No. 2-2020

Financial Sector Development Studies

Responses of Economic Growth to Financial Development Changes: Evidence from Arab Countries

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ARAB MONETARY FUND

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2020

These economic studies are the product of the staff of the Economic and Technical Department at the Arab Monetary Fund (AMF). The Fund publishes these studies which survey issues pertinent to monetary, fiscal, banking, trade and capital market policies and their impact on Arab economies.

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Executive summary

Given the important role played by the financial sector in boosting economic growth, most Arab countries have devoted particular attention to develop it by issuing many regulatory and supervisory legislations in order to activate its role more in the economy. The literature lists some empirical works on the finance-growth link for the Arab countries, with no clear consensus on the responses of economic growth to the changes in financial development due to heterogeneity in the economies, the development degree of the financial sector, how to measure financial development, the study period, and the methodology. In this study, we enhance the understanding of the relationship between financial development and economic growth in the Arab countries by opting for a reliable econometric methodology and various financial development measures. Under these conditions, we attempt to examine whether there is evidence of a significant finance-growth nexus over both the long- and short-run and to determine the extent of the adjustment speed of the short-run deviations of economic growth towards the long-run equilibrium state in the Arab countries.

The results reveal that economic growth positively responds to the changes in financial development in some Arab economies, with varied magnitudes across financial development measures and countries. Upon the obtained findings, some recommendations may help policymakers to boost financial development and, thus, activate

its role in promoting productive investments to stimulate economic growth in the Arab countries in a current environment characterized by many economic and financial fluctuations. In this vein, policymakers can enhance financial development by easing restrictions on provided credit, improving effective control of the financial sector through the issuance of favorable legislations, and adopting financial liberalization policies. They should also manage resources effectively to address the deficiency in the financial sector in order to activate its role in the national economy. Additionally, authorities can develop strategies and plans to enhance the financial sector in order to alleviate the obstacles that prevent economic growth in the Arab countries.

Introduction

The financial sector, as a vital sector of any country's economy, has witnessed many developments in recent decades. It mainly transfers funds from savers to investors, i.e. it directs funds towards investment projects, thus highlighting the important role of the financial sector in directing these funds to new and high-productivity projects that serve the national economy. The level of financial development in the country determines the size and effectiveness of the financial sector and improves its performance in many respects, as it reduces the costs of obtaining information in financial institutions, enhances and improves corporate governance and control of investments, enables it to attract and accumulate many savings, and reduces risks through investment portfolio diversification.

Over the past few decades, the economic growth in some Arab countries has contributed to improve the living standard in these countries. This economic growth may be driven not only by standard production factors but also by other factors related to financial development. For that reason, most Arab economies have devoted more attention to the development of the financial sector given its importance and its key role in contributing to economic growth. In fact, the financial sector in the Arab countries has witnessed significant development with the issuance of several regulatory and supervisory legislations that aimed at activating the role of this sector

in the economy. The development of the financial sector leads to the question of the effectiveness of such legislations and their impact on economic growth and the nature of the relationship between financial development and economic growth therein.

The prior works on the Arab countries do not show consensual findings on the finance-growth nexus, as the obtained results vary according to the nature of the economy, the degree of its development, the financial development indicators, the time period, and the methodology. For all these reasons, we revisit the relationship between financial development and economic growth for the Arab region by considering various financial development indicators and a sophisticated econometric methodology. Specifically, the main research problem can be expressed by the following questions:

- Is there a significant long-run relationship between financial development and economic growth in the Arab countries? What is its nature?
- Is there a significant short-run relationship between financial development and economic growth in the Arab countries? What is its nature?
- How about the adjustment speed of the short-run deviations of economic growth towards the long-run equilibrium state in the Arab countries? What is its extent?

The adopted methodology aims to obtain pertinent results and, thus, draw reliable conclusions that can help authorities make sound

decisions and policies, based on the magnitude and sign of the finance-growth nexus, to develop the financial sector in order to effectively foster future economic growth in the Arab countries. In addition, the study aims to compare the magnitude of the effects of the financial development measures on economic growth of the Arab countries in order to determine the set of countries for which the financial sector contributes more to economic growth. The other economies can therefore draw on the experience of these countries to improve their financial sector in order to boost economic growth.

The remainder of the paper is structured as follows. Section 1 presents a brief literature review of some empirical works in the field. Section 2 provides a preliminary analysis of data to select the appropriate methodology to apply for studying the finance-growth nexus. Section 3 introduces the econometric methodology. Section 4 discusses the empirical results. The study concludes with some policy implications of the obtained results.

1. Literature review

The study of the relationship between financial development and economic growth in developing and developed countries has received increasing attention in recent years based on a wide range of financial development measures and different econometric methodologies. The empirical works found mixed conclusions in terms of magnitude and sign of the impact of financial development on economic growth, thus suggesting that there is no consensus on

the issue. This section briefly reviews some relevant empirical studies in the field related to international economies first and to the Arab region second.

1.1. Finance-growth nexus for international economies

Kar and Pentecost (2000) investigates the effects of financial development on economic growth for the Turkish economy from 1963 to 1995 based on Granger causality tests in the vector error correction framework. The findings indicate that the financial development, measured by money to income, leads to economic growth and that, when using bank deposits, private credit and domestic credit ratios, economic growth causes financial development. Based on the same methodology, Ang and McKibbin (2007) examine the links between financial development and economic growth in Malaysia during the period 1960-2001 by controlling for real interest rate and financial repression. The empirical findings reveal a positive finance-growth nexus and support the Robinson's view stipulating that over the long-run, economic growth leads to higher financial depth.

Al-Yousif (2002) opts for time series and panel data techniques to investigate the relationship between financial development and economic growth in 30 developing economies from 1970 to 1999. The results reveal bidirectional causality between financial development and economic growth and point to the fact that the finance-growth nexus cannot be generalized across economies, as

these latter adopt heterogeneous economic policies whose success relies on the efficiency of the institutions that implement them.

Bojanic (2012) examines the finance-growth link for Bolivia over the period 1940-2010 based on cointegration and causality techniques. The findings reveal a long-run relationship between the variables and a significant impact of financial development on economic growth. Adusei (2013) finds a positive bi-directional finance-growth nexus for a set of 24 African countries from 1981 to 2010 by applying the GMM dynamic panel methodology. Based on the same methodology, Barajas et al. (2013) examine whether the impact of financial development on economic growth varies across 150 economies over the period 1975-2005. The results show that the finance-growth nexus is heterogeneous across countries, which might be due to the regulatory and supervisory characteristics as well as the access to financial services.

Ayu (2016) examines the finance-growth link by controlling for auxiliary variables in the model for a set of 50 economies over the period 2000-2013 based on panel data techniques. The results reveal long-run linkages between the variables for three regions. As regards the finance-growth link, it is found that causality between financial development and economic growth depends on regions. Indeed, there is evidence of bidirectional causality between financial development and economic growth for Europe. However, for America, Asia-Oceania and Middle East, causality runs from economic growth to

financial development. Durusu-Ciftci et al. (2017) investigate the relationship between financial development and economic growth for a set of 40 economies over the period 1989-2011 using panel data techniques that allow cross-country dependence. The results show evidence of a positive effect of financial development on economic growth over the long-run. The authors recommend that policymakers foster the financial sector to accelerate economic growth in the considered countries.

Stojkoski et al. (2017) employ panel cointegration techniques to examine the relationship between financial development and economic growth for a group of 16 South-Eastern and Central European economies from 1995 to 2014. The results point to a positive impact of financial development on economic growth, and that this effect is almost twice the size of the gross capital formation. Based on a similar methodology, Bist (2018) examines the finance-growth nexus for a panel of low-income economies over the period 1995-2014. The FMOLS and DOLS methods applied to estimate the long-run relationship show evidence of a positive impact of financial development on economic growth. The author recommends that policymakers should encourage more the private sector by providing a favorable environment.

1.2. Finance-growth nexus for Arab economies

Al-Bulbul et al. (2004) investigates the reactions of total factor productivity to changes in the financial development in the Egyptian

economy during the period 1974-2002 by controlling for per capita income and private resource flows in the model. The estimation of the linear regression model reveals that the banking indicators negatively affect the total factor productivity, and that stock indicators have a positive impact on the total factor productivity. These results imply that expanding the financial sector to include the stock market has benefited from efficient investment and growth in Egypt, which can be maximized through more active reforms in the banking and stock markets. In a similar context, Abu-Bader and Abu-Qarn (2008) employ Granger causality tests in the framework of error correction models to study how economic growth reacts to changes in the financial development for the Egyptian economy from 1960 to 2001. The findings reveal bi-directional links between financial development and economic growth, and point to the necessity of boosting efficiency of the financial system in order to stimulate economic growth.

Mohamed (2008) examines the finance-growth nexus in Sudan from 1970 to 2004 based on the bounds testing approach to cointegration developed by Pesaran et al. (2001). The findings reveal a negative relationship between financial development and economic growth, which may be explained by the inefficient allocation of resources, the inappropriate investment climate and the poor quality of credit outlay of the banking sector. Based on the same methodology, Al-Malkawi et al. (2012) investigate the effects of financial development on economic growth in the United Arab Emirates (UAE) from 1974 to

2008. The results suggest that the financial development, measured by the monetization ratio, negatively affects economic growth, which may be explained by the fact that the financial sector in the UAE is still in the transition phase and must reach a certain threshold before driving economic growth.

Samargandi et al. (2014) employ the bounds testing approach to cointegration to study the relationship between financial development and economic growth for both oil and non-oil sectors in the Saudi economy during the period 1968-2010. The results show that financial development positively impacts economic growth emanating from the non-oil sector. However, there is evidence of either negative or insignificant effects on economic growth as a whole and of the oil-sector. Therefore, the finance-growth nexus may be mainly different in resource-driven economies. In a similar study and based on the same methodology, Al-Gafes (2016) investigates the relationship between financial development and economic growth for the non-oil sector in Saudi Arabia during the period 1985-2015. Using various financial development indicators, the results show evidence of a positive impact of financial development on economic growth for both government and private non-oil sectors. The results reveal that there is no impact of the financial development on economic growth for the government non-oil sector, and that financial development exerts a significant effect on economic growth for the non-oil sector as a whole and the private non-oil sector. Based

on these findings, the author argues that it is necessary to privatize some government sectors to improve productivity and reduce costs.

Ismaiel and Shaker (2016) examine the effects of financial development on economic growth in Syria from 1980 to 2010 by employing the Johansen's cointegration approach. The findings reveal that economic growth negatively reacts to changes in the financial development over the long-run. However, there evidence of no significant linkages between financial development and economic growth over the short-run. The authors explain these results by the inefficiency and the underdevelopment of the financial sector as well as its inability to keep pace with the development requirements of the Syrian economy. Therefore, it is necessary to redress the deficiencies of the financial sector in terms of the efficiency of resource management.

2. Preliminary analysis of the data

We investigate the dynamic relationship between economic growth, measured by real gross domestic product (RGDP), and a set of financial development indicators in six Arab countries (Saudi Arabia, the UAE, Algeria, Tunisia, Egypt, and Jordan) based on annual data sample, from 1980 to 2018,[1] collected from the World Development

[1] The study period is recent and considers the last sharp falls in oil price, which has not been done in previous works on the Arab region.

Indicators database of the World Bank.[2] To assess financial development in the Arab region, we consider a set of banking indices that consist of domestic credit provided by financial sector as share of GDP (DCFS),[3] domestic credit to private sector by banks as share of GDP (DCPSB), and broad money as percentage of GDP (BM).[4] The use of three measures to proxy financial development allows us to determine the indicator that contributes more to economic growth across the Arab countries and to provide a robustness check to the finance-growth nexus. We also add auxiliary variables, known as usual drivers of economic growth, in the model, namely trade openness (OPEN) defined as the sum of exports and imports of goods and services as share of GDP and investment (INVS) measured by gross fixed capital formation as percentage of GDP. All variables, except of the domestic credit provided by financial sector as share of GDP that contains negative values, are converted into logarithm, thus implying that the coefficient estimates are considered as elasticities

[2] Readers are referred to the Appendix for the definition of the variables.

[3] We are the first to consider this indicator to analyze the relationship between financial development and economic growth for the Arab countries.

[4] It would have been useful to consider stock market indicators to measure financial development, such as the market capitalization of listed domestic companies, the total value of stocks traded, and the turnover ratio of domestic shares, to diversify the analysis, but the data for most Arab countries over the study period are unavailable.

that measure the responses of economic growth to changes in the considered independent variables.

The dynamic patterns of the variables across countries displayed in Figures 1-6 show evidence of similar time trending behavior with upward and downward peaks over different periods, thus suggesting structural breaks in the variables, which will be checked below by the unit root test with structural change. These insights may reveal cointegration between the variables over the study period. Some descriptive statistics of the variables reported in Table 1 indicate that the real gross domestic product varies in average from 1.7E+10 for Jordan to 4.18E+11 for Saudi Arabia, with the lowest risk for Joran, as shown by the standard deviation. The correlation analysis provided in Table 2 reveals mixed results in terms of magnitude and sign of the correlation coefficients between the real gross domestic product and the set of independent variables. Indeed, the real gross domestic product is positively correlated with the broad money for all countries. However, there is evidence of mixed correlations between the real gross domestic product and the other variables, with more positive correlation for domestic credit provided by financial sector, domestic credit to private sector by banks and trade openness, and more negative correlation for investment. These insights cannot be determinant as to the detection of causality between financial development and economic growth, thus justifying recourse to a reliable econometric methodology, as will be done later in the study.

We now conduct unit root tests to examine the non-stationarity properties of all variables across countries and, thus, determine the integration order of the time series in order to choose the suitable methodology to apply for studying the relationship between financial development and economic growth. To that effect, we employ the unit root test, developed by Lee and Strazicich (2003), that considers two endogenous break dates in the level and trend.[5] The incentive behind the use of this test is that the considered variables reveal stylized facts, such as unit root and structural break (see Figures 1-6), and that the usual unit root tests without structural change are not powerful in presence of breaks in the data. The results displayed in Table 3 show evidence of mixed integration order for the variables, as some of them are non-stationary in level and stationary in first-differences, i.e. I(1), and others are stationary in level and first-differences, i.e. I(0), across countries regardless of the test equation. Under these conditions, we can apply the bounds approach developed by Pesaran et al. (2001) to test for cointegration between the variables and to examine the long- and short-run effects of financial development on economic growth in the Arab countries.

[5] The test is built under the null hypothesis of unit root. The choice of a test with two break dates is dictated by the relatively small sample size of the time series.

The break dates determined by the test and displayed in Table 4 show similar dates across variables and countries,[6] thus suggesting that the Arab countries are simultaneously affected by shocks, given that most Arab countries are linked economically and characterized by common features in terms of development strategies. These dates coincide with various influential international events, in addition to domestic events that occurred at different times in the Arab countries.

3. Econometric methodology

Given that the variables are mixed in terms of integration order (a mixture of I(0) and I(1) variables), we employ the bounds testing approach to cointegration developed by Pesaran et al. (2001), which is very useful for small samples (see Narayan, 2005), as it is the case in our study (39 observations), and avoids endogeneity problems.

3.1. Cointegration test

For each country, the bounds test is based on the following ARDL $(p_1, p_2, p_3, p_4, p_5, p_6)$ model:[7]

[6] The similarity of some dates for all variables in each country gives support to our study of the linkages between economic growth and the set of considered variables.

[7] ARDL stands for Autoregressive Distributed Lag. Unlike the Johansen's testing procedure that assumes similar lag orders, the ARDL approach allows different lags for the variables, thus improving the small-sample properties of the estimators. Pesaran et al. (2001) outline that the orders of the ARDL model can be identical

$$\Delta RGDP_t = \alpha' V_t + \sum_{j=1}^{P_1} a_{1j} \Delta RGDP_{t-j} + \sum_{i=2}^{6} \sum_{j=1}^{p_i} a_{ij} \Delta X_{i,t-j} + b_1 RGDP_{t-1} + \sum_{i=2}^{6} b_i X_{i,t-1} + \varepsilon_t \quad (1)$$

where 'Δ' refers to the first-differences, X_t is the vector of independent variables ($DCFS_t$, $DCPSB_t$, BM_t, $OPEN_t$, and $INVS_t$), V_t is the vector of deterministic variables, and ε_t is the error term. The optimal lag orders of the ARDL model are selected using the Schwarz information criterion given a maximum lag length that is equal to 3 in this study.

Analytically, under the null hypothesis of no cointegration between the variables, the long-run coefficients b_1, b_2, b_3, b_4, b_5 and b_6 are all equal to zero, thus implying that the test statistic is simply the *F*-statistic of joint significance of the lagged variables $RGDP_{t-1}$ and $X_{i,t-1}$ $(i = 2, 3, \dots, 6)$. Given that the asymptotic distribution of the *F*-statistic is non-standard, Pesaran et al. (2001) calculate lower and upper bound critical values to decide on the rejection of the null hypothesis. Under these conditions, we reject the null hypothesis of no cointegration if the *F*-statistic is greater than the upper bound critical value. On the other hand, there is evidence of no cointegration if the *F*-statistic is less than the lower bound critical value. However, if the *F*-statistic is between the lower and upper bound critical values, the test is inconclusive. In this situation, we can use the error

for all variables, i.e. $p_1 = p_2 = p_3 = p_4 = p_5 = p_6$, without affecting the asymptotic theory.

correction term coefficient in the error correction model to decide on the existence of cointegrating linkages between the variables, as recommended by Bahmani-Oskooee and Nasir (2004).

3.2. Long-run relationship

Given cointegration between the variables, the coefficients of the long-run relationship are estimated based on the following ARDL $(p_1, p_2, p_3, p_4, p_5, p_6)$ model:

$$\emptyset(L, p_1)RGDP_t = \beta' V_t + \sum_{i=2}^{6} \varphi_i(L, p_i)X_{it} + u_t \qquad (2)$$

where $\emptyset(L, p_1) = 1 - \emptyset_1 L - \emptyset_2 L^2 - \cdots - \emptyset_{p_1} L^{p_1}$, $\varphi_i(L, p_i) = \varphi_{i0} + \varphi_{i1} L + \varphi_{i2} L^2 + \cdots + \varphi_{ip_i} L^{p_i}$, and u_t is the error term. Given the optimal lag orders of the ARDL model, $\hat{p}_1$, $\hat{p}_2$, $\hat{p}_3$, $\hat{p}_4$, $\hat{p}_5$ and $\hat{p}_6$, selected using the Schwarz information criterion, the long-run effects of the independent variables on economic growth are given by the following coefficients:

$$\hat{\delta}_i = \frac{\hat{\varphi}_{i0} + \hat{\varphi}_{i1} + \hat{\varphi}_{i2} + \cdots + \hat{\varphi}_{i\hat{p}_i}}{1 - \hat{\emptyset}_1 - \hat{\emptyset}_2 - \cdots - \hat{\emptyset}_{\hat{p}_1}}, \qquad i = 2, 3, \ldots, 6 \qquad (3)$$

In this situation, $\hat{\delta}_2$ measures the long-run effect of the domestic credit provided by financial sector on economic growth, $\hat{\delta}_3$ measures how economic growth reacts to changes in the domestic credit to private sector by banks over the long-run, $\hat{\delta}_4$ measures the long-run impact of the broad money on economic growth, $\hat{\delta}_5$ measures the responses of economic growth to the fluctuations in trade openness

over the long-run, and $\hat{\delta}_6$ measures the long-run effect of investment on economic growth.

3.3. Error correction model

Given the estimated long-run relationship, the error correction model is expressed as follows:

$$\Delta RGDP_t = \gamma ECT_{t-1} + \theta' \Delta V_t + \sum_{j=1}^{\hat{p}_1 - 1} c_j \Delta RGDP_{t-j} + \sum_{i=2}^{6} \sum_{j=0}^{\hat{p}_i - 1} d_{ij} \Delta X_{i,t-j} + \epsilon_t \quad (4)$$

where γ is the error correction term (ECT) coefficient (should be significantly negative) that measures the adjustment speed of the short-run deviations of economic growth towards the long-run equilibrium state, θ is the vector of coefficients of the deterministic variables, the coefficients c_j measure the short-run effects of the lagged values of the real gross domestic product on its current values, the coefficients d_{ij} measures the short-run effects of the current and lagged values of the independent variables on economic growth, and ϵ_t is the error term.

4. Discussion of the results

The *F*-statistic of the bounds testing approach for cointegration reported in Table 5 reveal long-run linkages between economic growth, financial development and auxiliary variables across countries for at least one test equation, as the test rejects the null hypothesis of no cointegration at the 1% significance level.

Therefore, the financial development indicators, the trade openness and the investment are drivers of economic growth over the long-run. Within this context, the detection of long-run linkages indicates that the nexus between the considered variables is not necessarily stable over the study period (see Bahmani-Oskooee and Chomsisengphet, 2002), thus incentivizing us to conduct stability tests, as will be done later in this section.

The estimate results of the long-run relationships displayed in Table 6 reveal that the domestic credit provided by financial sector does not influence economic growth over the long-run for all the Arab countries. However, there is evidence of a significantly negative (positive) long-run transmission of information from the domestic credit to private sector by banks to economic growth in Saudi Arabia (Egypt). Additionally, the broad money positively affects economic growth only for Algeria over the long-run. These findings point to the fact that for some Arab countries, financial development is not a relevant driver of economic growth. Accordingly, the finance-growth nexus is sensitive to financial development indicators in the Arab region.

Regarding the auxiliary variables, the results indicate that economic growth positively reacts to changes in trade openness for Saudi Arabia, Algeria and Jordan, with more impact for Jordan. In this context, a 1% increase in trade openness allows increasing economic growth of 0.624%, 0.357% and 1.885% for Saudi Arabia, Algeria and

Jordan, respectively. Moreover, there is a significant long-run response of economic growth to the fluctuations in investment only for Egypt. It is also found that financial development, trade openness and investment do not exert an impact on economic growth over the long-run for Tunisia and the UAE.

The results reported in Table 7 indicate that like the long-run, no variable exerts an impact on economic growth for Tunisia over the short-run. Economic growth is driven by its own lagged values for Saudi Arabia, Algeria and Egypt over the short-run. Regarding financial development, economic growth is driven by the domestic credit provided by financial sector and broad money over the short-run for three out of six countries, namely Saudi Arabia, Algeria and Jordan. These responses of economic growth to the changes in financial development are mixed in terms of sign and magnitude across the three countries. Additionally, economic growth in Algeria positively responds to the changes in domestic credit to private sector by banks. This financial development indicator negatively affects economic growth in the UAE and Egypt over the short-run. As to auxiliary determinants, trade openness (investment) enhances economic growth over the short-run for all countries, except of Egypt (Jordan). The Wald test is conducted to test the joint significance of the coefficients related to some variables in the error correction model. The results (not reported) reveal joint significance, thus suggesting that the corresponding variables exert significant effects

on economic growth for Saudi Arabia, the UAE, Algeria, Egypt and Jordan.

Regarding the adjustment speed of the short-run deviations, it is found that there is evidence of a return to the long-run equilibrium state for all the Arab countries, as the error correction term coefficients are statistically significant and negative.[8] The adjustment speed of the short-run deviations of economic growth towards the long-run equilibrium state is faster for Egypt, as the error correction term coefficient is equal to -0.715, thus suggesting that a deviation from the equilibrium state in the current year is corrected by 71.5% in the next year. Accordingly, the long-run equilibrium state is restored in about one year and a half (1/0.715). For the Saudi Arabia, Algeria and Tunisia, a deviation from the equilibrium state in the current year is corrected by 56.1%, 41.4% and 53.4% in the next year, respectively, thus suggesting that the long-run equilibrium state is restored in about two years (1/0.561), about two years and a half (1/0.414), and about two years (1/0.534) for Saudi Arabia, Algeria and Tunisia, respectively. For the UAE and Jordan, the adjustment speed is low, as a deviation from the equilibrium state in the current year is corrected by 17.2% and 17.6% in the next year, respectively,

[8] The fact that the error correction term coefficient is significantly negative implies that there is evidence of cointegration between the variables for Tunisia for the model with linear trend, as the observed *F*-statistic (2.949) falls between the lower (2.75) and upper (3.79) bound critical values at the 10% level (see Table 5).

thus suggesting that we need about six years (1/0.172 and 1/0.176) to restore the long-run equilibrium state for both countries.

To test the validity of the model for all countries, some diagnostic tests are applied to residuals, namely the Breusch-Godfrey LM (Lagrange Multiplier) test for no autocorrelation, the ARCH test for no heteroscedasticity, and the Jarque-Bera test for normality. The Ramsey RESET test for the correct functional form of the model is also conducted. The results displayed in Table 8 indicate that the hypotheses of no autocorrelated, homoscedastic and normally residuals are not generally rejected at the conventional significance levels, thus showing no deviations from the classical regression assumptions. The RESET test shows evidence of correct functional form of the specifications. In addition to these tests, the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests[9] are graphed in Figures 7-12 and generally reveal stability of the coefficients of the error correction models over the study period. This diagnostic and stability analysis suggests that the error correction models are well fitted to data for the Arab countries.

Conclusion and policy implications

Some empirical works in the literature have examined how economic growth significantly reacts to the fluctuations in financial

[9] These tests take into account the short- and long-run dynamics through the model residuals.

development. In this study, we have applied the bounds testing approach to cointegration based on the ARDL model to enhance the understanding of the responses of economic growth to the changes in financial development in the Arab countries using three indicators and by controlling for trade openness and investment in the model over the period 1980-2018. It is found that financial development positively affects economic growth in some Arab countries, and that the magnitude of the responses varies across financial development indicators and countries. The obtained results are of great interest for the Arab policymakers and can help them make judicious policies to enhance the impact of financial development on economic growth, depending on the used indicator as well as the magnitude of the responses and their sign. Considering the obtained results, we provide some recommendations that may contribute to enhance the role of the financial sector in economic growth in the Arab countries:

- Policymakers should reinforce the financial development indicators that exert significant effects on economic growth in order to make them more competitive, and support the other indicators that are not able to boost economic growth.
- Arab countries should ease restrictions on provided credit to greatly enhance financial development, thus accelerating economic growth. In addition, effective control of the financial sector is needed to achieve financial stability, which contributes to the promotion of productive investments that boost economic growth.

- Authorities should ensure favorable legislations especially to small and medium enterprises by offering them many incentives during the early years of their activities in order to orientate provided credit to productive investment, thus stimulating economic growth.
- Arab countries should address the deficiency in the financial sector in terms of efficient resource management and allow the private sector to play an active role in the national economy by ensuring that funds go in channels that promote economic growth.
- Financial liberalization policies should be adopted to ensure financial development that contributes positively to economic growth, considering the important challenges faced by many Arab countries in a current environment characterized by many economic and financial fluctuations and the repercussions on the banking sector in terms of granting credit, especially in the Arab countries that have experienced turmoil in recent years.
- Developing strategies related to the development of the financial sector in the Arab countries that have weaknesses in this sector, as the absence of these strategies is one of the main obstacles to the contribution of the financial sector in promoting economic growth. In this context, strategies and plans give a clear vision of the approach taken by the Arab

countries to face the challenges and obstacles that prevent the contribution of the financial sector to economic growth.

References

Abu-Bader, S. and Abu-Qarn, A.S. (2008). "Financial development and economic growth: The Egyptian experience". Journal of Policy Modeling, 30, 887–898.

Adusei, M. (2013). "Finance-growth nexus in Africa: A panel generalized method of moments (GMM) Analysis". Asian Economic and Financial Review, 3, 1314–1324.

Al-Malkawi, H.A.N., Marashdeh, H.A. and Abdullah, N. (2012). "Financial development and economic growth in the UAE: Empirical assessment using ARDL approach to co-integration". International Journal of Economics and Finance, 4, 105–117.

Al-Yousif, Y.K. (2002). "Financial development and economic growth: another look at the evidence from developing countries". Review of Financial Economics, 11, 131–150.

Ang, J.B. and McKibbin, W.J. (2007). "Financial liberalization, financial sector development and growth: Evidence from Malaysia". Journal of Development Economics, 84, 215–233.

Ayu, K.-M. (2016). "Financial development and economic growth: Evidence from panel cointegration". International Journal of Applied Business and Economic Research, 14, 3369–3396.

Bahmani-Oskooee, M. and Chomsisengphet, S. (2002). "Stability of M2 demand functions in industrial countries". Applied Economics, 34, 2075–2083.

Bahmani-Oskooee, M. and Nasir, A.B.M. (2004). "ARDL approach to test the productivity bias hypothesis". Review of Development Economics, 8, 483–488.

Barajas, M.A., Chami, M.R. and Yousefi, M.R. (2013). "The finance and growth nexus re-examined: Do all countries benefit equally"? International Monetary Fund working paper No. 13–130.

Bist, J.P. (2018). "Financial development and economic growth: Evidence from a panel of 16 African and non-African low-income countries". Cogent Economics and Finance, 6, 1–17.

Bojanic, A.N. (2012). "The impact of financial development and trade on the economic growth of Bolivia". Journal of Applied Economics, 15, 51–70.

Durusu-Ciftci, D., Ispir, M.S. and Yetkiner, H. (2017). "Financial development and economic growth: Some theory and more evidence". Journal of Policy Modeling, 39, 290–306.

Kar, M. and Pentecost, E.J. (2000). "Financial development and economic growth in Turkey: Further evidence on the causality issue". Economic Research Paper No. 00/27, Department of Economics, Loughborough University, United Kingdom.

Lee, J. and Strazicich, M.C. (2003). "Minimum Lagrange multiplier unit root test with two structural breaks". Review of Economics and Statistics, 85, 1082–1089.

Mohamad, S.E. (2008). "Finance-growth nexus in Sudan: Empirical assessment based on an application of the Autoregressive Distributed Lag (ARDL) model". Working Paper No. API/WPS 0803. Arab Planning Institute, Kuwait.

Narayan, P.K. (2005). "The saving and investment nexus for China, evidence from cointegration tests". Applied Economics, 37, 1979–1990.

Ng, S. and Perron, P. (1995). "Unit root tests in ARMA models with data-dependent methods for the selection of the truncation lag". Journal of the American Statistical Association, 90, 268–281.

Pesaran, M., Shin, Y. and Smith, R. (2001). "Bounds testing approaches to the analysis of level relationships". Journal of Applied Econometrics, 16, 289–326.

Samargandi, N., Fidrmuc, J. and Ghosh, S. (2014). "Financial development and economic growth in an oil-rich economy: The case of Saudi Arabia". Economic Modelling, 43, 267–278.

Stojkoski, V., Popova, K. and Tevdovski, D. (2017). "Financial development and growth: Panel cointegration evidence from South-

Eastern and Central Europe". Munich Personal RePEc Archive Paper No. 80802.

Arabic References

البلبل، ع.أ.، عمران، م.م. وفتح الدين، أ. (2004). "التطور والهيكل المالي والنمو الاقتصادي: حالة مصر، 1974-2002". أوراق صندوق النقد العربي، عدد 9.

إسماعيل، ل. وشاكر، ر. (2016). "دراسة العلاقة بين التطور المالي والنمو الاقتصادي في سورية خلال الفترة (1980-2010)". مجلة جامعة البعث، 38، 73–107.

الغفيص، م. (2016). تحليل مقارن: "أثر تطور القطاع المالي على النمو الاقتصادي للقطاع غير النفطي في المملكة العربية السعودية". ورقة عمل رقم 5/16، مؤسسة النقد العربي السعودي.

Table 1. Descriptive statistics of the variables

Variable	Country	Mean	Max.	Min.	Std. Dev.
RGDP	Saudi A.	4.18E+11	7.00E+11	2.08E+11	1.46E+11
	UAE	2.11E+11	3.93E+11	9.40E+10	9.78E+10
	Algeria	1.23E+11	2.03E+11	7.00E+10	4.06E+10
	Tunisia	2.96E+10	5.09E+10	1.29E+10	1.26E+10
	Egypt	1.43E+11	2.86E+11	4.77E+10	7.03E+10
	Jordan	1.70E+10	3.22E+10	7.17E+09	8.35E+09
DCFS	Saudi A.	9.749	43.064	-55.235	29.127
	UAE	46.942	107.593	12.500	29.548
	Algeria	43.800	99.353	-12.698	32.828
	Tunisia	61.278	93.930	44.433	12.341
	Egypt	89.709	119.600	69.422	11.513
	Jordan	93.274	114.651	57.244	15.966
DCPSB	Saudi A.	28.536	58.114	6.805	13.546
	UAE	42.340	84.465	15.574	20.868
	Algeria	27.263	69.284	3.905	23.842
	Tunisia	52.799	68.299	37.690	6.964
	Egypt	34.306	54.931	13.936	11.414
	Jordan	68.529	91.603	46.501	10.527
BM	Saudi A.	48.337	74.734	14.147	13.186
	UAE	47.345	93.457	14.555	21.311
	Algeria	62.312	83.824	33.006	14.363
	Tunisia	54.055	73.523	40.825	9.956
	Egypt	83.647	98.136	66.423	7.769
	Jordan	112.892	139.232	81.704	16.210
OPEN	Saudi A.	74.454	96.103	56.088	11.129
	UAE	106.885	176.748	55.636	39.625
	Algeria	57.253	76.685	32.685	10.346
	Tunisia	89.686	114.355	67.485	10.654
	Egypt	50.156	74.460	30.247	11.268
	Jordan	119.382	149.453	81.840	17.435
INVS	Saudi A.	22.642	63.456	17.309	7.359
	UAE	24.127	34.071	17.578	4.156
	Algeria	30.156	43.059	20.677	6.141
	Tunisia	24.321	34.031	18.688	3.640
	Egypt	21.909	34.127	12.446	5.978
	Jordan	25.124	43.832	16.665	6.101

Table 2. Correlation analysis between RGDP and the other variables

Country	DCFS	DCPSB	BM	OPEN	INVS
Saudi A.	0.310	0.893	0.667	0.165	0.104
UAE	0.913	0.925	0.900	0.976	-0.581
Algeria	-0.555	-0.445	0.432	0.512	0.496
Tunisia	0.642	0.660	0.924	0.711	-0.700
Egypt	-0.105	0.183	0.108	-0.354	-0.854
Jordan	0.681	0.694	0.447	-0.291	-0.441

Table 3. Unit root test results

	RGDP	DCFS	DCPSB	BM	OPEN	INVS
Saudi A.			**Level breaks**			
	-2.475	-3.021	-5.469***	-4.264***	-1.968	-1.396
	-4.163***	-5.195***	-6.613***	-6.586***	-6.304***	-3.349*
			Level and trend breaks			
	-7.638***	-4.855	-6.386**	-4.435	-6.225*	-3.371
	-6.005*	-31.600***	-7.173***	-8.324***	-5.991*	-6.387**
UAE			**Level breaks**			
	-2.961	-3.677**	-4.173***	-8.124***	-2.747	-4.136***
	-6.550***	-4.929***	-5.517***	-6.358***	-4.416***	-5.834***
			Level and trend breaks			
	-4.556	-6.337**	-5.275	-6.074*	-5.090	-5.774
	-7.703***	-7.259***	-6.943**	-7.488***	-6.174*	-7.018**
Algeria			**Level breaks**			
	-4.349***	-2.606	-2.058	-4.244***	-2.378	-2.391
	-5.676***	-4.570***	-4.985***	-5.719***	-5.075***	-5.599***
			Level and trend breaks			
	-5.626	-4.706	-5.139	-4.643	-5.109	-7.359***
	-7.599***	-19.661***	-5.904*	-8.237***	-7.413***	-8.434***
Tunisia			**Level breaks**			
	-5.213***	-4.058**	-4.041**	-4.242***	-5.366***	-3.073
	-6.222***	-5.132***	-4.831***	-3.956**	-6.112***	-4.283***
			Level and trend breaks			
	-7.795***	-4.944	-4.919	-7.185***	-6.272**	-4.821
	-6.623**	-8.548***	-8.788***	-8.988***	-6.152*	-6.040*
Egypt			**Level breaks**			
	-2.938	-5.019***	-2.475	-3.881**	-3.594**	-4.560***
	-4.090***	-3.478*	-3.356*	-3.816**	-4.293***	-5.806***
			Level and trend breaks			
	-4.409	-5.364	-6.222**	-6.131*	-5.460	-7.820***
	-6.248*	-5.979*	-5.964*	-6.236**	-5.939*	-6.630**
Jordan			**Level breaks**			
	-4.391***	-5.036***	-3.412*	-4.625***	-2.722	-3.917**
	-7.292***	-4.787***	-4.827***	-7.973***	-5.796***	-5.441***
			Level and trend breaks			
	-6.501**	-4.500	-7.296***	-5.359	-7.995***	-8.822***
	-7.696***	-6.121*	-6.597**	-8.343***	-6.876**	-6.172*

Notes: The Lee and Strazicich (2003) unit root test considers an equation with two endogenous break dates in the level as well as an equation with two endogenous break dates in both the level and trend. For each test equation, the top value refers to the observed test statistic for the level series and the bottom value refers to the observed test statistic for the first differences series. The optimal lag order is determined by the general-to-specific procedure suggested by Ng and Perron (1995). ***, ** and * stand for stationarity at the 1%, 5% and 10% levels, respectively.

Table 4. Selected break dates

		Level breaks		Level and trend breaks	
Country	Variable	Date 1	Date 2	Date 1	Date 2
Saudi A.	RGDP	2002	2007	2002	2013
	DCFS	2000	2007	2000	2008
	DCPSB	2002	2009	1995	2010
	BM	2004	2010	1994	2013
	OPEN	1999	2009	2001	2007
	INVS	1998	2013	1994	2005
UAE	RGDP	2003	2008	1994	2002
	DCFS	2002	2008	1998	2005
	DCPSB	1995	2004	2001	2006
	BM	1999	2009	2008	2013
	OPEN	1995	2013	1994	2002
	INVS	1996	2008	1996	2006
Algeria	RGDP	1996	2002	2000	2005
	DCFS	1994	2004	1997	2005
	DCPSB	2001	2008	1996	2001
	BM	1997	2005	1994	1999
	OPEN	1999	2004	1997	2009
	INVS	2001	2009	1998	2007
Tunisia	RGDP	1995	2006	1998	2005
	DCFS	1999	2009	1994	1999
	DCPSB	1999	2009	1994	2007
	BM	1999	2006	1996	2006
	OPEN	2006	2012	1997	2012
	INVS	2002	2008	2002	2007
Egypt	RGDP	2001	2011	1995	2006
	DCFS	2007	2013	1994	2005
	DCPSB	1998	2007	2006	2011
	BM	1994	2006	1994	2003
	OPEN	2007	2013	2002	2013
	INVS	1997	2002	1996	2008
Jordan	RGDP	1999	2007	1994	2002
	DCFS	2004	2013	2004	2011
	DCPSB	2001	2007	2002	2011
	BM	2000	2009	2000	2007
	OPEN	1999	2011	2002	2013
	INVS	1997	2004	1997	2002

Note: The trimming factor used by the Lee and Strazicich (2003) unit root test to detect breaks is fixed at 0.2.

Table 5. Cointegration test results

	None	Constant	Linear trend
Saudi Arabia	5.651***	6.936***	15.446***
UAE	10.896***	5.997***	5.872***
Algeria	7.161***	5.177***	10.460***
Tunisia	11.292***	1.527	2.949
Egypt	95.447***	1.680	8.607***
Jordan	15.468***	4.789***	5.887***

Notes: The Pesaran et al. (2001) bounds test for cointegration considers an equation without constant and trend, an equation with constant and an equation with linear trend. For the model without constant and trend, the lower bound critical values are 1.81 (10%), 2.14 (5%) and 2.82 (1%), and the upper bound critical values are 2.93 (10%), 3.34 (5%) and 4.21 (1%); for the model with constant, the lower bound critical values are 2.26 (10%), 2.62 (5%) and 3.41 (1%), and the upper bound critical values are 3.35 (10%), 3.79 (5%) and 4.68 (1%); and for the model with linear trend, the lower bound critical values are 2.75 (10%), 3.12 (5%) and 3.93 (1%), and the upper bound critical values are 3.79 (10%), 4.25 (5%) and 5.23 (1%). The optimal lag orders of the ARDL models are selected by the Schwarz information criterion given a maximum of 3 lags. *** stands for cointegration at the 1% level.

Table 6. Long-run estimates

	Dependent variable: RGDP					
	Saudi A.	UAE	Algeria	Tunisia	Egypt	Jordan
DCFS	3.680E-4	-0.332	2.750E-4	-0.179	-0.021	-0.202
	(0.001)	(0.619)	(5.560E-4)	(0.131)	(0.036)	(0.463)
DCPSB	-0.292**	-0.121	-0.018	-0.235	0.053***	0.540
	(0.141)	(0.710)	(0.045)	(0.190)	(0.010)	(0.490)
BM	0.259	-0.024	0.228*	0.085	-0.041	0.152
	(0.263)	(0.411)	(0.119)	(0.142)	(0.056)	(0.454)
OPEN	0.624**	1.297	0.357**	-0.009	-0.022	1.885*
	(0.268)	(0.796)	(0.154)	(0.082)	(0.026)	(1.080)
INVS	0.007	-1.015	-0.078	0.085	0.127***	-0.794
	(0.279)	(0.736)	(0.104)	(0.070)	(0.031)	(0.538)
Constant	23.266***	24.810***	23.001***	24.349***	24.456***	14.352***
	(1.016)	(2.617)	(0.698)	(0.631)	(0.184)	(3.804)
Trend	0.037***	0.016	0.023***	0.042***	0.047***	0.035***
	(0.005)	(0.029)	(0.003)	(0.002)	(0.001)	(0.007)

Notes: For Saudi Arabia, the selected model is an ARDL (2, 3, 1, 3, 3, 2); for the UAE, the selected model is an ARDL (1, 0, 2, 0, 0, 0); for Algeria, the selected model is an ARDL (3, 2, 3, 2, 3, 3); for Tunisia, the selected model is an ARDL (1, 0, 0, 0, 0, 0); for Egypt, the selected model is an ARDL (3, 0, 3, 0, 0, 1); and for Jordan, the selected model is an ARDL (1, 1, 0, 1, 3, 1). The optimal lag orders of the ARDL models are selected using the Schwarz information criterion given a maximum of 3 lags. The values in parentheses are the standard errors. ***, ** and * stand for significance at the 1%, 5% and 10% levels, respectively.

Table 7. Error correction model estimates

	Dependent variable: D(RGDP)					
	Saudi A.	UAE	Algeria	Tunisia	Egypt	Jordan
D(RGDP(-1))	-0.389***	-	-0.013	-	0.243**	-
	(0.113)	-	(0.162)	-	(0.123)	-
D(RGDP(-2))	-	-	0.283*	-	0.231**	-
	-	-	(0.147)	-	(0.116)	-
D(DCFS)	0.004***	-0.057	7.700E-4	-0.095	-0.015	0.268***
	(0.001)	(0.094)	(5.770E-4)	(0.079)	(0.027)	(0.103)
D(DCFS(-1))	-0.005**	-	0.001*	-	-	-
	(0.002)	-	(5.17E-4)	-	-	-
D(DCFS(-2))	0.003***	-	-	-	-	-
	(0.001)	-	-	-	-	-
D(DCPSB)	0.127	-0.221*	-0.009	-0.125	0.012	0.095
	(0.093)	(0.116)	(0.011)	(0.096)	(0.027)	(0.070)
D(DCPSB(-1))	-	0.150**	-0.009	-	0.008	-
	-	(0.067)	(0.086)	-	(0.026)	-
D(DCPSB(-2))	-	-	0.023***	-	-0.070***	-
	-	-	(0.008)	-	(0.019)	-
D(BM)	-0.456***	-0.004	-0.001	0.046	-0.030	-0.225***
	(0.120)	(0.071)	(0.034)	(0.083)	(0.038)	(0.075)
D(BM(-1))	-0.181	-	-0.079**	-	-	-
	(0.128)	-	(0.038)	-	-	-
D(BM(-2))	-0.234***	-	-	-	-	-
	(0.065)	-	-	-	-	-
D(OPEN)	0.151	0.223***	0.042	-0.005	-0.016	-0.112
	(0.096)	(0.083)	(0.031)	(0.044)	(0.020)	(0.076)
D(OPEN(-1))	-0.044	-	0.092**	-	-	-0.133**
	(0.107)	-	(0.044)	-	-	(0.066)
D(OPEN(-2))	-0.282***	-	-0.089**	-	-	-0.140**
	(0.098)	-	(0.036)	-	-	(0.062)
D(INVS)	0.184	-0.175**	-0.045	0.045	0.050**	0.006
	(0.109)	(0.075)	(0.037)	(0.042)	(0.023)	(0.054)
D(INVS(-1))	0.377***	-	0.158***	-	-	-
	(0.088)	-	(0.044)	-	-	-
D(INVS(-2))	-	-	-0.117***	-	-	-
	-	-	(0.026)	-	-	-
Trend	0.021***	0.003	0.010**	0.022***	0.033***	0.006
	(0.006)	(0.006)	(0.004)	(0.006)	(0.006)	(0.004)
ECT	-0.561***	-0.172**	-0.414***	-0.534***	-0.715***	-0.176*
	(0.110)	(0.080)	(0.137)	(0.144)	(0.127)	(0.092)

Notes: For Saudi Arabia, the selected model is an ARDL (2, 3, 1, 3, 3, 2); for the UAE, the selected model is an ARDL (1, 0, 2, 0, 0, 0); for Algeria, the selected model is an ARDL (3, 2, 3, 2, 3, 3); for Tunisia, the selected model is an ARDL (1, 0, 0, 0, 0, 0); for Egypt, the selected model is an ARDL (3, 0, 3, 0, 0, 1); and for Jordan, the selected model is an ARDL (1, 1, 0, 1, 3, 1). The optimal lag orders of the ARDL models are selected using the Schwarz information criterion given a maximum of 3 lags. The values in parentheses are the standard errors. ***, ** and * stand for significance at the 1%, 5% and 10% levels, respectively.

Table 8. Diagnostic tests

	Saudi A.	UAE	Algeria	Tunisia	Egypt	Jordan
LM	4.053	0.932	2.969	0.301	3.102	0.699
	(0.132)	(0.334)	(0.227)	(0.742)	(0.212)	(0.705)
ARCH	0.425	0.342	0.389	1.682	0.349	0.785
	(0.809)	(0.843)	(0.823)	(0.431)	(0.840)	(0.676)
JB	5.246	0.484	0.311	0.902	2.108	9.517
	(0.073)	(0.785)	(0.856)	(0.637)	(0.349)	(0.009)
RESET	0.752	0.201	2.377	0.469	0.711	4.599
	(0.485)	(0.657)	(0.108)	(0.631)	(0.502)	(0.042)

Notes: LM is the Breusch-Godfrey LM (Lagrange Multiplier) test for no autocorrelation applied to residuals, ARCH is the Engle test for no heteroscedasticity applied to residuals, JB is the Jarque-Bera normality test applied to residuals, and RESET is the Ramsey test for the correct functional form of the model. The values in parentheses are the *p*-values of the tests.

Figure 1. Dynamic Patterns of the variables for Saudi Arabia

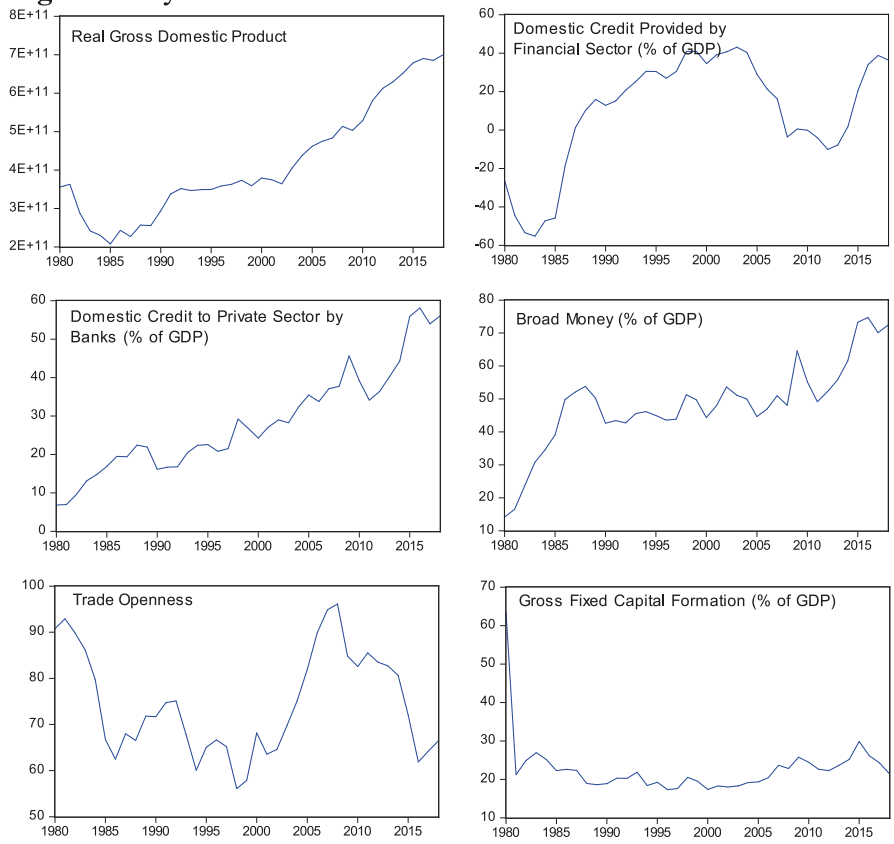


Figure 2. Dynamic Patterns of the variables for the UAE

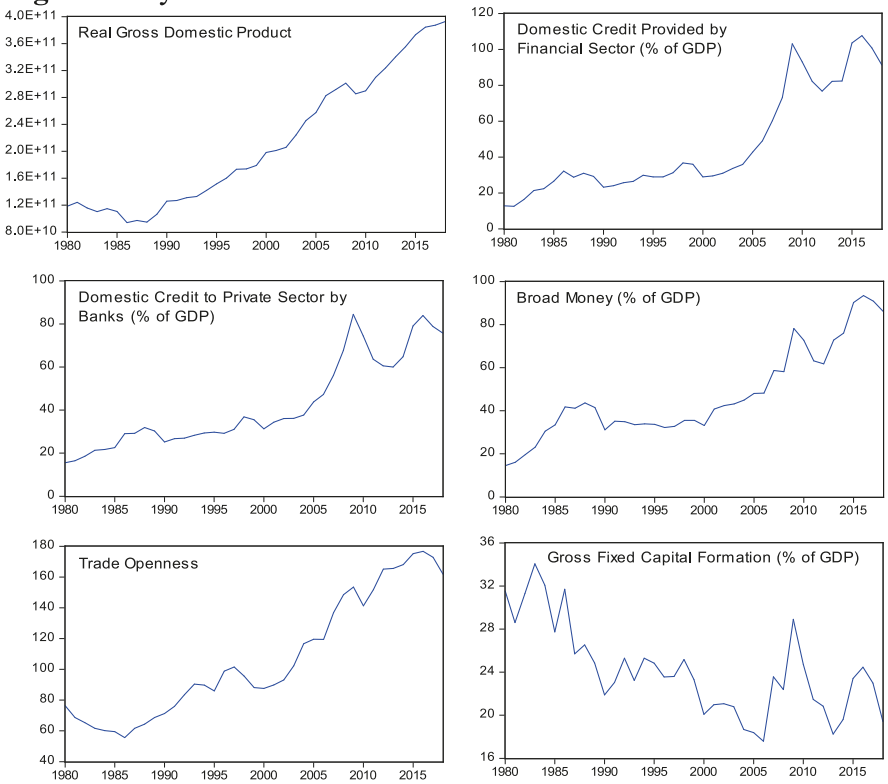


Figure 3. Dynamic Patterns of the variables for Algeria

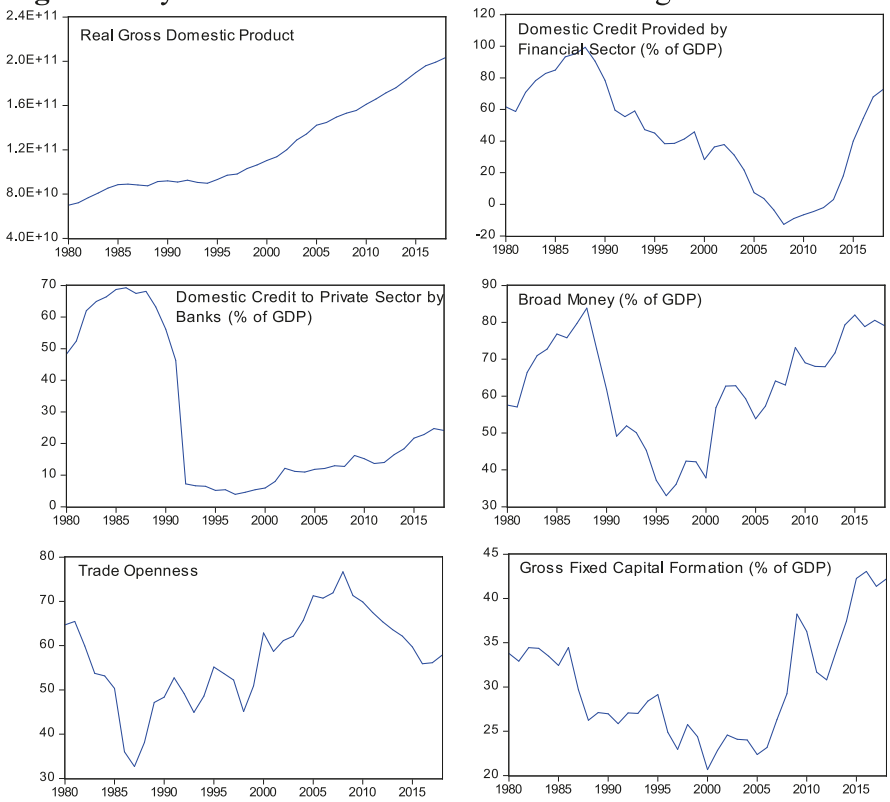


Figure 4. Dynamic Patterns of the variables for Tunisia

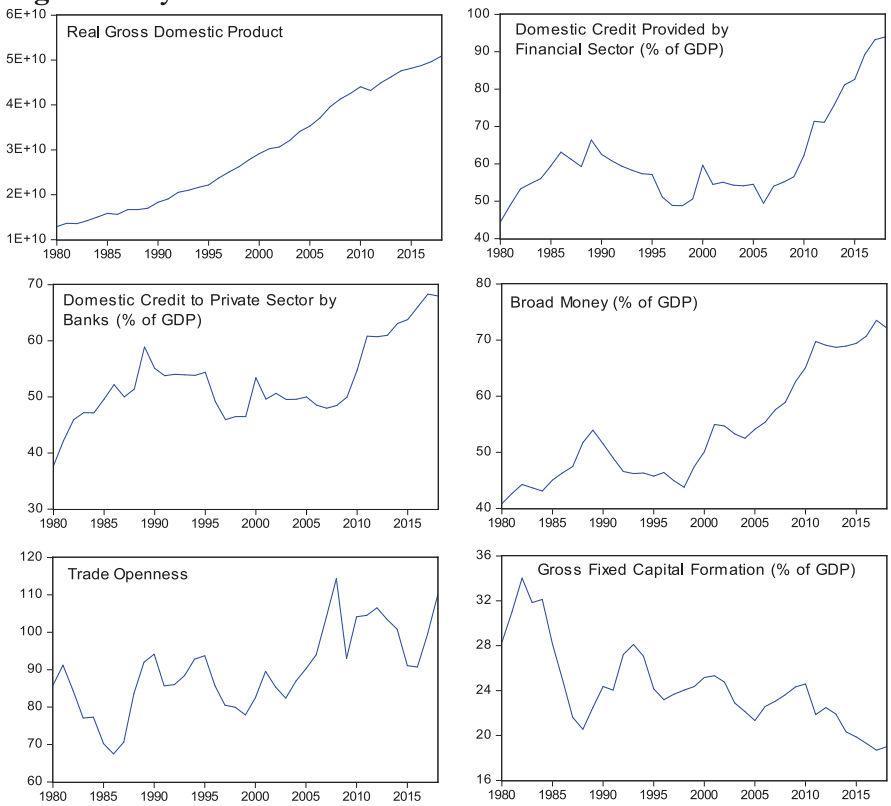


Figure 5. Dynamic Patterns of the variables for Egypt

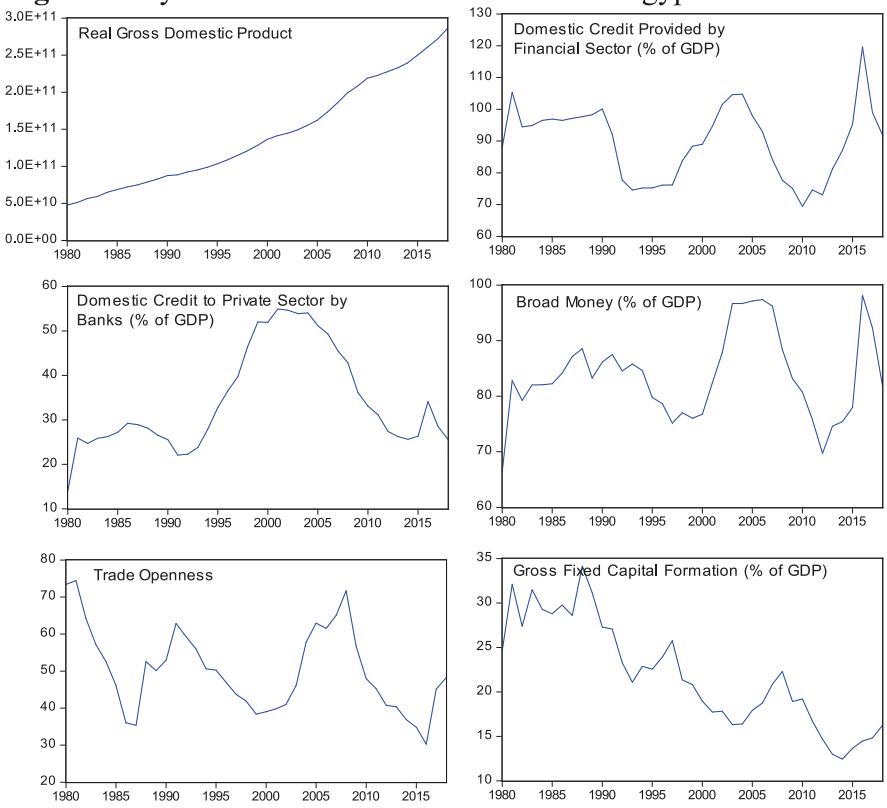


Figure 6. Dynamic Patterns of the variables for Jordan

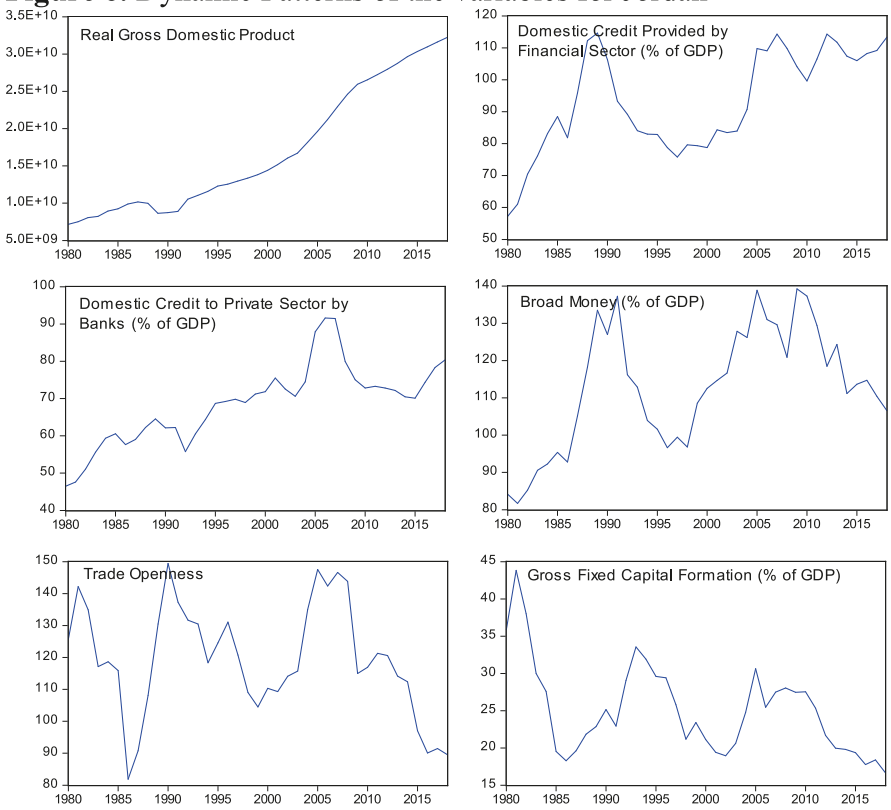


Figure 7. CUSUM and CUSUMSQ tests for Saudi Arabia

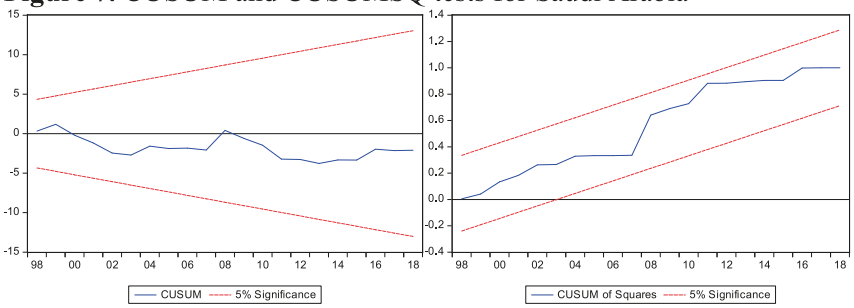


Figure 8. CUSUM and CUSUMSQ tests for the UAE

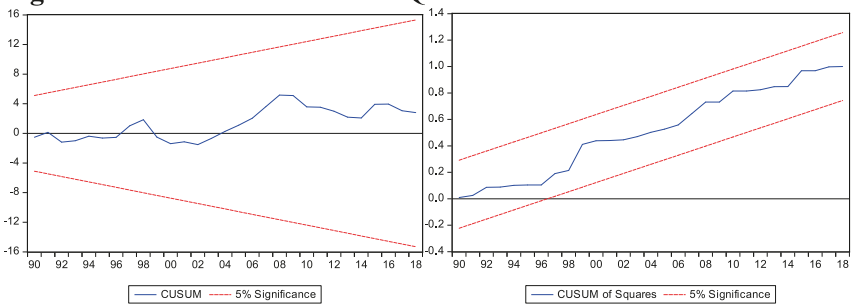


Figure 9. CUSUM and CUSUMSQ tests for Algeria

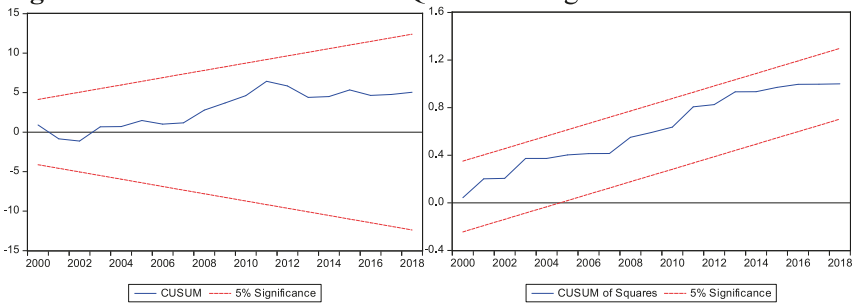


Figure 10. CUSUM and CUSUMSQ tests for Tunisia

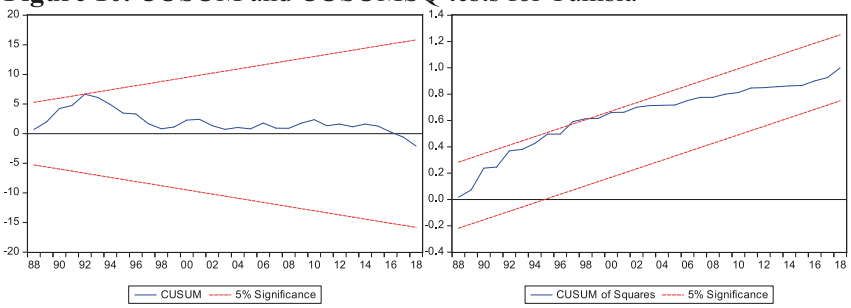


Figure 11. CUSUM and CUSUMSQ tests for Egypt

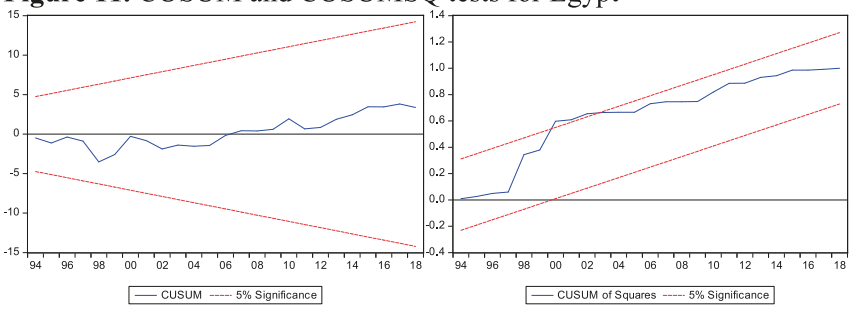
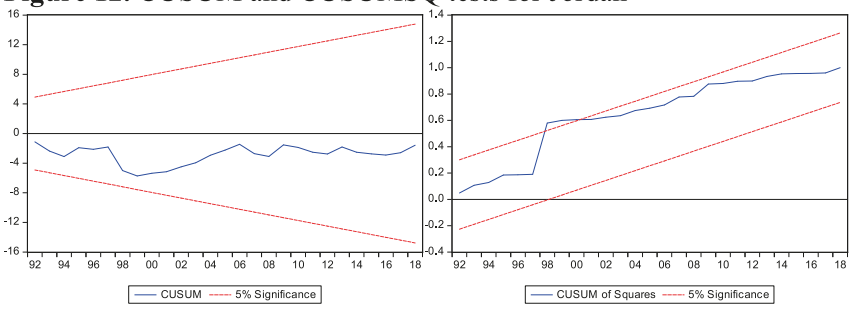


Figure 12. CUSUM and CUSUMSQ tests for Jordan



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