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## **An empirical analysis of the interlinkages between financial sector and economic growth**

Pirtea , Marilen, Dima, Bogdan and Milos, Laura Raisa  
West University from Timisoara (Romania), Faculty of  
Economics and Business Administration, Finance  
Department, West University from Timisoara (Romania),  
Faculty of Economics and Business Administration, Finance  
Department, Eftimie Murgu University Resita, Faculty of  
Economics and Administrative Sciences

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## AN EMPIRICAL ANALYSIS OF THE INTERLINKAGES BETWEEN FINANCIAL SECTOR AND ECONOMIC GROWTH

PIRTEA, G[abriel], M[arilen]; DIMA, B[ogdan] & MILOS, L[aura], R[aisa]

**Abstract:** *There is a growing literature body which examines the connections between financial status and economic growth. The aim of this paper is to examine the mechanism through which this positive connection is realized. The methodology is based on a pool data regression with dynamic of real GDP as dependent variable and some key variables of the financial sector. The main output of our study consists in the thesis that the financial status matter for the economic growth.*

**Key- words:** *finance, growth, cost of capital, yield*

### 1. INTRODUCTION

We consider that one of the most significant transmission channel between finance and growth is represented by the cost of borrowed financial resources. Financing costs are an important determinant in firms' decisions to undertake investment projects. Higher interest rates, for example, reduce the profitability of an investment project because of higher financing costs. Therefore, lower the probability of the project being undertaken.

Having access to a wider and diversified range of financial resources, the companies can realize their investment projects, adding value to their company and leading to economic growth. Therefore, in this paper the authors aim at finding new evidence of the mechanism through which the economic growth can be achieved. Section 2 reviews a part of the relevant literature concerning this problem. Section 3 provides the analytical framework. Section 4 offers the empirical framework. The last section is dedicated to some conclusions and suggestions regarding potential further research.

### 2. LITERATURE REVIEW

Levine (1991) is among the first authors that propose models of endogenous growth that identify the mechanisms through which the financial system influence the long-run growth of an economy. Levine's innovation was to consider financial services as affecting economic growth through five main channels: savings mobilization, resource allocation, risk management, managerial monitoring, trade facilitation. By considering the functions of the financial sector in a comprehensive manner, Levine is able to demonstrate a significant role for financial markets that was not present in earlier models that used a narrower definition. Also, he states that industries and firms that rely on external financing tend to grow faster in countries with well developed financial systems than countries with poorly functioning financial systems.

The positive association between the degree of development of the financial system and economical growth was largely analyzed also by Demircuc-Kunt (2006) and Levine and King (1993). They get to the conclusion that this correlation stays significant even when other factors of influence are taken into consideration. Moreover, they prove that regarding a country with a developing financial system, the degree of financial development is correlated not only with the current growth, but also with the future economical growth. Their model identifies the innovation (including the financial

one) as engine for economic growth. The financial markets have the role of discriminate between different investment projects according to their efficiency potential. In this way, it is assured the function of efficient allocation. This is the main reason why, an economy with an efficient financial system will experiment a higher rate of productivity (Demetriades and Hussein, 1996). These show that, on the case of some countries like Zair or Mexico, if the volume of loans as percent of GDP would have increased, respectively the value traded on the capital markets as percent of GDP would have increased in the considered period of time, then the economic growth, measured as GDP per capita, would have increased as well.

If the nature of financing the economic growth manner is a key variable for the economic growth, there are still some important methodological issues concerning the evaluation of the financing cost. Thus, the purpose of our study is to take into account the different components of the borrowed financial resources, in order to examine at the level of the European Union countries, their impact on the economic growth.

### 3. THE ANALYTICAL FRAMEWORK

The analytical framework is represented by a Two-Stage Least Square (TSLS) regression between the dynamic of real GDP and the relevant explanatory variables with the inclusion of some cross-section *random effects* and also of some period specific *instrumental variables*. This could be seen as an appropriate technique when some of the right-hand side variables are correlated with the error terms, and there is neither heteroskedasticity, nor contemporaneous correlation in the residuals. The general specification of the regression model looks like:

$$y_{it} = \alpha + X_{it}\beta + \delta_t + \gamma_t + \varepsilon_{it} \quad (1)$$

where  $y$  is the dynamic of real GDP,  $X = \begin{bmatrix} div \\ mm \\ bm \end{bmatrix}$  is the

vector of explanatory variables ( $div$  represents the dividend yield for each country, obtained as a ratio between the distributed dividends by the companies that compose the main index, if possible and the market capitalization,  $mm$  the 3-month money market rate for each country and  $bm$  the yield on current 10 years Government bonds, for each country) with  $\beta_t$  coefficients that are period specific,  $\alpha$  is an overall constant, while the  $\delta_t, \gamma_t$  represent cross-section or period specific effects.

The random effects specifications assume that the corresponding effects  $\delta_i$  and  $\gamma_t$  are realizations of independent random variables with mean zero and finite variance. Most importantly, the random effects specification

assumes that the effect is uncorrelated with the idiosyncratic residual.

The estimation of the covariance matrix for the composite error formed by the effects and the residual (e.g.,  $v_{it} = \delta_i + \gamma_t + \varepsilon_{it}$  in the two-way random effects specification), uses the quadratic unbiased estimators (*QUE*) from *Swamy-Arora* method. This estimator uses residuals from the within (fixed effect) and between (means) regressions. The list of instrumental variables includes the lagged values of the dependent and explanatory ones:

$$INSTRUMENT_t = [gdp_{t-1} \text{ div}_{t-1} \text{ mm}_{t-1} \text{ bm}_{t-1}] \quad (2)$$

The structure of the correlations between residuals is described as a *Period Heteroskedasticity and Serial Correlation* (Period SUR) one. This class of covariance structures allows for arbitrary period serial correlation and period heteroskedasticity between the residuals for a given cross-section, but restricts residuals in different cross-sections to be uncorrelated. Accordingly, it is assumed that:

$$\begin{aligned} E(\varepsilon_{is} \varepsilon_{it} | X^*_i) &= \sigma_{st} \\ E(\varepsilon_{is} \varepsilon_{jt} | X^*_i) &= 0 \end{aligned} \quad (3)$$

for all  $i, j, s, t$  with  $i \neq j$ . It should be noticed that the heteroskedasticity and serial correlation does not vary across cross-sections  $i$ . Using the cross-section specific residual vectors, one may rewrite this assumption as:

$$E(\varepsilon_i \varepsilon_i' | X^*_i) = \Omega_T \quad (4)$$

for all  $i$  with

$$\Omega_T = \begin{pmatrix} \sigma_{11} & \sigma_{12} & \dots & \sigma_{1T} \\ \sigma_{21} & \sigma_{22} & \dots & \sigma_{2T} \\ \dots & \dots & \dots & \dots \\ \sigma_{T1} & \sigma_{T2} & \dots & \sigma_{TT} \end{pmatrix} \quad (5)$$

This specification involves covariances across periods within a given cross-section, as in seemingly unrelated regressions with period specific equations. Such a framework allows for multiple interactions between the involved variables without imposing to rigid hypothesis about the nature of such interlinkages.

#### 4. THE EMPIRICAL FRAMEWORK

In order to implement the methodology, we considered a sample of data belonging to 16 countries, members of the European Union (Greece, Spain, Italy, Hungary, Germany, Netherlands, Belgium, Portugal, France, Ireland, Slovenia, Great Britain, Luxemburg, Sweden, Poland and Austria). Data was provided from Eurostat (2009) and World Federation of Exchanges (2009) and the time span is between 2004 and 2007.

The main results are presented in the below table. Despite some unit roots common processes at the level of the residuals (suggested especially by the *Hadri Z-stat* test) the quality of the model could be overall considered as satisfactory.

Dependent Variable: The dynamic of the real GDP				
Method: Pooled IV/Two-stage EGLS (Cross-section random effects)				
Cross-sections included: 16				
Total pool (unbalanced) observations: 42				
Swamy-Arora estimator of component variances				
Period SUR (PCSE) standard errors & covariance (no degree of freedom correction)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	673.4907	279.8444	2.406662	0.0220
DIV—2005	21.77603	19.74610	1.102801	0.2783
DIV—2006	58.63235	25.41840	2.306689	0.0277
DIV—2007	99.60585	36.69249	2.714611	0.0106
MM—2005	-78.40737	35.64972	-2.199383	0.0352
MM—2006	-20.02118	33.53529	-0.597018	0.5547
MM—2007	49.30112	57.57215	0.856336	0.3982
BM—2005	44.34550	71.77164	0.617869	0.5410
BM—2006	-12.54052	61.97273	-0.202356	0.8409
BM—2007	-91.53098	48.93977	-1.870278	0.0706
Effects Specification				
Cross-section random S.D. / Rho			823.1883	0.9985
Idiosyncratic random S.D. / Rho			32.24111	0.0015
Weighted Statistics				
R-squared	0.432588	Mean dependent var	16.03920	
Adjusted R-squared	0.273003	S.D. dependent var	42.43189	
S.E. of regression	36.17916	Sum squared resid	41885.82	
Durbin-Watson stat	2.289885	Instrument rank	13.00000	

Tab. 1. The TSLS estimation between the dynamic of real GDP and the considered financial variables

#### 5. CONCLUSIONS AND FURTHER RESEARCH

The advanced analysis provided some empirical support for the thesis of a positive connection between a lower cost of borrowed resources and the economic growth (despite the fact that such a connection seems not to be stable enough over the considered period).

As a potential further research, there can be taken into consideration a broader range of countries belonging to European Union. Likewise, a distinction between developed and developing countries, as far as concerns the current state of the financial system must be done, in order to have a more accurate analysis. Moreover, the sample can be enlarged, using a larger time span.

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