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Abstract

This paper investigates the linkages between financial development and economic growth in the Middle East using newly developed methods of panel cointegration along with the popular time series methodologies such as the Johansen's cointegration, Granger causality, and the variance decompositions. The results indicate that, in the long run financial development and economic growth may be related to some level. In the short run, the panel causality tests point to real economic growth as the force that drives changes in financial development while individual countries' causality tests fail to give a clear evidence of the direction of causations.

Keywords: Financial Development; Economic Growth; Panel Cointegration

JEL classification: O16; G18; G28

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Introduction:

In the past three decades numerous studies have examined the causal relationships between financial development and economic growth. The support of the existence of a growth-finance relationship is strong; however, empirical findings have been mixed or conflicting regarding the direction of causality.

Financial development may be caused by economic growth when real growth has been taken place so that the expansion of financial institutions is only a result of the need of the expansion of the real economic activities. Support of this view can be found, for example, in Demetriades and Hussein (1996) and Gupta (1984). On the other hand, the expansion of financial institutions may help to foster and lead economic growth by increasing savings and improving borrowing options and the reallocation of capital. Evidence supporting this view can be found in Beck et al (2000), Xu (2000); Levine et al. (2000); Neusser and Kugler (1998); Levine (1997); and King and Levine (1993) to point a few. Moreover, the financial and the real sectors may expand simultaneously contributing to the developments of each other, which points to bidirectional causality between the two. Two-way relationship between financial development and economic growth has been shown by, for example, Luintel and Khan (1999), Berthelemy and Varoudakis (1997), and Greenwood and Bruce (1997).

This paper aims at filling a gap of research devoted solely to investigating the relationship between financial development and economic growth in the Middle East. Moreover, it makes a use of newly developed methods of panel cointegration by Pedroni (1995, 1997, and 2001) and panel FMOLS estimator (Pedroni 2000) in addition to the popular time series methodologies such as Johansen's cointegration, Granger causality, and the variance decompositions.

Methodology:

Panel Cointegration

We use two tests of unit roots proposed by Im, Pesaran and Shin (1997) (IPS, hereafter). Unlike other existing tests such as in Levin and Lin (1993) and Quah (1992, 1994), IPS’s allow for heterogeneity across members and residual serial correlation. They consist of testing the null that λ_i=1 (where i indicates the cross sectional member) against the alternative that λ_i< 1 for some or all i in the following equation:

$$\Delta x_{i,t} = \mu_i + \theta_{i,t} - (1-\lambda_i)x_{i,t-1} + \sum_{j=1}^{p_i} \rho_{i,j} \Delta x_{i,t-j} + \upsilon_{i,t} \quad (1)$$

where $\Delta x_{i,t} = x_{i,t} - x_{i,t-1}$ and $x_{i,t}$ is the time series to be tested, μ_i is the fixed effect. θ_i allows for an idiosyncratic linear trend for each group while $\nu_{i,t}$ is *i.i.d.* The resulting *LM*-bar statistic is based on the average of the N individual LM statistics and a pooled log-likelihood function defined in IPS (1997). The second test presented in IPS (1997) is the *t*-bar, which is based on the Augmented Dickey-Fuller test. Monte Carlo experiments show that IPS (1997) tests outperform Levin and Lin's (1993) test. They have greater power and better small-sample properties. Moreover, the *t*-bar test has better performance over the *LM*-bar test when N and T are small. We will use the *t*-bar test mainly and present the *LM*-bar test for the sake of comparison only. In addition, they proposed a cross-sectionally demeaned version of both tests to be used in the case where the errors in different regressions contain a common time-specific component.

If our panel variables are integrated of order one I(1), we proceed then to test for the presence of cointegration. This is normally done by verifying the stationarity of the estimated residuals. In conventional time series, the same unit root tests can be applied for both raw data and residuals with proper adjustments to the critical values when applied to the latter. However, Pedroni (forthcoming) showed that testing for cointegration in panel data is not so straightforward unless the regressors are strictly exogenous and the pooled OLS slope is constrained to be homogeneous. Otherwise, he observed that in the case where the alternate hypothesis is that the cointegrating relationship is not constrained to be homogeneous across members and the parameters estimates are allowed to vary across individual members then, proper adjustments should be made to the test statistics themselves. If not, this may have the effect of transforming a convergent test statistic into a divergent one asymptotically. In practice, this means that as the sample size grows large, one is certain to reject the null of no cointegration regardless of the true relationship. Moreover, imposing homogeneity falsely across members when the true relationship is heterogeneous generates an integrated component in the residuals making them non-stationary leading an econometrician to conclude that her variables are not cointegrated even if they really are.

For these reasons, Pedroni (forthcoming) developed two sets of statistics designed to test for the null of no cointegration for the case of heterogeneous panels and derived their asymptotic distributions. The first set consists of three statistics, $Z_{\hat{\rho}_{NT}}, Z_{\hat{v}_{NT-1}}$, and $Z_{t_{NT}}$, is based on pooling the residuals along the within dimension of the panel. The three statistics are respectively analogous to the "panel variance ratio", "panel rho", and "panel t" statistics in Phillips and Ouliaris (1990). The second set of statistics is based on pooling the residuals along the between dimension of the panel. This allows for a heterogeneous autocorrelation parameters across members. The asymptotic distribution of each of those five statistics can be expressed in the following form:

$$\frac{X_{N,T} - \mu\sqrt{N}}{\sqrt{\nu}} \Rightarrow N(0,1)$$

(2)

where $X_{N,T}$ is the corresponding form of the test statistic, while μ and v are the mean and variance of each test, respectively. Their values are given in Table 2 in Pedroni (1999). Under the alternative hypothesis, Panel-v statistic diverges to positive infinity. Therefore, it is a one sided test where large positive values reject the null of no cointegration. The remaining statistics diverge to negative infinity, which means that large negative values reject the null of no cointegration.

As is well known in the literature, in the presence of I (1) variables, the effect of superconsistency may not dominate the endogeneity effect of the regressors if OLS is used. This would result in a biased and a non normal distribution of the residuals. This distribution depends also on the nuisance parameters associated with the serial correlation of the data. As Pedroni (2000) showed, the problem is amplified in a panel setting by the potential dynamic heterogeneity over the cross sectional dimension. Specifically, as this dimension increases, second order biases could be expected to occur by the poor performance of the estimators designed for large samples as they are averaged over the panel's members. For this reason, he modified the FMOLS methodology to make inferences in cointegrated panels with heterogeneous dynamics as the cross sectional dimension becomes large even with relatively short time series .

Time series Cointegration:

For the time series setting we use the conventional Augmented Dickey-Fuller (ADF) Dickey and Fuller (1979, 1981) methodology to test for unit roots. Then the multivariate cointegration tests are used to assess for long run linkages among the variables in the system. We use the Johansen (1988, 1991) and Johansen and Juselius (1990) maximum likelihood technique. This technique is summarized as follows: if X_1, X_2, X_3 and X_4 are integrated of order one, I(1), then we estimate the following vector autoregressive models:

$$\Delta X_t = \sum_{j=1}^{\rho-1} \Gamma_{0,j} \Delta X_{t-j} + v_{0,t}$$
$$\Delta X_{t-\rho} = \sum_{j=1}^{\rho-1} \Gamma_{1,j} \Delta X_{t-j} + v_{1,t}$$

(3)

where X_t is 1×4 vector of I(1) variables, Γs are matrices of unknown parameters, and *v's* are normal $(0, \Sigma)$. From the residual vectors, we construct two likelihood ratio test statistics. The first test statistic is trace test which is given by

$$\tau_{trace} = -T \sum_{j=r+1}^{\rho} \ln(1-\lambda_j)$$

(4)

where λ represents the ρ-r smallest canonical correlations of $v_{0,t}$ with respect to $v_{1,t}$ This tests the hypothesis that there are, at most, r unique cointegration vectors. The second test statistic is the maximal eigenvalue test which is given by

$$\tau_{\max} = -T\ln(1-\lambda_{\tau+j}) \qquad j = 1,\ldots,\rho.$$

(5)

The null hypothesis for this test is that there are *r* cointegrating vectors in X_t. For both tests, the alternative hypothesis is that there are *g*>*r* cointegration vectors in X_t. Johansen and Juselius (1990) suggested that the trace test may lack power relative to the maximal eigenvalue test. However, the trace test is more robust to the non-normality of errors[1].

Causality:

Causal relations among the variables for the panel and the time series data are investigated using the Granger causality tests (Granger, 1969, 1981, 1988; Granger & Weiss, 1983). We examine causality from one variable to another using the following four-variable vector auto regression VAR(4) error correction model:

$$\Delta Y_t = \alpha + \beta_1 \Delta Y_{t-1} + \ldots + \beta_k \Delta Y_{t-k} + EC_{t-1} + u_t \text{ , } u_t \sim i.i.d.(0,\Sigma_u)$$

(4)

Where Δ is the first difference operator, Y_t is a vector of real GDP, the ratio of private sector credit to base money, government consumption, and M1, *k* is the number of lags in the VAR system, and EC_t is an error correction series. The inclusion of the error correction series follows the fact that if the variables are cointegrated, then causality must exist among some of them in at least one direction. Therefore, we add an error correction series to the system if cointegration is not rejected. In this test Y_{1t} Granger causes Y_{2t} if the estimated coefficients on Y_{1t} or the estimated coefficient on the lagged value of the error correction term is statistically significant. Moreover, to measure the strength of the Granger causality relationships we use the variance decompositions VDCs as suggested by Sims (1982). The VDCs are calculated in a four-variable error correction VAR. If a large portion of the forecast error variance of real GDP is explained by financial development, or a large portion of the forecast error variance of financial development is explained by real GDP then this can be used as evidence of a strong causal relationship between the two variables.

Data and Empirical Results:

Data are from the World Banks' World Development Indictors CD ROM except for the monetary base which is from the IMF's International Financial Statistics CD ROM and they span from 1969 to 2000 for each country in the sample. Real GDP, real government spending, and real M1 are calculated using the GDP deflator. All variables are expressed in natural logarithms except for the financial development variable which is expressed as the ratio of private credit to the monetary base following the results of Pill and Pradham (1995) and Rother (1999) where they show that this measure performs well better than other measures of financial development. Credit to the private sector has been used also by Ndikumana (2000), Gregrio & Guidotti (1997). Real M1 and real government spending are used in the analysis to capture macroeconomic policies that may be associated with economic growth.

Table (1) presents the results of unit root testing for the panel series. As mentioned above, we use IPS (1997) *t-bar* test to verify the existence of unit root in the panel series. The *LM-bar* test results will be presented as well for the sake of comparison only. We observe that the *t-bar* test shows a strong indication in favor of the non-stationarity hypothesis of the variable and so does the *LM-bar* test but to a lesser extent. The only exception is the financial development variable, which rejects the null of non-stationarity when a common time dummy is included. The last two columns show that the first order differences of our variables easily reject the non-stationarity hypothesis concluding that all variables integrated of order one, I(1).

The next step is to test whether the variables are cointegrated using Pedroni's (1995, 1997, 2001) methodology as described previously. The results of the cointegration tests are presented in table (2). We test for cointegration including an intercept and a trend in the individual series. The null of no cointegration is rejected for all panel and group tests except for the group-ρ test which does not reject the null of no cointegration. However, as in Pedroni's

(1995, 1997, and 2001) Monte Carlo simulations, the panel-*v* and panel-*ρ* tests tend to under reject it in case of small N and T which is our case. For instance, at the 95% significance level, the rate of rejection is 10% instead of 5% for the panel-*t* test and is between 1% and 3% for panel-*v* and panel-*ρ* tests. This may explain the non-rejection of the null using the group-*ρ* test. Therefore, we may conclude that our variables are cointegrated with a trend.

On the other hand, the group-tests presented at the end of table (2) are presented for the sake of comparison only. We can not rely on the group mean cointegration tests because Financial Development series is non-stationary.

We turn next into the estimation of the idiosyncratic cointegrating vectors using FMOLS. Since our variables are cointegrated with a time trend, we estimate the idiosyncratic parameters (not shown) of the non stochastic trend using OLS and use the residuals to pursue our investigation of long run elasticities. The results are shown in table (3). It is obvious that financial development has a positive significant effect on the GDP growth only in the case of Egypt and Jordan. Five countries show a positive significant relationship between government expenditures and growth, while only one country only shows a significant positive relationship between real M1 and growth. However, since our individual data is short, the results are not powerful. We refer to the panel estimator. Two panel estimators are presented at the end of table (3). The panel estimator pools the data along the within-dimension of the panel and the group-mean estimator pools the data along the between dimension of the panel. The advantage of using the between dimension estimator is that it allows heterogeneity across members under the alternative hypothesis. In other terms, while the panel estimator permits testing the null H0: $\beta_i=\beta_0$ for all *i* versus H_1: $\beta_i=\beta_a\neq\beta_0$ where β_0 is the hypothesized common value for β under the null and β_a is an alternative common value, the group-mean estimator allows for heterogeneous elasticities and allows therefore to test H_0: $\beta_i=\beta_0$ for all *i* versus H_1: $\beta_i\neq\beta_0$ for all *i*, so that the value of β is not necessarily constrained to be the same across the members under H_1. While the within-dimension estimator represents the panel regression average, the between dimension estimator is the average of the cointegrating vectors of the panel's member and has less minor size distortions in small sample compared to the within dimension estimator. As is clear from the last row of table 3, the elasticities of GDP growth with respect to financial development, government expenditures and real money are all positive and significant. This suggests an evidence of a long run linkage between financial development and economic growth.

In table (4) the Granger causality tests for the panel data show that there is an evidence of one-way causality running from economic growth to financial development as the error correction term is significant at the 1% level although the F-statistics is not significant. There is no evidence that financial development has an effect on economic growth in the short run which gives support to the idea that financial development may be a result of economic growth or demand-following phenomenon. As suggested by Patrick (1966), the financial development may take place following real economic growth. Therefore, the results of the Granger causality tests along with the panel cointegration tests suggest that there is an evidence of long run linkages between financial development and economic growth in the Middle East both in the long run and the short run. However, it seems that the role of financial development may not be crucial for economic development in the region, but, instead, it reacts to economic development which may propose that its role can be considered as passive. On the other hand, an alternative review of financial development in the region may suggest that our results stress the fact that the financial sector is not developed enough in the region to support a sustained economic development.

We now turn into the time series result to investigate the linkages between financial development and real GDP for the individual countries. Starting by looking at the time series properties of the variables, table (5) presents the results of the Augmented Dickey Fuller tests. The lag lengths are chosen using the Schwarz criterion. For all countries, the variables are integrated of order (1) except for real government spending for Algeria which is I(0) and for Tunisia and Turkey where it is I(2) in both cases. This variable is not used in the cointegration tests for these three countries.

Table (6) shows the results of the multivariate cointegration tests for the individual countries. The lag lengths are chosen using the Schwarz criterion and all tests are conducted by including an intercept in the cointegration space following the Pantula (1989) approach for selecting the deterministic components in the cointegration relations. The results indicate that cointegration is rejected in two cases at the 5% level, namely in the cases of Iran and Kuwait using both the trace and the maximal eigenvalue tests and we add to those Jordan using the maximal eigenvalue test. There is an evidence of the existence of one cointegrating vector in the cases of Egypt, Saudi Arabia, and Syria using both tests and for Jordan Arabia using the trace test. Moreover, the evidence shows that there are two cointegrating vectors for the Algeria, Morocco, and Tunisia using both tests while for Turkey the trace test indicates the existence of two cointegrating vectors while the maximal eigenvalue test indicates the existence of only one cointegrating vector.

Taking into account that the trace test is more robust to the non-normality of the errors, we may conclude that the results of table 6 point to a strong relationship between financial development and real GDP in all countries in the sample except for Iran and Kuwait. Moreover, it is surprising that three groups of countries with similar economic systems show similar results. The first group consists of Algeria, Morocco, and Tunisia which forms what is called the "Magreb Countries" and all have two cointegrating vectors. The second group which consists of Egypt, Syria, and Jordan which form what is known as the "Mashreq Countries" and all have one cointegrating vector. Finally, the third group consists of two oil producing countries, namely Iran, and Kuwait who do not show any evidence of cointegration in their sample data, and Saudi Arabia makes an exception of this group.

In table (7) the results of the Granger causality tests are consistent with the cointegration results based on the idea that if two or more variables are cointegrated then at least one way causality must exist in the system to take it towards equilibrium. The evidence of Granger causality can be established when we reject the null of cointegration using an F-statistics or when the error correction variable, which is derived from the normalized cointegration relation, is significant. Therefore, table (7) shows that evidence of two-causality between financial development and real economic growth can be observed for Syria and Morocco[2] at the 5% significance level. One way causality that runs from financial development to economic growth can be seen for Algeria, Egypt, Saudi Arabia, and Tunisia. For Jordan and Turkey causality runs from economic growth to financial development while for Iran and Kuwait no evidence of causality in any direction is found.

The evidence presented in table (7) does not concur with the evidence presented from the panel causality tests where it is shown that economic growth is Granger caused by financial development and not vise versa. For the individual countries, causality that runs from financial development to economic growth exists in six cases while growth causes financial development in four cases.

To discuss the strength of the evidence of causality that was established in table (7) we turn into the variance decompositions VDCs which are presented in tables (8) and (9). For Syria and Morocco, the two-way causality which is observed in table (7) seems to be very weak in tables (8) and (9). The financial development variable, in general, explains less than 1% of the forecast error variance of real GDP while GDP explains around 5% and 9% after 5 and 10 years of the forecast error variance of financial development for Syria and Morocco, respectively. For Algeria, Egypt, Saudi Arabia, and Tunisia, causality that runs from financial development to real GDP seems to be significant only in the case of Egypt where more than 37% of the forecast error variance of GDP is explained by financial development after 5 and 10 years. This percentage does not exceed 7% for Algeria, 4% for Saudi Arabia, and 3% for Tunisia, and it is not significant in all cases. On the other hand, real GDP explains between 11% to 13% of the forecast error variance of financial development after 5 to 10 years in Egypt, and around 4% for Algeria, 6% for Saudi Arabia, and 2% for Tunisia. In all cases including Egypt these numbers are not significant at the 5% level. For the cases of Jordan and Turkey, Granger causality that was observed in the direction of real GDP to financial development seems to be significant in the case of Jordan where real GDP explains around 33% to 38% of the forecast error variance of financial development. For Turkey, real GDP explains around 20% of the forecast error variance of financial development but this percentage, although large, is not significant at the 5% level. Moreover, financial development explains more than 11% and up to 36% of the forecast error variance of real GDP for Jordan and Turkey, respectively. However, these numbers are not significant. For Iran and Kuwait, no evidence of causality was observed from table (7) and it is still the case from the evidence shown by tables (8) and (9). Finally, the results in table (8) show that the money stock variable fails to explain major portion of the forecast error variance of GDP except for the case of Iran where it explains more than 45% of this forecast error variance. This evidence signifies the importance of money in the Iranian economy; however, it gives a great support to the neutrality of money hypothesis in the Middle East region. On the other hand, government spending seems to be important in the determination of real GDP in the cases of Kuwait and Morocco where it explains around 25% of the forecast error variance of real GDP.

From tables (7), (8) and (9) we may conclude that causal relationships between financial development and economic growth that are observed are not very strong in most cases in the sample. Moreover, there is no overwhelming evidence that supports either direction of causality as in the case of the panel causality tests where it is shown that it is economic growth that causes financial development in the region and not vise versa.

Conclusion:

In this paper we investigate the relationship between financial development and economic growth for ten Middle Eastern countries as a group using panel cointegration and as individual countries using popular time series methodologies. The results indicate that, in the long run financial development and economic growth may be related to some level as suggested by the panel cointegration tests. Moreover, in the short run, the evidence of linkages between financial development and economic growth shows that the causality affects run from economic growth to financial development. Time series methodologies, on the other hand, support the finding of strong relationship between financial development and real economic growth in the region but they fail to, clearly, establish the direction of causation. The results in the paper may be explained by the high degree of financial repression and the weak financial sector in the region that is unable to support a sustainable economic development. Furthermore, the sluggish and unbalanced economic growth in the region may weaken any relationship between financial development and economic growth, especially in the short run as large fluctuations in real GDP growth are always observed in the region. Therefore, countries in the region should take more measures to reduce financial repression to help increase financial development which results in more efficient reallocation of funds and connections between savers and investors. Otherwise, the Lucas (1988) argument that the financial sector has no important role in real economic activity may find its greatest support in the Middle East region, at least in the short run.

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Table 1: Panel Unit Root Tests (IPS tests)

Variable	*Data Type*	*Deterministic*	*t*-bar	*LM*-bar	*First difference*	
					t-bar	*LM*-bar
Real M1	Raw data	Constant	0.63***	1.63**	-8.80	11.58
		Constant+ trend	-0.18***	0.28***	-8.94	9.99
	Demeaned data	Constant	2.50***	-0.13***	-10.87	14.53
		Constant+ trend	0.11***	0.19***	-9.67	10.78
Real GDP	Raw data	Constant	-1.67*	2.15*	-14.06	17.39
		Constant+ trend	0.16***	-0.06***	-13.78	13.46
	Demeaned data	Constant	2.69***	-1.60***	-13.29	17.23
		Constant+ trend	-0.26***	0.36***	-12.29	13.01
Real G	Raw data	Constant	-1.69*	3.28	-12.39	15.541
		Constant+ trend	-0.62***	0.80***	-11.84	12.19
	Demeaned data	Constant	2.41***	-0.47***	-14.52	18.25
		Constant+ trend	-1.35**	1.59**	-13.45	13.75
FD	Raw data	Constant	-0.75***	1.08***	-12.54	16.46
		Constant+ trend	-1.12***	1.37**	-11.08	11.97
	Demeaned data	Constant	-3.05	3.82	--	--
		Constant+ trend	-2.92	3.55	--	--

(***, **,*) indicate failure to reject the null of non-stationarity at the 10%, 5%, and 1% levels, respectively.

Table 2: Panel Cointegration Analysis Tests

Test	*Statistics*
Panel-v	2.68**
Panel-ρ	-0.05
Panel-t	-2.68**
Panel-adf	-2.18**
Group-ρ	0.26
Group-t	-3.47**
Group-adf	-3.60**

* (**) reject the null of no cointegration at the 10% (5%) level.

Table 3: FMOLS regression

Country	FD	Real G	Real M1
Algeria	0.02 (0.40)	0.58* (14.22)	0.01 (0.37)
Egypt	0.45* (2.73)	-0.29* (-2.93)	-0.05 (-0.49)
Iran	-0.17* (-2.84)	0.96* (24.24)	-0.02 (-0.70)
Jordan	0.20* (4.84)	0.55* (5.90)	0.17* (2.38)
Kuwait	-0.01 (-1.29)	0.04 (0.28)	-0.38** (-1.77)
Morocco	0.01 (0.62)	0.84* (8.62)	-0.29* (-2.52)
Saudi Arabia	-0.18 (-0.17)	0.21 (1.00)	0.14 (0.65)
Syria	-0.15 (-0.97)	-0.42* (-3.06)	-0.16 (-0.68)
Tunisia	-1.14* (-2.27)	0.81* (16.53)	0.04 (0.76)
Turkey	-0.04 (-1.06)	-0.01 (-0.01)	-0.07 (-0.68)
Within dimension	-0.10 (0.00)	0.33* (20.49)	-0.06 (-0.85)
Between dimension	0.13* (2.46)	0.17* (11.80)	0.11* (5.26)

* (**) Significant with 95% (90%) confidence level.

Table (4): Granger Causality Tests: Panel Data

Null	F Statistics	P-Value	EC_{t-1}	P-Value
FD does not cause GDP	0.273	0.6012	0.001	0.5017
GDP does not cause FD	0.683	0.4092	0.597	0.0061

Table (5): The ADF Unit Root Tests of the Individual Countries

Country	Variable	ADF levels	ADF first difference	Conclusion at the 5% level
Algeria	RGDP	-2.739^{C}	-3.501^{C}	I(1)
	FD	-2.411^{T}	-4.152^{N}	I(1)
	G	-3.275^{C}	-	I(0)
	M1	-1.541^{T}	-2.429^{N}	I(1)
Egypt	RGDP	2.676^{N}	-2.837^{C}	I(1)
	FD	-2.364^{T}	-2.750^{N}	I(1)
	G	-2.634^{C}	-4.282^{N}	I(1)
	M1	-2.120^{T}	-2.741^{N}	I(1)
Iran	RGDP	-2.150^{T}	-3.677^{N}	I(1)
	FD	-1.405^{N}	-3.742^{N}	I(1)
	G	-2.394^{T}	-3.438^{N}	I(1)
	M1	-2.279^{C}	-1.772^{N}	I(1)*
Jordan	RGDP	-2.405^{C}	-3.221^{N}	I(1)
	FD	-1.835^{C}	-2.248^{N}	I(1)
	G	-2.301^{C}	-3.240^{C}	I(1)
	M1	0.252^{N}	-3.630^{N}	I(1)
Kuwait	RGDP	-2.002^{C}	-4.432^{N}	I(1)
	FD	-2.535^{T}	-4.574^{N}	I(1)
	G	-2.409^{T}	-4.737^{N}	I(1)
	M1	-2.065^{C}	-6.719^{N}	I(1)
Morocco	RGDP	-2.258^{C}	-4.183^{C}	I(1)
	FD	-1.905^{C}	-2.778^{N}	I(1)
	G	-1.891^{C}	-2.905^{N}	I(1)
	M1	-2.114^{C}	$--2.450^{N}$	I(1)
Saudi Arabia	RGDP	-3.150^{T}	-3.093^{C}	I(1)
	FD	1.615^{N}	-2.649^{N}	I(1)
	G	-2.412^{C}	-3.548^{N}	I(1)
	M1	-2.116^{C}	-3.610^{N}	I(1)
Syria	RGDP	-2.273^{C}	-3.917^{C}	I(1)
	FD	-2.922^{C}	-4.744^{N}	I(1)
	G	-2.579^{C}	-4.620^{N}	I(1)
	M1	-2.176^{C}	-2.851^{N}	I(1)
Tunisia	RGDP	-2.493^{T}	-4.546^{C}	I(1)
	FD	-2.817^{T}	-3.550^{N}	I(1)
	G	-2.527^{C}	-2.363^{C}	I(2)
	M1	-3.461^{T}	-2.485^{N}	I(1)
Turkey	RGDP	-2.919^{T}	-4.330^{C}	I(1)
	FD	-2.631^{T}	-6.118^{T}	I(1)
	G	-2.773^{T}	-2.334^{C}	I(2)
	M1	-2.378^{T}	-3.788^{T}	I(1)

(T) Includes a constant and a trend, (C) Includes only a constant, (N) Does not include a constant nor a trend, and (*) denotes testing at the 10% level.

Table (6): The Multivariate Johansen Cointegration Tests

Country	Null	Eigenvalue	Trace Statistics	Max. Eigen. Stat.
Algeria	None	0.614	50.991	28.571
	At most 1	0.426	22.421	16.636
	At most 2*	0.175	5.785*	5.785*
Egypt	None	0.665	60.408	32.768
	At most 1	0.369	27.640*	13.835*
	At most 2	0.235	13.806	8.033
	At most 3	0.175	5.772	5.772
Iran	None	0.414	46.127*	16.041*
	At most 1	0.357	30.086	13.257
	At most 2	0.277	16.829	9.713
	At most 3	0.211	7.115	7.115
Jordan	None	0.591	55.158	26.837*
	At most 1	0.507	28.321*	21.189
	At most 2	0.170	7.133	5.586
	At most 3	0.050	1.546	1.546
Kuwait	None	0.505	45.842*	21.082*
	At most 1	0.369	24.760	13.801
	At most 2	0.224	10.959	7.602
	At most 3	0.106	3.357	3.357
Morocco	None	0.700	73.186	36.113
	At most 1	0.526	37.073	22.390
	At most 2	0.307	14.683*	11.020*
	At most 3	0.115	3.663	3.663
Saudi Arabia	None	0.635	59.715	29.223
	At most 1	0.439	30.492*	16.753*
	At most 2	0.264	13.739	8.888
	At most 3	0.154	4.851	4.851
Syria	None	0.844	79.913	55.757
	At most 1	0.332	24.156*	12.110*
	At most 2	0.266	12.046	9.265
	At most 3	0.089	2.782	2.782
Tunisia	None	0.648	59.846	31.323
	At most 1	0.481	28.522	19.666
	At most 2	0.256	8.856*	8.856*
Turkey	None	0.609	49.342	28.162
	At most 1	0.341	21.181	12.510
	At most 2	0.251	8.671*	8.671*

* denotes non-rejection of the null at the 5% level

Table (7): Granger Causality Tests: Time Series Data

Country	Null	F Statistics	P-Value	EC_{t-1}	P-Value
Algeria	FD does not cause GDP	6.428	0.0074	-0.138	0.0000
	GDP does not cause FD	1.008	0.3834	-0.452	0.2031
Egypt	FD does not cause GDP	7.860	0.0098	-0.022	0.0042
	GDP does not cause FD	0.052	0.8214	0.050	0.4865
Iran	FD does not cause GDP	0.121	0.8866	-	-
	GDP does not cause FD	0.552	0.5841	-	-
Jordan	FD does not cause GDP	0.510	0.4819	-0.218	0.2295
	GDP does not cause FD	3.251	0.0839	0.340	0.0450
Kuwait	FD does not cause GDP	1.433	0.2622	-	-
	GDP does not cause FD	0.582	0.5682	-	-
Morocco	FD does not cause GDP	0.267	0.6104	-0.107	0.0203
	GDP does not cause FD	0.450	0.5088	3.612	0.0502
Saudi Arabia	FD does not cause GDP	0.406	0.5300	-0.172	0.0065
	GDP does not cause FD	0.052	0.8208	0.013	0.4775
Syria	FD does not cause GDP	0.003	0.9571	-0.035	0.0500
	GDP does not cause FD	1.171	0.2900	0.287	0.0473
Tunisia	FD does not cause GDP	1.365	0.2542	-0.044	0.0369
	GDP does not cause FD	0.001	0.9714	-0.005	0.6079
Turkey	FD does not cause GDP	0.580	0.5698	-0.020	0.1912
	GDP does not cause FD	1.432	0.2636	-0.364	0.0045

Table (8): Variance Decomposition of the Real GDP– Time Series

Country	Period	SE	RGDP	FD	G	M1
Algeria	1	0.04	76.30*	5.42	5.95	12.32
	5	0.04	72.81*	6.63	6.20	14.36
	10	0.04	71.82*	6.80	6.28	0.04
Egypt	1	0.02	80.73*	6.12	4.22	8.93
	5	0.03	37.01*	37.81*	10.81	14.36
	10	0.03	34.94*	36.66	11.07	17.32
Iran	1	0.53	97.53*	1.97	0.24	0.27
	5	0.22	36.32*	15.72	1.39	46.57*
	10	0.22	35.87*	15.85	1.39	46.89*
Jordan	1	0.14	93.34*	3.80	0.76	2.09
	5	0.15	83.04*	11.07	0.94	4.95
	10	0.15	82.77*	11.19	0.94	5.11
Kuwait	1	0.11	70.85*	2.41	24.08	2.67
	5	0.12	60.82*	9.48	24.27*	5.42
	10	0.13	57.65*	11.51	23.04*	7.80
Morocco	1	0.04	76.00*	0.17	23.76	0.08
	5	0.05	74.49*	0.26	24.38	0.86
	10	0.05	74.28*	0.34	24.42	0.96
Saudi Arabia	1	0.05	93.89*	1.11	0.00	5.00
	5	0.06	89.03*	3.66	2.92	4.39
	10	0.06	87.90*	3.80	3.84	4.47
Syria	1	0.07	92.92*	0.05	0.28	6.75
	5	0.07	91.51*	0.68	0.78	7.03
	10	0.07	91.46*	0.69	0.80	7.05
Tunisia	1	0.03	86.66*	2.74	1.26	9.35
	5	0.03	83.15*	3.01	2.29	11.55
	10	0.03	82.86*	3.02	2.32	11.80
Turkey	1	0.04	93.98*	0.16	0.93	4.93
	5	0.04	74.21*	20.23	1.47	4.09
	10	0.05	58.74*	35.95	1.78	3.53

(*) Significant at the 5% level

Table (9): Variance Decomposition of Financial Development – Time Series

Country	Period	SE	RGDP	FD	G	M1
Algeria	1	0.33	3.35	75.03*	0.50	21.13
	5	0.35	4.03	73.91*	1.38	20.68
	10	0.35	4.15	73.71*	1.49	20.65
Egypt	1	0.21	11.71	81.24*	0.01	7.04
	5	0.22	13.00	77.77*	0.26	8.98
	10	0.22	12.94	77.57*	0.39	9.10
Iran	1	0.37	1.13	91.51*	7.08	0.28
	5	0.46	2.18	64.62*	5.59	27.60
	10	0.46	2.29	63.94*	5.53	28.25
Jordan	1	0.13	33.32*	59.17*	7.49	0.02
	5	0.14	38.21*	48.86*	10.99	1.95
	10	0.15	37.78*	48.72*	10.90	2.60
Kuwait	1	2.15	3.81	90.63*	2.95	2.61
	5	2.34	3.68	82.15*	4.52	9.66
	10	2.41	3.59	81.05*	4.51	10.84
Morocco	1	1.18	7.67	89.96*	2.17	0.19
	5	1.39	9.22	71.97*	6.15	12.65
	10	1.41	9.50	71.36*	6.15	12.98
Saudi Arabia	1	0.01	3.40	87.50*	9.06	0.03
	5	0.02	5.60	59.61*	32.21*	2.59
	10	0.02	6.25	58.89*	31.88*	2.98
Syria	1	0.56	1.57	95.50*	1.87	1.05
	5	0.58	5.31	90.56*	2.44	1.69
	10	0.58	5.39	90.41*	2.44	1.76
Tunisia	1	0.01	0.61	93.72*	3.81	1.86
	5	0.01	2.23	87.98*	6.09	3.70
	10	0.01	2.23	87.97*	6.10	3.70
Turkey	1	0.34	12.76	84.60*	0.17	2.47
	5	0.56	20.24	74.33*	2.73	2.69
	10	0.77	20.27	74.77*	2.60	2.36

(*) Significant at the 5% level

[1] See Cheung and Lai (1993).
[2] Significance of causality that runs from GDP to financial development for Morocco is on the margin as the P-value is very slightly higher than 5%.