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FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH: EVIDENCE FROM THE MENA REGION

Key Words

Economic Growth; Financial Development; Vector-Autoregression; MENA-Region

Abstract

This paper attempts to empirically investigate the question of whether financial development leads to economic growth in a group of five developing countries in the Middle East and North Africa, (MENA) region. Unlike most previous empirical research on the issue, the paper focuses on the causal link between financial development and economic growth in order to discriminate between alternative theoretical hypotheses. Measures of financial development that are more appropriate to use than what is commonly used in the literature are adopted in this paper. The results of the empirical investigations are mixed. For all countries, financial development reveals to be an engine to economic growth. But in some of these countries, the causality seems to run in both directions. These results seem to be well in accordance with the views that economic policies are country specific and that their implications depend on the features of the institutions that implement them.

Introduction

The relationship between financial development and economic growth has been the subject of extensive research for a long time. Undoubtedly, the debate has intensified in the 1980's with the emergence of the endogenous growth theory. But it had existed long before. In fact, the association between the level of development in the financial sector and economic growth goes back to Shumpeter (1912), (and even earlier than that). One of the standard arguments advanced in the literature is that financial deepening is indeed an engine of economic growth. This propo-

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sition is often referred to as the "supply leading" hypothesis. It basically contends that the development of the financial system and in particular its evolution into a market oriented sector provides an efficiency stimulus to the process of capital accumulation in a way that promotes economic growth. According to this view, both the quantity and quality of investment are enhanced as a result of financial development whereby household real supply of credit increases and holdings of unproductive tangible decreases. Another argument in support of the proposition that causality runs from financial deepening to economic growth is related to technological innovations as promoted by the former, (King and Levine, (1993b)). But whatever argument presented in support of the "supply leading" hypothesis, it is contemplated that financial deepening is a vital pre-condition for tangible growth and development.

In contrast, the so-called "demand following" hypothesis contends that inspiring growth ultimately creates demands for particular types of financial arrangements. That is, as the economy becomes more sophisticated, increased demand for many services and increasingly adept settings are inevitable, among which is an increased demand for financial deepening. The financial system would eventually respond to this increased demand. From this perspective, financial development has very little effect on economic growth. It simply follows economic growth as opposed to creating it. In fact, it could even be argued on this ground that any planned efforts to promote financial development is plainly an unnecessary use of resources given that a resulting improvement in the financial sector will have little effect on growth.

With this sharp divergence in views, it is no surprise that empirical studies investigating the relationship between financial development and economic growth are abundant in the relevant literature. However, the body of these studies have so far been far from being conclusive one way or the other in terms of the direction of causality between financial development and growth. They have produced mixed evidence. Some have found evidence to suggest that financial development does indeed promote growth. For example, in a cross-section study by King and Levine (1993b) it was found that financial development propels technological innovations and productivity growth, which in turn would have positive effects on growth. More recently, XU (2000), using time series data, has found evidence in support of the proposition that financial development is crucial to growth through its effect on investment. On the other side, using time

series data from a group of developing economies, Thornton (1996) is an example of studies not finding credible evidence suggesting positive effects of financial development on growth.

Clearly, in light of the empirical evidence, the proposition that financial development is conducive to growth need not be taken for granted. Its validity should be assessed empirically further. The principal aim of this paper is to add some scientific value to this debate by interjecting an empirical contribution on the matter.

More precisely, this study attempts to provide an in-depth empirical investigation of this issue in the context of a group of five economies from the so-called "MENA"[1] region. These are Egypt, Jordan, Morocco, Tunisia, and Turkey.[2] We believe that this particular scope involving these economies is an interesting one, whose investigation would result into insightful findings. There are a number of common features to these economies that render an empirical investigation of the issue of causality between financial development and growth in this context worthy. To start with, these countries have had relatively good growth performances in recent years in comparison with the rest of the MENA countries. All of them have undertaken macroeconomic reform policy programs in recent years. All of them have done so in the context of International Monetary Fund arrangements. All are perceived, albeit to different extents, as economies that benefited from implementation of structural reforms. They have also undertaken different levels of reforms in their financial markets. Evidently, in comparison with the rest of the countries in the region, they offer the tempting combination of financial markets reform and economic growth. We believe that an empirical investigation of the causality between financial development and economic growth in the context of these countries is useful for providing further evidence on the issue.

There are at least three additional merits to our study. First, unlike most previous empirical research on the issue, in testing for the causal link between financial development and economic growth, we adopt here measures of financial development that are more appropriate to the context of developing countries than what is commonly used in the literature. It is believed that the measures adopted in this paper improve the reliability of the findings. Also, unlike much of previous empirical research on the

(1) "MENA" standing for "Middle East and North Africa".

(2) Note that Turkey is an OECD country, but it is classified by the Economic Research Forum (ERF) as a MENA country.

issue, our paper focuses on the causal link between financial development and economic growth in an attempt to detect either way of causation. In other words, this study does not rule out the possibility that causality between financial development and growth could well be running both ways. Finally, being aware of the widespread skepticism associated with findings based on cross-country growth regressions, we herein use time-series techniques to test Granger-causality. Following Granger (1988), Sims et al. (1990), Toda and Phillips (1993), and given that cointegration has implications on the way causality testing is conducted, causality tests in this paper are performed within a framework based on unit root testing and cointegration.

The remainder of this paper is organized as follows. The second section offers brief insights on the historical evolution of financial development in the countries under study. The third section outlines briefly an approach to measuring financial development that we believe is more appropriate to use in this type of investigation than what is commonly used in the literature. The fourth section provides detailed description of the econometric methodology. The empirical results are summarized in the fifth section. The final section offers some concluding remarks.

Financial Development in the Region, Background Information

As indicated earlier, the five economies that are under investigation in this paper all have undertaken different levels of reforms in their financial sectors. They are countries that have made significant progress in financial development in the last three decades, in comparison with other MENA countries. However, most would argue that further financial reforms are needed in these countries so as to either promote and/or accommodate economic growth.

In reality, and despite the common features, there are some clear differences in the experiences of these countries in terms of the evolution of financial development in the last few decades. These differences relate to a variety of factors, such as the overall economic performance, the regional and world dynamics affecting each country, institutional arrangements and the pace of reforms. Therefore, some disparities in the dynamic paths of the processes of financial development are inevitable, as a logical outcome to these differences.

For instance, data from international organizations would clearly reveal that, in their financial sector reforms during the last decade, Turkey and Egypt have moved relatively more rapidly in the path towards

liberalization than Jordan, Morocco and Tunisia, (with Turkey suffering two financial crises).[3] Jordan has perhaps had the better record in terms of bank supervision, which many argue is essential for minimizing the risk of financial instability. Morocco and Tunisia have had relatively more restrictions in terms of capital account convertibility than the other countries understudy. The International Monetary Fund rates these countries differently in terms of their financial development. Indeed, using 2000 and 2001 data, and based on an index of quantitative and qualitative data, Jordan is classified as a country with a "high level" of financial development in the MENA region; whereas Egypt and Morocco are in the "middle" group.[4]

Evidently, this indicates that some of the countries in the sample understudy have been outperformed by others in several aspects of financial development, and that the progress in this front has been uneven. Nevertheless, and for the purpose of the investigation in this paper, these differences would not warrant a different model specification for each country. Indeed, by all standards these economies have several important common features. In particular, and with respect to financial development, these are the countries in the region that perhaps have made the more significant advances. From this perspective, using a single model specification for all countries would be appropriate, especially in light of the fact that the variability in the data will certainly reflect some of the discrepancies. As long as the model is well specified, as the case in this paper, any variety in the dynamic paths across these countries will be picked-up by differences in the empirical results.

Measuring Financial Development

With the exception of few studies, the usual approach in the literature to measuring financial development has typically relied on the ratio of broad money stock (M2) to income as measured by either nominal GNP or GDP (King and Levine, 1993a; World Bank, 1989). Obviously, an increase in this ratio could be resulting from an increase in either deposits in the banking system or currency held outside or both. That is, an increase in this ratio may well simply be due to expanded currency. It is even conceivable for the ratio of broad money to income to rise with no increases in bank deposits. In fact, the reality in the majority of developing economies is that currency

(3) For more information on this matter, refer to Ottolenghi (1999).

(4) For further information, refer to Creane et al (2003).

held outside the banking system represents typically a large component of the broad money stock. Which means that the presence of large components of the broad money stock in the form of currency, as typical in developing countries, may not necessarily be a reflection of elevated levels of financial intermediation. On this basis, using the ratio of broad money stock to nominal income as a measure of financial development could well be reckless, at least in the context of developing countries.

For this reason, this paper proposes to adopt more fitting measures of financial development to the context of developing countries in general and the MENA region in particular. Following Ghali (1999), the ratio of bank deposit liabilities to nominal GDP (*DL*), and the ratio of bank claims on the private sector to nominal GDP (*CL*) are both retained as measures of financial development levels in these countries. Obviously, it can easily be argued that both ratios would serve as better indicators of financial deepening in the region than the ratio of broad money stock to income. In fact, the ratio of bank deposit liabilities to nominal GDP excludes currency in circulation from the broad money stock. Also, the ratio of bank claims on the private sector to nominal GDP reflects the level of financial intermediation in a rather explicit way. On this basis, these two proposed variables are used as measures of financial development in this study's empirical investigation.

Data and the Econometric Methodology

The analysis uses annual series for the group of countries under investigation: Egypt, Jordan, Morocco, Tunisia, and Turkey covering the period 1965 - 1999. The source of the data for all series is the IMF publication *International Financial Statistics* (CD Rom, 2000). To be noted that all variables are converted into their natural logarithm for the usual statistical rationale. In addition, and in conformity with the standard practice as in King and Levine, (1993a,b); Roubini and Sala-i-Martin, (1992), we use the real GDP per capita (y), for which the growth rate is generated as the first difference in the logarithm of the series.

Turning to the econometric methodology, we begin by outlining a procedure to test for Granger-causality. The more common procedure to test for such causality between two variables x_{1t} and x_{2t} necessitates the specification a kth order vector autoregression (VAR) as follows,

$$x_{1t} = \mu_1 + \pi_{11}(L)x_{1t-1} + \pi_{12}(L)x_{2t-1} + \varepsilon_{1t} \quad (1)$$

$$x_{2t} = \mu_2 + \pi_{21}(L)x_{1t-1} + \pi_{22}(L)x_{2t-1} + \varepsilon_{2t} \quad (2)$$

where, μ_1 and μ_2 are constant drifts and $\pi_{ij}(L)$ are polynomials of order k-1 in the lag operator L.

According to Granger (1963), x_{1t} causes x_{2t} if $E[x_{2t+1}/I_t] \neq E[x_{2t+1}/I'_t]$, (with I_t being the set inclusive of all available information, and I'_t excluding present and past information on x_{1t}). This would certainly imply that a better forecast of x_{2t+1} (in terms of smaller forecast error variance) is obtained when using information in x_{1t-j}. Accordingly, and referring to equations (1) and (2) above, x_{2t} would Granger-cause x_{1t} if $\pi_{21}(L)$ is different from zero. Likewise, x_{1t} would Granger-cause x_{2t} when the polynomial $\pi_{12}(L)$ is different from zero. It should be noted that the specification above presumes that x_{1t} and x_{2t} are stationary. Having said this, if they are I(1) processes, Granger (1988) postulates that the above model would be miss-specified. Under such circumstances, cointegration possibilities between x_{1t} and x_{2t} have to be explored, as causality testing are in all likelihood conducive to erroneous conclusions.

In fact, following (Engle and Granger, 1987; Hendry et al., 1984; Johansen, 1988), and using the Granger representation theorem, the model outlined above could be re-parameterized yielding an error- correction model (ECM)). This would be possible in case of the presence of i) a long-run relationship due to co-movements of the variables, and (ii) prospects that these variables will trend together towards a long-run equilibrium state. In which case, the ECM version will be:

$$\Delta x_{1t} = \mu_1 + \gamma_{11}(L)\,\Delta x_{1t-1} + \gamma_{12}(L)\,\Delta x_{2t-1} + \alpha_1(\beta' X_{t-1}) + \varepsilon_{1t} \quad (3)$$

$$\Delta x_{2t} = \mu_2 + \gamma_{21}(L)\,\Delta x_{1t-1} + \gamma_{22}(L)\,\Delta x_{2t-1} + \alpha_2(\beta' X_{t-1}) + \varepsilon_{2t} \quad (4)$$

where, $\beta' X_{t-1}$ is a stationary linear combination of x_{1t-1} and x_{2t-1}, representing the residuals from the cointegrating relationship.

The model in (3) and (4) can be combined into one single equation as

$$\Delta X_t = \mu + \Gamma(L)\Delta X_{t-1} + \Pi X_{t-1} + \varepsilon_t \quad (5)$$

where, $X_t = (x_{1t}, x_{2t})'$, $\mu = (\mu_1, \mu_2)'$, $\Gamma(L) = \{\gamma_{ij}\}$ and $\Pi = \alpha\beta'$, Δ is the first difference operator, and ε_t is a vector of impulses depicting the unanticipated movements in X_t.

It is important to mention that if the $I(1)$ variables are not cointegrated, then Granger-causality tests can be performed without including the error correction term $\beta' X_{t-1}$ as the system given by equations (3) and (4) is not stationary. So, in case x_{1t} and x_{2t} are $I(1)$, $\Pi = \alpha\beta'$ in equation (5) would then be a pivotal long-run parameter matrix. In case of a one cointegrating vector, r = 1, Π would have a rank equaling

one. Both α and β are in this case 2 x 1 vectors. Vector α measures the strength of the cointegrating relationship within the ECM, as it comprises relevant adjustment coefficients. Whereas β is simply made-up of the parameters in the cointegrating vector.

Obviously, a careful examination of the cointegration methodology would reveal clearly the possible presence of some sort of an inconsistency between the equilibrium framework and the environment from which the data is collected. However, the specification of the ECM as expressed in equation (5) would make it possible to settle this issue rather easily. This could be achieved by feeding the adjustment mechanisms, as represented by the error-correction terms, into the equilibrium framework.

It is to be noted that, with the equilibrium conditions being imposed, the ECM describes system adjustment details recorded in each time period in the path towards the long-run equilibrium. Any short-term deviations from this long-run equilibrium will feed back on the changes in the dependent variables so as to gear their movements back towards their equilibrium state in the long-run. This is bound to happen as the variables are cointegrated. In which case, α_1 and α_2, the coefficients of the error-correction terms, illustrate the magnitude by which any disparity (with respect to the long-run equilibrium) in the dependent variables are corrected every short-term period. Thus, it is the cointegrating vector, from which the error-correction term is derived, that is effectively leading the way towards a stable long-run equilibrium state.

Clearly, a totally new approach for testing Granger-causality has been made possible thanks to the cointegration methodology. For instance, each equation of the system represented by (3) and (4) involves two channels of dynamic interactions between x_{2t} and x_{1t}. The first channel is through the lagged dynamic terms. In equation (4) for example, this would be Δx_{1t-1}, if $\gamma_{21} \neq 0$, indicating the causal effects of x_{1t} on x_{2t}. The second channel in this case is due to the error-correction term $\beta' X_{t-1}$ when $\alpha_2 \neq 0$. The latter marks the adjustment of x_{2t} to its long-run equilibrium state with x_{1t}. Accordingly, causality as based on ECM is detected in a system, where the adjustment of variables to their long-run equilibrium relationship influences their short-run dynamics.

In the context of this study, the two variables of interest between which the causal link is investigated are financial development (with proposed measures as outlined above), and economic growth in a group of five MENA

region. Following Granger (1988), Sims et al. (1990), Toda and Phillips (1993), and given that cointegration has implications on the way causality testing is conducted, the causality tests are performed within a framework based on unit root testing and cointegration.

Empirical Results

In this section, the main test results concerning unit roots, cointegration, and Granger-causality are presented.

Test results for unit roots

As common in relevant research using modern times series techniques, this study employs the augmented Dickey-Fuller (ADF) as well as the Phillips-Perron (P-P) unit root tests to investigate the stationarity status of each variable. They are performed on both the level variables and their first differences, with the null hypothesis being that the variable under investigation has a unit root against the alternative that it does not. Table 1 reports the results of the unit root tests for each country in the sample. The first half of the table reports the results of the unit root tests performed on the level variables. As can be seen, both tests cannot reject the null hypothesis for all countries.

The second half of the table reports the results of the unit root tests performed on the first difference of the variables. In this case both tests reject the null hypothesis. No further tests are performed given that the data appear to be stationary in first differences. Accordingly, it can be inferred from the results of table 1 that there is credible statistical evidence to suggest non-rejection of the null hypothesis that, for each country in the sample, the three variables are integrated of order one.

Test results for cointegration

Testing for cointegration using the Engle-Granger procedure is conducted in study. The results are presented in table 2, with each row reporting coefficients from the following two regressions:

i) a cointegrating regression of the form:

$$Y_t = \beta_1 + \beta_2 X_t + v_t \qquad (6)$$

Where, v_t is the residual term.

The coefficients β_1 and β_2 are reported in table 2. To be noted that residuals from this regression were checked for the existence of first and higher order serial correlation.

ii) a regression to test for the existence of a unit root in the residuals of the relevant cointegration regression; it takes the following form:

$$\Delta v_t = \rho v_{t-1} + \sum_{s=1}^{n} d_s \Delta v_{t-s} \qquad (7)$$

The coefficient ρ is also reported in table 2.

Table 1
Test Results for Unit Roots[a]

Country	y_t	DL_t	CL_t	$\Delta(y_t)$	$\Delta(DL_t)$	$\Delta(CL_t)$
Egypt						
ADF	-1.455	-2.001	-1.673	-4.211	-5.229	-4.845
P-P	-1.661	-2.020	-1.860	-5.339	-5.328	-4.991
Jordan						
ADF	-1.877	-1.604	-1.368	-3.712	-4.011	-4.300
P-P	-1.910	-1.712	-1.481	-4.371	-4.195	-4.446
Morocco						
ADF	-1.556	-1.750	-1.308	-4.002	-4.113	-4.251
P-P	-1.780	-1.805	-1.556	-5.322	-4.239	-4.44
Tunisia						
ADF	-1.001	-1.133	-1.319	-5.006	-4.781	-4.116
P-P	-1.104	-1.223	-1.422	-5.437	-4.882	-4.226
Turkey						
ADF	-1.255	-0.997	-0.555	-3.899	-4.275	-4.006
P-P	-1.336	-1.004	-0.879	-4.227	-4.301	-4.166

[a] The variables are as defined in the text. The null hypothesis tested is that the relevant series contain a unit root against the alternative that it does not.

Table 2
The Engle-Granger Cointegration Tests[a]

Y_t	X_t	β_1	β_2	ρ	k
Egypt					
y_t	DL_t	4.501 (6.229)	-0.345 (-2.165)	-0.108 (-3.401)	3
y_t	CL_t	6.002 (2.528)	0.889 (1.027)	-0.04 (-0.871)	3
Jordan					
y_t	DL_t	1.337 (3.605)	-0.199 (-1.994)	-0.435 (-2.061)	3
y_t	CL_t	2.072 (4.661)	-0.235 (-7.820)	-0.511 (-3.448)	3
Morocco					
y_t	DL_t	6.209 (2.506)	-0.315 (-6.227)	-0.265 (-4.335)	3
y_t	CL_t	7.113 (12.016)	-0.829 (-8.423)	-0.616 (-3.711)	3
Tunisia					
y_t	DL_t	5.909 (8.477)	-0.295 (-1.033)	-0.086 (-1.552)	3
y_t	CL_t	7.565 (27.017)	0.986 (10.899)	-0.401 (-3.560)	3
Turkey					
y_t	DL_t	8.225 (5.991)	-0.766 (-12.061)	-0.554 (-7.303)	3
y_t	CL_t	9.769 (22.007)	-0.841 (-6.544)	-0.368 (-4.207)	3

[a] The coefficients β_1 and β_2 are estimated from the regression in (6) using ordinary least squares (OLS). The coefficient ρ is estimated from the regression in (7) using OLS and n indicates the number of lags used. The numbers in parentheses are the *t*-statistics. The residuals in (6) are also checked for first and higher order serial correlation.

In table 3a, we report the Johansen cointegration test results, including the maximum eigenvalue (λ_{max}) and the trace statistics, the 10% critical values along with the corresponding λ values. Estimates of the corresponding Π matrix, containing the cointegrating vector and the adjustment coefficients of the variables, are reported in table 3b. In light of the fact the Johansen procedure is sensitive to the choice of the lag length in VAR (see Banerjee et al., 1993), we used the Akaike's final prediction error (FPE) criterion to select the appropriate lag length for each country. Using the chosen lag, we also performed diagnostic checking tests for normality and absence of serial correlation on the residuals of each equation in VAR. These tests results (not reported in here) give indication that, approximately speaking, the chosen lag length has left the residuals normally independently identically distributed (*niid*).

A quick review of the results in table 2 and table 3b reveal clearly that the results of the Engle-Granger and the Johansen cointegration are different. This should not come as a surprise given the differences in the techniques. Indeed, the Johansen approach uses the maximum likelihood procedure and estimates jointly the cointegration vectors and the ECM. On the other hand, the Engle-Granger cointegration approach uses least squares (OLS) to estimate the cointegration vectors and the ECM in two separate steps. In this study, we assign more weight to the estimates obtained using the Johansen cointegration technique. Indeed, as argued by Banerjee et al., (1986) and Inder, (1993), using the Engle-Granger procedure might be at the foundation for substantial bias in the OLS estimates of the cointegrating vectors.

As to the specifics of the results in the context of this investigation, without any exception, in each country the Johansen cointegration test results suggest that per capita real GDP and each of the financial development ratios are cointegrated. This is suggesting evidence of a stable long-run equilibrium relationship linking together the evolution of each of the measures of financial development ratio and the evolution of per capita real GDP.

There are dynamic interactions in the movements of the variables in the short-run. In addition, and depending on the direction of causality, feedbacks go from one variable to the other or in both ways. This is related to the fact that these short-run dynamics are considered as fluctuations around the cointegrating relationship, which in turn is viewed as the long-run equilibrium state. For each country in

Table 3a
The Johansen Cointegration Tests: Testing the Rank of Π[a]

Trace				λ_{max}				λ
H_0	H_0	Stat.	90%	H_0	H_0	Stat.	90%	
Egypt (*Variables included in VAR:* y_t, DL_t)								
r = 0	r ⩾ 1	16.07	10.60	r = 0	r = 1	18.02	13.31	0.533
r ⩽ 1	r = 2	1.13	2.71	r ⩽ 1	r = 2	1.30	2.71	0.067
Egypt (*Variables included in VAR:* y_t, CL_t)								
r = 0	r ⩾ 1	19.65	10.29	r = 0	r = 1	19.09	17.79	0.388
r ⩽ 1	r = 2	5.08	7.50	r ⩽ 1	r = 2	6.00	7.50	0.065
Jordan (*Variables included in VAR:* y_t, DL_t)								
r = 0	r ⩾ 1	13.22	10.60	r = 0	r = 1	19.65	13.31	0.411
r ⩽ 1	r = 2	0.80	2.71	r ⩽ 1	r = 2	1.01	2.71	0.091
Jordan (*Variables included in VAR:* y_t, CL_t)								
r = 0	r ⩾ 1	15.14	10.29	r = 0	r = 1	20.66	17.79	0.768
r ⩽ 1	r = 2	5.01	7.50	r ⩽ 1	r = 2	6.50	7.50	0.329
Morocco (*Variables included in VAR:* y_t, DL_t)								
r = 0	r ⩾ 1	16.90	10.60	r = 0	r = 1	16.50	13.31	0.544
r ⩽ 1	r = 2	0.60	2.71	r ⩽ 1	r = 2	0.98	2.71	0.117
Morocco (*Variables included in VAR:* y_t, CL_t)								
r = 0	r ⩾ 1	18.08	10.29	r = 0	r = 1	21.66	17.79	0.479
r ⩽ 1	r = 2	3.22	7.50	r ⩽ 1	r = 2	4.50	7.50	0.255
Tunisia (*Variables included in VAR:* y_t, DL_t)								
r = 0	r ⩾ 1	18.90	10.60	r = 0	r = 1	20.88	13.31	0.672
r ⩽ 1	r = 2	0.50	2.71	r ⩽ 1	r = 2	0.95	2.71	0.431
Tunisia (*Variables included in VAR:* y_t, CL_t)								
r = 0	r ⩾ 1	19.01	10.29	r = 0	r = 1	22.01	17.79	0.418
r ⩽ 1	r = 2	6.01	7.50	r ⩽ 1	r = 2	6.00	7.50	0.087
Turkey (*Variables included in VAR:* y_t, DL_t)								
r = 0	r ⩾ 1	12.56	10.60	r = 0	r = 1	17.05	13.31	0.771
r ⩽ 1	r = 2	0.47	2.71	r ⩽ 1	r = 2	0.75	2.71	0.451
Turkey (*Variables included in VAR:* y_t, DL_t)								
r = 0	r ⩾ 1	15.45	10.29	r = 0	r = 1	19.90	17.79	0.672
r ⩽ 1	r = 2	5.05	7.50	r ⩽ 1	r = 2	6.02	7.50	0.391

Table 3b
The β and α Vectors[a]

Country	Variables included in VAR			Variables included in VAR		
	y_t	DL_t	*Intercept*	y_t	CL_t	*Intercept*
Egypt						
β	1	-1.906 (-4.355)	-5.588 (-7.003)	1	-1.867 (-3.071)	-6.602 (-10.112)
α'	-0.544 (-3.661)	0.688 (5.902)		-0.601 (-5.335)	-0.7303 (-8.656)	
Jordan						
β	1	-1.308 (-3.016)	-3.050 (-5.770)	1	-1.568 (-6.011)	-4.244 (-7.551)
α'	-0.320 (-4.881)	0.687 (7.611)		-0.388 (-3.766)	0.556 (-6.811)	
Morocco						
β	1	-1.662 (-8.120)	-6.775 (-6.933)	1	-1.434 (-9.160)	-9.577 (-12.901)
α'	-0.565 (-8.001)	0.503 (0.777)		-0.610 (-5.664)	0.588 (1.443)	
Tunisia						
β	1	-1.756 (-5.883)	-4.782 (-6.331)	1	-1.200 (-7.122)	-8.462 (-11.834)
α'	-0.089 (-3.016)	0.119 (1.555)		-0.077 (-2.893)	0.095 (1.515)	
Turkey						
β	1	-0.320 (-2.001)	-7.615 (-3.156)	1	-0.388 (-3.110)	-9.850 (-4.166)
α'	-0.056 (-3.228)	0.076 (5.772)		-0.075 (-5.665)	0.087 (7.034)	

[a] In each case the cointegrating vector (β) is normalized on per capita real GDP (y_t). The numbers in parentheses are *t*-statistics.

the analysis, the cointegrating vector points the way to the system in its move towards reaching the long-run equilibrium state. By the same token, the error-correction term signals at each short-term period, how far the variables are away from their long-run equilibrium path. Therefore, per capita real GDP and each financial development ratio are adjusting, at every short-term period, to their long-run equilibrium relationship. Indeed, the fact that the estimated α vectors turned out to be significant signals clearly adjustment to the long-run equilibrium state by the income and financial development variables, (with coefficient magnitudes indicating the speed of adjustment). It is clear that the speed of adjustment of the financial development variables to the long-run equilibrium state seems to be a little bit higher than that of the income variable. There are, however, some disparities between the countries concerning the speed of adjustment of the financial sector and per capita real GDP to the long-run equilibrium state.

But a key question still remains unanswered at this stage, is this process of dynamic interactions of the variables depicting feedbacks going from financial development to real output or from real output to financial development or both? Testing for the direction of Granger-causality will provide the answer to this.

Test results for Granger-causality

Following the results of the unit root and cointegration tests outlined above, an error-correction representation for per capita real GDP growth and financial development variables can be represented as:

$$\Delta y_t = \mu_1 + \gamma_{11}\Delta y_{t-1} + \gamma_{12}\Delta y_{t-2} + \gamma_{13}\Delta x_{t-1} + \gamma_{14}\Delta x_{t-2} + \alpha_1(\beta' X_{t-1}) + \varepsilon_{1t} \quad (8)$$

$$\Delta x_t = \mu_2 + \gamma_{21}\Delta y_{t-1} + \gamma_{22}\Delta y_{t-2} + \gamma_{23}\Delta x_{t-1} + \gamma_{24}\Delta x_{t-2} + \alpha_2(\beta' X_{t-1}) + \varepsilon_{2t} \quad (9)$$

where, $\beta' X_{t-1}$ represent the error-correction terms given by the residuals from the cointegrating equations. α_1 and α_2 are the adjustment coefficients, and x_t represents either financial development ratio variables, (DL_t or CL_t).

According to Granger (1988), Granger-causation in at least one direction must be present if a pair of series is cointegrated. In the context of this problem, and to investigate the dynamic interactions between financial development and economic growth in the group of countries at hand, two different tests are performed. These, along with their results, are:

(*i*) *F*-tests that are applied to the dynamic exogenous terms in equations (8) and (9):

F_1: H_0: $\gamma_{13} = \gamma_{14} = 0$,

F_2: H_0: $\gamma_{21} = \gamma_{22} = 0$.

Where F_1 simply tests the null hypothesis that financial development does not Granger-cause economic growth, whereas F_2 tests the null hypothesis that economic growth does not Granger-cause financial development.

(*ii*) *t*-tests that are applied to the coefficients of the error-correction terms in equations (8) and (9). These are:

t_1: $H_0: \alpha_1 = 0$,

t_2: $H_0: \alpha_2 = 0$,

where t_1 tests for weak exogeneity of economic growth, whereas t_2 tests for weak exogeneity of financial development. It is to be noted that a dependent variable is weakly exogenous when it is not adjusting to the long-run equilibrium state; i.e., when the error-correction term is insignificant in its equation.

Table 4 reports the results of these tests using the Johansen cointegrating vectors. Note that Granger-causality tests seem against the rejection of the hypothesis that financial development Granger-causes economic growth in each of the five countries in the sample. Moreover, the statistical significance of the F_1 statistics signals that future per capita income growth rate changes are affected by growth rates of each financial development ratio. Accordingly, this would indicate statistical evidence to suggest that higher growth rates of per capita real GDP could be the result of higher growth rates of the ratio of bank deposit liabilities, or higher growth rates of the ratio of bank claims on the private sector.

Having said that, it should be reported that the evidence suggests, that for some countries Granger-causality seems to be unidirectional, while for the others the flow of causality is running in both directions. More specifically, for Egypt, Jordan and Turkey, the flow of causality is running in both directions; while for Tunisia and Morocco, causality is running in only one direction from finance to economic growth.

Concluding Remarks

This paper uses a multivariate VAR approach to investigate causality between financial development and economic growth for a group of countries from MENA. The results of the empirical investigation are mixed. For all countries, financial development turned out to be an engine to economic growth. This is consistent with the "supply leading" hypothesis. Accordingly, these findings come in support for the reforms in the financial markets that have been undertaken in these countries. Even more, this should serve as a solid backing for a continued effort by policy-makers in

Table 4
Granger-causality Test Results

Egypt:

(*a*) *Granger-causality between* y_t *and* DL_t:

H_0:	DL_t *does not Granger-cause* y_t		y_t *does not Granger-cause* DL_t	
	$t_1(29)$	$F_1(2, 29)$	$t_2(29)$	$F_2(2, 29)$
	3.66*	4.66*	]5.90*	5.02*

(*b*) *Granger-causality between* y_t *and* CL_t:

H_0:	CL_t *does not Granger-cause* y_t		y_t *does not Granger-cause* CL_t	
	$t_1(29)$	$F_1(2, 29)$	$t_2(29)$	$F_2(2, 29)$
	5.33*	5.71*	8.66*	6.31*

* Indicates significance at the 5% level. The numbers in parentheses are degrees of freedom.

Jordan:

(*a*) *Granger-causality between* y_t *and* DL_t:

H_0:	DL_t *does not Granger-cause* y_t		y_t *does not Granger-cause* DL_t	
	$t_1(29)$	$F_1(2, 29)$	$t_2(29)$	$F_2(2, 29)$
	4.88*	6.56*	7.61*	7.03*

(*b*) *Granger-causality between* y_t *and* CL_t:

H_0:	CL_t *does not Granger-cause* y_t		y_t *does not Granger-cause* CL_t	
	$t_1(29)$	$F_1(2, 29)$	$t_2(29)$	$F_2(2, 29)$
	3.77*	4.00*	6.81*	5.33*

* Indicates significance at the 5% level. The numbers in parentheses are degrees of freedom.

Morocco:

(*a*) *Granger-causality between* y_t *and* DL_t:

H_0:	DL_t *does not Granger-cause* y_t		y_t *does not Granger-cause* DL_t	
	$t_1(29)$	$F_1(2, 29)$	$t_2(29)$	$F_2(2, 29)$
	8.00*	7.88*	0.78	5.34*

(*b*) *Granger-causality between* y_t *and* CL_t:

H_0:	CL_t *does not Granger-cause* y_t		y_t *does not Granger-cause* CL_t	
	$t_1(29)$	$F_1(2, 29)$	$t_2(29)$	$F_2(2, 29)$
	5.66*	9.54*	1.44*	6.87*

* Indicates significance at the 5% level. The numbers in parentheses are degrees of freedom.

Table 4 (Cont'd)
Granger-causality Test Results

Tunisia:

(*a*) *Granger-causality between* y_t *and* DL_t:

H_0:	DL_t *does not Granger-cause* y_t		y_t *does not Granger-cause* DL_t	
	$t_1(29)$	$F_1(2, 29)$	$t_2(29)$	$F_2(2, 29)$
	3.02*	4.16*	1.55	5.66*

(*b*) *Granger-causality between* y_t *and* CL_t:

H_0:	CL_t *does not Granger-cause* y_t		y_t *does not Granger-cause* CL_t	
	$t_1(29)$	$F_1(2, 29)$	$t_2(29)$	$F_2(2, 29)$
	2.89*	3.97*	1.51*	5.77*

* Indicates significance at the 5% level. The numbers in parentheses are degrees of freedom.

Turkey:

(*a*) *Granger-causality between* y_t *and* DL_t:

H_0:	DL_t *does not Granger-cause* y_t		y_t *does not Granger-cause* DL_t	
	$t_1(29)$	$F_1(2, 29)$	$t_2(29)$	$F_2(2, 29)$
	3.29*	6.57*	5.77*	8.41*

(*b*) *Granger-causality between* y_t *and* CL_t:

H_0:	CL_t *does not Granger-cause* y_t		y_t *does not Granger-cause* CL_t	
	$t_1(29)$	$F_1(2, 29)$	$t_2(29)$	$F_2(2, 29)$
	5.66*	5.29*	7.03*	6.82*

* Indicates significance at the 5% level. The numbers in parentheses are degrees of freedom.

these countries to promote a market oriented financial sector in future. Policy makers in these countries should therefore continue their efforts towards broadening and strengthening their financial intermediation systems, so as to better mobilize domestic and international resources in support of productive investment and economic growth.

On the other hand, in light of the findings, there is reason to believe that causality also runs in the opposite direction in some of these countries. In fact, in three out of five cases, Egypt, Jordan and Turkey, causality runs in both directions. This indicates that in these countries, financial development is partly the outcome of growth. This is to suggest that the ''demand following'' hypothesis

might be valid as well. The fact that results for Morocco and Tunisia turned-out to be different than those pertaining to Egypt, Jordan and Turkey, should not come as a surprise given that economic policies are country specific and their implications depend on the features of the institutions that implement them. But one thing for sure, more research is needed to gain further insights into the matter, especially in the countries where causality was found to run both ways.

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الملخص

التنمية في القطاع المالي والنمو الاقتصادي: حقائق مستمدة من تجارب مجموعة من بلدان الشرق الأوسط وشمالي إفريقيا

علي سالم عريفة **خليفة بن الحبيب الغالي**
جامعة الكويت

يهدف هذا البحث إلى دراسة العلاقة الجدلية بين تنمية القطاع المالي من جانب والنمو الاقتصادي من جانب آخر. ويقوم البحث باستخدام بيانات من مجموعة من بلدان الشرق الأوسط وشمالي إفريقيا، شهدت إصلاحات اقتصادية جوهرية على المستوى الكلي، وتطورات جذرية في القطاع المالي. وتختلف المنهجية المعتمدة في هذا البحث عن ما هو سائد في الدراسات المشابهة، وذلك من خلال التركيز على العلاقة السببية (بمفهوم جرينجر) بين تنمية القطاع المالي والنمو الاقتصادي. وفي هذا الإطار يتم اعتماد مقاييس لمدى نمو القطاع المالي أكثر ملاءمة لمثل هذه الدراسات. وجاءت النتائج مختلفة باختلاف دول العينة. وتبين أن تنمية القطاع المالي تمثل إحدى الدوافع للنمو الاقتصادي في جميع دول العينة دون استثناء، فإن النتائج أوضحت وجود علاقة سببية في الاتجاهين في عدد منها دون الأخرى. وتؤكد هذه النتائج الآراء التي تقول بأن السياسات الاقتصادية وانعكاساتها هي في الأساس مختلفة باختلاف خصائص الدول والمؤسسات التي تقوم بتنفيذها.

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