

Financial Growth Versus Economic Development in Turkey, Portugal and Greece 1968-1983*

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The association between finance and economic development has received considerable attention recently, and there is still controversy among experts as to whether finance is exogenous or endogenous to economic development.

This study suggests that even among economically similar countries, the direction of causality between finance and economic development varies, and different development proxies yield different results within the same country. A generalization on the causal role of finance on economic development should be avoided.

I. Introduction

In the past two decades the debate over the role that finance plays in economic development has drawn much attention from economists and international analysts. Studies by Bhatia and Khatkhate, Galbis, Drake, Gupta, and Jung conclude that financial development leads economic development. Gurley and Shaw

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seem to lean to the view that financial development depends on real growth, even though they concede the possibility of feedback, as does Goldsmith. Wolmer's study of Nigeria leads to the conclusion that economic development led the growth of finance up to the early 1970's. Patrick refers to this phenomenon as "demand following" rather than "supply-leading" which means that domestic growth of income and economic prosperity follows the growth of financial institutions and finance. The contemporary studies with supply-leading conclusions are often acted upon by policy makers in developing countries, and implemented by international development organizations like the World Bank and the

Table 1

SUMMARY OF CROSS CORRELATIONS SHOWING SIGNIFICANT LEADS AND LAGS FOR TURKEY, PORTUGAL AND GREECE

Leading variable	Turkey	Portugal	Greece
Q* leads	M ₁ (13) M ₂ (9, 11) CR (2, 3, 6) F(11)	M ₁ (16) M ₂ (13, 16) CR (0, 5) PCR(4)	M ₁ (2)
GDPRES leads	M ₁ (6) M ₂ (2) F(2)	M ₂ (8) PCR(7) F(8)	M ₁ (11)
M ₁ leads	GDPRES(1)	G*(6, 14) GDPRES(5) GDP(9, 10)	
CR leads		GDPRES(4, 5)	GDP(7) GDPRES(6)
PCR leads		GDP(11)	G*(1) GDP(1)
F leads		GDPRES(10)	Q*(6, 11, 15)

Note: Parenthesis indicate significant lag(s).

IMF who support development of financial institutions in order to stimulate economic development.

Using three of the poorest countries in the OECD — Turkey, Portugal, and Greece — this study found that even where there appears to be a relationship between finance and economic development, the direction of the relationships is different for each country and the results are sensitive to the development proxies used. Only in the case of Greece can one feel justified in drawing the conclusion of a supply-leading phenomenon, considering the results across all proxies. For Portugal and Turkey uses of different proxies lead to varying conclusions.

II. The Model

The variables used were as follows:

Financial Growth Variables:

M_1	Bank demand deposits and currency
M_2	M_1 plus quasi-money
CR	Total domestic credit
PCR	Private Credit (Claims on private sector by government and commercial banks)
F	Total Finance (All money, postal savings, bonds and capital accounts)

Economic Development Variables:

GDP	Gross domestic product
GDPRES	Gross domestic product per capita in real terms
Q^*	Gross domestic product less the value of all exports

In developing countries M_1 is a good indicator of monetization of economic activity; M_2 is a good proxy for the degree of financial intermediation; CR and PCR are measures of borrowing and credit; and F is an aggregate measure of total finance. These proxies are identical to Gupta's proxies of financial growth.

Both GDP and real GDP per capita¹ were used as indicators of

¹ Real GDP per capita was used by Jung, and the index of industrial production was used by Gupta as proxies of economic development.

Table 2
TESTING FOR UNIDIRECTIONAL CAUSALITY IN TURKEY

Regressions	F-ratio	Economic Meaning
1. $GDPRES(t) = -.0057 + .106 M_1(t-4)$	(1, 48) = 4.38*	
2. $GDPRES(t) = -.0027 + .108 M_1(t-4)$ $-.0524 M_1(t+6)$	(1, 42) = 1.78	
3. $M_1(t) = .0854 - 1.31 GDPRES(t-6)$	(1, 45) = 8.04**	$M_1 \rightarrow GDPRES$
4. $M_1(t) = .0984 - .655 GDPRES(t-6)$ $-.207 GDPRES(t+4)$	(1, 42) = 5.23*	SL
1. $GDPRES(t) = .0017 + .339 M_2(t-1)$	(1, 48) = 5.08*	
2. $GDPRES(t) = .0021 + .454 M_2(t-1)$ $-.326 M_2(t+1)$	(1, 48) = 8.03**	
3. $M_2(t) = -.0005 - .316 GDPRES(t-2)$	(1, 50) = 5.34*	$GDPRES \leftrightarrow M_2$
4. $M_2(t) = -.0017 - .321 GDPRES(t-2)$ $+ .266 GDPRES(t+1)$	(1, 48) = 7.66**	FDBK
1. $GDPRES(t) = .0026 + .461 F(t-10)$	(1, 42) = 6.09	
2. $GDPRES(t) = .0036 + .406 F(t-10)$ $-.421 F(t+2)$	(1, 39) = 6.02*	
3. $F(t) = .0024 - .355 GDPRES(t-2)$	(1, 50) = 7.99**	$GDPRES \leftrightarrow F$
4. $F(t) = -.001 - .339 GDPRES(t-2)$ $+ .261 GDPRES(t+10)$	(1, 39) = 4.84*	FDBK

- * — .05 level of significance
 ** — .01 level of significance
 SL — Supply-leading
 DF — Demand-following
 FDBK — Feedback
 INDP — Independent

economic development because GDP includes production and services of foreigners within the country, and excludes incomes earned abroad by nationals. Using the output approach, GDP is measured by summing total output of agricultural, extractive, manufacturing, and construction industries. GDP also includes goods and services produced by local residents who have obtained financing in international financial markets, and by foreigners who have brought in external capital for this activity. In Greece

and Portugal the latter type of financing is common. Therefore, the third development proxy, Q^* , attempts to remove the effect of foreign financing from GDP in order to measure the value of domestically financed goods and services.

The data used were quarterly figures from the beginning of 1968 to the end of 1982 from the various issues of *International Financial Statistics*. Where data on quarterly national income was not available. Lisman's and Sandee's method was used to derive quarterly figures from annual data.

III. Methodology

Cross-correlation analysis and causality testing require that all input and output series be white noise variables. All financial and development variables used in the study were prewhitened by first taking the natural log to produce stationarity. Then ARIMA models including seasonal components were fitted parsimoniously to each series, until the residuals showed no significant auto-correlation.

The prewhitened financial series and development proxies were then cross-correlated to determine the direction of the relationships between the variables and to identify the correct lag structure. According to Vandaele, the cross-correlations are scaled cross covariances and are defined as:

$$\rho_{xy}(k) = \gamma_{xy}(k) / \sigma_x \sigma_y, \quad k = 0, \pm 1, \pm 2, \dots$$

where

$$\gamma_{xy}(k) = \sum (X_t - \mu_x) (Y_{t+k} - \mu_y), \quad k = 0, \pm 1, \pm 2, \dots$$

ρ_{xy} is the cross-correlation of x and y , γ_{xy} is the cross covariance of x and y , and μ_x and μ_y are the means of stationary series of x and y . A large lag cross-correlation $\rho_{xy}(k)$, $k > 0$ would indicate that current y_t is related to past values of x_t . A large lead cross-correlation $\rho_{xy}(k)$, $k < 0$ would indicate that y_t is a predictor of x_t . Significant leads and lags were identified by Ljung-Box chi-square test.

For pairs of variables that showed both a demand following

and a supply leading pattern, a test for determining unidirectional causality was formed. This test was the same as that used by Sims and Gupta with one major exception. Where these authors arbitrarily chose the lags and leads, here the lags and leads were only those identified by the significant cross correlations. Assume x is the monetary variable and y is the development proxy, then the test involves fitting the following system of equations.

$$(1) x(t) = a_1 + b_1 y(t-i) + u$$

Table 3

TESTING FOR UNIDIRECTIONAL CAUSALITY IN PORTUGAL

Regressions	F-ratio	Economic Meaning
1. $Q^*(t) = -.00021 + .442 M_1(t-15)$	(1, 38) = 6.53*	
2. $Q^*(t) = -.0095 + .512 M_1(t-15)$ + .592 $M_1(t+16)$	(1, 21) = 19.08**	
3. $M_1(t) = -.0051 + .449 Q^*(t-16)$	(1, 37) = 7.87**	$Q^* \rightarrow M_1$
4. $M_1(t) = .00026 - .125 Q^*(t-16)$ + .260 $Q^*(t+15)$	(1, 21) = 2.45	DF
1. $Q^*(t) = -.0012 + .664 M_2(t-15)$	(1, 38) = 9.35*	
2. $Q^*(t) = .0037 + .395 M_2(t-15)$ + .630 $M_2(t+16)$	(1, 21) = 3.25	
3. $M_2(t) = -.00064 + .329 Q^*(t-16)$	(1, 37) = 7.87**	Q^*, M_2 INDP
4. $M_2(t) = .00094 + .115 Q^*(t-16)$ + .395 $Q^*(t+15)$	(1, 21) = .498	
1. $GDPRES(t) = .0051 - .669 M_2(t-5)$	(1, 37) = 4.44*	
2. $GDPRES(t) = .0041 - .642 M_2(t-5)$ - 1.09 $M_2(t+8)$	(1, 39) = 18.48**	
3. $M_2(t) = -.0048 - .277 GDPRES(t-8)$	(1, 45) = 20.6**	$GDPRES \leftrightarrow M_2$
4. $M_2(t) = .0051 - .263 GDPRES(t-8)$ - .156 $GDPRES(t+5)$	(1, 39) = 7.13*	FDBK

* — .05 level of significance

** — .01 level of significance

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$$(2) x(t) = a_2 + b_2y(t-i) + c_2y(t+i) + u$$

$$(3) y(t) = a_3 + b_3x(t-i) + u$$

$$(4) y(t) = a_4 + b_4x(t-i) + c_4x(t+i) + u$$

where i indicates a significant lead or lag structure.

Equations 2 and 4 are then tested for statistical significance with respect to equations 1 and 3. Under the null-hypothesis that c_2 and c_4 are not statistically different from zero an F-test was calculated. If c_2 and c_4 were both significantly different from zero there is feedback. If c_2 is significant, but c_4 is not, then x cause y or finance leads development. If c_4 is significant, but c_2 is not, then y causes x and development leads finance. If c_2 and c_4 are not statistically significantly different from zero, then both variables are independent.

IV. Results

Table 1 gives the summary of the cross-correlations with the corresponding significant lags. For example, in the case of Turkey the proxy Q^* leads M_1 by 13 quarters. The present level of Q^* is also correlated to the levels of M_2 both 9 and 11 quarters later.

Where the cross-correlations showed bi-directional causality in Table 1, the test for unidirectional causality was conducted as explained previously. Tables 2, 3, and 4 give the results of the test for unidirectional causality for each country, respectively. For example, in the case of Turkey, Table 1 shows real GDP per capita leads M_1 and M_1 also leads GDP per capita. This is the first test for unidirectional causality shown in Table 2. This test shows that future values of GDP per capita are significant predictors of the current value of M_1 , but future values of M_1 do not increase predictability of GDP per capita. Under the assumption that A can cause B only if A precedes B, the conclusion is that M_1 causes growth, a supply-leading relationship.

Table 5 summarizes the final results of the tests. For Turkey the results unequivocally point to a demand-following relationship when the variable Q^* is used.² Alternatively, GDP proxy showed

² Variable PCR for Turkey, and variables M_2 and F for Greece were omitted from the analysis, since no ARIMA model could be found which produced white noise residuals.

Table 4

TESTING FOR UNIDIRECTIONAL CAUSALITY IN GREECE

Regressions	F-ratio	Economic Meaning
1. $GDPRES(t) = .0024 + .326 M_1(t-16)$	(1, 37) = 8.8*	
2. $PRES(t) = .0015 + .639 M_1(t-16)$ + .182 $M_1(t+11)$	(1, 25) = 1.93	
3. $M_1(t) = .009 - .751 GDPRES(t-11)$	(1, 42) = 5.68*	GDPRES, M_1
4. $M_1(t) = .006 - .429 GDPRES(t-11)$ + .26 $GDPRES(t+16)$	(1, 25) = .188	INDP
1. $Q^*(t) = .01 + .313 M_1(t-11)$	(1, 41) = 4.05*	
2. $Q^*(t) = .0009 + .103 M_1(t-11)$ + .266 $M_1(t+2)$	(1, 39) = 3.85	
3. $M_1(t) = .001 + .682 Q^*(t-2)$	(1, 51) = 10.6**	Q^* , M_1
4. $M_1(t) = -.0038 + .544 Q^*(t-2)$ + .242 $Q^*(t+11)$	(1, 39) = .07	INDP

* — .05 level of significance

** — .01 level of significance

SL — Supply-leading

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no dependence relationship with any of the financial variables. The use of a real per capita GDP (GDPRES) showed supply-leading for M_1 , but feedback for M_2 and F, and independence for CR.

For Portugal the results were mixed for all proxy measures. The variable Q^* indicated a demand-following role for three of the five financial proxies. The variable GDP showed independence for all cases except for PCR and M_2 where supply-leading was evident. For GDPRES the results were evenly divided among supply-leading and demand-following with M_2 showing feedback.

In the case of Greece, the only financial variable that showed a dependence relationship with Q^* was PCR, and the direction of the relationship was supply-leading. All of the available financial variables showed a supply-leading relationship with GDP, but

only CR was dependent on GDP per capita and the direction of the relationship was supply-leading. None of the financial variables were related to the development proxies in a demand-following direction.

V. Discussion

The aim of this study was to examine empirically the issue of whether development was the consequence of or the cause of financial development. This study attempted to improve on the methodology used by previous studies by using only those series that could be prewhitened, since the absence of serial correlation is necessary for any causality test. Furthermore, only significant lags were included in the test of causality rather than an arbitrary lag used by many others. Finally, since no single measure has been accepted by economists as a measure of "true" economic development, three measures of economic development were used to strengthen the evidence for a single country. Theoretically, if financial variables are exogenous or endogenous, the direction of causation should be consistent. As evidenced in the paper, the results of the empirical test varied both by country and by proxy.

Two important questions arise: First, why did the results vary by country, and, second, why did the results vary by proxy? The answer to the first question lies in the institutions of the countries studied. In Turkey, for instance, we notice that there is more demand-following phenomenon than supply-leading. During the period of study the Turkish government for the most part kept interest rates constant and followed an accommodations policy. This policy made money and finance endogenous (demand-following) rather than exogenous. In Turkey until the late 1970's interest rates were pegged, and as a result of growth of economic activity and income, there was increased demand by the public for more money, which was provided by the central bank.

In Greece there was no indication of endogeneity of finance (no demand following or feedback). The Greek government during the period of study followed a policy of credit rationing, rather than strict interest rate controls. Also, government attempts to mobilize funds to priority industries made money and credit variables exogenous in Greece.

Table 5
SUMMARY OF RESULTS OF CAUSALITY TESTS WHERE
CROSS-CORRELATIONS SHOWED BOTH LEADS AND LAGS
BETWEEN FINANCIAL AND DEVELOPMENT VARIABLES

Economic Variables	Financial Variables				
	M ₁	M ₂	CR	PCR	F
TURKEY					
Q*	DF	DF	DF	N/A	DF
GDP	IND	IND	IND	N/A	IND
GDPRES	SL	FDB	IND	N/A	FDB
PORTUGAL					
Q*	DF	IND	DF	DF	SL
GDP	IND	SL	IND	SL	IND
GDPRES	SL	FDB	SL	DF	DF
GREECE					
Q*	IND	N/A	IND	SL	N/A
GDP	SL	N/A	SL	SL	N/A
GDPRES	IND	N/A	SL	IND	N/A

DF — Demand-Following

SL — Supply-Leading

IND — Independent

FDB — Feedback

N/A — Not Available

In Portugal there was evidence of both policies. Both credit rationing and different forms of interest rate controls existed prior to the 1974 revolution. The socialist revolution of 1974 made the government more eager to control interest rates. Finally, in 1977 through the early 1980's Portugal's return to capitalism and the IMF guidelines forced the Portuguese central bank to abandon its interest rate controls. This may have been the reason why the results of the causality test for Portugal were inconclusive.

All three countries were on a semi-fixed exchange rate system during the majority of the period studied. Government budget deficits, expansive monetary policy, and inflation all reduce the purchasing power of the domestic currency. Fixed or sticky ex-

change rates make foreign goods more attractive, hence increasing the demand for imports. In the absence of sterilization operations by monetary authorities, a payment imbalance effects bank reserves directly. Since bank reserves are a major part of the money supply, M_1 , M_2 , and total finance (F) are all affected directly, but differentially by balance of payments deficits.

Another explanation of why the three countries showed different directions of causality goes back to Patrick's assertion that the causal pattern changes with the process of economic development. Patrick argued that the supply-leading role of financial institutions becomes less important as the economy develops, and a demand-following role then becomes dominant. This explanation can not be totally accepted since Greece, with a per capita income three times that of Turkey and 1.5 times that of Portugal, leans toward a supply-leading role. It is possible that in the course of economic development shifts in the direction of causality do take place. However, empirically measuring these shifts requires a greater number of observations and flow-of-funds data which are unavailable in developing countries.

Several inconsistencies that exist among proxies used can be explained by Gurley and Shaw's hypothesis that there could be a feedback relationship between finance and growth but not necessarily among the same variables. For example F causes Q^* in Portugal, but GDPRES causes F (refer to Table 5). The tests performed here were limited to testing pairwise relationships between financial and development variable. Relationships among development variables were not examined.

The other explanation in the variation among proxies could be due to the varying quality of the data and variation in the collection procedures used in underdeveloped countries. This problem exists in all empirical studies dealing with developing countries.

VI. Concluding Remarks

In comparison with other studies, this study used a significantly more reliable procedure to test the relationship between finance and economic development. Using three proxies for economic development, the results were different for each country and

across countries.

The results of this study do not support the broad generalization and policy prescriptions made in the literature that finance is exogenous (supply-leading), and suggests that policy must be determined by a detailed study of the countries' institutions and on a case-by-case analysis for each country.

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