>	√		-5.957**(2)	-5.513*(3)	-2.393(2)	-1.094(2)
<i>FD</i>		√	-5.366*(0)	-5.179*(1)	-6.934(0)	-1.786(0)
<i>D(FD)</i>		√	-7.480*(0)	-12,80*(11)	-6.126(0)	-1.174(0)

Note: (1) ***, ** and *denotes significant at 1%, 5% and 10% level respectively. (2) "K" Denotes lag length. (3) Selection of lag length in NP test is based on Spectral GLS detrended VAR based on SIC and selection of lag length (Bandwidth) and in PP test it is based on Newey-West using Bartlett kernel.

Table 2 reports the results of Augmented Dickey-Fuller (ADF), Philips Perron and Ng-perron test statistic. However, Ng and Perron (2001) has proposed three tests two of them will be used in this study, namely MZ(α) and MZ(t). The results indicate that the variables are non stationary at level. All series turns into stationary ones at their first differences. However, the results are not the same in the three tests. This implies that the variables a one, integrated of order one, i.e. I(1).

5.2 Selection of lag length

Vector auto regression (VAR) is an econometric model that is utilized for the understanding of the linear relationships among variables with multiple time series. Models included in VAR simplify the autoregression models by allowing the impact for more than one changing variable on relevant time series data. The preliminary task in estimating the VAR model is to determine the optimum order of lag length. This is important since under parameterization may lead to estimation bias and over parameterization results in the loss of degrees of freedom and thus the power of the test. In order to select the lag length of the VAR model the selection criteria is used, Sequential Modified Likelihood Ratio (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC) and Hannan-Quinn Information Criterion (HQ) are employed. It is clear from Table 3 that LR, FPE, AIC, SC, HQ and HQ statistics are chosen lag 1 for each endogenous variable in their autoregressive and distributed lag structures in the estimable VAR model. Therefore, lag of 1,1 is used for estimation purpose.

Table 3: VAR lag order selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	12.03329	NA	0.000108	-0.622985	-0.481541	-0.578687
1	112.9848	174.0543*	1.91e-07*	-6.964469*	-6.398691*	-6.787274*
2	119.3530	9.662099	2.34e-07	-6.782965	-5.792855	-6.472875
3	125.6887	8.301955	2.99e-07	-6.599221	-5.184777	-6.156235
4	134.4662	9.685524	3.41e-07	-6.583876	-4.745099	-6.007994
5	142.9936	7.645234	4.34e-07	-6.551282	-4.288171	-5.842504

* indicates lag order selected by the criterion

5.3 Cointegration Test

As the econometric analysis suggests, when the concern of unit root has been addressed, the co-integration test can be applied to verify the existence of long run relationship. The theory of co-integration defines that even though the variables under consideration are non-stationary at individual level but the linear relationship among them may still be stationary. After confirming the stationarity of the variables at 1(1). We started the cointegration analysis by employing the Johansen and Juselius (1990) multivariate cointegration test. This technique observes the long run relationship among the non-stationary variables while showing number of co-integrating equations. The test is based on the comparison of H_0 ($r=0$) against the alternative H_1 ($r \neq 0$) where “r” represents the number of co integrating vectors.

Table 4. Test results from Johansen and Juselius procedure
Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.463543	30.60243	35.01090	0.1373
At most 1	0.150368	8.182775	18.39771	0.6641
At most 2	0.062320	2.316492	3.841466	0.1280

Trace test indicates no cointegration at the 0.05 level

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.463543	22.41965	24.25202	0.0857
At most 1	0.150368	5.866283	17.14769	0.8294
At most 2	0.062320	2.316492	3.841466	0.1280

Max-eigenvalue test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table 4 reported the result from the cointegration tests. Evidence from the result suggests that the null hypothesis of no co-integration ($r = 0$) cannot be rejected. Based on these results, we cannot find a cointegrating. This in effect suggests that the existence of long-run relationship between the variables employed in our study is not confirmed.

5.4 Granger Causality Test

Granger Causality test is widely used by researchers to determine the causal relationship among the variables. This test has other advantages that it also specifies the direction of the causality. Having found no cointegration among the variables (financial development trade openness and economic growth) we carried out the Granger-causality by the mean of VAR. The results are reported in Table no. 5.

Table 5: Pair-wise Granger Causality test

Null Hypothesis	F-Statistic	Probability
GDP does not Granger Cause FD	20.4842	6.0E-05
FD does not Granger Cause GDP	1.14872	0.29076
OP does not Granger Cause FD	0.92098	0.34399
FD does not Granger Cause OP	1.90480	0.17655
OP does not Granger Cause GDP	2.26132	0.14187
GDP does not Granger Cause OP	0.44560	0.50894

The next step is the Granger test to determine the Pair-wise causal relationship between the variables. Our results suggest that the null hypothesis that GDP does not Granger cause FD is rejected which indicates causality

running from economic growth to financial development. In addition, there aren't any relationships between GDP and OP as well as between OP and FD.

5.5 Dynamic Simulation

The results of variance decomposition analysis, which measures the percentage of a variable's forecast error variance that occurs as the result of a shock from a variable in the system, are presented in Table 6. The forecast horizon is for 25 years and the contribution of each variable own shock and to the shocks of other variables in the system are reported. The variance decomposition analysis indicates that trade openness and financial development are the most exogenous variables. A high proportion of their shocks are explained by their own innovations compared to the contributions of own shocks to innovations for economic growth. The proportion of variance of economic growth explained by its own decreases over time and reaches 36.69 percent at the end of the period. Trade openness shock accounts for 0 percent in the first year. Its proportion increases over time and reaches 43.79 percent in horizon number 25. The role played by financial development shock decreases over time and accounts for 25.51 percent in the last period. Financial development shock, which is assumed to account for the whole variance of financial development the first year, continuously dominates in the following years. Its proportion sharply decreases over time, but still accounts for 42.98 percent in the 25th year. In the long run, trade openness shock is an important source of financial development variability. The role played by trade openness shock increases over time and accounts for 40.61 percent in the last year. The evidence suggests that trade openness shock is the important factor explaining its own variability. Trade shock accounts for 93.12 percent. Its proportion decreases over time and reaches 90.87 percent in the last year. The estimated results from variance decomposition demonstrate the trade openness -led growth hypothesis.

Table 6: Variance Decompositions

<i>Variance Decomposition of economic growth (GDP)</i>			
Period	GDP	FD	OP
1	67.87431	32.12569	0.000000
5	60.86925	27.53636	11.59438
10	45.67267	26.55586	27.77147
15	37.55339	26.03201	36.41460
20	33.22533	25.71289	41.06178
25	30.69193	25.51324	43.79483

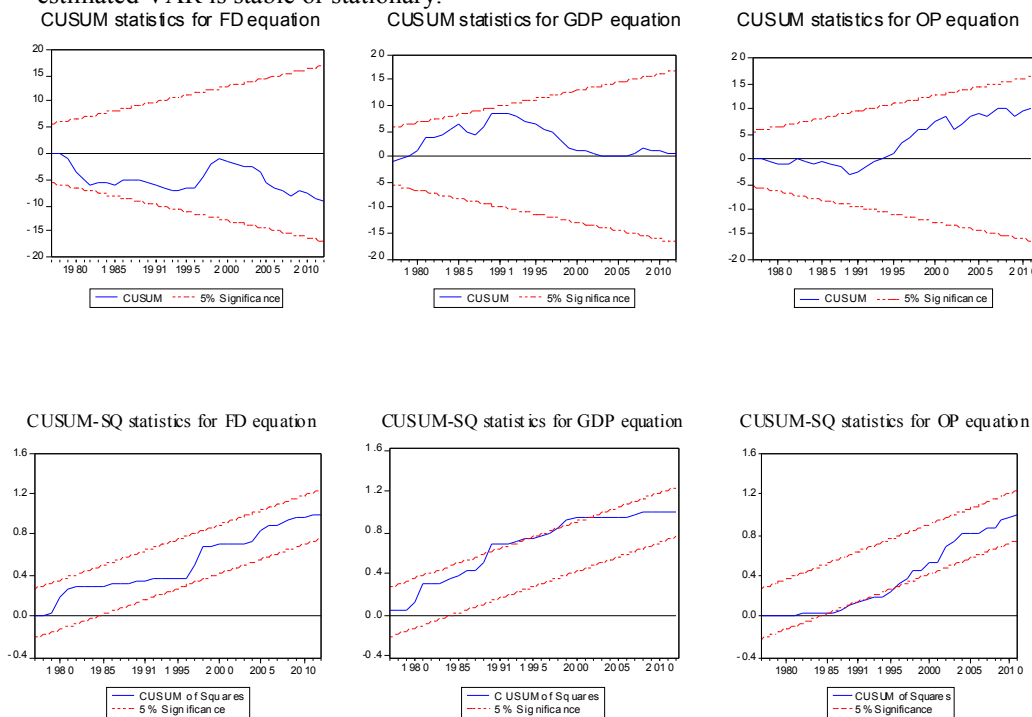
<i>Variance Decomposition of financial development (FD)</i>			
Period	GDP	FD	OP
1	0.000000	100.0000	0.000000
5	7.124567	77.45904	15.41639
10	12.24118	59.53524	28.22358
15	14.45094	51.01313	34.53593
20	15.65511	46.12373	38.22116
25	16.41072	42.97832	40.61095

<i>Variance Decomposition of trade openness (OP)</i>			
Period	GDP	FD	OP
1	6.472640	0.410618	93.11674
5	5.047965	3.071175	91.88086
10	5.130057	3.605531	91.26441
15	5.296442	3.602230	91.10133
20	5.402897	3.614791	90.98231
25	5.472684	3.656433	90.87088

There is causality of financial development on GDP growth, but this impact is weak. In summary, trade openness shock is the most important source of shock to GDP and financial development. Shock to trade openness is important sources of variability for its own at first, but this self-effect diminishes in a very small portion.

VAR Stability

Figure 2 is a graphical representation of CUSUM and CUSUMSQ plots which are applied to the VAR model. CUSUM plots do not cross critical bounds; accordingly the null hypothesis would be rejected at the 95% significant level, indicating the stability of VAR parameters., in CUSUMSQ plot two plots slightly cross the critical bound indicating slight instability of the parameters of the model. Stability of the estimated VAR is examined further by checking the Roots of Characteristic Polynomial. The test results show that the Modulus of all roots are less than unity and lie within the unit circle. Accordingly we can conclude that our model the estimated VAR is stable or stationary.



In addition to the above tests we perform the Jarque-Bera test. According to the result we cannot reject the hypothesis of normality properties; since P-value is 0.2970 this provides some support for the hypothesis that residuals from our VAR model have a normal distribution. The Lag order selection shows that lag intervals of (1, 1) is proper selection. However, there may be some indication of serial correlation as it indicated by VAR residual serial correlation LM test.

6. Conclusion

This paper examines the causal relationship between financial development, trade openness and economic growth in Oman during the period 1972-2012. The study uses multivariate VAR framework, Variance Decomposition (VDC). The Johansen's multivariate cointegration test evidence from the result suggests that the null hypothesis of no co-integration ($r = 0$) cannot be rejected. Based on these results, we cannot find a cointegrating. This in effect suggests that the existence of long-run relationship between the variables employed in our study is not confirmed. The Granger causality test confirmed that there is presence of unidirectional causality from economic growth to financial development, while empirical results derived from VDCs show that trade openness shock is the most important source of shock to GDP and financial development. Indicating unidirectional causality running from trade openness to the other two series. Shock to trade openness is important sources of variability for its own at first, but this self-effect diminishes in a very small portion. The above findings clearly indicate that financial deepening plays a role in contributing financial development, globalization and economic growth, both directly and indirectly. This suggests that there is need of reforming Omani financial system. Thus, Sultanate of Oman should promote its trade liberalization policy, in order to enhance both growth of GDP and financial development.

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