Iranian Economic Review, Vol.14, No.23, Spring2009

Which is leader in MENA region? Economic growth or financial development

Omid Ranjbar[*]
Zahra (Mila) Elmi[**]

Abstract

There are vast literature about the relationship between financial development and economic growth. In most studies, the positive relation is approved while in few advocate that there is no relation. The positive relation may be from financial development to growth or vice versa or two ways. In this paper, the Granger causality relationship between financial development and economic growth is studied by the dynamic panel GMM-SYS approach and with two kinds of data, annual and five-non-overlapping data in MENA countries as a group. Five different measures of financial deepening are used to capture the variety of different channels through which financial development can affect growth. Results imply that a strong bi-directional causality between financial development and economic growth, but the relation from economic growth to financial development is stronger than vice versa direction.

Keywords: finance-growth nexus, dynamic panel GMM-SYS approach, MENA countries, Granger causality

---

* M.A. in economics from Mazandaran University and Economic affairs expert of Mazand Tarh Consulting Engineers Co. E-mail: o_rangbar@yahoo.com
** Economics Assistant professor in Mazandaran University E-mail: z.elmi@umz.ac.ir

1- Introduction

In recent years, with the renaissance of interest in growth theory by economists, there has been a reappraisal of factors that matter for growth. Traditional growth theory says that as capital grows diminishing returns set in and long-term growth is determined by factors other than capital, such as technological progress, that are independent of policy intervention. Thus, growth theory at least as it applied to policy analysis was effectively dead in the water. But the emergence of endogenous growth theory in the mid-1980s suggested that alternative models that explain long run growth. By assuming aggregate production function that exhibit non-decreasing returns to scale, endogenous growth models have provided mechanisms through which economic and social policies can affect long run growth through their effects on human and physical capital accumulation. One of the policies is financial sector development.

There are four views expressed for the finance-growth nexus. The first one is the supply-leading view, which supports a positive impact of financial development on economic growth. According to this approach, there is a robust effect that runs from financial intermediation to economic growth, and is exercised either by raising the efficiency of capital accumulation (Goldsmith, 1969) or by raising the savings rate and thus the investment rate (Shaw, 1973). This view is supported by Schumpeter (1911), Gurley and Shaw (1955), and recent empirical studies of Roubini and Sala-i-Martin (1992), King and Levine (1993a, 1993b) and Rousseau and Wachtel (2000) among others. According to the view, financial markets via (i) reduce transaction costs and facilitate management risk, (ii) mobilize and pool savings, (iii) ease the exchange of goods and services, (iv) produce information ex ante about possible investments, and (v) monitor investments and exert corporate governance exert influence on growth(Apergis, et al, 2007, pp: 179-180).

The demand-following view, which states that finance actually responses to changes that happen in the real sector(Levine et al(2000, p:32). Somewhere between these two views is the one that claims-mutual impact of finance and growth. Patrick (1966), Demetriades and Hussein (1996) and Greenwood and Smith (1997) are some of the studies that provide evidence of bi-directional causality (Habibullah and Eng, 2006, p: 380). Finally, there are some studies arguing that there is no relationship at all. For instance,

Lucas (1988, p.6) stated his belief clearly in such a way that 'I believe that the importance of financial matters is very badly overstressed in popular and even much professional discussion'. Dornbusch & Reynoso (1989) have questioned the conclusions of previous influential studies and argue that the evidence in support of the financial-led growth paradigm is 'episodic' and a 'vast exaggeration. Recently, Dawson (2003) and Zang et al (2007) provide evidence that do not support the existence of a positive and significant relationship between financial development and economic growth.

The objective of this paper is to investigate the causality direction between financial development and economic growth for the MENA region. The choice of MENA countries is accounted for by the fact that firs, despite significant efficiency discrepancies are observed between the financial sectors, many MENA countries have tried toward establishing a more market-based and private sector-led economy to implement reforms in their financial sectors in order to achieve high growth performance. But, to our best knowledge, little work has been done to evaluate their effectiveness on enhancing economic growth. Second, all of studies that have investigated causality between financial development and economic growth were based on time series bivariate VAR analysis. Since long series of data are scarce for these countries, here upon in our opinion, is not long enough to capture the loge-run relationship between financial development and economic growth. But, by using the panel data approach, it is possible to analyze the issue of financial-led growth using pooled cross-sectional and time-series data. To explore the causal relationship between financial deepening and economic growth, we use the Generalized Method of Moments (GMM) panel estimates proposed by Arellano & Bover (1995) and Blundell & Bond (1998)[1] to extract consistent and efficient estimates on the role of financial development on economic growth in the MENA countries. A GMM panel data analysis has several advantages over cross-sectional or time-series in the following ways: (a)working with a panel, we gain degrees of freedom by adding the variability of the time series dimensions; (b) in a panel context, we are able to control for unobserved country-specific effects and thereby

1 - All reported results are estimated using STATA (version 10) and EViews (version 5).

reduce biases in the estimated coefficients; (c) the panel estimator controls for the potential endogeneity of all explanatory variables by using lagged values of the explanatory variables as valid instruments (see Levine *et al*., 2000); (d) the small number of time-series observations should be of no concern given that all the asymptotic properties of the GMM estimator rely on the size of the cross-sectional dimension of the panel (Beck *et al*., 2000); and (e) when the number of cross-sectional units is much larger than the number of time-series periods, the non-stationary problem commonly seen in time-series data can be reduced (Holtz-Eakin *et al*., 1988).

Third, there are many channels through which financial deepening could impact on growth and these channels can not be explored by employing only a single indicator. Hereupon, ***we employ five different measures of financial deepening in order to quantify the impact of financial depth on growth. Hence, this study is different from previous studies.***

The remainder of the paper is organized as follows: section 2 briefly reviews the theoretical and empirical aspect on the role of financial development on economic growth. The section after presents the Model specification. Section 4 gives an economic overview of the region. Data and variable descript in section 5. In section 6, the econometric methodology is introduced. Section 7 estimates the model and discusses the empirical results. Section 8 concludes.

2- A review of related literature

The link between financial development and cross-country economic growth rates has been widely discussed in the empirical and theoretical academic literature. The theoretical relationship between financial development and economic growth goes back to the study of Schumpeter (1911) who focuses on the services provided by financial intermediaries and argues that these are essential for innovation and development. An analysis of the causes of underdevelopment traps and economic growth, which can be traced back to the work of Rosenstein-Rodan (1943) and Nurkse (1953), who have also identified the financial services sector as one the key factors in driving growth and economic development.

Patrick (1966) has resulted in widespread investigations into the role of the financial sector as an engine for economic growth. Patrick points out two

possible relationships between financial development and economic growth. First, as the economy grows, it generates demand for financial services, which he calls a 'demand-following' phenomenon. According to this view, the lack of financial institutions in developing countries is an indication of lack of demand for their services. Second, the establishment and the widespread expansion of financial institutions in an economy may actively promote development, which Patrick called 'supply-leading' phenomenon. This latter view, which has been dubbed the 'financial-led' growth hypothesis, has been popular among governments in several developing countries as a means to promoting development (Habibullah and Eng, 2006, p: 380).

The endogenous growth theory has reached similar conclusions by explicitly modeling the services provided by financial intermediaries such as risk-sharing and liquidity provision. This theory also suggests that financial intermediation has a positive effect on steady-state growth and that government intervention in the financial system has a negative effect on economic growth (Dritsakis and Adamopoulos, 2004, p: 548).

Levine (1997) argues that the financial sector plays various roles in an economy in a way that underpins growth and development. The financial services sector facilitates the allocation of goods and services across time and space. He asserts that the financial services sector's various roles are :(i) to mobilize savings, (ii) facilitate the exchange of goods and services, (iii) to facilitate trading, (iv) to facilitate hedging and the risk reduction, (v) to encourage the efficient allocation of resources, and (vi) to underpin the market for corporate control and monitor managers.

The transmission mechanism for each of these functions of the financial services sector into economic growth and development works through the two channels of capital accumulation & technological innovation (Ncube,2007,p: 14).

The theoretical work linking the financial sector to economic growth was provided in later years, among others by Pagano (1993), Greenwood & Jovanovic (1990), Levine (1991), Bencivenaga & Smith (1991) and Saint-Paul (1992). Pagano (1993) provides a simple endogenous growth model called the AK model to look at the impact of financial development on economic growth. To illustrate how financial development affects growth,

we draw heavily from Pagano (1993) by assuming the following aggregate production function:

$$Y_t = A_t K_t \quad (1)$$

Where output is a linear function of the aggregate capital stock. This production function can be seen as a reduced form as a result (a) as in Romer (1989), that a firm in a competitive economy with external economies faces a technology with constant returns to scale but productivity is an increasing function of the aggregate capital stock K_t; and (b) as in Lucas(1988), assuming K_t be a composite of physical and human capital, then the two types of capital are reproducible with identical technologies. Assuming in the model that there is no population growth and the economy produces only one good which can be consumed or invested, if it is invested, and given the rate of depreciation per period as δ , then the gross investment equals:

$$I_t = K_{t+1} - (1-\sigma)K_t \quad (2)$$

In a modern society, as a result of specialization and division of labor, the process of investment is separated from the savings process. Thus, it is the function of the financial institutions to provide the mechanism to channel funds from the savers to the investors. By reducing the asymmetry of information for borrowers and lenders, the allocation of funds to the most productive sectors can be made, thereby increasing economic efficiency and social welfare. In the process, they absorb resources so that a dollar saved by savers will generate less than a dollar's worth of investment. Assume θ as the fraction of each dollar saved that is available for investment, while the remainder (1-θ) is retained by the financial institutions as a reward for the services rendered.

In a closed economy, the capital market equilibrium requires that gross saving S_t equals gross investment I_t. The following equation ensures equilibrium in the capital market:

$$\theta S_t = I_t \quad (3)$$

Next we derive the growth rate at time $t + 1$ from equation (1) as:

$$g_{t+1} = (\frac{Y_{t+1}}{Y_t}) - 1 = (\frac{K_{t+1}}{K_t}) - 1 \quad (4)$$

Rewriting equation (2) as $K_{t+1} = I_t + (1-\sigma)K_t$ and substituting into equation (4) we have:

$$g_t = (I_t + K_t - \sigma K_t - K_t) / K_t = (\frac{I_t}{K_t}) - \sigma \quad (5)$$

Rewriting equation (1) as $k_t = \frac{Y_t}{K_t}$ and, together with equation (3), substituting into equation (5) and dropping the time indices, we have the steady-state growth rate as:

$$g = A(\frac{I}{Y}) - \sigma = A\theta s - \sigma \quad (6)$$

Where s denotes the gross savings rate (S/Y). Equation (6) reveals that there are two ways in which the development of the financial sector might affect economic growth. First, banking sectors that operate in a more competitive environment, are likely to become more efficient in the process of transferring saving into investment, and as a result θ can be raised. As θ rises in equation (6), it also increases the growth rate *g*. Second, to their best interest, financial institutions can allocate funds to those projects where the marginal product of capital is highest. In this model, banks increase the productivity of capital, *A*, thereby promoting growth. Thus, savings channeled through financial institutions are allocated more efficiently, and the higher productivity of capital results in higher growth.

Sinha & Macri (2001) examine the relationship between financial development and economic growth for eight Asian countries, which are divided into two categories. The first includes seven developing countries while the second one includes only Japan. The aim of their study is to investigate through a multivariate causality test if there are differences between financial development and economic growth for both examined categories. The empirical results are mixed, namely there is a bilateral causal relationship between the examined variables for India, Malaysia, and Sri Lanka, and a unidirectional causal relationship between financial

development and economic growth for Japan and Thailand, while reverse causality is found, namely from economic growth to financial development for Korea, Pakistan and the Philippines. Shan & Morris (2002) adopt Toda & Yamamoto's (1995) model and by using quarterly data for the period 1985:I–1998IV investigate the causal relationship among the following variables: real GDP, ratio of total credit to GDP, spread of borrowing and lending interest rates, productivity, ratio of gross investment to GDP, ratio of total trade to GDP, consumer price index, official interest rate, stock market price index for 19 OECD countries. They conclude that financial development leads to economic growth either directly or indirectly through the remaining examined variables. As far as Greece is concerned, the authors suggest that no causal relationship between financial development and economic growth is found for the examined period.

Evans *et al*. (2002) evaluate the contribution of human capital and financial development to economic growth in a panel of 82 countries using the translog production function as a framework for estimating the relationships among economic growth and factor inputs such as labor, physical capital, human capital and monetary factor (money or credit). The results of their paper suggest that financial development is as important as human capital in the growth process.

Nourzad (2002) examines the effect of financial development on productive efficiency using three separate panels of developed and developing countries. The results indicate that the more financially developed economy, the more efficient the production of output. This effect appears to be larger in developed countries relative to the developing ones.

Habibullah and Eng (2006) examine the causal relationship between financial development and economic growth of the Asian developing countries from a panel data perspective and use the system GMM technique developed by Arellano & Bover (1995) and Blundell & Bond (1998) and conducts causality testing analysis. The results of their study indicate that financial development promotes growth, thus supporting the old Schumpeterian hypothesis and Patrick's 'supply-leading' hypothesis.

Darrat (1999) implemented Granger causality tests within a bivariate VAR for three MENA countries: Saudi Arabia, Turkey, and United Arab Emirate over the period 1964-1993. Using the currency m1 ratio and m2/GDP as alternative measures of financial development. Darrat's results

suggest some support for the supply-leading hypothesis that financial deepening promotes economic growth, although the strength and consistency of his evidence varies across countries.

Ghali(1999) tested Granger causality between financial development and economic growth for Tunisia over the period 1963-1993 using two financial development measures: bank deposits liabilities/GDP ratio and private credit/GDP ratio, found the financial development Granger causes economic growth.

Awhad and Harb(2005) used both panel and individual country cointegration and Granger causality tests within a quadvariate VAR framework, for ten MENA countries for period 1969-2000. They based their analysis on a single financial measure, namely, the ratio of private credit to monetary base. Their cointegration results strongly support the existence of long-run relationship between the two variables but they fail to clearly establish the direction of causality. Another study addressing the finance–growth nexus in 16 MENA countries is by Boulila and Trabelsi (2004), who used cointegeration and Granger causality tests based on a bivariate vector autoregression (VAR) and three different financial measures. Their findings support the view that causality runs from real economy to financial sector.

3- Model specification

The specification used in this paper to investigate the mutual causality between GDP growth rate (*growth*) and financial development (*finance*) is as follows:

$$growth_{i,t} = \alpha_0 + \sum_{j=1}^{m} \alpha_j growth_{i,t-j} + \sum_{j=1}^{m} \beta_j finance_{i,t-j} + \mu_i + \varepsilon_{i,t}$$

$$i = 1,...,N \quad ; t = 1,...,T \tag{7}$$

$$finance_{i,t} = \lambda_0 + \sum_{j=1}^{m} \lambda_j growth_{i,t-j} + \sum_{j=1}^{m} \theta_j finance_{i,t-j} + \mu_i + \varepsilon_{i,t}$$

$$i = 1,...,N \quad ; t = 1,...,T \tag{8}$$

In equation (7) and (8), i and t denotes respectively for country and time. When β in equation (7) and λ in equation (8) are statistically

significant, the mutual causality between growth and financial development can not be rejected. In this research, the wald statistic was used to test a mutual causality.

A basic point in estimation these kinds of model are to specify the optimal lags. In time series VAR models there are certain standard procedures like SBC or AIC to determine the optimal lags, but in panel VAR there is not a similarly procedure. In this paper, we follow Arellano & Bond (1991) to determine the optimal lags. In this method, when there is no serial correlation in panel VAR residuals, the lag is optimal (Arrelano, 2003, p.123). The statistic m_j is used to determine no serial correlation in residuals.

4- MENA countries: an economic overview of the region

4-1- Economic overview

The MENA region enjoys abundant human and natural resources specially crude-oil production. One quarter of the world's known crude-oil reserves are located in Saudi Arabia. The Islamic Republic of Iran has 15% of the world's total of natural gas reserves. Morocco has more than 30% of the world's phosphate rock and 40% of its phosphoric acid trade. Almost all the country groups have coasts and fishing grounds. Within this general characterization countries vary substantially in resources, economic and geographical size, and population. Intra-regional interaction is weak, being restricted principally to labor flows with limited trade in goods and services. The rate of unemployment exceeds those of most other regions in the world. On the external side the MENA region appears very open, but it trades mainly with industrial economies. EU countries are the most important trading partners (Guetat and Serranito, 2006, pp: 5-6).

MENA countries have to face the same challenges of improving adequate resource location by reducing bureaucratic ineffectiveness, red tape, corruption and excessive government intrusion and also, liberalization of financial sectors.

Most of these challenges remain difficult to meet in MENA countries because of the outdated regulations. The future of the MENA economies is still linked to their ability to cooperate and how their governments, businesses, investors, workers, and communities generally, respond to these challenges.

Many MENA countries, especially Arab countries have embarked on programs for reforms in their financial sectors, restructuring their industrial sector and are reviewing their industrial policies and strategies. But despite these efforts, yet the impact of such programs is still limited.

Domestic output is dominated by the public sector in most MENA countries. The public sector accounts for 30–60% of the labor force in most countries. Public enterprises have weak performance because of very low competition, organizational and managerial shortcomings, administrative controls, inappropriate pricing policies, and over employment. Consequently, the public sector depends heavily on government transfers and subsidies, which create more problems with regard to fiscal and monetary policies. In addition, dominance of public sector employment and recruitment, job security, wage setting practices, a weak institutions quality (Liman, 2004) and corruption (Guetat, 2006) explain the low productivity in most MENA countries.

4-2- Financial sector in MENA countries

In MENA countries, the banking system plays only a minor role in financing economic activities and family-run businesses where individuals rely on relatives, friends and the informal financial market. Moreover, in some MENA countries (Bahrain, Kuwait, Saudi Arabia, and UAE) many agents prefer to deposit their funds in Islamic banks due to religious conviction, which may account for the rapid expansion of Islamic banking in the region. Islamic banking, however, is likely to have a weaker relationship with economic growth than Western-style banking in the finance and growth theoretical literature. Within the MENA region there is substantial variation in the degree of financial development. Some countries, such as Bahrain and Lebanon, are fairly well advanced, whereas a few others (for example, Libya, the Syrian Arab Republic, and the Islamic Republic of Iran) have significant room for improvement. As a group, MENA countries appear to reform relatively well on regulation and supervision more to reinforce the institutional environment and promote non-bank financial sector development. Compared with most other developing country regions, the MENA region reforms well based on the alternative financial development

index, but it ranks far behind industrialized countries and East Asia (Creane at al, 2007, p:480 -81).

Capital markets, which include intermediaries that mobilize and trade debt and equity instruments, are generally at an early stage of development in most MENA countries. The stock markets in the MENA region are relatively new, and, capitalization, value traded, and numbers of listed companies all remain low compared to higher-income countries. Overall, the issuance of stocks and bonds is still a fairly minor method of raising funds in the MENA region. However, after September 11 2001, regional stock markets have witnessed increased intra-regional financial flows. With a temporary pullback from US financial markets, MENA investors have increasingly sought returns in markets closer to home, which has supported a sharp rise in regional real estate and equity prices (over 2004 alone, Middle East equity markets rose by more than 60 percent, the strongest performance in the world but they experienced over 2006 a sharp downward correction (World bank report, 2006).

Despite this general characterization, many MENA countries have tried to implement reforms in their financial sectors in order to achieve high growth performance. These reforms were part of an overall strategy toward establishing a more market-based and private sector-led economy. Even though some of these reforms have been in practice for quite some time now, little work has been done to evaluate their effectiveness on enhancing economic growth. In this paper we try to fill this gap in the empirical literature.

5- Data and Methodology

The balanced panel consists of annual data for 13 MENA Countries for 1975–2004. Data on GDP at purchasing power parity (constant 2000 international $) and financial development measures are obtained from World Bank (2006). An interesting and controversial view of the finance-growth nexus is that the magnitude of financial development's impact on growth varies depending on the type of the financial indicator employed and the level of the country's development. To address this concern, we examine the impact of five different measures of financial development. The first one is the ratio to GDP of liquid liabilities (m_3). It is considered in accordance with the inside money model of McKinnon (1973), where the accumulation

of real money balances is a required condition for investment. An increase in this ratio may be interpreted as an improvement in financial deepening in the economy. This measure is also considered as less convenient with the debt-intermediation approach developed by Gurley and Shaw (1955) and Shaw (1973), where the accumulation of real balances is not seen as a sine qua non condition for investment. The second indicator is liquid liabilities less narrow money divided by GDPor financial savings that removes the pure transactions asset. The subtraction of the money stock (M_1) aims at getting the quasi-liquid assets considered as the main source of investment financing. Likewise, liquid monetary assets (M_1) are generally more destined to finance current transactions and are held, in developing countries, outside the banking system. Thus, a better proxy should rule out the liquid assets in circulation to be more representative of financial activity. A rising ratio of financial savings to GDP may reflect an improvement in bank deposits and/or other financial resources outside the banking sector, which are likely to be used for accumulation and growth. The third indicator used to measure the extent of financial activity is the credit allocated to the private sector to GDP (priv). This proxy is in line with the McKinnon–Shaw inside money model, where financial intermediation is responsible for the quality and quantity of capital accumulation and, therefore, of economic growth. The recent empirical literature (De Gregorio and Guidotti, 1995; Demetriades and Hussein, 1996; Levine and Zervos, 1998; Rajan and Zingales, 1998; Beck et al., 2000) emphasizes this indicator as one of the relevant indicators of the magnitude and the extent of financial intermediation broadly defined. Fourth indicator, bank credit (bank), is defined as credit by deposit money banks to the private sector divided by GDP while the five one, is the composite index of financial development (finind) is calculated using a formula that is similar to the algorithm developed by Demirguc-Kunt-Levine(1996). For a country i in year t, $Finind_{it} = \frac{1}{m}\sum_{j=1}^{m}[100*(\frac{F_{j,it}}{\bar{F}_j})]$ where F is an indicator of financial depth, $\bar{F}_j$ is the sample mean of the indicator F_j and m is number of indicators included in the computation of the index (m=3 in our case). The composite index used in this paper (finind) combines liquid liabilities (m_3), bank credit, and credit to private sector. The selected MENA countries included in the present study are Algeria, Egypt, Iran, Israel, Jordan, Kuwait, Malta, Morocco, Oman, Saudi Arabia, Syria,

Tunisia, and united Arab emirate for the period 1975 to 2004. We used two kinds of data to investigate the mutual causality between economic growth and financial development. First, five-year-non-overlapping means data which are computed by the rough data for each five-year sub-period such as 1970-1974, 1975-1979, …, 2000-2004. Thus, the time span of the variables is six years. Second, we used 1975-2004 annual data.

To achieve the causality tests between economic growth and financial development and for avoid of spurious regression, we test the stationary state of variables. For non-overlapping means data, because the number of cross-sectional units is much larger than the number of time-series periods, the non-stationary problem commonly seen in time-series data can be reduced (Holtz-Eakin *et al*., 1988). But for annual data, we have run panel unit root test. In this paper we apply Im, Pesaran, and Shin (2003) panel unit root test.

To investigate the causality between economic growth and financial development, be assumed them as endogenous variable which are generated by a time stationary VAR (m) process in a panel data context. The model is specified in a 2- variable panel VAR form. as follows:

$$y_{it} = \alpha_0 + \sum_{j=1}^{m} \alpha_j y_{i,t-j} + \sum_{j=1}^{m} \beta_j x_{i,t-j} + \mu_i + \varepsilon_{i,t} \qquad i = 1,...,N; \quad t = 1,...,T \tag{9}$$

In equation (9), $y_{i,t}$, $y_{i,t-j}$, $x_{i,t-j}$ and μ_i are respectively dependent variable (GDP growth rate or financial development), lags of the dependent variable, lags of explanatory variables, and country-specific effect. It is assumed that $E(\mu_i) = \mu$ and $VAR(\mu_i) = \sigma_\mu^2$; i and t denotes respectively for country and time.

The error term $\varepsilon_{i,t}$ is assumed to be independently distributed across countries with zero mean, but may be heteroskedastic across time and cross. Arellano and bond (1991) point out that they can be either serially uncorrelated or moving average.

The last equation contains lags of dependent variable and thus has a dynamic structure. Arrelano & Bound (1991) proposed GMM dynamic panel estimator and used lags of dependent variables as instrumental variables.

The consistency of GMM estimator depends on the assumptions about the validity of the instrument and error term. Therefore, we use two kinds of

test: instruments validity test and no-serial correlation in error term test. To test instrument validity, we use Sargan test. The null hypothesis of the Sargan test is as follows:

H_0: over – identifying restrictions are valid.

For the first and second order serial correlation of the differenced residuals, we use m_j statistic where j is the order of autocorrelation. This statistic has asymptotically normal distribution N (0, 1).

6- Results and Discussions

By using GMM-SYS estimator for equations (7) and (8), we estimated the relationship between financial development and growth with two kinds of data, annual and non-overlapping means data. To achieve the causality tests between economic growth and financial development with annual data, and avoid the problem of spurious regression; we have carried out the IPS panel unit root test. The results are presented in Table 1 and are reported with a trend.

On the base of table 1, the variables of growth (GY) and measures of financial development, i.e. M_3 - M_1, bank, and finind are well characterized as an I(0) process, as well as the hypothesis of zero order integration in level[1]. We can reject the problem of spurious regression, when the mutual causality between economic growth and these financial development variables are carried out. These results allow us to use GMM-SYS estimator for equations (7) and (8).

In table (2), the results of mutual causality tests are provided for annual data. The values of m_1 and m_2 statistics show that the serial autocorrelation among error terms are disappeared for one lag in all cases. Thus, the first lag is considered as the optimal.

According to Sargan test, the choice of instruments seems to be correct. Wald test shows that the mutual causality between financial development and growth is not rejected for measures of financial development M_3 - M_1

1- Whereas the variables of liquid liabilities (m_3) and credit to private sector are I(1), hence are not used.

and bank. For measure of financial development Finind, the causality from financial development to growth is not rejected but the vice versa is not true.

The effect of the first lag of $M_3 - M_1$, Bank, and Finind on growth is positive and the vice versa is true only for $M3 - M_1$ and Bank. The effect of the first lag of growth on Finind is not significant.

The coefficients in equation (7) show that separately, one percent increase in measures of financial development, i.e. $M_3 - M_1$, Bank, and Finind increase respectively, the GDP growth rate 0.1, 0.4, and 0.03 percent in the following year. Also, these effects are long-run.

The coefficients in equation (8) show that one percent increase in GDP growth rate increases the measures of financial development [($M_3 - M_1$) and bank] 0.05 and 0.08 percent respectively. These effects are long-run too.

Whereas, the using of non-overlapping means data is prevalent in economic growth studies, hence, we used five-year-non-overlapping means for analysis of mutual causality relationship. The results are presented in table 3.

The values of m_1 and m_2 statistics show that the serial autocorrelation among error terms are disappeared for one lag in all cases, barring M_3-M_1. Thus, the first lag is considered as the optimal for the four financial development variables (bank, Priv, m3, and Finind). For the variable of (M_3-M_1) the first and second lags are considered. According to Sargan test, the choice of instruments seems to be correct.

Wald test shows that the mutual causality between financial development and growth is not rejected in four variables of financial development, Bank, Priv, M_3, and M_3-M_1. For Finind, alone the causality from financial development to growth is not rejected.

The effect of the first lag of financial development variables on growth is positive in all case, and the vice versa is true for all barring Finind. The effect of the first lag of growth on Finind is not significant. The effect of second lag of the growth is positive on (M_3-M_1).

The coefficients in equation (7) show that separately, one percent increase in financial development variables, i.e. M_3, M_3-M_1, Bank, Priv, and Finind increase respectively the GDP growth rate 0.03, 0.08, 0.04, 0.04, and 0.03 percent in the following year. These effects are long-run too. The coefficients in equation (8) show that separately, one percent increase in GDP growth rate increases respectively financial development variables, i.e.

M_3, M_3-M_1, Bank, and Priv 0.6, 0.5, 0.5, and 0.2 percent in the following year. These effects are long-run. The effect of the first lag of growth on Finind is not significant.

7- Conclusion

In this paper, the mutual causality between growth and financial development is studied by a GMM-SYS estimator with two kinds of data, annual and five-non-overlapping data. We use five different measures of financial development for 13 MENA countries as a group. The results indicate a strong bi-directional causality between financial development and economic growth. In all case, causality from financial development to growth has not rejected and vice versa direction has rejected only for the composite index of financial development (finind: the composite index of financial development which we calculated it by using a formula that is similar to the algorithm developed by Demirguc-Kunt- Levine(1996)).

The implications of our study are:

First, the studies which investigated the financial development and economic growth in MENA region, underestimated the mutual causality between financial development and economic growth. All of these studies were based on time series bivariate VAR analysis. Since long series of data are scarce for these countries, hereupon in our opinion, is not long enough to capture the loge-run relationship between them. But, by using the panel data approach, it is possible to analyze the issue of financial-led growth using pooled cross-sectional and time-series data. To explore the causal relationship between financial deepening and economic growth, we use the Generalized Method of Moments (GMM) panel estimates.

Second, policies that improve financial markets and their functions will have a significant effect on economic growth in the long run. Such policies are especially important for developing countries (e.g. MENA region countries). In these countries, the impact of financial sector development on growth is found to be stronger compared to industrial countries. Therefore, in these countries, undertaking a number of reforms in the financial sector that could contribute further to economic growth.

Third, there are many channels through which financial deepening could impact on growth and these channels cannot be explored by employing

only a single indicator. Hereupon, ***we employ five different measures of financial deepening in order to quantify the impact of financial depth on growth. Hence, this study is different from previous studies***.

Forth, as termed by Patrick (1966), we can not neither reject 'demand-following' hypothesis nor 'supply- leading' hypothesis.

The empirical evidence suggests that countries in the MENA region should take policies to reduce financial repression to help increase financial development. With more efficient reallocation of funds and easier connections between savers and investors, they increase their economic growth.

Table1: IPS panel unit root test

variables	level
M_3 _ M_1(liquid liabilities less narrow money divided by GDP)	-2.1(0.02)
Bank(deposit money banks to the private sector divided by GDP)	-4.1(0.00)
Finind (the composite index of financial development)	-2.1(0.02)
M3	-0.99(0.16)
Priv (the credit allocated to the private sector to GDP)	-0.8(0.2)
GY (GDP Growth)	-11.7(0.00)

The p-value is reported in parenthesis.

Table 2: the results of Granger causality tests with annual data the numbers in parenthesis are P-values.

	$M_3 - M_1$		Bank		Finind	
	growth	**finance**	**growth**	**finance**	**growth**	**finance**
Growth(-1)	0.13 (0.04)	0.05 (0.007)	0.18 (0.06)	0.08 (0.03)	-0.03 (0.9)	-0.1 (0.6)
finance(-1)	0.1 (0.02)	0.9 (0.000)	0.4 (0.001)	0.97 (0.000)	0.03 (0.00)	1.07 (0.00)
Direction of causality	Two way causality		Two way causality		One way causality	
m_1 **(Arellano-Bond test of first order autocorrelation)**	-1.9 (0.06)	-1.9 (0.06)	-2.01 (0.03)	-1.25 (0.2)	-1.3 (0.2)	-2.2 (0.03)
m_2 **(Arellano-Bond test of second order autocorrelation)**	0.8 (0.4)	-0.8 (0.4)	1.06 (0.3)	-1.6 (0.1)	0.09 (0.9)	-1.6 (0.11)
Sargan test of over identifying restrictions	11.9 (1.000)	8.4 (1.000)	11.9 (1.000)	12.5 (1.000)	10.9 (1.000)	12.3 (1.000)
Causality Wald test	5.2 (0.02)	7.2 (0.007)	11.6 (0.001)	4.8 (0.03)	31.3 (0.000)	0.2 (0.6)
Obs[N]	363[13]	363[13]	363[13]	363[13]	363[13]	363[13]
	$M_3 - M_1$		Bank		Finind	
	growth	**finance**	**growth**	**finance**	**growth**	**finance**
Growth(-1)	0.13 (0.04)	0.05 (0.007)	0.18 (0.06)	0.08 (0.03)	-0.03 (0.9)	-0.1 (0.6)
finance(-1)	0.1 (0.02)	0.9 (0.000)	0.4 (0.001)	0.97 (0.000)	0.03 (0.00)	1.07 (0.00)
Direction of causality	**Two way causality**		**Two way causality**		**One way causality**	
m_1 **(Arellano-Bond test of first order autocorrelation)**	-1.9 (0.06)	-1.9 (0.06)	-2.01 (0.03)	-1.25 (0.2)	-1.3 (0.2)	-2.2 (0.03)
m_2 **(Arellano-Bond test of second order autocorrelation)**	0.8 (0.4)	-0.8 (0.4)	1.06 (0.3)	-1.6 (0.1)	-0.09 (0.9)	-1.6 (0.11)
Sargan test of over identifying restrictions	11.9 (1.000)	8.4 (1.000)	11.9 (1.000)	12.5 (1.000)	10.9 (1.000)	12.3 (1.000)
Causality Wald test	5.2 (0.02)	7.2 (0.007)	11.6 (0.001)	4.8 (0.03)	31.3 (0.000)	0.2 (0.6)
Obs[N]	363[13]	363[13]	363[13]	363[13]	363[13]	363[13]

	M_3		M_3-M_1		Bank		Priv		Finind	
	growth	finance	growth	finance	growth	finance	growth	finance	growth	finance
Growth(-1)	**0.05** (0.03)	**0.6** (0.000)	**0.02** (0.7)	**0.5** (0.000)	0.04 (0.2)	**0.5** (0.000)	**0.09** (0.002)	**0.2** (0.05)	**-0.05** (0.3)	**0.02** (0.95)
Growth(-2)	-	-	-	**0.4** (0.001)		-	-	-	-	-
finance (-1)	**0.03** (0.00)	**0.98** (0.000)	**0.08** (0.00)	**0.9** (0.000)	**0.04** (0.001)	**1.01** (0.000)	**0.04** (0.00)	**0.99** (0.000)	**0.03** (0.00)	**0.9** (0.00)
finance (-2)	-	-	-	**-0.08** (0.006)	-	-	-	-	-	-
Direction of causality	**Two way causality**		**Two way causality**		**Two way causality**		**Two way causality**		**One way causality**	
m_1 **(Arellano-Bond test of first order autocorrelation)**	**-2.1** (0.04)	**-1.8** (0.07)	**-2.1** (0.04)	**-1.7** (0.09)	**-2.2** (0.02)	**-1.3** (0.2)	**-2.2** (0.03)	**-1.9** (0.06)	**-1.7** (0.09)	**-1.8** (0.07)
m_2 **(Arellano-Bond test of second order autocorrelation)**	**0.9** (0.3)	**-1.4** (0.15)	**0.99** (0.3)	**-0.8** (0.4)	**0.6** (0.5)	**-1.6** (0.12)	**-1.2** (0.24)	**1.06** (0.9)	**0.8** (0.4)	**-0.8** (0.4)
Sargan test of over identifying restrictions	**9.7** (0.7)	**12.1** (0.52)	**12.8** (0.5)	**11.5** (0.4)	**12.4** (0.5)	**11.8** (0.5)	**12.7** (0.5)	**9.8** (0.7)	**9.6** (0.7)	**11.9** (0.75)
Causality Wald test	**32.5** (0.00)	**49.6** (0.00)	**16.1** (0.00)	**21.15** (0.00)	**13844** (0.00)	**39.5** (0.00)	**31.7** (0.00)	**3.9** (0.05)	**293.6** (0.00)	**0.00** (0.95)
obs.[N]	65(13)	65(13)	65(13)	52(13)	65(13)	65(13)	65(13)	65(13)	65(13)	65(13)

The numbers in parenthesis are P-values.

References:

1- Arellano, M.(2003) *Panel data econometrics*, Oxford University Press,New York.

2- _____ and S. R. Bond, (1991) Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations, *Review of Economic Studies*, 58: 277–297.

3- _____ (1998) Dynamic panel data estimation using DPD98: A guide for users, Mimeo.

4- _____ and O.Bover (1995) Another look at the instrumental variable estimation of Error-Component Models, *Journal of Econometrics*, 68: 5–27.

5- Beck, T., R. Levine, and N. Loyaza (2000) Finance and the sources of growth, *Journal of Financial Economics* , 58: 261– 300.

6- Blundell, R. W. and S. R. Bond (1998) Initial conditions and moment restrictions in dynamic panel data models, *Journal of Econometrics*, 87: 29–52.

7- Boulila, G. and M. Trabelsi (2004) The causality issues in the finance and growth nexus: Empirical evidence from Middle East and North African countries, *Review of Middle East Economics and Finance*, 2 (2): 123–138.

8- Darrat, A. F. (1999) Are financial deepening and economic growth causality related? Another look at evidence. *International Economic Journal*, 13(3): 19-35.

9- Dawson, P. G. (2003) Financial development and growth in economies in transition, *Applied Economics Letters*, 10: 833–836.

10- Demetriades, P.O., and A. K. Hussein (1996) Does financial development cause economic growth? Time series evidence from 16 countries, *Journal of Development Economics* , 51: 387– 411.

11- Dornbusch, R. and A. Reynoso (1989) Financial factors in economic development, *American Economic Review*, Papers and Proceedings, 79: 204–209.

12- Dritsakis, N. and A. Adamopoulos (2004) Financial development and economic growth in Greece: An empirical investigation with Granger causality analyses, *International Economic Journal*, 18(4): 547 – 559.

13- Engle, R. F. and C.W.J.Granger (1987) Cointegration and error correction: Representation, estimation and testing, *Econometrica*, 55: 251–276.

14- Evans, A., C. Green and V. Murinde (2002) Human capital and financial development in economic growth: New evidence using translog production function, *International Journal of Finance and Economics*, 7(2): 123–140.

15- Ghali, K.H. (1999) Financial development and economic growth: The Tunisian experience, *Review of Development Studies*, 3 (3): 310–32.

16- Goldsmith, R. W. (1969) *Financial structure and development*, Yale University Press, New Haven, CT. 6

17- Granger, C.W. J. and P. Newbold (1974) Spurious regression in econometrics, *Journal of Econometrics*, 2: 111–120.

18- Greenwood, J. and B. Jovanovic (1990) Financial development, growth and the distribution of income, *Journal of Political Economy*, 98: 1067–1107.

19- _____ and B. Smith (1997) Financial markets in development and the development of financial market, *Journal of Economic Dynamic and Control*, 21: 181–1456.

20- Guetat, I. and F. Serranito (2006) Income convergence within the MENA countries: A panel unit root approach, *The Quarterly Review of Economics and Finance*, xxx xxx–xxx

21- Habibullah, M. S and Y. Eng (2006) Does financial development cause economic growth? A Panel data dynamic analysis for the Asian developing countries, *Journal of the Asia Pacific Economy*, 11: 377–393.

22- Holtz-Eakin, D., W. Newey and H. S. Rosen (1988) Estimating vector autoregressions with panel data, *Econometrica*, 56: 1371–1396.

23- Liman, I. (2004) Meeting the growth challenge in the MENA region, This Paper presented at *the first international workshop on economic and finance reforms in MENA.*

24- Im, S.K., H. M. Pesaran, Y. Shin (1997) Testing for unit roots in heterogeneous panel, *Department of Applied Econometrics*, University of Cambridge.

25- King, R. G. and R. Levine (1993a) Finance and growth: Schumpeter might be right, *Quarterly Journal of Economics*, 108: 717–738.

26- _____ (1993b) Finance, entrepreneurship, and growth: theory and evidence, *Journal of Monetary Economics*, 32: 513–542.

27- Levine, R. (1997) Financial development and economic growth: Views and agenda, *Journal of Economic Literature*, 35: 688–726.

28- Lucas, J. R. E. (1988) On the mechanics of economic development, *Journal of Monetary Economics*, 22: 3–42.

29- McKinnon, R. I. (1973) Money and capital in economic development, *Brookings Institution*, Washington DC.

30- Ncube, M. (2007) Financial services and economic development in Africa, *Journal of Aferican Economics*, 16(1): 13–57.

31- Nourzad, F. (2002) Financial development and productive efficiency: a panel study of developed and developing countries, *Journal of Economics and Finance*, 26(2): 138–149.

32- Nurkse, R (1953) *Problems of capital formation in underdeveloped countries*, Oxford University Press, New York.

33- Patrick, H. T. (1966) Financial development and economic growth in underdeveloped countries, *Economic Development and Cultural Change*, 14: 174–189.

34- Pagano, M. (1993) Financial markets and growth: An overview, *European Economic Review*, 37: 613–22.

35- Rajan, R.G. and L. Zingales (1998) Financial dependence and growth, *American Economic Review*, 88: 559–86.

36- Romer, P. (1989) Capital accumulation and the theory of long-run growth, in: R. Barro (Ed) *Modern Business Cycle Theory* (Cambridge: Harvard University Press).

37- Roubini, N. and X. Sala-I-Martin (1992) Financial repression and economic growth, *Journal of Development Economics*, 39: 5–30.

38- Saint-Paul, G. (1992) Technological choice, financial markets and economic development, *European Economic Review*, 36: 763–781.

39- Schumpeter, J. A. (1934) *The theory of economic development*, Oxford University Press.

40- Shaw, E. (1973) *Financial deepening in economic development*, Oxford University Press.

41- Shan, J.Z., F. Sun and A. Morris (2001) Financial development and economic growth, *Review of International Economics*, 9 (3): 443–54.

42- Sinha, D. and J. Macri (2001) Financial development and economic growth: The case of eight Asian countries, *Economia Internazionale*, 54(2): 219–234.

43- World Bank (2006), *World Development Report* (Washington, DC: The World Bank).

44- Zang, H. and K. Y. Chul (2007) Does financial development precede growth? Robinson and Lucas might be right, *Applied Economics Letters*, 14(1): 15 – 19.