International Journal of Accounting and Finance Studies
Vol. 1, No. 2, 2018
www.scholink.org/ojs/index.php/ijafs
ISSN 2576-2001 (Print) ISSN 2576-201X (Online)

Original Paper

Financial Development and Economic Growth: The Case of Greek Economy

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Received: October 22, 2018 Accepted: October 23, 2018 Online Published: October 29, 2018

doi:10.22158/ijafs.v1n2p173 URL: http://dx.doi.org/10.22158/ijafs.v1n2p173

Abstract

This paper examines the relationship among financial development and economic growth, within a framework which also accounts trade openness, for the case of Greece using data covering the period 2001-2017. We investigate this relationship using the Johansen and Juselius (1990) cointegration approach and the Vector Error Correction Models (VECM), employing Granger causality technique, in order to explore the presence of causality among the variables. The results of cointegration analysis suggested that there is one cointegrated vector among the functions of financial development, economic growth and trade openness. Granger causality tests have shown that there are unidirectional causalities running from economic growth to financial development as well as from financial development to trade openness. The results support that financial development and trade openness do not have causal impact on economic growth in Greece, for the aforementioned period. On the other hand, economic growth has a causal impact on trade both directly and indirectly through financial development.

Keywords

financial development, economic growth, trade openness, VECM, Granger causality

1. Introduction

Ever since the pioneering contributions of Schumpeter (1911) and more recently Goldsmith (1969), McKinnon (1973) and Shaw (1973) the relation between financial development and economic growth remains a subject of interest for various theoretical and empirical studies. At the beginning of the 90s, research on the endogenous growth model emphasizes on the role of finance in the long term economic growth.

Results of these studies point out that endogenous growth could influence growth through financial development by enhancing higher savings and higher returns on investments (Bencivenga & Smith,

1991). Furthermore, these studies emphasize on the positive effect that financial liberalization may play on economic growth by promoting higher savings and higher returns on investments (Galindo, Schiantarelli, & Weiss, 2007).

On the other hand, there are economists who believe that the finance-growth relationship is not important (Lucas, 1988; Chandavarkar, 1992). However, the known of direction of causality remains vital and has important implication for development policy. The relation between financial and economic growth remains unclear.

In recent literature very few studies examine the causality relationship between financial development and economic growth, either in develop or developing economies. In terms of innovative econometric methods and new data, this study investigates the causality relations among financial development and economic growth within a framework that also accounts trade openness for Greece using data over the period 2001-2007.

The structure of the paper is as follows: Section 2 briefly presents the literature review. Section 3 presents the data and the econometric methodology. Finally, concluding remarks and policy implications are given in the final section.

2. Literature Review

In all countries, either developed or developing, the aim of the policy makers is to attain sustainable growth of the economy. The effect of financial development in any process of economic growth of a country has been the subject of numerous studies in the economics and finance literature.

Hondroyiannis, Lolos and Papapetrou (2005) examined the relationship between the development of the banking system and the stock market and economic performance for the case of Greece over the period 1986-1999. Their findings suggest that there is a bidirectional causality relationship between finance and growth in the long run. The causality results, using the error correction model, support that both bank and stock market financing can enhance economic growth, in the long run. In addition the contribution of stock market finance to economic growth appears to be substantially smaller compared to bank finance.

Yucel (2009) examined the causality relations among financial development, trade openness and economic growth for the Turkish economy over the period 1989-2007. The results of study showed that while trade openness has a positive effect on economic growth, financial development affects it negatively. Finally, the causality results indicated the existence of bidirectional causalities between economic growth and financial development and between economic growth and trade openness. In addition financial development and trade openness cause growth. The findings support that economic policies aimed at financial development and trade openness have a statistically significant impact on economic growth.

A similar study was conducted by Chimobi (2010). He investigated the causal relationship among financial development, trade openness and economic growth in Nigeria for the period 1970-2005. The

Granger causality results suggest that trade openness and financial development can affect economic growth in the country. Furthermore economic growth has causal impacts on trade and finance implying the support for growth-led trade hypothesis but not the trade-led growth model.

Rachdi and Mbarek (2011) examined the direction of causality between finance and growth for a sample of 10 countries, 6 from the OECD region and 4 from the MENA region during 1990-2006. Their empirical analysis confirms a long-term relationship between financial development and economic growth for the OECD and the MENA countries. Findings show that financial development and real GDP per capita are positively and strongly linked. Finally, the causality analysis shows the existence of a bidirectional relationship for the OECD countries and of a unidirectional causality running from economic growth to financial development for the MENA countries.

Kaushal and Pathak (2015) investigated the causal relationship among financial development, economic growth and trade openness in India for the post liberalization period ranging from 1991-2013. Their findings suggest that economic growth and financial development have a positive effect on trade openness. The results recommend that India should consider economic policies which support the philosophy of growth-led trade, where dependence on foreign direct investment might be a feasible option.

3. Data and Methodology

3.1 Data

The sample used is annual data covering the period 2001-2017 for the case of Greece. The data are taken from the World Development Indicators (WDI, 2018) and Annual Macro-Economic database (AMECO, 2018). The selection of the starting period was constrained by the availability of data. The variables are GDP per capita in constant 2005 US$ measures the economic growth (GDP), domestic credit to private sector as share of GDP as a proxy for Financial Development (FD) and are Trade Openness (TO) measured by the sum of exports and imports as a percentage of GDP at 2005 US$ constant prices. The descriptive statistics of the variables are presented on Table 1.

Table 1. Descriptive Statistics

	GDP	TO	FD
Mean	22249.88	0.569786	90.28882
Median	21955.10	0.575244	89.28991
Maximum	31997.28	0.675163	118.1057
Minimum	12538.18	0.477438	50.08139
Std. Dev.	5366.634	0.065127	24.63527
Skewness	0.033385	0.120079	-0.333457
Kurtosis	2.323858	1.743782	1.641530

Jarque-Bera	0.326986	1.158662	1.622236
Probability	0.849173	0.560273	0.444361

3.2 Methodology

The relationship between financial development, economic growth and trade openness can be expressed as follows (see also the study of Kaushal and Patahk 2015):

$$FD_{\mathrm{t}} = \alpha_0 + \beta_1 GDP_t + \beta_2 TO_t + \varepsilon_t \quad (1)$$

where ε_t is the white noise.

After descriptive statistics, this papers uses unit root techniques to examine the stationarity of the three variables and then cointegration approach to investigate the long run relationship among them. Finally, a dynamic panel Vector Error Correction Model (VECM) is used in order to find the short and long run Granger causal relationships between financial development, economic growth and trade openness in Greece.

3.2.1 Unit Root Tests

The literature proposes several methods for unit root tests. Since these methods may give different results, we selected ADF by Dickey-Fuller (1979), PP by Phillips-Perron (1988) and DF-GLS by Elliott, Rothenberg and Stock (1996). In all these tests, the null hypothesis is that the variable contains a unit root (i.e., it is not stationary).

3.2.2 Cointegration Analysis

Since unit root tests have been applied, we continue by testing the long run relationships between financial development, economic growth and trade openness for the Greek economy, using the Johansen and Juselius (1990) cointegration approach. Johansen and Juselius have (1990) developed two tests to detect the number of cointegrating vectors: the maximum-likelihood test and the trace test.

3.2.3 Vector Error Correction Models

Once the variables are proved to be cointegrated, two different kinds of equations arise:

i) The long-run equation:

$$FD_{\mathrm{t}} = \alpha_0 + \beta_1 GDP_t + \beta_2 TO_t + u_t \quad (2)$$

where FD, GDP and TO represent financial development, economic growth and trade openness, respectively. In addition u_t is the stochastic error term with mean zero and a constant variance.

ii) The short-run model or the vector error-correction representations:

$$\Delta FD_t = \alpha_1 + \sum_{i=1}^{p} \beta_{1i} \Delta FD_{t-i} + \sum_{i=1}^{p} \gamma_{1i} \Delta GDP_{t-i} + \sum_{i=1}^{p} \delta_{1i} \Delta TO_{t-i} + \lambda_1 ECM_{t-1} + \varepsilon_{1t} \quad (3)$$

$$\Delta FD_t = \alpha_2 + \sum_{i=1}^{p} \beta_{2i} \Delta FD_{t-i} + \sum_{i=1}^{p} \gamma_{2i} \Delta GDP_{t-i} + \sum_{i=1}^{p} \delta_{2i} \Delta TO_{t-i} + \lambda_2 ECM_{t-1} + \varepsilon_{2t} \quad (4)$$

$$\Delta FD_t = \alpha_3 + \sum_{i=1}^{p} \beta_{3i} \Delta FD_{t-i} + \sum_{i=1}^{p} \gamma_{3i} \Delta GDP_{t-i} + \sum_{i=1}^{p} \delta_{3i} \Delta TO_{t-i} + \lambda_3 ECM_{t-1} + \varepsilon_{3t} \quad (5)$$

where i (i=1,…p) is the optimal lag length determined by the Akaike information criterion (AIC), where ECM_{t-1} stands for the lagged error correction term from the long-run cointegration equation (Eq. 2), λ_1, λ_2, λ_3 are the adjustment coefficients, and ε_{1t}, ε_{2t}, ε_{3t} are the disturbance terms assumed to be uncorrelated with zero means $N(0,\sigma)$.

4. Empirical Results

4.1 Unit Root Results

We begin applying the unit root tests of ADF (of Dickey-Fuller 1979), PP (of Phillips-Perron 1988) and DF-GLS (of Elliott, Rothenberg & Stock, 1996). The results of level and first difference unit root tests for the three variables are provided in Table 2.

Table 2. Unit Root Tests Results

Var.	ADF		P-P		DF-GLS	
	C	C,T	C	C,T	C	C,T
FD	-1.81(3)	0.36(3)	-1.76[1]	0.59[0]	6.2(3)	6.8(3)
DFD	-3.80(1) ***	-3.39(1) ***	-2.80[3] *	-3.36[3] *	2.10(3) ***	3.9(3) ***
GDP	-1.89(3)	-1.59(3)	-1.88[2]	-1.59[3]	-0.64(3)	87.1(3)
DGDP	-6.11(2) ***	-6.10(2) ***	-6.14[13] ***	-8.90[13] ***	0.83(3) ***	3.27(3) ***
TO	0.96(3)	-3.30(3)	-0.80[3]	-3.29[3]	7.26(3)	7.59(3)
DTO	-3.89(3) **	-3.79(3) **	-6.51[14] ***	-6.93[14] ***	1.85(3) ***	4.11(3) ***

Notes. *, ** and *** show significant at 1%, 5% and 10% levels respectively. The numbers within parentheses followed by ADF, DF-GLS statistics represent the lag length of the dependent variable used to obtain white noise residuals. The lag lengths for ADF equation were selected using SIC. Mackinnon (1994) critical value for rejection of hypothesis of unit root applied. The numbers within brackets followed by PP statistics represent the bandwidth selected based on Newey West (1999) method using Bartlett Kernel. C=Constant, T=Trend.

As can be seen from Table 2, the results showed that all variables (FD, GDP, TO) contain a unit root (non-stationary) in levels. In all cases the tests confirm the stationarity hypothesis, either with intercept or including intercept and trend. Evidently, the results indicated that all variables are stationary in their first differences (i.e., *I*(1)).

4.2 Cointegration Results

After identifying the order of integration, we then use the Johansen and Juselius (1990) Full Information Maximum Likelihood (ML) technique to investigate cointegration for long run relationship between the examined variables. Akaike Information Criterion (AIC) was used to determine the optimum lag length selection, while maximum lag length is set up to level four. The results of the Johansen and Juselius's cointegration test are presented in Table 3.

Table 3. Cointegration Tests—VAR(2)

Null Hypothesis	**Statistics**		**5% Critical Values**	
	Trace	**Max-Eigen**	**Trace**	**Max-Eigen**
(FD, GDP, TO) k=3				
r=0	62.12	36.14	57.19	29.79
r≤1	29.36	18.24	27.13	15.49
r≤2	3.12	3.16	6.95	3.84

Notes. Critical values derive from Osterwald–Lenum, r denotes the number of cointegrated vectors, Akaike criterion are used for the order of VAR model.

Empirical results from Table 3 show that both the maximum eigen value and trace tests statistics have their values greater than the critical values at 5 percent level of significance. Therefore, the null hypotheses of no cointegrating vectors (r=0; r≤1) against the specific alternatives are clearly rejected. Thus it is possible to say that there are long run equilibrium relations between three variables.

The cointegrating vector is shown below:

$$FD_t = 0.28GDP_t + 1.83TO_t \quad (6)$$

(0.000) (59.55) (standard error in parentheses)

The above equation shows that if the GDP increases by 1% then there is a growth in FD of 0.28 % and if TO increases by 1% there is an increase in FD of 1.83%.

4.3 Granger Causality Test Based on VECM

In order to investigate the short and long run dynamic relationships among the variables of financial development, economic growth and trade openness we adopt the two steps Engle and Granger (1987) method. The existence of cointegration between the examined variables implies that there is causality relation among them in at least one direction (Engle & Granger, 1987). However, the direction of

causality can be detected through the Vector Error Correction model (VECM) of long run cointegrating vectors.

Thus, on the first step we find out the long run equilibrium relationship from equation and save the residuals corresponding to the deviation from equilibrium point. The second step estimates the parameters related to the short run adjustment. The equations that arise for Granger causality testing are the following:

$$\begin{bmatrix} \Delta FD_t \\ \Delta GDP_t \\ \Delta TO_t \end{bmatrix} = \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \end{bmatrix} + \sum_{i=1}^{p} \begin{bmatrix} \beta_{11} & \beta_{12} & \beta_{13} \\ \beta_{21} & \beta_{22} & \beta_{23} \\ \beta_{31} & \beta_{32} & \beta_{33} \end{bmatrix} \begin{bmatrix} \Delta FD_{t-p} \\ \Delta GDP_{t-p} \\ \Delta TO_{t-p} \end{bmatrix} + \begin{bmatrix} \lambda_1 \\ \lambda_2 \\ \lambda_3 \end{bmatrix} ECM_{t-1} + \begin{bmatrix} u_{1t} \\ u_{2t} \\ u_{3t} \end{bmatrix} \quad (7)$$

where i (i=1,…p) is the optimal lag length determined by the Schwarz Information Criterion (SIC), ECM_{t-1} is the lagged residual obtained from the long-run relationship presented in equation, λ_1, λ_2, λ_3 are the adjustment coefficients, and u_{1t}, u_{2t}, u_{3t} are the disturbance terms assumed to be uncorrelated with zero means N(0,σ).

Table 4. Granger Causality Results

Dependent Variable	**Source of Causation (Independent Variables)**			
	F-statistic			**t-test**
	Short-run			**Long-run**
	ΔFD	**ΔGDP**	**ΔTO**	**ECT**
ΔFD		3.83*	2.36	2.34**
ΔGDP	0.50		0.14	0.65
ΔTO	4.09*	2.23		3.15**

Notes. Δ denotes first difference operator. ** and * significant at 5% and 10% levels. Short-run causality is determined by the statistical significance of the partial F-statistics associated with the right hand side variables. Long-run causality is revealed by the statistical significance of the respective error correction terms using a t-test.

From the results of Table 4 we can see that:

There are two short run unidirectional causalities running from GDP to FD as well as from FD and TO. We can point out that, according to the result, trade openness is affected both by financial development (directly) and economic growth (indirectly through FD, see Figure 1).

In the long run, the estimated coefficients of ECT in equations of financial development and trade openness are negative and statistically significant at 5% level, implying that financial development and trade openness could play an important adjustment role as the system departs from the long-run equilibrium.

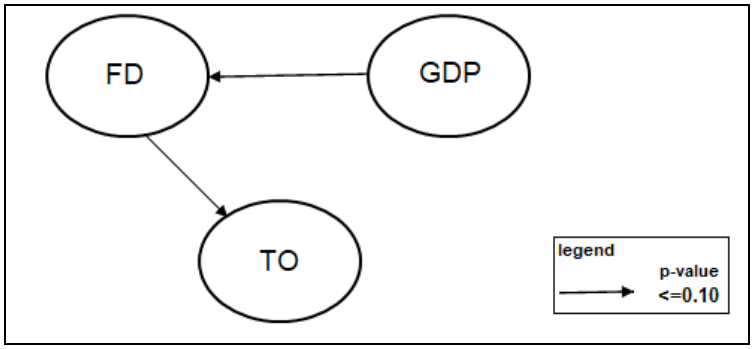

Figure 1. Granger Causality Relations for Greece

5. Conclusion and Policy Implications

This study investigates the relationship between financial development and economic growth within a framework which also accounts trade openness in Greece using the Jojansen's maximum likelihood procedure in a multivariate model over the period 2001-2017.

Findings suggest that there is a strong evidence of cointegration between the three variables, which indicates that there is a long-run equilibrium relationship. The cointegration relationship indicates that an increase 1% of economic growth has as a result an increase 0.28% of financial development. In addition, increase 1% of trade openness will cause an increase of 1.83 in financial development.

The causality results based on the Vector Error Correction Model (VECM) show both in the short and long run that financial development and trade openness do not have casual impact on economic growth. On the other hand, economic growth has a casual impact on trade both directly and indirectly through financial development. Findings support the growth-led trade hypothesis instead of trade-led growth. This follows the studies of Soukhakian (2007) in Japan, Chimobi (2010) in Nigeria and Kaushal and Pathal (2015) in Indian.

The new model in the theory of growth considers technological progress as an endogenous factor and foreign direct investments to have a permanent effect on the development through technology transfer. Therefore, Greece should immediately implement policies to attract foreign direct investments and foreign capitals in order to promote economic growth and enhance financial and trade liberalization.

References

Annual Macroeconomic Database. (AMECO). Retrieved October 15, 2018, from http://ec.europa.eu/economy_finance

Bencivenga, V. R., & Smith, B. D. (1991). Financial Intermediation and Endogenous Growth. *The Review of Economic Studies*, *58*(2), 195-209. https://doi.org/10.2307/2297964

Chandavarkara, A. (1992). Of Finance and Development: Neglected and Unsettled Questions. *World Development*, *20*(1), 133-142. https://doi.org/10.1016/0305-750X(92)90142-I

Chimobi, O. P. (2010). Causality between Money and Inflation in the Nigerian Economy. *International Journal of Economic Perspectives*, *4*(1), 363-370.

Chimobi, O. P. (2010). The Causal Relationship among Financial Development, Trade Openness and Economic Growth in Nigeria. *International Journal of Economics and Finance*, *2*(2). https://doi.org/10.5539/ijef.v2n2p137

Dickey, D., & Fuller, W. A. (1979). Distribution of the Estimates for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association*, *74*, 427-431.

Elliott, G., Rothenberg, T. J., & Stock, J. H. (1996). Efficient Tests for an Autoregressive Unit Root. *Econometrica*, *64*(4), 813-836. https://doi.org/10.2307/2171846

Engle, R. F., & Granger, C. W. J. (1987). Cointegration and Error Correction: Representation, Estimation, and Testing. *Econometrica*, *55*(2), 251-276. https://doi.org/10.2307/1913236

Galindo, A. J., Schiantarelli, F., & Weiss, A. (2007). Does Financial Liberalization Improve the Allocation of Investment? Micro Evidence from Developing Countries. *Journal of Development Economics*, *83*, 562-587. https://doi.org/10.1016/j.jdeveco.2005.09.008

Goldsmith, R. W. (1969). *Financial Structure and Development*. Yale University Press, New Haven.

Hondroyiannis, G., Sarantis, L., & Papapetrou, E. (2005). Financial Markets and Economic Growth in Greece, 1986-1999. *Journal of International Financial Markets*, *Institutions and Money*, *15*(2), 173-188. https://doi.org/10.1016/j.intfin.2004.03.006

Johansen, S., & Juselius, K. (1990). Maximum Likelihood Estimation and Inference on Cointegration with Applications to Demand for Money. *Oxford Bulletin of Economics and Statistics*, *52*, 169-210. https://doi.org/10.1111/j.1468-0084.1990.mp52002003.x

Kaushal, L. A., & Pathak, N. (2015). The Causal Relationship among Economic Growth, Financial Development and Trade Openness in Indian Economy. *International Journal of Economic Perspectives*, *9*(2), 5-22.

Lucas, R. E. (1988). On the Mechanics of Economic Development. *Journal of Monetary Economics*, *22*(1), 3-42. https://doi.org/10.1016/0304-3932(88)90168-7

MacKinnon, J. G., Haug, A. A., & Michelis, L. (1999). Numerical Distribution Functions of Likelihood Ratio Tests for Cointegration. *Journal of Applied Econometrics*, *14*(5), 563-577. https://doi.org/10.1002/(SICI)1099-1255(199909/10)14:5%3C563::AID-JAE530%3E3.0.CO;2-R

McKinnon, R. I. (1973). *Money and Capital in Economic Development*. The Brookings Institution, Washington, DC.

Newey, W. K., & West, K. D. (1994). Automatic Lag Selection in Covariance Matrix Estimation. *Review of Economic Studies*, *61*, 631-653. https://doi.org/10.2307/2297912

Osterwald-Lenum, M. (1992). A Note with Quantiles of the Asymptotic Distribution of the Maximum Likelihood Cointergration Rank Test Statistics. *Oxford Bulletin of Economics and Statistics*, *54*(3), 461-471. https://doi.org/10.1111/j.1468-0084.1992.tb00013.x

Phillips, P. C., & Perron, P. (1988). Testing for a Unit Root in Time Series Regression. *Biometrika*, *75*(2), 335-346. https://doi.org/10.1093/biomet/75.2.335

Rachdi, H., & Mbarek, H. B. (2011). The Causality between Financial Development and Economic Growth: Panel Data Cointegration and GMM System Approaches. *International Journal of Economics and Finance*, *3*(1), 2011.

Schumpeter, J. A. (1911). *The Theory of Economic Development*. Harvard University Press, Cambridge, MA.

Shaw, E. S. (1973). *Financial Deepening in Economic Development*. Oxford University Press, London and New York.

Soukhakian, B. (2009). Financial Development, Trade Openness and Economic Growth in Japan: Evidence from Granger Causality Tests. *International Journal of Economic Perspectives*, *1*(3), 118-127.

World Development Indicators-The World Bank. (2018). Retrieved October 15, 2018, from http://data.worldbank.org/-data-catalog/world-development-indicators

Yucel, F. (2009). Causal Relationships between Financial Development, Trade Openness and Economic Growth: The Case of Turkey. *Journal of Social Sciences*, *5*(1). https://doi.org/10.3844/jssp.2009.33.42