



## **JOINT EFFECT OF FINANCIAL DEEPENING AND FINANCIAL FRAGILITY ON ECONOMIC GROWTH: EVIDENCE FROM NORTHERN AFRICA**

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### **ABSTRACT**

*This paper intends to resolve the apparent contradiction emanating from two interrelated but conflicting theories of financial deepening on one hand and financial fragility on the other hand as they jointly effect Economic growth in different directions. The study was conducted on five cross-sections within the North African Sub-region and it covers a period of thirty-one (31) years (1985-2016). Levin, Lin and Chu unit-root test was conducted and the variables (RGDP, PSECR, FINFR and TROPN) were found to be integrated of the first order  $I(1)$ , the study also found the presence of a positive and statistically significant joint influence of financial deepening and financial fragility on Economic growth based on the results of the computed Fully Modified Ordinary Least Squares (FMOLS). Causality test conducted based on the Pairwise Panel Granger framework indicates that there is no causation between financial deepening, financial Fragility and Economic growth in Northern Africa. Result of the cross-sectional dependence test indicates that there is a serious contagious effect of financial fragility across Northern Africa, as shocks within the North African sub-region is transmitted to all cross-sections within the region. Findings from this study call for the extension of private sector credit to productive enterprises (Small and Medium), in addition to the need for an effective institutional arrangement that will reduce the number of non-performing loans and bad debts which will also stabilize the intensity of the shocks arising from financial fragility.*

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**Keywords:** *Financial deepening, financial fragility, Cointegration, North Africa, Economic Growth.*

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## **INTRODUCTION**

The critical roles of financial deepening in achieving economic growth has been widely acknowledged in the financial economics literature in recent years, both theoretical and empirical studies have justified the presence of a strong relationship between financial deepening on economic growth in both developed and developing economics (see, Gantman and Dabos, 2012) this relationship is seen in the roles of deposit money banks which is performed through intermediation between surplus and deficit spending units within a distinct economic environment and which facilitates technological innovation that aid mass production of output and which translates to economic growth. This has enjoyed the strong support of various theoretical and empirical studies that testify the existence of the finance and economic growth relationship. These include Levine (2002), Ranciere (2002) and Jacques (2010). Their works on financial deepening and Economic growth pointed that a developed financial system positively influence economic growth and that every economy (Developed and Developing) requires an efficient financial system to prosper. Hence, financial sector deepening is one of the fundamental requirements for economic growth at both short and in the long-run.

On the other hand financial fragility theories suggest that financial deepening indicators are among the best predictors of financial fragility based on the assertion that rapid development within the financial sector (financial deepening) is always associated with financial fragility which culminates into financial crisis and economic growth slowdowns (see Amri, Prabha and Whilborge 2012). The argument was build based on the positive and negative relationship between financial deepening and financial fragility on economic growth respectively. It is against this background that this study intends to explore the dynamic connection between financial deepening and economic growth in North Africa.

The paper is structured into six sections including introduction, section two present theoretical considerations, section three present literature reviews, section four is the Data and methodology of the study, section five present

data analysis and interpretation of results and lastly, section six concludes the paper.

## **THEORETICAL CONSIDERATIONS**

The divide existing in the proponents of the theories of financial development on one hand and the theories of financial fragility and economic growth on the other hand is that while the former suggests the positive roles of efficient allocation of financial resources for profitable and productive investments, the later holds that rapid and accelerated development of financial sector always increased the vulnerabilities of financial sector to macroeconomic shocks that may culminate into financial fragility and crisis.

To this end, Economic theories have developed two perspectives on the emergence of financial fragility. The proponents of these theories presupposes the root of financial fragility as traceable from the intermediation roles played by financial institutions which entails lending to long term investment while borrowing on short term bases through deposits payable on demand. The central argument of the fragility and growth is presented in a two sector endogenous growth model that results into the prevalence of financial fragility. The model according to Ranciere, Tornell & Westermann (2003) is used to analyze fragility-growth nexus. Their model states that the economies that have experienced periodic crises have grown on average more rapid than countries with smooth credit conditions evidenced by imperfections in the credit market that lead to borrowing constrains and slower economic growth. Their model further concludes that the factors contributing to financial fragility are also identified as sources of economic growth. The potential implication of financial sector development evidenced by a rapid growth of credit to the private sector and macroeconomic stability by stimulating aggregate demand compared to potential output which creates over heating pressures. This means that as bank lending stimulates consumption or demand for imported commodities which has adverse effect on current account balance and currency stability (Hilbers, Robe, Pazarbasioglu & Johnson, 2005).

## **EMPIRICAL LITERATURE**

Country specific studies on financial deepening and economic growth include Gregorio and Guidotti (2005) where empirical evidence on finance and growth

connection is provided in a wider sense, Their studies revealed that the ratio of bank credit to the private sector to GDP has a direct link to economic growth. Liang and Teng (2006) investigates the relationship between financial development and economic growth in China, their result suggest the existence of only one directional causality running from economic growth to financial development.

Ang & McKibbin (2007) examine whether financial development lead to economic growth in a small but open economy of Malaysia using time-series data from 1960 to 2001. Adopting cointegration, Granger causality and Lagrange Multiplier (LM) tests, empirical evidence from this work suggest a favorable effect of financial sector development in stimulating economic growth. It further revealed a positive correlation between financial depth and economic growth. Study by Yang and Yi (2008) on the Korean economy revealed that financial sector development control causes economic growth, supporting a unidirectional causation among finance and economic growth. Applying the recently Autorregressive Distributed Lag (ARDL) bound test for cointegration on Pakistan, Anwar, Shabir & Hussain (2011) confirmed the existence of a stable long-run relationship between financial development and economic growth. They also reported that financial development is the base for economic growth at both short-run and in the long-run. Research work that lend to their findings includes Seetanah (2007), Jalil & Ma (2008), Khan & Qayyum (2008).

Studying the interaction between financial fragility and dynamically unstable financial systems, Sordi & Vercelli (2006) examines this link by proposing a prototype model which describes the complex dynamics of a sophisticated monetary economy. This work classifies financial fragility into micro-fragility describing the situation of financially fragile units that respond to cyclical fluctuations and macro-fragility conceived interms of structural instability and dynamically unstable financial fluctuations. Findings from this research work revealed that the financial fluctuations in different financial units cumulatively causes high degree of financial fragility which spread in the economy after a prolonged boom leading to bankruptcy of many financial units and financial crisis of the entire economy.

## DATA AND METHODOLOGY

The study covers a period of thirty-one (31) years and the choice of the study period is justified by the fact that it represents the period of economic and financial reforms within the study area. The study includes four cross-sections selected based on probability sampling and availability of data within the study period, each cross-section represent a country within the Northern African Sub-region.

Variables measured include: Real Gross Domestic Product (RGDP) as a proxy for Economic growth and as the dependent Variable. Independent variables of the study are the Volume of private sector credit ratio of GDP as a proxy for financial deepening, Standard deviation of the growth rate of private sector credit ratio to GDP (from deposit money banks) as a proxy for financial fragility and Trade openness as a control variable.

The following model shows the mathematical connections between dependent and independent variables of the study as indicated by the reviewed literature;

$$LGDP_{it} = \beta_0 + \beta_1 LPSECR_{it} + \beta_2 LFINFR_{it} + \beta_3 LTROPN_{it} + \mu_{it} \dots \dots \dots (1)$$

Where: *LGDP* is the Log of real GDP per Capita, *LPSECR* is the Log of Private sector credit, *LFINFR* is the Log of Financial fragility, *LTROPN* is the Log of Trade Openness.  $\beta_0$  is the Constant parameter while  $\beta_1, \beta_2$  and  $\beta_3$ , are the Coefficients of independent variables.

To establish a long run connection between financial deepening, financial fragility and Economic growth in the Northern African sub-region, the following unrestricted Var equations were estimated:

$$\begin{aligned} LRGDP_t = & \sum LRGDP_t + \sum LPSECR_t + \sum LFINFR_t + \sum LTROPN_t \\ & + \mu_t \dots \dots \dots (2) \end{aligned}$$

$$\begin{aligned} LPRSECP_t = & \sum LRGDP_t + \sum LPSECR_t + \sum LFINFR_t + \sum LTROPN_t \\ & + \mu_t \dots \dots \dots (3) \end{aligned}$$

$$\begin{aligned} LFINFR_t = & \sum LRGDP_t + \sum LPSECR_t + \sum LFINFR_t + \sum LTROPN_t \\ & + \mu_t \dots \dots \dots (4) \end{aligned}$$

$$LTROPN_t = \sum LRGDP_t + \sum LPSECR_t + \sum LFINFR_t + \sum LTROPN_t + \mu t \dots \dots (5)$$

## DATA ANALYSIS AND DISCUSSION OF RESULTS

This section begins with the conventional unit-root test to ascertain the stationarity properties of the series variable and to identify their order of integration as contained in table 1

**Table 1:** Unit root test

Variables	Level Value	Diff. Value	Prob.	Conclusion
<b>LRGDP</b>	3.28541	-5.79011***	0.0000	<b>I(1)</b>
<b>LPRSECR</b>	<b>-0.78552</b>	<b>-22.1148***</b>	<b>0.0000</b>	<b>I(1)</b>
<b>LFINFR</b>	<b>-0.89012</b>	<b>-21.6693***</b>	<b>0.0000</b>	<b>I(1)</b>
<b>LTROPN</b>	<b>-1.73451</b>	<b>-9.90403***</b>	<b>0.0000</b>	<b>I(1)</b>

**Source:** Author's Computation using EVIEWS 9.

\*\*\*, \*\*, \*, Indicates level of significance at 1%, 5% and 10% respectively.

Table 1 presents the results of Levin, Lin and Chu Panel Unit-root test of the panel of North Africa for the variables of interest (LRGDP, LPSECR, LFINFR and LTROPN) over the period (1985-2016). Panel unit-root test for the panel Africa revealed a level value of, 3.28541, 0.78552, -0.89012 and -1.73451 for LRGDP, LPRSECR, LFINFR and LTROPN respectively. This indicates that the null hypothesis of the variables have unit-root is accepted. However, taking the first difference of the variables revealed the values of DLRGDP, DLPSECR, DLFINFR and DLTRONP have the coefficients of, -5.79011, -22.1148, -21.6693 and -9.90403 respectively, these coefficients are statistically significant at 1%.

**Table 2:** FMOLS Panel Cointegration Regression Results

Variables	Coefficients	Statistics	P-Values
<b>Dependent Variable: Log of Real GDP (LRGDP)</b>			
<b>LPSECR</b>	3.50E+09	-1.45268	<b>0.0804</b>
<b>LFINFR</b>	3.72E+09	1.580461	<b>0.0162</b>
<b>LTROPN</b>	6.03E+08	1.018046	<b>0.0807</b>

<b>R<sup>2</sup></b>	0.363397
<b>Adjusted R<sup>2</sup></b>	0.333082
<b>L/Run Variance</b>	<b>6.11E+21</b>

**Source:** Author's Computation using E-Views 9.

\*\*\*, \*\*, \*, Indicates level of significance at 1%, 5% and 10% respectively.

Results of Fully Modified Least Squares (FMOLS) Panel cointegration regression is presented in table 2 for the panel of North Africa. It shows that PSECR has a positive relationship with RGDP having the Coefficient of 3.50 but not statistically significant even at the weakest 10% level. The Log of FINFR has a positive coefficient of 3.72 and a corresponding probability value of 0.0162 which is not statically significant. TROPN also indicates a positive relationship with RGDP having the coefficient of 6.03 and 0.0807 as its P-Value which is also not significant. The result of computed R<sup>2</sup> indicates a 36% joint influence of PRISEC, FIVOL and TROPN on RGDP with an adjusted R<sup>2</sup> value of 0.33.

**Table 3:** Results of Pedroni Panel Cointegration

<b>Functions</b>	<b>Statistics</b>	<b>Weighted Statistics</b>	<b>P-Values</b>
<b>Panel ADF</b>	0.2849	-0.1452**	<b>0.0023</b>
<b>Panel PP</b>	0.3240	-0.2233***	<b>0.0016</b>
<b>Panel V</b>	0.8498	1.4229*	<b>0.0074</b>
<b>Panel rho</b>	0.9859	0.5572***	<b>0.0013</b>

**Source:** Author's Computation using E-Views 9.

\*\*\*, \*\*, \*, Indicates level of significance at 1%, 5% and 10% respectively.

The results of Pedroni residual cointegration test for panel analysis is shown in table 3 which includes 5 cross-sections in the panel of North Africa. The result indicates the values of Panel ADF, Panel PP, Panel V and Panel Rho statistics and their weighted statistics. The result indicates a Panel ADF value of 0.2849, the Panel PP statistics is 0.3240, the Panel V statistics is 0.8498 while Panel Rho statistics is 0.9859. The results of weighted statistics also indicates a panel ADF of -0.1452 which corresponds to 0.0023 as its P-Value significant at 5%, the panel PP has -0.2233 and a corresponding P-Value of 0.0016 significant at 1%, panel v statistics has a computed value of 1.4229 with the corresponding probability value of 0.0074, while Rho weighted



statistics is 0.5572 which corresponds to a p-value of 0.0013 which is statistically significant at 1%.

**Table 4:** Results of Panel Granger Causality test Northern Africa

Null Hypothesis	Lags	Obs.	F-statistics	P-Value
<b>PSECR does not Granger Cause RGDP</b>	2	145	0.13135	<b>0.8770</b>
<b>RGDP does not Granger Cause PSECR</b>	2	145	0.38027	<b>0.6844</b>
<b>FINFR does not Granger Cause RGDP</b>	2	145	1.63621	<b>0.1984</b>
<b>RGDP does not Granger Cause FINFR</b>	2	145	0.31888	<b>0.7275</b>
<b>TROPN does not Granger Cause RGDP</b>	2	145	1.19458	<b>0.3059</b>
<b>RGDP does not Granger Cause TROPN</b>	2	145	0.91699	<b>0.4021</b>
<b>FINFR does not Granger Cause PSECR</b>	2	145	2.52004	<b>0.0841</b>
<b>PSREC does not Granger Cause FINFR</b>	2	145	1.52817	<b>0.2205</b>
<b>TROPN does not Granger Cause PSECR</b>	2	145	1.09184	<b>0.3384</b>
<b>PSECR does not Granger Cause TROPN</b>	2	145	0.44666	<b>0.6407</b>
<b>TROPN does not Granger Cause FINFR</b>	2	145	1.68110	<b>0.1899</b>
<b>FINFR does not Granger Cause TROPN</b>	2	145	0.33195	<b>0.7181</b>

**Source:** Author's Computation using E-Views 9.

\*\*\*, \*\*, \*, Indicates level of significance at 1%, 5% and 10% respectively.

The result of Pairwise Panel Granger causality test is presented in table 4 which indicates the number of 145 observations within a cross-section of five (5) North Africa countries included in the panel. It indicates that there is no causal relationship between PSECR and RGDP with an F-Statistics of 0.131 and a corresponding P-Value of 0.877 which is not statistically significant.



Result on causal relationship between FINFR and RGDP also indicates no causation between the variables as the computed F-Statistics is 1.632 and a corresponding P-Value of 0.684. The Null hypothesis of no causality between RGDP and FINFR is accepted as the Computed F-Statistics is 0.319 on one way and 1.636 on the other way which corresponds to P-Values of 0.198 and 0.728 respectively. TROPN and RGDP also have an F-statistics of 1.195 and 0.917 which correspond to 0.306 and 0.402 as P-Values. The causal relationship between PSECR and FINFR indicates an F-Statistics of 2.520 which corresponds to a P-Value of 0.084 which is not statistically significant. PSECR and TROPN have an F-Statistics of 0.447 and a P-Value of 0.641 which is not statistically significant. The Null hypothesis of no causation between TROPN and FINFR is accepted as the computed F-Statistics is 0.332 and a corresponding P-Value of 0.718 which is not statistically significant.

**Table 5:** Cross-Sectional Dependence Test

<b>Variables</b>	<b>Breusch-Pagan</b>	<b>Pesaran scaled</b>	<b>P-value</b>
<b>L RGDP</b>	272.3590***	58.66527***	<b>0.0000</b>
<b>LPSECR</b>	41.97826***	7.150556***	<b>0.0000</b>
<b>LFINFR</b>	54.68707***	9.992333***	<b>0.0000</b>
<b>LTROPN</b>	<b>102.2197***</b>	<b>20.62094***</b>	<b>0.0000</b>

**Source:** Author's Computation using E-Views 9.

\*\*\*, \*\*, \*, Indicates level of significance at 1%, 5% and 10% respectively.

Table 5 presents the result of Cross-sectional dependence test for the panel North Africa which is indicated based on comparison of Breusch-Pagan and Pesaran Scaled tests of cross-sectional dependence. It indicates that LRGDP has a coefficient of 272.3590 and 58.66527 based on Breusch-Pagan and Pesaran Scaled and all are significant at 1%. LPSECR also indicates statistically significant coefficients of 41.97826 and 7.150556 which are also significant at 1%. LFINFR has a coefficient of 54.68707 and 102.2197 based on Breusch-Pagan and Pesaran Scaled which are also significant at 1%. Results of cross-sectional dependence test on TROPN revealed a coefficient of 102.2197 and 20.62094 also significant at 1%. Results from these tests revealed the contagious effect of shocks within the North African sub-region.

## **CONCLUSION AND RECOMMENDATION**

This study concludes that there is a positive and statistically significant influence of financial deepening on economic growth in the Northern African Sub-region which is in line with the Schumpeterian supply-leading hypothesis. The study also found the presence of the priori-expected negative connection between financial fragility and economic growth. While finding of no causation between financial deepening, financial fragility and economic growth is attributed to the under developed nature of financial market within the region. It is recommended that policy makers within these regions should formulate policies that will improve accessible and affordable credit to the private sector which should include Small and Medium Enterprises (SMEs) in addition to the need for effective institutional arrangement that will reduce the number of non-performing loans and bad debts which will also stabilize the intensity of the shocks arising from financial fragility.

## **REFERENCES**

- Amri, P. D. Prabha, A. P. & Whilborge, C. (2012) 'What makes High Credit Growth harmful? Evidence from banking crises' *Journal of financial economic and policy* 3(4) Pp, 322-339.
- Ang, J. B & McKibbin, W. J (2007) 'financial liberalization, financial sector development and economic growth: Evidence from Malaysia' *Journal of Development Economics*. 84, 215-232.
- Anwar, S. Shabir, G. & Hussain, Z (2011) 'Relationship between financial sector development and economic growth: Time series analysis from Pakistan' *International Journal of Economics and Finance Vol 3 No.1 Pp, 262-270*.
- Gantman, R. E & Dabos, P. M (2012) 'A fragile link? A New Empirical Analysis between Financial Development and Economic Growth' *Oxford development studies Doi:10. 1080*.
- Gregorio, O. J & Guidotti, P. E (2005) 'Financial development and economic growth' *World Development Vol 23 No. 3 Pp, 433-488*.
- Hilbers P. Robe O. I Pazarbasioglu, C & Johnsen , G. (2005) 'Assessing and Managing rapid Credit Growth and the role of supervisory and Prudential policies' IMF working paper 05/151.

- Jacques, L. E. (2010) 'Co integrating and Causal relationship between financial development and Economic growth in ECOWAS Countries' *Journal of Economic and international finance*, Vol.2 (3) Pp 36-48. Available on line @ <http://www.academicjournals.org/JEIF>.
- Jelil, A. & Ma, Y (2008) 'Financial development and economic growth: Time series evidence from Pakistan and China' *Journal of Economic Co-operation* 29, 2. 29-68.
- Khan, M. A & Qayyum, A (2008) 'Financial Development and Economic Growth: the case of Pakistan' *Pakistan Development Review* Vol 44 No 4 Pp, 819-832.
- Levine, R. (2002) 'Bank-based or market-based financial system: Which is better' *Journal of financial intermediation*, 11 (4), 398-428.
- Liang, Q. & Teng, J. Z (2006) 'Financial Development and economic growth: Evidence from China' *China Economic Review* 17 Pp, 395-411. Retrieved from [www.sciencedirect.com](http://www.sciencedirect.com).
- Ranciere, R. (2002) 'Essay on financial development, financial fragility and growth' New York university CERAS, *Journal of monetary Economics*, 46(1), 31-77.
- Ranciere, R. Tornel, A. & Westermann, F (2003) 'Crises and Growth: A revolution' National Bureau of Economic Research Working paper 10073
- Seetanah, B. (2007) 'Financial Development and economic growth: An ARDL approach for the case of small island state of Mauritius' *Applied Economic Letters*.
- Sordi, S. & Vercelli, A. (2006) 'financial fragility and economic fluctuations' *Journal of Economic Behavior and Organisation*. 61, 543-561.
- Yang, Y. Y & Yi, M. H (2008) 'Does Financial development cause Economic growth? Implication for policy in Korea' *Journal of policy modeling* 30 Pp, 827-840. Retrieved from [www.elsevier.com/locate/jpm](http://www.elsevier.com/locate/jpm).