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The Effect of Financial Development on Economic Growth in the MENA Region

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This paper provides new evidence that sheds light on the effect of financial development on economic growth in nine MENA countries over the period of 1991–2009. The empirical results using the Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS) estimators reveal financial development is a statistically significant determinant of economic growth, but the impact is more apparent on stock market development than banking sector development. This finding suggests that improving the functioning of the banking sector is crucial to spur economic growth in MENA countries.

1. Introduction

The relationship between financial development and economic growth has been the subject of increasing attention. A growing body of empirical research has found evidence of a robust relationship between financial development and economic growth, which supports the endogenous growth literature that stresses the significance of financial development for long-run economic growth (see Goldsmith 1969; King and Levine 1993; Odedokum 1996; Levine and Zervos 1998; Beck *et al*. 2000; Chang and Ho, 2001; Arestis *et al*. 2001; Chang and Caudill 2005; Eita and Jordaan 2007; Law 2007; Apergis et.al. 2007).

While the majority of empirical studies show that there exists a positive relationship between financial development and economic growth, it is

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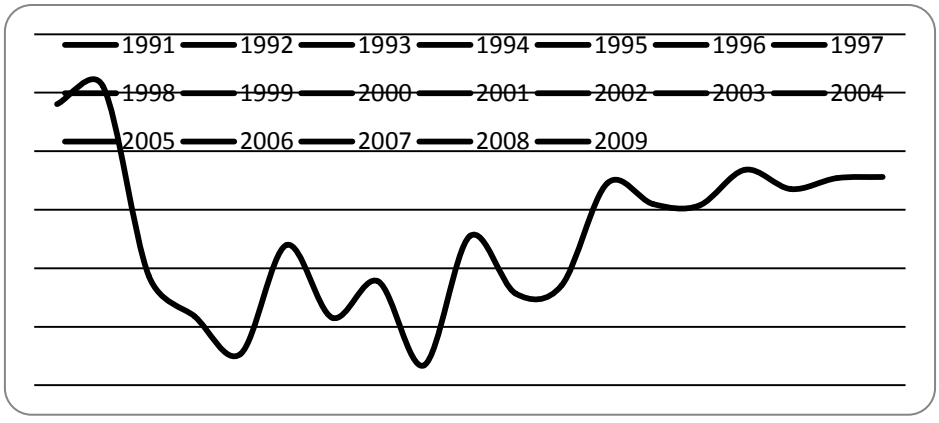
surprising that empirical studies from the Middle East North Africa (MENA) region are limited as well as the fact that the empirical results are mixed. For example; Al-Awad and Harb (2005) point out that financial development and growth may be related in the long run but their results fail to clearly establish the direction of causality. Using a composite index of bank development and stock market development, Naceur and Ghazouani (2007) find that overall financial development is unimportant or even harmful for economic growth in the MENA region. According to Abu-Bader and Abu-Qarn (2008), finance leads to growth in five out of the six MENA countries they studied which were Algeria, Egypt, Israel, Morocco, Syria, and Tunisia. Another study by Rachdi and Mbarek (2011) demonstrates that there is a long-term relationship between financial development and economic growth, but the causal effect is running from economic growth to financial development. In contrast, Kar *et al*. (2011) point out that there is no clear consensus on the direction of causality between financial development and economic growth for all measurements of financial development in MENA countries.

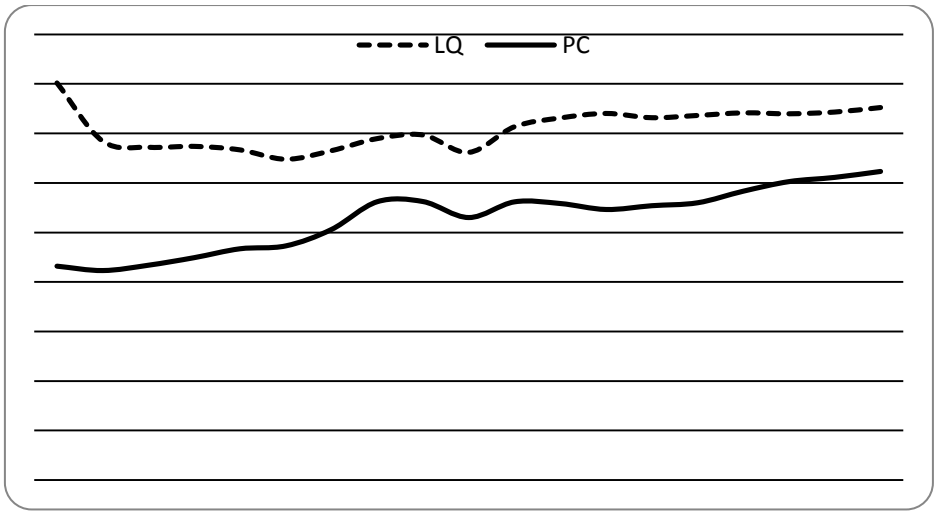
On the other hand, when looking at the growth performance and financial development indicators in the MENA countries in recent years, two observations are noteworthy. First growth has fluctuated more and increased weakly since 1991. Secondly, financial development indicators (which include the banking sector and the stock market) have fluctuated and rose during the last decade.

Figure 1: The average of GDP per capita growth (annual %) of selected MENA countries (1991-2009)



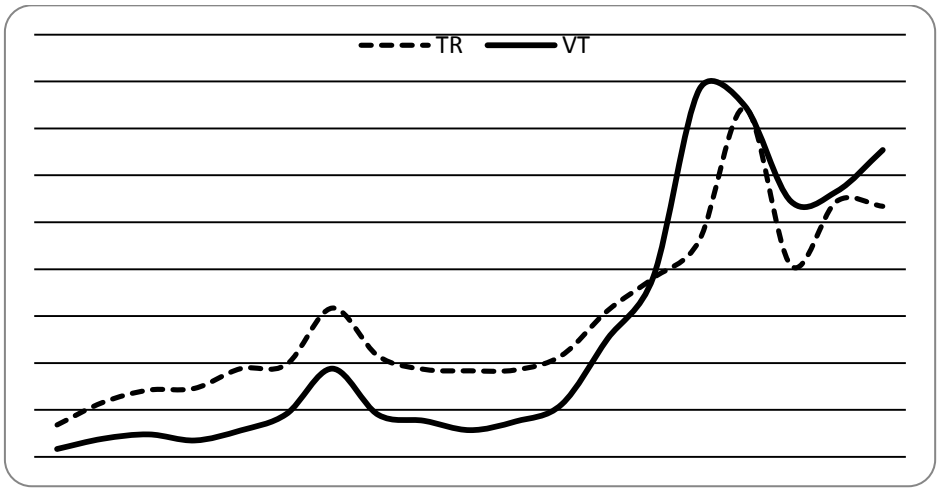
Source: World development indicator (World Bank, 2011)

Figure 2: The average value of Banking Indicators (Liquid Liabilities (M3) as % of GDP and Domestic Credit to Private Sector as % of GDP) of selected MENA countries (1991-2011)



Source: World development indicator (World Bank, 2011)

Figure 3: The average value of Stock Market Indicators (Turnover ratio (TR) and Total Value Traded to GDP (VT)) of selected MENA countries (1991-2009)



Source: Financial Structure Dataset (2011)

The objective of this study is to examine the effect of financial systems on economic growth in MENA countries namely Egypt, Iran, Jordan, Kuwait, Malta, Morocco, Oman, Saudi Arabia and Tunisia during 1991-2009. This study extends on the literature by making several important contributions. Firstly, the relationship between financial development and economic growth has been studied widely in different countries, but only a few empirical studies have been conducted for the MENA region (Al-Awad and Harb 2005; Naceur and Ghazouani 2007; Abu-Bader and Abu-Qarn 2008; Rachdi and Mbarek 2011; Kar *et al*. 2011). However, their studies are mainly based on banking sector development indicators except Naceur and Ghazouani (2007), who used a composite index of the banking sector (two indicators) and stock market indicators (three indicators) for an unbalanced panel data from 11 MENA region countries. Therefore, this study fills the gap by employing both banking sector (three indicators) and stock market (three indicators) development indicators as financial development measures that each one is analyzed separately. Further, we examine empirically the finance/growth nexus by using two measures of GDP (oil and non oil) to analyze the determinants of variation in the magnitude of the financial development contribution across economic growth region. To assess the robustness of our results, we uses two econometric techniques namely the Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS) methods in a panel data context, where both techniques allow for a great amount of heterogeneity and have better properties in small samples.

It is important to note that the effect of the global financial crisis is significant on MENA financial markets. Although financial systems in MENA countries have limited integration with world financial institutions and have not been very vulnerable to the crisis, the MENA countries' real economy has been affected by the global recession. Therefore, it is important for policy makers in the MENA countries to address the vulnerabilities in their economies and attempt to improve on them. In this regard, the results stemming from the MENA region could be of interest to other developing countries in the same stage of financial development for instance like African, Eastern European and Latin American countries which have been reforming their financial systems a great deal in recent years.

This paper is organised as follows. Section 2 explains the empirical model and econometric techniques while the data employed in the

analysis is presented in section 3. Section 4 reports and discusses the econometric results and section 5 finalizes the study with a summary of the paper and concludes the findings.

2. Empirical Model and Econometric Techniques

2.1 Empirical model

In order to test the effectiveness of financial development, this study adopts the framework introduced by Mankiw*et al.* (1992). Consider the following Cobb-Douglas production function:

$$Y_t = K_t^{\alpha} H_t^{\beta} (Z_t L_t)^{1-\alpha-\beta} \quad (1)$$

Where Y is real output, K is the capital stock, H is the stock of human capital, L is raw labour, Z is a labour-augmenting factor reflecting the level of technology and efficiency in the economy and the subscript t indicates time. Assuming that $\alpha + \beta < 1$, which implies that there are decreasing returns to all capital. Raw labour and labour-augmenting technology are assumed to grow according to the following functions:

$$L_t = L_0 e^{nt} \quad (2)$$

$$Z_t = Z_0 e^{gt+p\theta} \quad (3)$$

Where n is the exogenous rate of growth of the labour force, g is the exogenous rate of technological progress, P is a vector of financial development policies and the other factors that can affect the level of technology and efficiency in the economy, and θ is a vector of coefficients related to these policies and other variables. In this model, the steady state of output per worker grows at the constant rate g (the exogenous component of the growth rate of the efficiency variable Z). This outcome can be obtained directly from the definition of output per effective worker as follows:

$$\frac{Y_t}{Z_t L_t} = (k_t)^{\alpha} (h_t)^{\beta}$$

$$\frac{Y_t}{L_t} = Z_t (k_t)^{\alpha} (h_t)^{\beta} \quad (4)$$

Furthermore, the steady-state values of h and k are defined as:

$$h^* = [\frac{(s^K)^{\alpha}(s^H)^{\beta}}{(n+g+\delta)}]^{1/1-\alpha-\beta} \quad (5)$$

$$k^* = [\frac{(s^K)^{1-\beta}(s^H)^{\beta}}{(n+g+\delta)}]^{1/1-\alpha-\beta} \quad (6)$$

Substituting these two equations into the production function (4) and taking the logs yields the expression for the steady state output.$\ln\left(\frac{Y}{L}\right) =$

$$lnZ_0 + gt + P\theta + \frac{\alpha}{1-\alpha-\beta} lns^K + \frac{\beta}{1-\alpha-\beta} lns^H - \frac{\alpha+\beta}{1-\alpha-\beta} \ln(n + g + \delta) \quad (7)$$

Equation (7) indicates the steady state output per worker where a vector of financial development proxy exist; s^K and s^H are the shares of output of physical and human capital; and δ is the rate of depreciation. The addition of g and δ is assumed to be constant across countries over time. Rearranging Equation (7) yields an estimating equation for the relationship between financial development and output per worker as follows:

$$\ln GDP_{it} = Z_0 + Z_1 T + Z_2 lnFD_{it} + Z_3 \ln CA_{it} + Z_4 \ln HC_{it} - Z_5 \ln LA_{it} + \varepsilon_{it} \quad (8)$$

In Equation (8)[3], GDP is real GDP per capita, T is a time trend, *FD* refers to the financial development indicators (banking sector and capital market), CA is physical capital, *HC* is human capital, and LA is the rate of labour growth. Also *i* identifies the fact that the sample includes a cross-section of data for the selected MENA countries, while *t* represents the time series element of the data series and ε is an error term. The constant is denoted by Z_0 while Z_1- Z_5 are the elasticities which show how much an increase in each individual variable will affect economic growth. All the coefficients are expected to carry a positive sign except for labour growth. According to Makdisi *et al*.(2000), many MENA countries are heavily dependent on oil therefore it plays an important role in shaping the growth pattern. Given the above discussion, the proposed Equation (8) will be estimated with non-oil GDP. Thus Equation (9)[4] is extended as follows:

[3]This Equation as Model (1) is presented in section 4.
[4]This Equation as Model (2) is presented in section 4.

$$LnNGDP_{it} = \beta_0 + \beta_1 \mathrm{T} + \beta_2\, LnFD_{it} + \beta_3\, LnCA_{it} + \beta_4\, LnHC_{it} -$$

$$\beta_5\, LnLA_{it} + \varepsilon_{it} \qquad (9)$$

where N*GDP* is real non-oil GDP per capita.

In addition, as stated by Rajan and Zingales (2003), market capitalization and private sector credit are more important financial development indicators. Thus, the proposed Equations (8) and (9) will be estimated while both indicators enter the model as the FD index at the same time. This analysis will be improvement obtained results of Equations (8) and (9) and explain the main contribution of banking sector development and stock market development in financial development in the MENA region as well.

2.2 Econometric methods

The unit root test

Before proceeding to the identification of a possible long run relationship it is necessary to verify that all variables are integrated of order one in levels. There are various unit root tests for panel data with each test having their own advantages and restrictions. For this study we have chosen the Levin, Lin and Chu version (LLC) and Im, Pesaran and Shin (1997; IPS) tests, both are based on the well-known Dickey-Fuller procedure. Although the Levin, Lin and Chu (LLC) test has a homogeneity limitation the Im, Pesaran and Shin (IPS) test solves this problem by assuming heterogeneity between units in a dynamic panel framework.

The co-integration test

The panel co-integration test introduced by Pedroni (1999) is employed to analyse the long-run relationship among the variables by using specific parameters which are allowed to vary across individual members of the sample. He has suggested seven tests which can be divided into two groups of panel co-integration statistics namely the within-dimension statistic or panel t-statistic and between-dimension statistic or group t-statistic. In the case of the panel statistics, the first order autoregressive parameter is limited to being the same for all cross sections. If the null is rejected, the parameter is smaller than 1 in its absolute value, and the variables in question are co-integrated for all

panel members. In the group statistics, the autoregressive factor is allowed to differ over the cross section, as the statistics amount to the average of the individual statistics. If the null is rejected, co-integration holds at least for one individual. Therefore, group tests offer an additional source of heterogeneity among the panel members (Dreger and Reimers, 2005).

Cross-sectional Dependency Test

Pesaran (2004) proposes a simple test of error cross section dependence which is applicable to a variety of panel data models, including stationary and unit root dynamic heterogeneous panels with short T and large N. The proposed test is based on the average of the pair-wise correlation coefficients of the OLS residuals from the individual regressions in the panel, and can be used to test for cross section dependence of any fixed order p, as well as the case where no a priori ordering of the cross section units is assumed, and is referred to as the CD test.

$$CD = \sqrt{\frac{2T}{N(N-1)}}\left(\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\hat{\rho}_{ij}\right) \longrightarrow N(0,1) \qquad (10)$$

It is clear that the test is correctly centred for fixed N and T, and is robust to single or multiple breaks in the slope coefficients and/or error variances. Also this test has the correct size in very small samples and satisfactory power, and as predicted by theory, is robust in the presence of unit roots and structural breaks.

The FMOLS approach

Having established that the dependent variable is structurally related to the explanatory variables, and thus a long run equilibrium relationship exists among these variables, we proceed to estimate equations (8) and (9) using the fully modified OLS procedure which is appropriate for heterogeneous cointegrated panels (Pedroni, 2000). This methodology addresses the problem of non-stationary regressors as well as the problem of simultaneity bias.

OLS estimation is known to yield biased results because, in general, the regressors are endogenously determined in the I(1) case. We consider the following co-integrated system for panel data:

$$y_{it} = \alpha_i + \acute{x}_{it}\beta + \mathrm{e_{it}} \qquad (11)$$
$$x_{it} = x_{i,t-1} + \varepsilon_{it}$$

Where $\xi_{it} = [e_{it}, \acute{\varepsilon}_{it}]$is stationary with covariance matrix Ω_i. Following Phillips and Hansen (1990) a semi-parametric correction can be made to the OLS estimator that eliminates the second order bias caused by the fact that the regressors are endogenous. Pedroni (2000) follows the same principle in the panel data context, and allows for heterogeneity in the short run dynamics and the fixed effects. Pedroni's estimator is:

$$\hat{\beta}_{FM} - \beta = \left(\sum_{i=1}^{N} \widehat{\Omega}_{22i}^{-2} \sum_{t=1}^{T} (x_{it} - \hat{x}_t)^2\right) \sum_{i=1}^{N} \widehat{\Omega}_{11i}^{-1} \widehat{\Omega}_{22i}^{-1} \left(\sum_{t=1}^{T} (x_{it} - \bar{x}_t) e_{it}^* - T\hat{\gamma}_i\right) \qquad (12)$$
$$\hat{e}_{it}^* = e_{it} - \widehat{\Omega}_{22i}^{-1} \widehat{\Omega}_{21i}, \quad \hat{\gamma}_i = \widehat{\Gamma}_{21i} + \widehat{\Omega}_{21i}^{0} - \widehat{\Omega}_{22i}^{-1} \widehat{\Omega}_{21i} \left(\widehat{\Gamma}_{22i} + \widehat{\Omega}_{22i}^{0}\right)$$

where the covariance matrix can be decomposed as $\Omega_i = \Omega_i^0 + \Gamma_i + \Gamma_i$ where Ω_i^0 is the contemporaneous covariance matrix, and Γ_i is a weighted sum of auto-covariance. Also $\widehat{\Omega}_i^0$ denotes an appropriate estimator of Ω_i^0 . This method produces two types of estimators, pooled panel estimator and group mean panel estimator. The former is based on 'within dimension' of the panel whereas the latter is based on 'between dimension' of the panel. An important advantage of the between-dimension estimators is that the form in which the data is pooled allows for greater flexibility in the presence of heterogeneity of the co-integrating vectors. Another advantage of the between-dimension is that the point estimates have a more useful explanation in the event that the true co-integrating vectors are heterogeneous. Particularly, point estimates for the between-dimension estimator can be interpreted as the mean value for the co-integrating vectors. This is not true for the within-dimension estimators (Pedroni, 2001).

Robustness test: The Dynamic OLS estimation

Besides using the FMOLS, this study also employs the DOLS estimator recommended by Kao and Chiang (2000) as a robustness check. This technique is a parametric approach and takes into account the potential endogeneity of the variables as well as the presence of serial correlation by including leads and lags of the differenced explanatory variables as additional regressors (Fidrmuc, 2009;441). Kao and Chiang (2000) show that the DOLS estimator outperforms the FMOLS estimator in the

estimation of co-integrated panel regressions. The DOLS estimator can be expressed as follows:

$$y_{it} = \alpha_i + \acute{x}_{it}\beta + \sum_{j=-q_2}^{j=q_2} c_{ij}\Delta x_{it+j} + v_{it} \quad (13)$$

where c_{ij} is the coefficient of a lead or lag of first differenced explanatory variables.

Kao and Chiang (2000) argue that both estimators (FMOLS and DOLS) have the same (normal) limiting properties, although the FMOLS estimator does not improve the properties of the fixed effects estimator in finite samples.

3. The data

This study employs two data sets, corresponding to the two different measures of financial development indicators, namely banking sector development and stock market development. The first measure of financial development contains three banking sector development indicators, namely private sector credit (PC), domestic credit provided by the banking sector (DC) and liquid liabilities (LQ). Private sector credit is defined as the value of credit supplied by financial intermediaries to the private sector. Liquid liabilities measure the ability of banks to mobilize funds whereas domestic credit comprises private credit as well as credit to the public sector. The second measure of financial development comprises three stock market development indicators namely total share value traded (VT), turnover ratio (TR) and stock market capitalization (MC). The total share value traded is a measure of the total value of shares traded during the period. The turnover ratio is a measure of the value of trades of shares on national stock markets divided by market capitalization to capture the efficiency of the domestic stock markets whereas market capitalization refers to the value or capitalization the market puts on a company. In addition, life expectancy, population growth and the Investment share of Real GDP per capita will be used as measures for human capital (HC), labour growth (LA) and capital stock (CA) respectively. Following standard practice, we use real GDP per capita, (GDPC), and non-oil GDP per capita (NGDP) as two measures for economic growth. The data are gathered from the World Development Indicator (World Bank CD-ROM

2011) and World Bank Financial Structure Dataset (2010) and are collected for 9 MENA countries. It is important to note that the sample covered only 9 countries over the period of 1991–2009 because some countries have not yet created stock markets (e.g. Iraq, Libya, Sudan, Syria and Yemen), and other countries established stock markets very recently (UAE). Beside, data were not available for a uniform period for each country, and many countries have established their stock markets recently. Therefore, the number of observations is expected to same across countries leading to estimations over balanced panel data. All financial development indicators (banking sector and stock market) are expressed as ratios to GDP. The definition of the financial development indicators above are presented in Appendix A.

4. Estimation result

4.1 Panel unit root result

Panel unit root tests are reported in Table 1 for data on real GDP per capita (gdp), real non-oil GDP per capita (ngdp), labor growth (la), capital stock per capita (ca), human capital (hc), liquid liabilities (lq), domestic credit (dc), private credit (pc) market capitalization (mc), turnover ratio (tr) and value traded (vt). All these variables are tested both in levels and first differences with a constant and constant plus time trend. The results of both the LLC and IPS panel unit root tests show that the unit-root hypothesis cannot be rejected when the variables are taken in levels. However when first differences are used, the hypothesis of unit root non-stationarity is rejected at the 1% level of difference. These results lead us to conclude that our series are characterized as an I(1) process.

Table 1: Unit Root tests (Model 1 and Model 2)

	LLC				IPS			
	Level		1th Difference		Level		1th Difference	
	Constant	Constant +Trend	Constant	Constant +Trend	Constant	Constant +Trend	Constant	Constant +Trend
lnGDP	3.002 (3)	-0.720 (2)	-4.327* (2)	-5.301* (2)	5.017 (3)	0.615 (2)	-4.261* (2)	-6.508* (2)
lnNGDP	2.006 (3)	0.348 (2)	-5.494* (2)	-3.731* (2)	4.962 (3)	1.789 (2)	-4.722* (2)	-3.463* (2)
lnLA	-2.751 (3)	0.209 (2)	-7.263* (2)	-7.038* (2)	-2.146 (3)	-0.475 (2)	-8.903* (2)	-7.501* (2)
lnCA	3.086 (3)	-5.990 (2)	-12.40* (2)	-11.341* (2)	2.569 (3)	-4.064 (2)	-9.164* (2)	-7.653* (2)
lnHC	-40.384 (3)	-5.082 (2)	-7.015* (2)	-5.154* (2)	-28.211 (3)	-3.121 (2)	-5.105* (2)	-5.248* (2)
lnLQ	-0.419 (3)	-4.201 (2)	-7.175* (2)	-7.290* (2)	0.032 (3)	-2.441 (2)	-7.045* (2)	-5.874* (2)
lnDC	-2.359 (3)	0.448 (2)	-8.820* (1)	-8.040* (2)	-2.287 (3)	1.116 (2)	-7.501* (1)	-5.849* (2)
lnPC	-3.103 (3)	-2.072 (2)	-8.104* (2)	-8.550* (2)	-2.695 (3)	-1.638 (2)	-7.438* (2)	-7.023* (2)
lnMC	-1.122 (3)	-3.747 (2)	-7.081* (2)	-4.225* (2)	-0.229 (3)	-3.621 (2)	-6.481* (2)	-4.305* (2)
lnTR	-3.643 (3)	-3.574 (2)	-8.640* (2)	-5.691* (2)	-3.789 (3)	-1.784 (2)	-7.964* (2)	-5.140* (2)
lnVT	-2.092 (3)	-2.125 (2)	-5.429* (2)	-3.473* (2)	-1.002 (3)	-1.417 (2)	-5.009* (2)	-3.155* (2)

Notes: Asterisk (*) denotes significant at 5% level. Optimal lag lengths are provided in the parentheses.

4.2 Panel co-integration results

The results of panel co-integration are reported in Tables 2 and 3. Table 2 presents the Pedroni co-integration analysis where the dependent variable is GDP per capita. The results reveal that most of the statistics reject the null hypothesis of no co-integration in all the specified models. For example, in models 1a, 1d, 1e and 1f where financial development is proxied by liquid liabilities, market capitalization, turnover ratio and total share value traded respectively, the results demonstrate that five out of seven statistics reject the null hypothesis. However, as shown in Table 2, the findings provide support for the presence of a co-integrating relationship amongst real GDP per capita, financial development, physical capital, human capital and labor growth.

Table 2: Result of Panel Co-integration Tests (Constant with Trend)
(Dependent variable: real GDP per capita)

	Model 1a FD=LQ	Model 1b FD=DC	Model 1c FD=PC	Model 1d FD=MC	Model 1e FD=TR	Model 1f FD=VT
Panel-v	3.4*	0.9	0.4	3.5*	3.1*	1.9*
Panel-ρ	0.6	0.4	0.3	0.8	1.2	1.6
Panel-t	-5.9*	-6.8*	-6.1*	-12*	-7.1*	-9.1*
Panel-adf	-6.1*	-6.9*	-6.4*	-9.3*	-6.1*	-3.8*
Group-ρ	2.4	2.8	2.3	2.4	3.3	3.1
Group-t	-4.2*	-5.2*	-6.5*	-7.7*	-6.2*	-6.3*
Group-adf	-5.4*	-5.9*	-6.2*	-6.8*	-4*	-4.4*

Notes: The critical value for one side tests is -1.64. Hence, large negative value ($k < -1.64$) implies the rejection of null hypothesis (no co- integration). However, exception for v-stat which critical value are 1.64 that rejection of null require value larger than 1.64.

*, ** reject the null of no co-integration at 1% and 5% significance level respectively.
FD= Financial Development; LQ= Liquid Liabilities; DC= Domestic Credit; PC= Private Credit; MC= Market Capitalization; TR = Turnover Ratio; VT= Value Traded.

Table 3 reports the result of the Pedroni co-integration analysis where the dependent variable is non-oil GDP per capita instead of GDP per capita. The results demonstrate that the test statistics reject the null hypothesis of no co-integration in all the models. For example, in model 2c, where financial development is proxied by private credit, the result reveals that three out of seven statistics reject the null hypothesis. Although a few tests reject the null hypothesis of no co-integration at the 1% significance level, the group tests are likely to be more robust than the panel tests and offer an additional source of heterogeneity among the panel members (Dreger and Reimers, 2005). Therefore, the findings provide support for the presence of a co-integrating relationship amongst real Non-oil GDP per capita, financial development, physical capital, human capital and labor growth.

Table 3: Results of Panel Co-integration Tests (Constant with Trend)
(Dependent variable: real non-oil GDP per capita)

	Model 2a FD=LQ	Model 2b FD=DC	Model 2c FD=PC	Model 2d FD=MC	Model 2e FD=TR	Model 2f FD=VT
Panel-v	1.9**	0.5	0.6	1.1	1.7**	1.04
Panel-ρ	2.2	2.5	2.6	2.7	2.6	2.8
Panel-t	-1.1	-0.2	-0.6	0.7	0.7	0.7
Panel-adf	-0.9	-1.5	-3.2*	-1.5	-1.06	-1.5
Group-ρ	3.5	3.9	3.8	3.5	4.2	4
Group-t	-1.1	-3.5*	-4.1*	-2.2*	-1.2	-1.8**
Group-adf	-0.3	-2.4*	-2.6*	-2.1*	-0.02	-0.5

Notes: The critical value for one side tests is -1.64. Hence, large negative value ($k < -1.64$) implies the rejection of null hypothesis (no co-integration). However, exception for v-stat which critical value are 1.64 that rejection of null require value larger than 1.64.
*, ** reject the null of no co-integration at 1% and 5% significance level respectively.
FD= Financial Development; LQ= Liquid Liabilities; DC= Domestic Credit; PC= Private Credit; MC= Market Capitalization; TR = Turnover Ratio; VT= Value Traded.

4.3 Pesaran'sTest of Cross-sectional Independence

With respect to the panel unit root and co-integration tests that have been employed so far were constructed under the assumption of cross-sectional independence. However it is important to test for the presence of cross-sectional dependence before implying panel fully modified least squares (FMOLS) and dynamic OLS (DOLS) methods. This is because failing to take into account of cross-sectional dependence may cause severe size distortions and thereby invalidate the estimations and inferences (Hamit-Haggar, 2011). Table 4 reports the cross-sectional independence results from the Pesaran test. The results of cross-sectional independence for Model (1) and Model (2) for different regressions are conformed in the data.

Table 4: Pesaran'sTest of Cross-sectional Independence results

Model 1a FD=LQ	Model 1b FD=DC	Model 1c FD=PC	Model 1d FD=MC	Model 1e FD=TR	Model 1f FD=VT
3.33 (0.05)	3.15 (0.09)	3.20 (0.18)	2.67 (0.07)	3.21 (0.10)	3.48 (0.08)
Model 2a FD=LQ	Model 2b FD=DC	Model 2c FD=PC	Model 2d FD=MC	Model 2e FD=TR	Model 2f FD=VT
-0.38 (0.70)	-1.88 (0.05)	-1.70 (0.08)	-1.71 (0.08)	-1.62 (0.10)	-1.81 (0.07)

Notes: Figures in brackets are probability values. FD= Financial Development; LQ= Liquid Liabilities; DC= Domestic Credit; PC= Private Credit;MC= Market Capitalization; TR = Turnover Ratio; VT= Value Trade. CD test statistic is based on two-sided N(0,1) test and distributed as a standard normal.

4.4 FMOLS estimation results

The fully modified OLS estimates of the co-integrating relationship are reported in Tables 5, 6, 7 and 8. Turning first to Table 5 with time dummies in the specification, the estimated coefficient for human capital is positive and statistically significant at the 1 percent level, as expected by theory, but labor growth is positive which is inconsistent with theory. It is interesting that the coefficient of physical capital is statistically insignificant and in some regressions is negative. The lack of a relationship between physical capital and economic growth may be linked to inefficient economic plans and the financial crisis in the MENA countries. On the other hand, the estimated coefficients for the financial development indicators in the stock market sector are positive and statistically significant at the 5 percent level. While the results show that the estimated coefficients for the banking sector indicators are significant and negative except for Model 1d, which uses liquid liabilities as the financial development measurement.. This indicates that economic growth for MENA countries are affected by financial development and that the stock market indicators are slightly stronger than the banking sector indicators in influencing growth in the MENA region. This finding is different from Naceur and Ghazouni (2007) who find that financial development is unimportant or even harmful for

economic growth in the MENA region. However, the negative and significant association between bank credit (private credit and domestic credit) and growth as shown in Models 1e and 1f may be directly linked to the overwhelming public sector and inefficiency in the credit allocation. With regards to the control variables, the empirical results show that human capital plays an important role in determining economic growth due to the fact that the magnitude of its contribution is higher than the other control variables.

Table 5: Panel Group FMOLS Results with time dummies
(Dependent Variable: Real GDP per capita)

FMOLS Regressions						
	Stock Market Development			Banking Sector Development		
	Model 1a (FD= Value traded)	Model 1b (FD = Turnover)	Model 1c (FD = Market Capitalization)	Model 1d (FD=Liquid Liabilities)	Model 1e (FD = Private credit)	Model 1f (FD = Domestic Credit)
Physical Capital	-0.0034 (-1.918)	-0.0231 (-2.519)	0.0126 (-0.737)	-0.0246 (-1.307)	0.0148 (0.860)	-0.0158 (-1.112)
Human Capital	5.255 (5.483)*	2.792 (2.923)*	5.160 (8.583)*	6.610 (9.444)*	3.145 (2.876)*	4.274 (6.755)*
Labour Growth	0.0481 (6.368)*	0.044 (6.123)*	0.0507 (6.584)*	0.0460 (9.479) *	0.0515 (10.471)*	0.052 (9.162)*
Financial Development (FD)	0.0064 (2.107)**	0.0152 (2.117)**	0.0196 (2.076)**	-0.106 (-1.693)	-0.054 (2.350)**	-0.083 (1.820)

Notes: * and ** denote significance at 1% and 5% levels, respectively. Figures in the parentheses are t-statistics. The sign of the coefficient and t-statistics can be inconsistent due to the t-statistic computation in FMOLS is different.

Table 6 repeats the analysis of Tables 5 with the alternative proxy for economic growth, namely non-oil GDP per capita as the dependent variable. Table 6 shows that all the estimated coefficients in the different regressions for physical capital are positive and statistically significant at the 1 percent level, as expected by theory. The coefficient of human capital is statistically significant and positive except for Model 1a, where the total share of value traded is the proxy for financial

development. For labor growth, the estimated coefficients are statistically significant and negative except for Models 1a to 1c where the stock market indicators are employed as the financial development measurement.

The estimated coefficients for the financial development indicators are statistically significant and negative where the banking sector proxies are used but insignificant when financial development is proxied by the stock market sector. As shown in Table 6, the coefficients associated to the banking sector indicators are negative and have high values (columns (4) to (6)). These findings are different from that obtained before which shows the importance of the stock market indicators in promoting economic growth.

Table 6: Panel Group FMOLS Results with time dummies
(Dependent Variable: Real Non-Oil GDP per capita)

FMOLS Regressions						
	Stock Market Development			Banking Sector Development		
	Model 1a (FD= Value traded)	Model 1b (FD = Turnover)	Model 1c (FD = Market Capitalization)	Model 1d (FD=Liquid Liabilities)	Model 1e (FD = Private credit)	Model 1f (FD = Domestic Credit)
Physical Capital	0.372 (7.762)*	0.352 (7.187) *	0.438 (8.620) *	0.280 (8.554) *	0.403 (8.612) *	0.269 (7.041) *
Human Capital	-2.125 (-0.011)	4.647 (-2.436) **	0.916 (3.722) *	0.479 (4.737) *	7.380 (-2.483) **	6.582 (1.975) **
Labour Growth	-0.0038 (1.253)	0.004 (1.713)	-0.0199 (1.305)	-0.010 (2.840) *	-0.038 (7.117) *	-0.010 (4.400) *
Financial Development (FD)	0.0051 (-0.257)	0.007 (-0.602)	-0.020 (0.186)	-0.488 (-9.254) *	-0.173 (-4.348) *	-0.348 (-4.649) *

Notes: * and ** denote significance at 1% and 5% levels, respectively. Figures in the parentheses are t-statistics. The sign of the coefficient and t-statistics can be inconsistent due to the t-statistic computation in FMOLS is different.

In order to compare the relative importance of both stock market and banking sector development in influencing growth, this study re-estimated Models (1) and (2) but with both indicators included in the

specification. As shown in Table 7, the estimated coefficient for stock market development is significant and positive while the banking sector is significant and negative for all the regressions. These results confirm that economic growth is affected by financial development, especially stock market development, in the MENA region. However, the significance and negative association between the banking sector, acting as a proxy of financial development, and economic growth during the observed period reveals the inefficiency of the credit allocation process, credit regulation and state owned banking in the MENA region. This finding is in line with Naceur and Ghazouni (2007) who find that there is no association between bank development and economic growth because of a high degree of financial repression in the MENA region. Indeed, the negative contribution of the banking sector indicators in the financial development process is mainly due to the underdevelopment of the banking system in MENA countries, implying limited efforts to press ahead with further development in response to higher growth. In addition, the development of capital market activities promotes higher economic activity which creates opportunities for financial diversification in light of the underdevelopment of the banking system.

Table 7: Panel Group FMOLS Results

	Dependent Variable: Real GDP per capita		Dependent Variable: Real Non-oil GDP per capita	
	without time dummies	with time dummies	without time dummies	with time dummies
Physical Capital	0.002 (-0.225)	-0.004 (0.791)	0.138 (2.747)*	0.348 (8.741)*
Human Capital	6.173 (30.284) *	3.952 (4.508)*	8.427 (22.414)*	6.176 (-2.666)*
Labour Growth	0.201 (8.893) *	0.039 (7.285)*	-0.153 (7.261)*	-0.013 (2.693)*
Market Capitalization	0.028 (0.440)	0.036 (4.284)*	0.028 (0.622)	0.042 (-0.530)
Private credit	-0.110 (-2.438)**	-0.054 (2.989)*	-0.022 (-3.140)*	-0.098 (-6.319)*

Notes: * and ** denote significance at 1% and 5% levels, respectively. Figures in the parentheses are t-statistics. The sign of the coefficient and t-statistics can be inconsistent due to the t-statistic computation in FMOLS is different.

Table 8 highlights the summary of the above results, where stock market development has a greater impact than banking sector development in influencing economic growth in the MENA region.

Table 8: Summary of the Results (FMOLS) - Financial Development and Growth

			Dependent Variable: Real GDP per capita		Dependent Variable: Real Non-oil GDP per capita	
			Without time dummies	With time dummies	Without time dummies	With time dummies
Financial Development Indicators	Banking Sector	Liquid Liabilities	(+) Significant	Insignificant	(-) Significant	(-) Significant
		Private credit	Insignificant	(-) Significant	Insignificant	(-) Significant
		Domestic Credit	(-) Significant	Insignificant	Insignificant	(-) Significant
	Stock Market	Value traded	(+) Significant	(+) Significant	(+) Significant	Insignificant
		Turnover	(+) Significant	(+) Significant	Insignificant	Insignificant
		Market Capitalization	(+) Significant	(+) Significant	(+) Significant	Insignificant

Robustness Checks

4.5 DOLS estimation results

This study employs the DOLS estimation procedure as a robustness check and the results are reported in Tables 9 and 10. As shown in Table 9, the estimated coefficients for the financial development indicators namely share value traded, turnover ratio and stock market capitalization are statistically significant at the 5 percent level and positive while for models 1d to 1f, which use banking sector indicators, are significant but negative. On the other hand, when we employ non-oil GDP per capita as the dependent variable, as reported in Table 10, the only estimated coefficients which were found to be statistically significant were two of the stock market development indicators namely, share value traded and turnover ratio. They were estimated to be positive, whereas the other indicators were insignificant and negative except Model 2c.

Overall, the DOLS results support those obtained from the FMOLS estimations which shows the importance of the stock market indicators in promoting economic growth. In fact, the findings provide new evidence in understanding that financial development has had a significant effect on economic growth in the MENA region and that stock market indicators are slightly stronger than banking sector indicators in influencing growth. With regards to the control variables, the empirical results also show that human capital plays an important role in determining economic growth due to having the correct sign and a high value, which is consistent with theory.

Table 9: Panel Group DOLS Results (Dependent Variable: Real GDP per capita)

	Stock Market Development			Banking Sector Development		
	Model 1a (FD= Value traded)	Model 1b (FD = Turnover)	Model 1c (FD = Market Capitalization)	Model 1d (FD=Liquid Liabilities)	Model 1e (FD = Private credit)	Model 1f (FD = Domestic Credit)
Physical Capital	-0.549 (-11.77)*	-0.478 (-10.29)*	-0.524 (-10.94)*	-0.433 (-9.18)*	-0.467 (-9.68)*	-0.479 (-10.15)*
Human Capital	20.091 (24.46)*	20.389 (28.05)*	19.997 (25.79)*	19.989 (26.68)*	20.732 (27.23)*	20.020 (30.03)*
Labour Growth	0.440 (49.24)*	0.288 (29.44)*	0.566 (66.87)*	0.403 (40.24)*	0.443 (51.81)*	0.427 (46.05)*
Financial Development (FD)	0.012 (3.05)*	0.181 (10.25)*	0.070 (3.46)*	-0.276 (-3.18)*	-0.342 (-5.00)*	-0.237 (-4.16)*
R^2	5.799	7.247	4.909	5.056	5.599	6.178

Notes: * and ** denote significance at 1% and 5% levels, respectively. Figures in the parentheses are t-statistics.

Table 10: Panel Group DOLS Results
(Dependent Variable: Real Non-Oil GDP per capita)

	Stock Market Development			Banking Sector Development		
	Model 2a (FD= Value traded)	Model 2b (FD = Turnover)	Model 2c (FD = Market Capitalization)	Model 2d (FD=Liquid Liabilities)	Model 2e (FD = Private credit)	Model 2f (FD = Domestic Credit)
Physical Capital	-0.231 (-3.11)*	-0.179 (-2.30)*	-0.239 (-3.00)*	-0.173 (-2.66)*	-0.208 (-2.69)*	-0.199 (-2.64)*
Human Capital	18.410 (14.06)*	18.672 (16.08)*	18.071 (14.01)*	18.133 (19.57)*	18.51 (15.05)*	18.284 (17.11)*
Labour Growth	0.227 (15.94)*	0.179 (11.48)*	0.321 (22.80)*	0.276 (20.00)*	0.322 (23.33)*	0.299 (20.08)*
Financial Development (FD)	0.047 (2.61)*	0.150 (5.34)*	0.019 (0.59)	-0.142 (-1.19)	-0.095 (-0.87)	-0.106 (-1.17)
R^2	2.252	2.504	1.958	1.912	2.112	2.153

Notes: * and ** denote significance at 1% and 5% levels, respectively. Figures in the parentheses are t- statistics.

5 Conclusion

This study examines the effect of financial development on economic growth using a panel of nine MENA countries over the period of 1991 to 2009. Pedroni panel co-integration, fully modify ordinary least squares and dynamic ordinary least squares methods are employed in the analysis. The estimated results confirm that each financial sector (banking sector-stock market) has a unique and different effect on economic growth. There is strong evidence that financial development has a significant effect on economic growth in the MENA region and stock market indicators look slightly stronger than banking sector indicators. The significance and negative association between the banking sector indicators, as financial development measurements, and economic growth during the observed period reveals that there is an inefficient credit allocation process, as well as inefficient credit regulation and state owned banking in the MENA region. In fact, government intervention appears to have negative effects resulting in efficiency losses according Mckinnon (1973) and Shaw (1973).

The findings of this study have important policy implications. It is obvious that policies that support both bank and stock market development are more favourable, rather than in favour of either banks or stock markets. Improving the banking sector, especially in its credit allocation process, strengthening credit regulation and reinforcing competition in the banking sector and privatizing the state owned banks can help to progress financial development programs and raise economic growth. Moreover, improving the corporate governance of MENA banks through initiatives, such as the one launched in 2005 which affected on board structures, risk management, competitiveness, investment and disclosure, enables banks to allocate capital efficiently and contributes to overall economic growth. On the other hand, improving and enhancing growth and liquidity as well as regulatory reforms and increased liberalization in the stock markets within the MENA region is expected to enhance regional intermediation of resources through the close integration of financial markets and will stimulate economic growth in the region.

To this end, it is very important to mention that the MENA region has completely different pattern of political rules and evolution in the course of the past two decades. The MENA region has experienced successive waves of protest, some sparked by economic conditions, others by political events. While the links between economic and political protest vary from country to country, they are much more closely intertwined in this region. Thus, It is apparent that policies that address both political and economic forces are more favourable, rather than in favour of either politics or economics. Since the development of financial sector and macroeconomic stability may depend on the political movements, it is important for the political leaders to manage the political risks and ensure that policies have time to work, take advantage of opportunities they encounter and avoid the pitfalls and the paths away from crisis they may pursue.

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Appendix A: Definition and Sources of the Data

Financial development Indicators	Definition	Sources
1.Liquid Liabilities/GDP	The sum of currency and deposits in the central bank (M0), plus transferable deposits and electronic currency(M1), plus time and savings deposits, foreign currency transferable deposits, certificates of deposit, and securities repurchase agreements(M2), plus travelers checks, foreign currency time deposits, commercial paper, and shares of mutual funds or market funds held by residents.	World Development Indicator (World Bank CD-ROM, 2011), World Bank Financial Structure Dataset (2010).
2.Domestic Credit/GDP	Includes all credit to various sectors on a gross basis. The banking sector includes monetary authorities and deposit money banks, as well as other banking institutions where data are available.	World Development Indicator (World Bank CD-ROM, 2011), World Bank Financial Structure Dataset (2010).
3.Private Sector Credit/GDP	Financial resources provided to the private sector, such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment.	World Development Indicator (World Bank CD-ROM, 2011), World Bank Financial Structure Dataset (2010).
4.Stock Market Capitalization/GDP	Market capitalization is the share price times the number of shares outstanding.	World Development Indicator (World Bank CD-ROM, 2011), World Bank Financial Structure Dataset (2010).
5. Stock Market Turnover Ratio	Ratio of the value of total shares traded and average real market capitalization.	World Development Indicator (World Bank CD-ROM, 2011), World Bank Financial Structure Dataset (2010).
6.Total Share Value Traded/GDP	Stock traded refers to the total value of shares traded during the period.	World Development Indicator (World Bank CD-ROM, 2011), World Bank Financial Structure Dataset (2010).