Financial Development and Economic Growth in The Organization of Islamic Conference Countries

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Abstract

This study provides evidence on the role of financial development in accounting for economic growth in OIC countries. To document the relationship between financial development and economic growth, we estimate not only unbalanced panel regressions, but also variance decompositions of annual GDP per capita growth rates to examine what proxy measures are most important in economic growth over time and how much they contribute to economic growth among OIC countries. We find positive association between financial development and economic growth in OIC developing countries. Moreover, short-term multivariate analysis implies one-way causality that runs from growth to finance.

JEL Classification: G21, O16, C33

Keywords: Financial development, growth, panel regression, Granger causality tests

I. Introduction

The relationship between financial development and economic growth has received a great deal of attention during recent decades. However, there are conflicting views concerning the role that financial system play in economic growth, for example, while Levine (1997) believes that financial intermediaries enhance economic efficiency and, ultimately, growth by helping allocate capital to its best uses, Lucas (1988) asserts that the role of the financial sector in economic growth is 'over-stressed'. Notwithstanding the controversy, modern theoretical literature (Romer 1986; Lucas 1988; Rebelo 1991; Grossman and Helpman 1991; Pagano, 1993; Khan, 2001, among others) on finance-growth nexus combines endogenous growth theory and microeconomics of financial systems.

Early studies on financial development and growth were based on cross-country analysis. For instance, Goldsmith, (1969), King and Levine (1993a, 1993b), and Levine and Zervos (1998) used cross-country analysis to study the relationship between financial development and growth. While their findings suggest that finance can help to predict growth, these studies do not deal formally with the issue of causality and neither do they exploit the time-series properties of the data.[1] Furthermore, conclusions based on cross-country analysis are sensitive to the selected countries, estimation methods, data frequency, functional form of the relationship, and proxy measures chosen in the study (see Hassan and Bashir, 2003; Khan and Senhadji, 2003; Chuah and Thai, 2004; Al-Awad and Harb, 2005), raising doubts about the reliability of cross-country regression analysis.

Panel time-series analysis, on the other hand, exploits time-series and cross-sectional variation in data, and avoids biases associated with cross-sectional regressions by taking into

[1] However, the main contribution of those studies is that they provided control variables and measures of financial development that are typically used in time-series analysis.

account the country specific fixed effect (Levine, 2005). To mitigate the shortcoming of cross-sectional analysis, this paper examines the dynamic relationship between economic growth and financial development across OIC countries using time-series analysis.

It is argued that well-developed domestic financial sectors, such as systems in developed countries (high-income OECD countries), can significantly contribute to raise savings and investment rate and, hence, reach economic growth (Becsi and Wang, 1997). Since the 1980s, most countries belonging to the Organization of Islamic Conference (OIC) have reformed their economic and financial systems to improve the efficiency of their financial intermediaries with the objective of achieving financial sector development and promoting growth. Therefore, we document the association between financial development and economic growth in these OIC countries over 25 years (1980 - 2005) using standard regression analysis as well as vector autoregressive (VAR) analysis. We employ unbalanced panel estimations and various multivariate time-series analysis to establish the direction, timing, and strength of the causal link between economic growth and the financial sector in OIC countries with the objective of exploring some policy implications. Specifically, we take a closer look at a range of financial development indicators and draw some conclusions about their impact on economic growth represented by annual Gross Domestic Product (GDP) per capita growth rate.

Consistent with King and Levine (1993), Levine, Loayza, and Beck (2000), among others, we find a positively long run association between finance and growth in OIC countries. Moreover, using Granger causality tests developed by Toda and Yamamoto (1995), we find that the direction runs from economic growth to financial development, supporting Gurley and Shaw (1967), Goldsmith (1969), and Jung (1986), who hypothesize that in developing countries

growth leads finance because of the increasing demand for financial services induced by the growth.

The paper is organized as follows. Section II provides a literature review. We describe the data and the proxy measures of financial development, real sector, and economic growth in section III. Section IV describes the unbalanced panel estimations and multivariate time-series methodologies applied in the paper. We analyze the empirical results in section V whereas section VI provides conclusions.

II. Literature Review

Since the pioneering contributions of Goldsmith (1969), McKinnon (1973) and Shaw (1973) on the role of financial development in promoting economic growth, the relationship between economic growth and financial development has remained as an important issue of debate among academicians and policymakers (De Gregorio and Guidotti, 1995).

Early economic growth theory argues that economic development is a process of innovations whereby the interactions of innovations in both financial and real sectors provide a driving force for dynamic economic growth. In other words, exogenous technological progress determines the long-run growth rate while financial intermediaries were not explicitly modeled to affect the long-run growth rate.

However, nowadays, a growing theoretical and empirical body of literature shows how financial intermediation mobilizes savings, allocates resources, diversifies risks, and contributes to economic growth (Greenwood and Jovanovic, 1990; and, Jbili, Enders, and Treichel, 1997). The new growth theory argues that financial intermediaries and markets appear endogenously in response to the market incompleteness and, hence, contribute to long-run growth. Financial

institutions and markets, who arise endogenously to mitigate the effects of information and transactions costs frictions, influence decisions to invest in productivity-enhancing activities through evaluating prospective entrepreneurs and funding the most promising ones. The underlying assumption here is that financial intermediaries can provide these evaluation and monitoring services more efficiently than individuals.

An important set of authors agree that there is an interrelation between finance and economic growth. However, they disagree in the direction of causality. On one hand, some authors have theoretically and empirically shown that there is a causal direction from financial development to economic growth. That is, policies toward the development of financial systems lead to economic growth. McKinnon (1973), King and Levine (1993), Levine et al. (2000), and, Christopoulos and Tsionas (2004) support this argument. On the other hand, other authors argue that the direction is from economic growth to financial development. Since the economy is growing, there is an increasing demand for financial services that induces an expansion in the financial sector. This view is supported by Gurley and Shaw (1967), Goldsmith (1969), and Jung (1986).

Other authors argue that the causal direction is two-way. Financial development and economic growth reinforce each other, that is, financial development helps economic growth and economic growth helps to develop financial systems. Blackburn and Huang (1998) also establish a positive two-way causal relationship between growth and financial development. Private parties obtain finance for their projects through incentive-compatible loan contracts, which are enforced through costly monitoring activity. More recently, Khan (2001) also establishes a positive two-way causality between finance and growth. When borrowing is limited, producers with access to financial intermediary loans obtain higher return; this creates an incentive for

others to undertake technology necessary to access investment loans, which in turn reduces financing cost and increases economic growth. Finally, Patrick (1966) postulates the stage of development hypothesis where the causality goes from finance to growth and then switch from growth to finance. In early stage of economic development, finance causes growth by inducing real per capita capital formation. Furthermore, since the economy is in the stage of growth, an increasing demand for financial services induces an expansion in the financial sector as well as the real sector, implying that growth causes finance.

Levine (1997, 2005) surveys a large amount of empirical research that deals with the relation between the financial sector and long-run growth. Levine (1997) argues that financial systems can accomplish five functions to ameliorate information and transactions frictions and contribute to long-run growth. According to Levine (1997), these five functions are: facilitating risk amelioration, acquiring information about investments and allocating resources, monitoring managers and exerting corporate control, mobilizing savings, and facilitating exchange. These functions facilitate investment and hence higher economic growth.

The results in the literature, however, are ambiguous. On one hand, cross-country and panel data studies find a positive effect of financial depth on economic growth after accounting for other determinant of growth and potential biases induced by simultaneity, omitted variables or country specific effect (Levine, 2005), suggesting that the causality runs from finance to growth (see King and Levine, 1993a, 1993b, Khan and Senhadji, 2003, Levine et al. (2000) and more recently Christopoulos and Tsionas, 2004). Furthermore, Claessens and Laeven (2005) relate banking competition and industrial growth and find that the higher of competition among banks the faster the growth of financial dependent industries, suggesting that higher financial development precedes economy growth.

On the other hand, Demetriades and Hussein (1996) and Shan, Morris and Sun (2001), using time-series techniques, find that the causality is bi-directional for the majority of countries in their samples. Furthermore, Luintel and Khan (1999), using a sample of ten developing countries, conclude that the causality between financial development and output growth is bi-directional for the 10 countries they studied. Also, Calderon and Liu (2002) study a sample of 109 developing and developed countries and find evidence of two-way relationship; however, financial deepening contributes more to the causal relationship in developing countries.

Since financial development is not easily measurable, papers attempting to study the link between financial deepening and growth have chosen a number of proxy measures and subsequently, have come up with different results (King and Levine, 1992; Savvides, 1995; Khan and Senhadji, 2003; Hassan and Bashir, 2003; Chuah and Thai, 2004; Al-Awad and Harb, 2005, among others). However, the general consensus of these studies is that there is a positive correlation between the financial sector and growth and that the development of bank credit has an important impact on economic growth.

III. Panel Estimations and Multivariate Time-Series Methodology

A. Panel Estimations with convergent term

To examine the general relationship between financial development and economic growth, we estimate panel regressions for a sample of all OIC countries member using financial and macro economical data. Specifically, to study the long-term association between GDP per capita growth

rate and measures of financial development, we follow the neo-classical growth model (Mankiw, 1995).[2] Define growth of real GDP per capita of country *i* at time *t* as:

$$GROWTH_{i,t} = \log GDPPC_{i,t} - \log GDPPC_{i,t-1},\ i = \{1,2,...N\} \quad (1)$$

where *GDPPC* is the real GDP per capita and *N* is the number of countries in the sample. Then, define the logarithm growth of GDP per capita for country *i* between *t* and *t* + *k* as:

$$GROWTH_{i,t+k,k} = \frac{1}{k}\sum_{j=1}^{k} GROWTH_{i,t+j},\ i = \{1,2,...N\} \quad (2)$$

Let $Q_{i,0}$ be the initial level of log(*GDPPC*) and Q_i^* the (long-run) steady state GDP per capita. The first-order approximation of the neo-classical growth model implies that $GROWTH_{i,t} = -\lambda\left(Q_{i,t} - Q_{i,t}^*\right)$, where λ is a positive convergent parameter. The literature often implicitly models Q_i^* as a linear function of structural variables such as initial level of human capital.[3] Thus, a typical growth relationship is:

$$GROWTH_{i,t+k,k} = -\lambda Q_{i,t} + \boldsymbol{\gamma}'\mathbf{X}_{i,t} + \varepsilon_{i,t+k,k} \quad (3)$$

Where $\mathbf{X}_{i,t}$ is a vector of variables controlling for long-run GDP per capita across countries. Our regression models, therefore, are:

$$GROWTH_{i,t+k,k} = \beta_0 Q_{i,1980} + \beta_1 FIN_{i,t} + \beta_2 TRADE_{i,t} + \beta_3 GOV_{i,t} + \beta_4 INF_{i,t} + \varepsilon_{i,t+k,k} \quad (4)$$

where $Q_{i,1980}$ is the log of GDP per capita and represents the initial GDP per capita proxy, whereas $FIN_{i,t} = \{DCPS_{i,t}, DCBS_{i,t}, PRIV_{i,t}, M3_{i,t}, GDS_{i,t}\}$, represents a proxy for financial depth and development and enter one by one in each regression. Also, we perform regressions with and

[2] The model used in this paper has been extensively used in the literature. See for example, Barro Sala-i-Martin (1995), Barro (1997), and Bekaert et al (2005).

[3] The literature often implicity models Q* as number of structural variables such as initial level of human capital. However, data that proxies for initial human capital level (such as years of education or proportion of work force with terciary degree) is not available for most of the OIC countries in our sample. Therefore, following Bekaert et al (2005), we use GDP per capital in 1980 which serves as initial GDP and allows us to capture a convergence term.

without inflation because there are seven countries that do not have enough time series inflation data. Moreover, since OIC countries are very heterogeneous among income level, we control this factor by adding dummies variables for low, middle and high income economies using World Bank classification.[4] Also, to control for business cycles, we calculate 5 non-overlapping-5-year averages for each variable and perform Ordinary Least Squares (OLS) regressions using robust-heteroscedastic errors. In summary, we perform ten regressions (five with inflation and five without inflation) to study the impact of finance on economic growth.

B. Multivariate Time-Series Models

The precedent model regressions study association but not causality among variables. To consider dynamic causality, direction, and timing between financial development and economic growth, we estimate vector autoregressive (VAR) models and test whether and what proxy variables Granger-cause economic growth and vice versa. Granger causality tests allow us to overcome the endogeneity problem presented in panel regressions in the sense that VAR equations consider all variables endogenous. In analyzing the results from the VAR model, we test Granger causality among variables and focus on two tools: impulse response function (IRF) and forecast error variance decomposition (FEVD). Impulse response functions show how one variable responds over time to a single innovation in itself or in another variable. Innovations in the variables are represented by shocks to the error terms in the equations. More importantly, we compute forecast error variance decompositions of GROWTH to examine what proxy measures are most important in economic growth over time and how much they contribute to economic growth.

[4] Economies are divided according to 2008 GNI per capita, calculated using the World Bank Atlas method. The groups are: low income, $975 per capita or less; lower middle income, $976 - $3,855 per capita; upper middle income, $3,856 - $11,905 per capita; and high income, $11,906 per capita or more.

Our VAR specification includes 5 endogenous variables including proxy measures for financial development (FIN), macroeconomics control variable (TRADE, GOV and INF), and economic growth (GROWTH) in OIC countries as well as 2 exogenous variables to control for country's income level. Formally, the VAR model is expressed as:

$$Y(t) = C + \sum_{s=1}^{m} A(s)Y(t-s) + B(s)X(t-s) + e(t) \quad (5)$$

where $Y(t)$ is a *5* x *1* column vector of 5 variables including proxy measures (GROWTH, FIN, TRADE, GOV, INF) and *C* and $A(s)$ are, respectively, *5* x *1* and *5* x *5* matrices of coefficients, m is the lag length, and $e(t)$ is the *5* x *1* column vector of forecast errors of the best linear predictor of $Y(t)$ using all the past $Y(s)$. X(s) is a *2* x *1* column vector that include country income control variable (LOW, MIDDLE).[5] By construction, $e(t)$ is uncorrelated with all the past $Y(s)$. If this is combined with the fact that $e(t)$ is also a linear combination of current and past $Y(t)$, $e(t)$ is serially uncorrelated. The *ij*-th component of $A(s)$ measures the direct effect that a change in the return to the *j*-th variable would have on the *i*-th variable in *s* periods. As can be seen from Equation (5), the right-hand side of each equation contains exactly the same terms, i.e., a constant, lagged value of each variable, and the error term.

We use Toda and Yamamoto (1995)'s procedure to test Granger causality. It is well known that F test of causality in VAR is not valid in the presence of non-stationary series. Toda and Yamamoto (1995) propose a procedure that is robust to the cointegration features of the series (e.g. it is valid without regard to the cointegration process of the variables). The procedure basically involves four steps. First, find the highest order of integration in the variables $(d_{\max})$.

[5] Since we use the constant C, we do not include a HIGH income dummy.

Second, find the optimal number of lag for the VAR model (m).[6] Third, overfit (on purpose) the VAR by estimating a $(m+d_{\max})^{\text{th}}$ order VAR using Seemingly Unrelated Regression (SUR).[7] Finally, test the null hypothesis of no Granger causality using Wald test, which follows a χ^2 distribution with m degrees of freedom.

We also use the estimated VAR to calculate impulse response functions on growth to innovations in each of the variables as well as forecast error variance decomposition for each variable. This decomposition of forecast error variance provides a measure of the overall relative importance of the variables in generating the fluctuations in proxy measures in their own and other variables.

III. Data and Proxy Measures

A. Structuring the Panel Dataset

Our sample period (1980 through 2005) covers an era of financial liberalization and development in many OIC countries as well as output expansion, money growth, and increasing volume of investment. Our comprehensive dataset includes all OIC member countries with available data from World Bank' *World Development Indicators* 2009 (WDI) database.[8] The list of countries as well as the time-series average of the variables used in this study is presented in appendix A.

This dataset allows us to effectively estimate panel regressions and to analyze various multivariate time-series models in our sample. Despite the shortcomings coming from aggregations, we believe that our approach to estimate models based on panel data from OIC members has several advantages to document the association and direction of relation finance-

[6] We use the Schwartz Bayesian Criterion to determine the optimal lag for the VAR.
[7] The Wald test gains efficiency if the VAR is estimated using SUR (Caporale and Pittis, 1999).
[8] The total number of countries in the OIC is 57. However, we dropped countries that do not have data for the analysis. The total number of countries with available data is 51.

growth. It is possible to derive meaningful policy implications for OIC countries by dynamically examining different economic roles, causality, directions, and timing among proxy measures for financial development and economic growth.

B. Proxy Measures for Financial Development and Economic Growth

Various measures have been used in the literature to proxy for the 'level of financial development', ranging from interest rates to monetary aggregates, to the ratio of the size of the banking system to GDP (Khan and Senhadji, 2000; Chuah and Thai, 2004; Al-Awad and Harb, 2005 among others). For this study, we collect proxy measures for macroeconomic conditions, financial development, and economic growth from the World Bank' *World Development Indicators* 2009 (WDI) database for the period from 1980 to 2005. In our analysis, we use GDP per capita growth rates as a proxy for economic growth (*GROWTH*). We also utilize five proxies for measuring financial development. Some of proxy measures for financial development incorporate information from banks and other financial intermediaries in addition to loan markets.

The first proxy is the domestic credit provided by banking sector as a percentage of GDP (*DCBS*). Higher DCBS indicates higher degree of dependence upon banking sector for financing.[9] The intuition behind this measure is that 'banks are more likely to provide the five financial functions" mentioned above (Levine, 2005) and therefore it measures financial development. Another related measure is the domestic credit to private sector as a percentage of GDP (*DCPS*).[10] A high ratio of domestic credit to GDP indicates not only a higher level of domestic investment but also higher development of the financial system. Financial system that

[9] It is assumed that banks are not subject to mandated loans to priority sectors, or obligated to hold government securities, which may not be suitable for developing countries.

[10] Domestic credit to the private sector covers claims on private non-financial corporations, households, and non-profit institutions (WDI, 2009)

allocate more credit to private sector are likely engaged in researching firms, exerting corporate control, providing risk management control, facilitating transactions, and mobilizing savings (Levine, 2005), which requires a higher degree of financial development. Another measure related to the previous one is the domestic credit to private sector provided by banking sector as percentage of GDP (PRIV).[11] Similarly to DCBS and DCPS a higher ratio implies higher financial development but measures the direct impact of banking development on the private sector.

We also use the broadest definition of money M3 –as a proportion of GDP– to measure the liquid liabilities in the economy. We use M3 as a financial depth indicator because monetary aggregates, such as M2 or M1, may be a poor proxy in that economies with underdeveloped financial systems may have a high ratio of money to GDP, as money is used as a store of value in the absence of other more attractive alternatives (Khan and Senhadji, 2000). A higher liquidity ratio means higher intensity of the banking system. The assumption here is that the size of the financial sector is positively associated with the financial services (King and Levine, 1993b).

The fifth indicator of financial development is the ratio of gross domestic savings to GDP (*GDS*).[12] Pagano (1993) concludes that the steady state growth rate depends positively on the percentage of savings diverted to investment, suggesting that one channel through which financial deepening affects growth is converting savings to investment. In other words, financial development is expected to benefit from higher GDS and, consequently, higher volume of investment. Moreover, financial repression and credit controls lead to negative real interest rates

[11] We thank tha anonimuos referee for recommending this measure. This variable is taken from Beck and Demirgüç-Kunt (2009).

[12] Gross domestic savings are calculated as GDP less final consumption expenditure (formerly total consumption). Final consumption expenditures cover the consumption expenditures by households and the general government (WDI, 2009).

that reduce the incentives to save. According to this view (Mckinnon-Shaw, 1973), a higher GDS resulting from a positive real interest rate stimulates investment and growth.

We follow Levine et al (2000) procedure to address the potential stock-flow problem of our financial variables. We deflate end-of-year financial balance sheet items by end-of-year CPI, then we compute the average of the real financial sheet items in year *t* and *t–1* and divide it by real GDP in year *t*.[13]

We control for country's macroeconomic conditions as well as country's income per capita level. We use total trade to GDP (TRADE) and the ratio of general government final consumption expenditure to GDP (GOV), which indirectly measure the size of real sector and the weight of fiscal policy. Many OIC countries tend to rely heavily on international trades to achieve economic growth, as financial liberalization in many of these countries is still in progress. In addition, some OIC countries use expansionary or contractionary fiscal policies for steady economic growth by adjusting government spending. We also include inflation rate (INF) to control for price distortions. If a country is classified as low income country by World Bank, the dummy variable LOW takes value of one and zero otherwise, whereas if it is classified as a middle income (lower or upper middle income) the dummy variable MIDDLE takes value of one and zero otherwise.

V. Empirical Results

A. Summary Statistics and Regression results

Table I compares key financial and real indicators along with the economic growth proxy with those of the OECD high-income countries. Panel A shows statistics of time-series average

[13] The stock-flow problem refers to the fact that financial balance sheet items are measured at the end of the year whereas GDP is measured throughout the year. See note at the beginning of appendix A for details of the calculations.

during the 1980-2005. The region has shown lower average growth rate compared to OECD countries (see median and mean) and has higher variability. Developed countries have an annual average growth rate of 2.2 percent whereas OIC countries have an annual average growth rate of 0.7 percent. There are 16 countries (out of 51 countries) that have had a negative growth.[14] For instance, among countries with negative growth rate, Turkmenistan is the one with the highest GDP per capita loss; it has an average decrease in GDP per capita of 3.7%. On the other hand, the country with the highest average growth rate is Maldives with an average growth of 5.4% during the period.

Furthermore, GDP per capita median is US $ 825, which indicates that more than half of the OIC members are low income countries. However, there are a few countries (mainly oil-exporter countries) that have income comparable to OECD countries.[15]

As expected, OECD countries possess higher values of DCBS, DCPS, PRIV and M3 proxy measures which represent the relative big sizes of their financial system and financial depth. It is obvious that developed countries with efficient financial intermediaries still tend to rely heavily on domestic credits provided by banking sector and have plenty of liquid liabilities traded in their well-developed exchanges or financial institutions. On the other hand, OIC countries have very low average of financial indicators denoting an under-developed financial system. For example, DCPS median for OIC member is 21 percent whereas DCPS median for OECD countries is 79 percent.

The level of trade is comparable to OECD countries and government expenditure (GOV) is lower. However, OIC countries have suffered high inflation during the period which maybe one of the reasons for lower economic growth.

[14] See appendix A for detailed country statistics.

[15] We include in the analysis all OIC countries and control for income level. However, the results are robust to exclusion of high income countries from the dataset.

Panel B shows correlations among the variables used in the study. Except GDS, all proxies for financial development are highly correlated (DCPS, DCBS, PRIV, and M3). Moreover, their simple correlations with GROWTH are positive but not significant. Also, GDS has small negative but not significant correlation with GROWTH. Clearly, government expenditure (GOV) and inflation (INF) are significant negatively correlated with growth. Finally, GDS has small, no significant, negative correlation with GROWTH and all other proxies for financial development. We further test the relationship between financial measures and growth after controlling for macroeconomic conditions and income level.

Table 2 shows the regression results for unbalanced panel data.[16] Panel A shows the results excluding inflation whereas panel B shows the results including inflation. The theoretical model explained above suggests that the coefficient for Q should be negative (see equation 3). As expected, given the standard results for conditional convergence, the coefficients for Q are negative in all specifications and are significant in Panel A. These results are consistent with previous literature (see for example Bekaert et al, 2005; Barro, 1997, Barro and Sala-i-Martin, 1995) and imply that low initial GDP per capita level is associated with higher growth rate, conditional on the other variables.

Excepting GDS, the financial measures (FIN) are significant positively related to GDP per capita growth rate in our sample, implying a positive long-run association between finance and growth. This result is also consistent with previous finding in the literature (see Levine, 2005).

[16] There are originally 51 countries in the sample. However, the number of countries with data drops when other variables, rather than GDS, enter in the regression. This drop is significant when including inflation. Moreover, there are 5 quinquennium, but not all countries have the 25 years of data. Thus, there are missing quinquennium which results in an unbalanced panel data. In other words, the observations in the regressions are lower than 255 (51*5).

Pagano (1993), among others neo-classical authors, demonstrates a link between gross domestic saving and growth. Furthermore, Becsi and Wang (1997) argument that well-developed domestic financial sectors may significantly contribute to raise savings and investment rate and, therefore economic growth. However, we find no evidence of positive association between Savings and Growth for OIC countries, which contradict the assertion that higher savings imply higher growth. We also note that the average GDS is low compared with other low and middle income countries in the world (see Table 1 panel A). Given this result, and considering that most OIC countries are low income developing countries, we speculate that the not significant coefficients could be the result of underdeveloped financial system.

There is, however, a positive significant relationship between TRADE and growth rate in our sample of Panel A. More importantly, government expenditure and inflation have negatively related to economic growth in OIC countries, suggesting policies toward more tight fiscal and monetary policies might be needed in OIC countries.

In summary, our results show that government expenditure and inflation have impaired economic growth in OIC countries whereas trade has positively impacted economic growth. Also, given the positive coefficients for DCPS, DCBS, PRIV and M3, we can conclude that there is a positive relationship between financial depth and growth in OIC countries.

B. Analysis of VAR results, Dynamic Causality, and Policy Implications

We turn to the VAR analysis. We decompose the forecast error of the endogenous variable GROWTH over different time horizons into components attributable to unexpected innovations (or shocks) of itself and proxy measures in the dynamic VAR system.[17] The forecast error

[17] Since GDS was not significant in the unbalanced panel regression, we do not include it in the VAR analysis.

variance decompositions of GROWTH in VAR are presented in Table 3.

It is typical in VAR analysis that a variable explains a huge proportion of its forecast error variance, which is the case in our analysis of GROWTH variation, which explains the biggest part of itself in all specifications. The second more important variable in explaining GROWTH is precisely those measuring financial development (FIN). For example, DCPS and DCBS explain more than 3% whereas M3 more than 10% of GDP growth variation. Also, government expenditure is the third most important variable explaining growth rate, accounting for 2 percent of the variation in growth rate.

GROWTH is said to be Granger-caused by proxy measures if those proxy measures help in the prediction of GROWTH, or equivalently if the coefficients on lagged proxy measures are statistically significant. A critical step of the Toda and Yamamoto (1995) procedure is the number of lags in the VAR. Using the Schwartz Bayesian Criterion, the optimal number of lags is 3.[18] We report *p*-values of Granger causality tests in Table 4.

Each panel represents a VAR system with each of the finance proxies entering one by one in the system. Each element in the matrix represents the p-value of the null hypothesis that row *i* does not Granger cause column *j*. For instance, the p-value of 0.57 in Panel A indicates that the null hypothesis of DCPS does not Granger cause GROWTH cannot be rejected. As a matter of fact, we have no evidence that financial measures Granger cause growth as shown by the elements (FIN, GROWTH) in each matrix (p-values of 0.57, 0.61, 0.72, and 0.76, respectively).

On the other hand, the elements (GROWTH, FIN) are significant, implying that Growth causes FIN in all specifications. All together, these results suggest a one way causality that runs from economic growth to financial development in OIC countries, supporting the view of Gurley

[18] The maximum order of integration in all series is one (1). Toda and Yamamoto (1995) procedure can be applied whether there is cointegration or not among the variables. Note that the emphasis in Granger causality tests is on *short-run* relationship.

and Shaw (1967), Goldsmith (1969), and Jung (1986), who hypothesize that in developing countries growth leads finance because of the increasing demand for financial services.

Regarding macroeconomic environment, as expected, all three variables (TRADE, GOV, and INF) Granger cause growth and vice versa (except in Panel C where GOV is not significant). Thus, trade, government expenditure and inflation has impacted GDP per capita growth, which has impacted the three variables.

Since our goal is to assess the role of the financial sector in economic growth, we also investigate the dynamic relationships among proxy measures and how two measures of financial development (GDS and DCPS) affect economic growth (GROWTH) over time. Choleski decomposition is generally used to identify the system of equations in order to get the Impulse Response Function. However, this decomposition implies that ordering of variables matter; in other words, different ordering may yield different results. Therefore, we use Generalized Impulse Response Function proposed by Pesaran and Shin (1998), which is invariant to the ordering of the equations. We use the same scale in the axis to assess the magnitude of the shock on growth among regions.

Figure 1 illustrates how GROWTH and FIN respond to shock innovations on FIN and GROWTH respectively. Clearly, shocks in growth causes a decline in all financial measures in the short run but move to a positive long term effect. The effect is more pronounced in DCPS and PRIV, whereby the proxies move to a positive effect after 2 years and end up with the two highest changes in magnitude considering the 4 proxies for financial development. Similarly, innovations in FIN cause a decline in growth but quickly move to zero (or almost zero) effect in growth, reflecting again that the direction of causality runs from growth to finance.

Figure 2 shows the impulse response functions of DCPS to innovations in the remainder endogenous variables. TRADE and GOV have positive impact on DCPS. However, while government expenditure (GOV) impact positively in the short return, the effect dissipates in the long run. On the contrary, a shock in trade gradually impact positively and permanently DCPS. Inflation really hurts financial development as implied by impulse response function of DCPS to shock in inflation.

Figure 3 shows impulse responses of GROWTH to shock in other variables in the VAR. Although the effect diminishes in the long run, the only variable that appears to cause a positive impact in the short run is TRADE. The other two variables (GOV) and (INF) causes short term decline in growth. Thus, it seems that government in OIC countries should avoid inflationary policies and encourage tight fiscal policies to minimize their impact in GDP per capita growth rate. Furthermore, there is no guarantee that promoting financial development will lead to economic growth; rather, it is economic growth which will help the development of the financial sector.

VI. Conclusions

We examine regional panel regressions with cross-sectional OIC countries and time-series proxy measures to establish linkage and directions between the financial development and economic growth. Furthermore, we perform various multivariate time-series model, such as VAR, forecast error variance decompositions, impulse response functions, and Granger causality tests to derive feasible policy implications.

In agreement with King and Levine (1993), Levine, Loayza, and Beck (2000), among others, we find long-run association between financial development and economic growth.

Specifically, we find that all proxies for financial development except gross domestic savings (GDS), are positively associated with economic growth in OIC countries.

Moreover, using Granger causality tests developed by Toda and Yamamoto (1995), we find that the direction is from growth to finance, supporting Gurley and Shaw (1967), Goldsmith (1969), and Jung (1986), who hypothesize that in developing countries growth leads finance because of the increasing demand for financial services induced by economic growth.

Our empirical results based on Granger causality tests and panel regressions do not answer the question "What will happen in the future?" Rather, they tell us "what has happened in the past", and therefore we may be able to learn from past experience. More specifically, the question of whether finance leads to growth (or growth leads to finance) will remain a subject of debate. We find that there has been a positive association between finance and economic growth and that the direction has been one way in OIC countries, from economic growth to financial development.

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Table 1. Summary of Statistics by regions (1980-2005)

This Table summarizes country-year statistics for 6 geographic regions and high income OECD and non-OECD countries classified according to the World Bank. The time-series average of each variable is calculated and then statistics are collected cross-country. DCPS: domestic credit provided to private sector; DCBS: domestic credit provided by banking sector; PRIV: private credit by deposit money banks. M3: Liquid Liabilities; GDS: gross domestic savings; TRADE: import plus export; GOV: government expenditure, all as a percentage of GDP. INF: inflation rate. In Panel B, the signs ***, ** and * denote significance at 1%, 5% and 10%, respectively.

Panel A. Summary Statistics

	Economics Growth		**Financial Development**					**Macroeconomic Variables**		
	GDP per capita (US $)	**GDP per capita Growth (%)**	**DCPS (%)**	**DCBS (%)**	**PRIV (%)**	**M3 (%)**	**GDS (%)**	**TRADE (%)**	**GOV (%)**	**INF (%)**
OIC countries (N=51)										
Mean	3,387.2	0.7	36.6	74.2	23.8	48.8	16.8	78.1	16.3	22.2
Median	824.7	0.9	20.6	30.8	20.2	32.7	14.5	71.2	15.2	6.1
Max	29,766.1	5.4	515.0	1702.0	97.5	348.5	64.8	180.9	30.0	261.5
Min	163.1	-3.7	2.7	6.8	3.5	8.2	-12.1	25.4	4.7	0.6
High Income OECD (N=27)										
Mean	19,476.5	2.2	85.3	103.6	77.3	72.4	23.8	77.7	19.0	5.1
Median	20,251.1	1.9	79.0	97.5	71.9	65.5	23.0	68.5	19.0	4.1
Max	36,442.1	5.6	183.1	265.7	148.8	194.2	37.8	220.0	27.2	15.3
Min	3,795.0	1.0	39.5	52.4	33.7	38.6	12.4	21.8	10.5	1.0

Panel B. Correlation for OIC countries

	GROWTH	DCPS	DCBS	M3	PRIV	GDS	TRADE	GOV	INF
GROWTH	1.00								
DCPS	0.09	1.00							
DCBS	0.09	0.98***	1.00						
M3	0.09	0.97***	0.96***	1.00					
PRIV	0.09	0.96***	0.96***	0.92***					
GDS	-0.02	-0.02	-0.09	-0.03	-0.02	1.00			
TRADE	0.01	0.07	-0.03	0.10	0.05	0.31***	1.00		
GOV	-0.23***	0.05	-0.01	0.11*	0.03	0.06	0.39***	1.00	
INF	-0.42***	0.00	0.03	0.02	0.01	-0.05	-0.03	0.03	1.00

Table 2. Economic Growth Regressions

The table shows OLS heteroskedastic-consistent error regression results for economic growth determinants. The dependent variable is GROWTH: the difference between natural logarithm of GDP per capita minus its lagged value. The explanatory variables are: Q: log of GDP per capita in 1980; DCPS: domestic credit to private sector; DCBS: domestic credit provided by banking sector; PRIV: credit to private sector provided by banking sector; M3: broad money; GDS: gross domestic savings divided; TRADE: import plus export; GOV: general government consumption expenditure, all as percentage of GDP; and INF: percentage inflation. In each model a proxy for financial development enter one by one: FIN={DCPS, DCBS, PRIV, M3, GDS}. Except Q, each variable is a 5 year non-overlapping average. The regression has dummy variables for each quinquennium (coefficients not reported) as well as dummies for country's income level according to the World Bank classification. LOW: low income country (GNI per capita of $975 or less); and MIDDLE: middle income country (between $976 and $11,905 GNI per capita). The hetero-robust adjusted t-statistics are in parentheses. The signs ***, ** and * denote significance at 1%, 5% and 10%, respectively. The sample period is 1980 to 2005.

Panel A. Growth rate determinants (Inflation excluded as explanatory variable).

	FIN=DCPS	**FIN=DCBS**	**FIN=PRIV**	**FIN=M3**	**FIN=GDS**
C	12.843*** (4.069)	12.764*** (4.109)	12.200*** (3.208)	12.997*** (4.033)	14.557*** (3.869)
Q	-1.017** (.432)	-1.000** (.438)	-1.070*** (.364)	-1.034** (.429)	-0.952** (.440)
FIN	0.0037*** (.0005)	0.0010*** (.0001)	0.0185** (.0084)	0.0044*** (.0012)	-0.034 (.031)
TRADE	0.0079** (.0038)	0.0084** (.0040)	0.0023 (.0055)	0.0080** (.0039)	0.009* (.005)
GOV	-0.100** (.045)	-0.100** (.045)	-0.058 (.036)	-0.104** (.045)	-0.133** (.056)
LOW	-3.685** (1.831)	-3.695** (1.838)	-3.330** (1.338)	-3.755** (1.816)	-5.096*** (1.779)
MIDDLE	-1.232 (1.333)	-1.230 (1.333)	-0.959 (.871)	-1.344 (1.316)	-2.053* (1.220)
Adj R2	0.20	0.19	0.20	0.19	0.19
# Obs.	207	208	168	209	226
#countries	50	50	41	50	51

Panel B. Growth rate determinants (Inflation included as explanatory variable).

C	8.652** (4.091)	8.620** (4.161)	10.606*** (3.247)	8.809** (4.040)	8.431** (3.883)
Q	-0.613 (.477)	-0.605 (.485)	-0.871** (.375)	-0.622 (.470)	-0.363 (.480)
FIN	0.0040*** (.0004)	0.0012*** (.0001)	0.0179* (.0094)	0.0054*** (.0012)	-0.0378 (.0239)
TRADE	0.0035 (.0049)	0.0045 (.0050)	-0.0011 (.0060)	0.0033 (.0049)	0.0061 (.0055)
GOV	-0.073* (.038)	-0.074* (.038)	-0.053 (.033)	-0.082** (.038)	-0.113** (.046)
INF	-0.019*** (.001)	-0.019*** (.001)	-0.003 (.008)	-0.018*** (.002)	-0.019*** (.001)
LOW	-1.800 (1.756)	-1.851 (1.774)	-2.781** (1.405)	-1.848 (1.722)	-2.221 (1.620)
MIDDLE	0.583 (1.209)	0.562 (1.218)	-0.468 (.951)	0.441 (1.185)	0.261 (1.097)
Adj R2	0.37	0.37	0.23	0.36	0.36
# Obs.	171	172	164	173	176
#countries	44	44	41	44	44

Table 3. Forecast Error Variance Decompositions of Economic Growth in VAR

This Table summarizes error variance decompositions of economic growth for OIC countries. The VAR system controls for country's income level (low, middle and high income economies.) GROWTH: the difference between natural logarithm of GDP per capita minus its lagged value; DCPS: domestic credit to private sector; DCBS: domestic credit provided by banking sector; PRIV: private credit by deposit money bank; M3: liquid liabilities. TRADE: import plus export; GOV: general government consumption expenditure, all as percentage of GDP; INF: percentage inflation. A proxy for financial development enter one by one in each VAR: FIN={DCPS, DCBS, PRIV, M3}. The sample period is 1980 to 2005.

	INF	**GOV**	**TRADE**	**FIN**	**GROWTH**
Panel A. Domestic credit to private sector (FIN=DCPS)					
2 years ahead	0.14	1.85	0.83	3.07	94.11
5 years ahead	0.15	2.28	1.03	3.09	93.46
10 years ahead	0.16	2.62	1.18	3.08	92.95
15 years ahead	0.17	2.76	1.25	3.08	92.74
Panel B. Domestic credit provided by banking (FIN=DCBS)					
2 years ahead	0.12	1.95	0.72	3.02	94.18
5 years ahead	0.13	2.34	0.84	3.04	93.64
10 years ahead	0.14	2.65	0.93	3.03	93.25
15 years ahead	0.14	2.78	0.96	3.03	93.09
Panel C. Domestic private credit provides by banking sector (FIN=PRIV)					
2 years ahead	0.12	1.64	1.36	1.27	95.61
5 years ahead	0.20	1.82	1.35	1.31	95.32
10 years ahead	0.22	1.96	1.35	1.37	95.10
15 years ahead	0.22	2.02	1.35	1.39	95.02
Panel D. Liquid Liabilities (FIN=M3)					
2 years ahead	0.10	1.83	0.73	10.60	86.73
5 years ahead	0.10	2.27	0.85	10.52	86.26
10 years ahead	0.11	2.61	0.93	10.48	85.88
15 years ahead	0.11	2.75	0.97	10.47	85.71

Table 3. Granger causality tests (*p-values*)

Toda and Yamamoto (1995) procedure is used to test the Granger causality among variables. This procedure can be used in presence of cointegration or not. The table reports *p*-values from WALD tests, where the null hypothesis is row *i* does not Granger cause column *j*. GROWTH: the difference between natural logarithm of GDP per capita minus its lagged value; DCPS: domestic credit to private sector; DCBS: domestic credit provided by banking sector, PRIV: private credit by deposit money bank; M3: broad money; TRADE: import plus export; and GOV: general government consumption expenditure, all as percentage of GDP; and INF: percentage inflation. A proxy for financial development enter one by one in each VAR: FIN={DCPS, DCBS, PRIV, M3}. The sample period is 1980 to 2005.

Panel A. Domestic credit to private sector (DCPS)

	Growth	DCPS	TRADE	GOV	INF
Growth		0.00	0.00	0.08	0.55
DCPS	0.57		0.01	0.00	0.45
TRADE	0.03	0.05		0.93	0.15
GOV	0.09	0.00	0.01		0.02
INF	0.00	0.00	0.00	0.02	

Panel B. Domestic credit provided by banking (DCBS)

	Growth	DCBS	TRADE	GOV	INF
Growth		0.00	0.01	0.07	0.62
DCBS	0.61		0.14	0.00	0.01
TRADE	0.03	0.37		0.89	0.15
GOV	0.09	0.00	0.03		0.02
INF	0.00	0.82	0.00	0.01	

Panel C. Domestic private credit provides by banking sector (DCBS)

	Growth	PRIV	TRADE	GOV	INF
Growth		0.00	0.05	0.27	0.09
PRIV	0.72		0.30	0.46	0.63
TRADE	0.04	0.11		0.74	0.11
GOV	0.18	0.61	0.01		0.00
INF	0.01	0.00	0.01	0.03	

Panel D. Liquid Liabilities (M3)

	Growth	M3	TRADE	GOV	INF
Growth		0.00	0.01	0.08	0.56
M3	0.76		0.01	0.00	0.55
TRADE	0.03	0.42		0.96	0.14
GOV	0.07	0.08	0.00		0.00
INF	0.00	0.00	0.00	0.00	

Figure 1. Impulse Responses of GROWTH and FIN

This Figure shows Pesaran and Shin (1998)'s Generalized Impulse Response Functions of GROWTH to shock in FIN as well as Impulse Response Functions of FIN to shock in GROWTH. GROWTH: the difference between natural logarithm of GDP per capita minus its lagged value; DCPS: domestic credit to private sector; DCBS: domestic credit provided by banking sector; PRIV: private credit by deposit money bank; M3: broad money; TRADE: import plus export divided by GDP; and GOV: general government consumption expenditure, all as percentage of GDP; INF: percentage inflation. The VAR system includes TRADE, GOV and INF and control for country's income level. A proxy for financial development enter one by one in each VAR: FIN={DCPS, DCBS, PRIV, M3}. The sample period is 1980 to 2005.

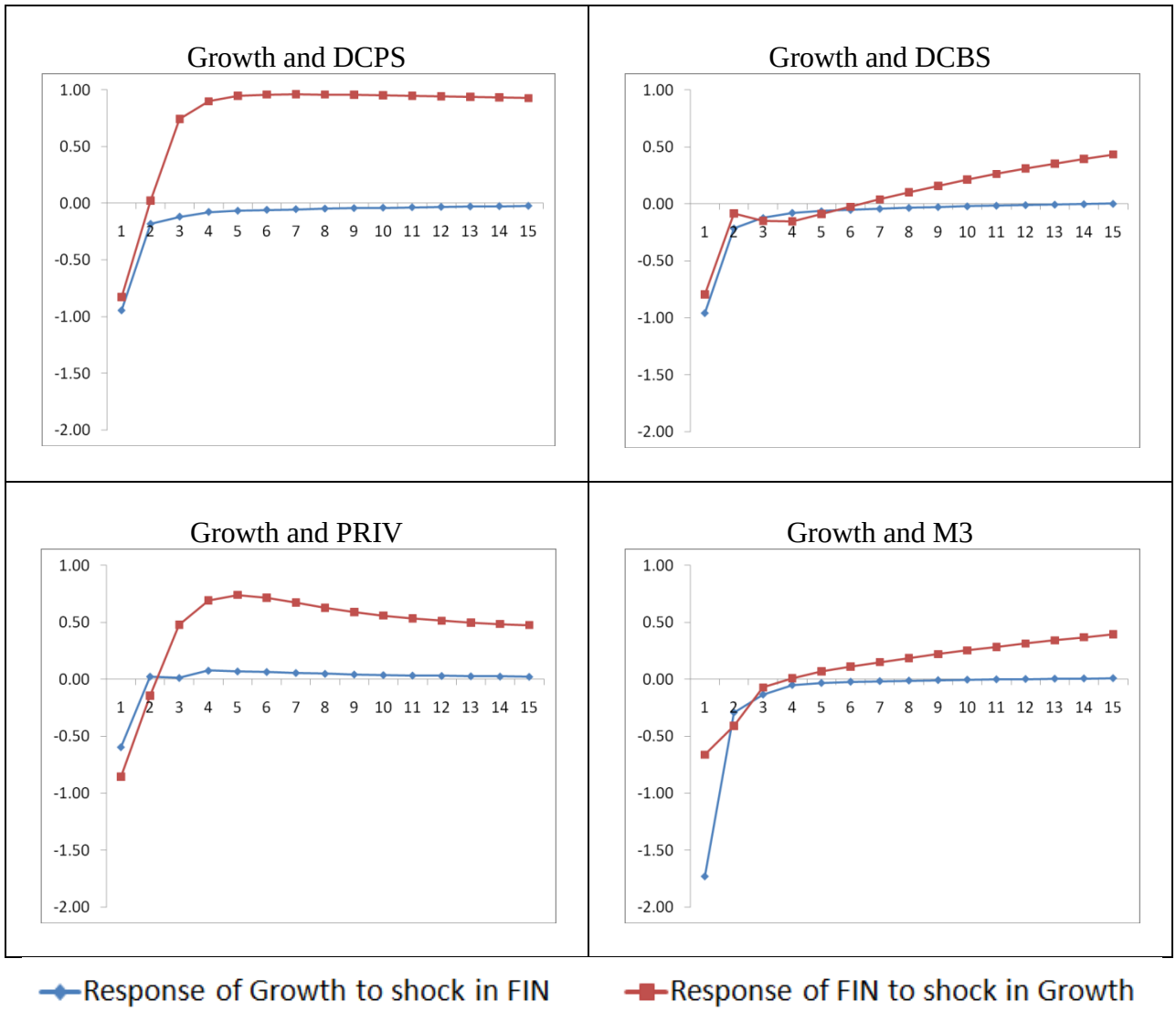


Figure 2. Impulse Responses of DCPS to Shocks in Other Endogenous Variables

This Figure shows Pesaran and Shin (1998)'s Generalized Impulse Response Functions of DCPS to shocks in each of the other endogenous variables in the VAR system. GROWTH: the difference between natural logarithm of GDP per capita minus its lagged value. DCPS: domestic credit to private sector; TRADE: import plus export; and GOV: general government consumption expenditure, all as percentage of GDP; INF: percentage inflation. The VAR system include GROWTH, DCPS, TRADE, GOV and INF and control for country's income level. The sample period is 1980 to 2005.

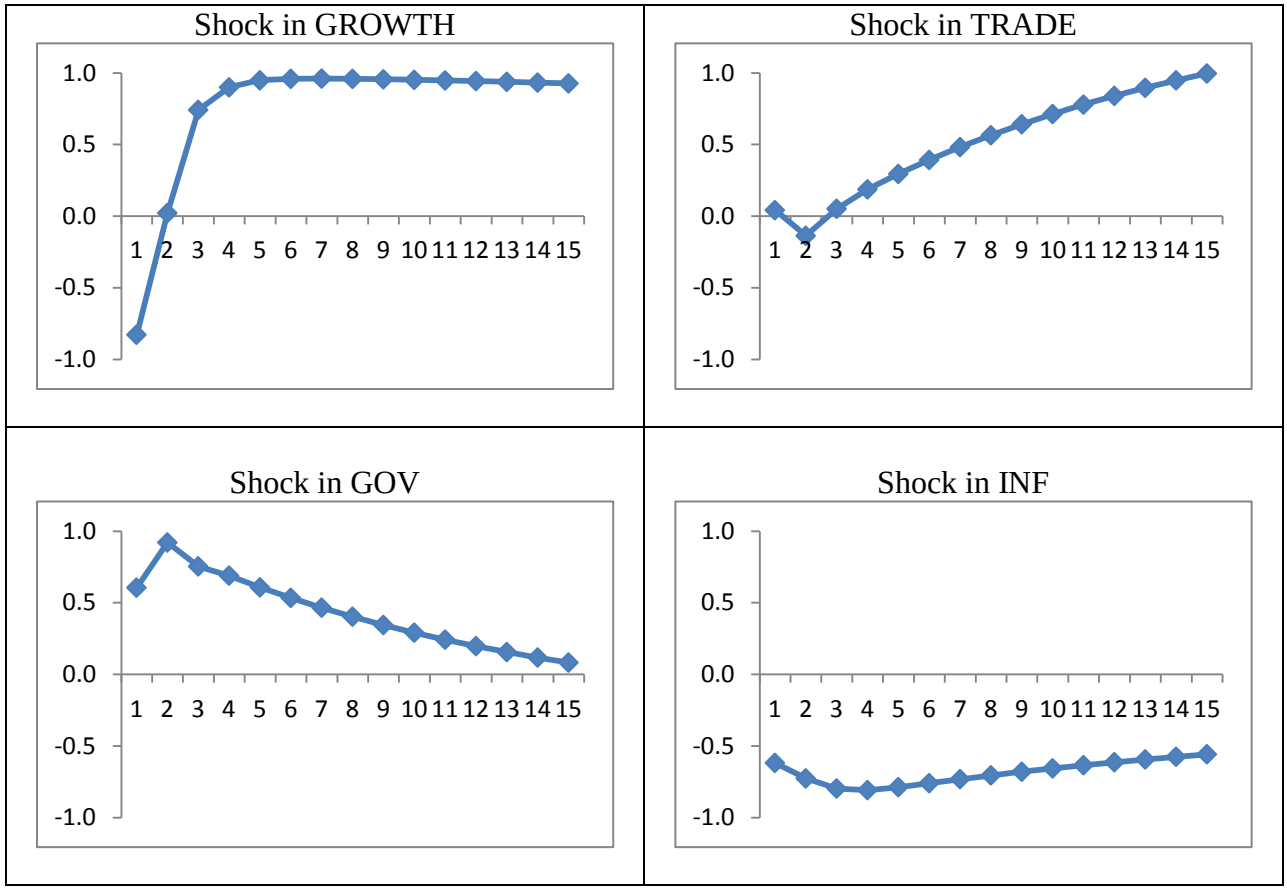
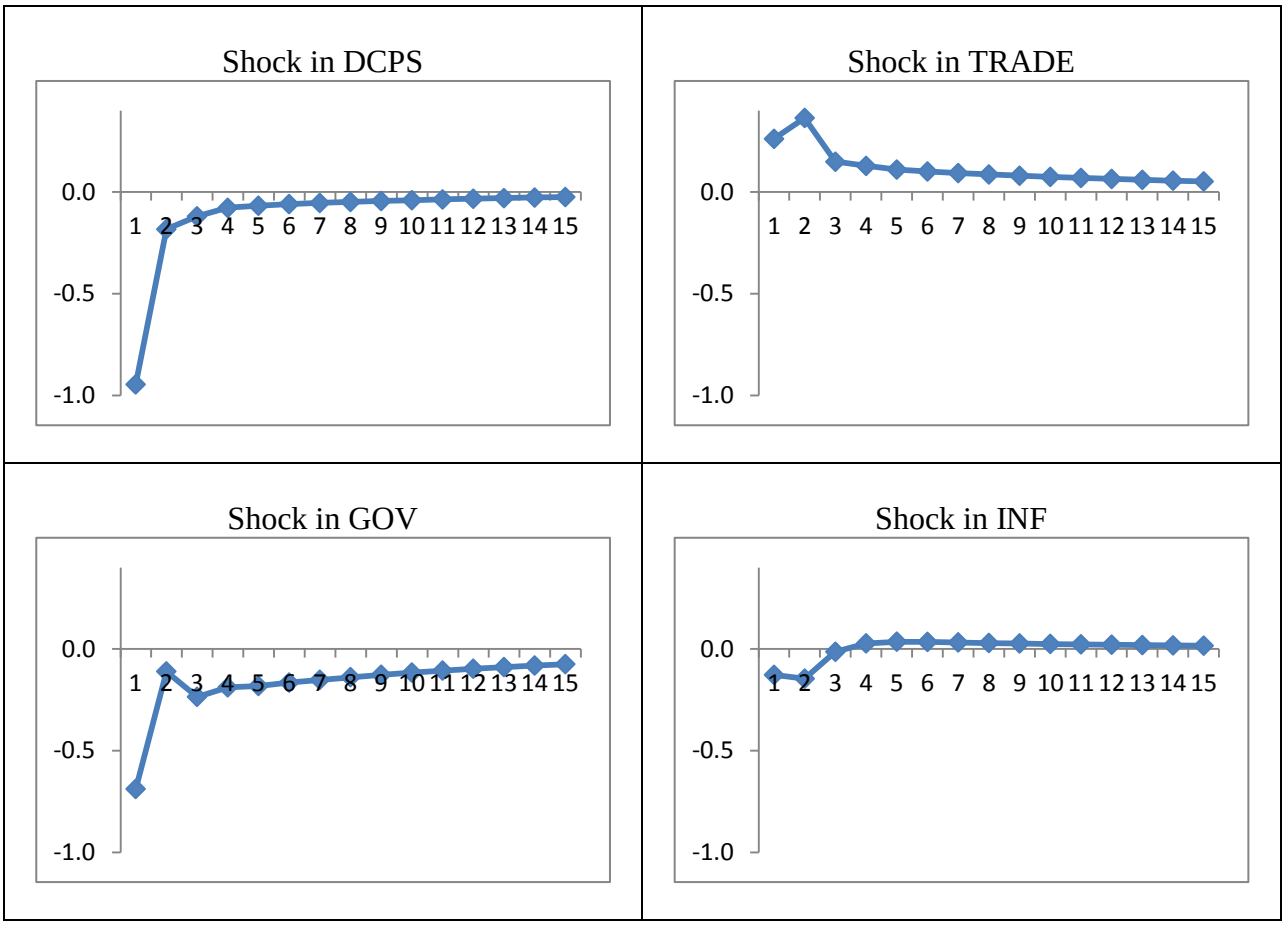


Figure 3. Impulse Responses of GROWTH to Shocks in Other Endogenous Variables

This Figure shows Pesaran and Shin (1998)'s Generalized Impulse Response Functions of GROWTH to shocks in each of the other endogenous variable in the VAR system. GROWTH: the difference between natural logarithm of GDP per capita minus its lagged value. DCPS: domestic credit to private sector; TRADE: import plus export; and GOV: general government consumption expenditure, all as percentage of GDP; INF: percentage inflation. The VAR system includes GROWTH, DCPS, TRADE, GOV and INF and control for country's income level. The sample period is 1980 to 2005.



Appendix 1. Time-series averages of variables by countries (1980-2005)

This appendix summarizes time-series statistics for 6 geographic regions and high income OECD and non-OECD countries classified according to the World Bank. The time-series average of each variable is calculated and then statistics are collected cross-country. Economies are divided according to 2008 GNI per capita, calculated using the World Bank Atlas method. The groups are: low income, $975 or less; lower middle income, $976 - $3,855; upper middle income, $3,856 - $11,905; and high income, $11,906 or more. Geographic classifications are assigned only for low-income and middle-income economies. DCPS: domestic credit provided to private sector, DCBS: domestic credit provided by banking sector, M3: Liquid Liabilities, GDS: gross domestic savings, TRADE: import plus export, GOV: government expenditure, all as a proportion of GDP. INF: inflation rate.

Balance sheet financial variables are adjusted to address the potential stock-flow problem. Our measures of financial variables are calculated as follow:

$$FIN_{i,t} = \frac{\frac{1}{2}\left[FIN_{i,t-1} / CPI_{t-1} + FIN_{i,t} / CPI_{t} \right]}{GDP_t}$$

Where $FIN_i = \{DCPS, DCBS, M3, GDS\}$. The table below presents time series statistics (1980-2005)

	Economics Growth		Financial Development				Real Sector		
	GDP per capita (US $)	Growth (%)	DCPS (%)	DCBS (%)	M3 (%)	GDS (%)	TRADE (%)	GOV (%)	INF (%)
Albania	1,105.2	1.7	8.0	47.9	60.2	7.2	52.0	11.0	26.9
Algeria	1,871.3	0.5	30.5	53.4	60.4	34.9	54.4	15.9	10.6
Azerbaijan	916.7	1.7	6.2	19.0	20.8	21.3	93.6	15.2	261
Bahrain	11,024.7	1.0	49.8	30.8	66.1	34.7	175.9	20.1	1.0
Bangladesh	298.7	2.4	19.3	29.7	30.3	12.4	26.9	4.7	6.0
Benin	298.8	0.4	17.5	16.2	25.2	1.9	46.4	11.9	6.1
Brunei Darussalam	19,780.4	-1.9	46.8	27.0	69.0	41.4	105.3	21.5	1.9
Burkina Faso	199.8	1.8	12.4	11.3	18.9	3.5	36.3	19.9	3.7
Cameroon	716.3	0.0	16.3	20.2	18.0	20.3	43.9	10.2	5.7
Chad	187.6	2.2	7.0	12.3	12.9	1.6	56.5	8.6	3.9
Comoros	399.3	-0.3	12.1	15.5	20.8	-5.5	56.4	21.5	NA

Appendix 1. (continued)

	Economics Growth		Financial Development				Real Sector		
	GDP per capita (US $)	Growth (%)	DCPS (%)	DCBS (%)	M3 (%)	GDS (%)	TRADE (%)	GOV (%)	INF (%)
Cote d'Ivoire	664.4	-1.9	26.0	33.5	26.3	18.9	73.5	12.4	5.0
Djibouti	869.0	-2.0	35.2	39.9	67.5	-1.4	99.8	30.0	4.4
Egypt, Arab Rep.	1,285.5	2.6	40.9	97.5	88.0	14.5	53.3	13.1	11.2
Gabon	4,673.0	-0.6	13.2	19.1	17.5	45.8	93.8	14.0	3.7
Gambia, The	310.5	0.3	14.4	23.6	29.9	7.6	108.4	19.7	10.5
Guinea	357.2	0.7	4.1	9.2	9.5	14.8	55.3	8.9	NA
Guinea-Bissau	163.1	-0.4	9.4	16.8	28.7	-0.8	61.5	14.0	26.9
Guyana	824.7	1.0	40.4	177.6	85.3	15.9	180.9	22.0	6.6
Indonesia	698.3	3.5	30.9	39.2	38.4	29.8	55.1	8.7	10.9
Iran, Islamic Rep.	1,527.1	1.4	32.2	58.1	48.0	29.5	38.4	14.9	19.6
Jordan	1,872.0	0.6	70.6	91.8	108.6	-2.1	123.8	24.6	5.0
Kazakhstan	1,454.6	2.2	20.6	17.5	18.3	24.4	90.9	12.2	156
Kuwait	16,773.2	-0.8	61.3	79.5	77.6	30.3	96.3	26.8	3.0
Kyrgyz Republic	328.5	-0.6	6.4	14.0	16.6	5.6	88.6	19.5	13.2
Lebanon	4,298.1	1.3	67.8	131.9	172.4	-12.1	71.2	16.5	77.1
Libya	6,714.0	1.6	20.2	11.2	40.5	25.8	55.5	23.2	4.4
Malaysia	3,237.2	3.6	128.2	156.8	110.6	36.6	162.6	13.3	3.1
Maldives	2,403.9	5.4	30.4	43.5	47.7	44.7	163.9	20.6	5.4
Mali	235.6	0.5	15.6	18.5	22.9	5.9	57.3	11.6	3.0
Mauritania	432.2	0.2	28.0	26.5	19.8	1.9	103.8	22.8	6.7
Morocco	1,259.8	1.8	43.1	68.6	65.6	18.7	57.9	17.3	4.6
Mozambique	214.2	2.0	515.0	1702.0	348.5	-0.5	49.8	11.3	26.4
Niger	188.6	-1.7	10.2	13.4	14.4	4.9	43.7	13.0	3.1
Oman	7,503.2	3.3	26.5	23.8	28.7	32.1	88.3	24.7	1.6
Pakistan	485.8	2.5	24.6	47.6	43.1	12.7	34.7	11.4	7.5
Qatar	29,766.1	2.6	29.6	36.7	41.3	64.8	89.5	22.8	4.0
Saudi Arabia	9,948.7	-1.7	54.0	42.5	43.5	30.7	74.0	27.0	0.6
Senegal	454.7	0.4	23.6	29.9	24.7	6.3	64.5	15.7	4.5
Sierra Leone	224.6	-0.7	3.9	39.4	18.3	3.7	46.8	10.6	41.8
Sudan	335.2	2.3	6.6	52.7	19.1	8.9	25.4	9.6	44.5
Suriname	2,223.4	0.4	25.9	60.0	63.0	9.7	74.6	29.8	46.4
Syrian Arab Republic	1,113.2	0.9	9.0	53.2	59.9	16.2	59.5	15.6	11.8
Tajikistan	256.0	-3.1	15.8	18.0	8.2	12.4	110.0	11.6	14.9
Togo	261.2	-1.4	20.6	22.8	32.7	7.5	86.1	14.3	4.7
Tunisia	1,763.3	2.5	61.2	67.4	51.8	21.8	88.7	16.0	4.9
Turkey	3,527.0	2.6	16.8	31.8	26.6	15.5	34.2	9.6	51.6
Turkmenistan	767.0	-3.7	2.7	6.8	15.9	24.6	135.7	14.8	NA
Uganda	220.1	2.3	5.7	12.6	13.4	5.0	32.9	11.9	44.3
United Arab Emirates	25,815.4	-2.4	43.6	42.4	51.9	41.4	124.5	16.8	NA
Yemen, Rep.	498.8	1.3	5.5	25.0	39.0	10.8	78.5	16.1	20.5