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THE SAVING-INVESTMENT RELATION IN THE POST-COMMUNIST ALBANIA

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Abstract

This study uses annual time series data to empirically analyze the relation between domestic saving and domestic investment in the post-communist Albania. The data are obtained from the World Bank and cover the period 1992-2012. The nature of the time series variables is examined using 4 traditional unit root tests that include ADF, PP, KPSS and DF-GLS. Based on the unit root test results the ARDL bounds testing method is employed to assess the nature of this relation. Results indicate the absence of a cointegrating relationship between domestic saving and domestic investment implying high capital mobility in the country. This means that over the long term domestic investment in Albania does not seem to be determined by domestic saving but by the pool of foreign capital flowing in the country. Consequently, economic policies that try to promote domestic investment by increasing domestic saving are likely to be inappropriate for Albania. Instead, efforts should concentrate on increasing the inflow of foreign capital in the country.

Keywords: Albania, Cointegration, Investment, Saving

INTRODUCTION

Investment is generally considered the "engine" of economic growth. Both, theoretical and empirical studies provide evidence in favor of its key growth enhancing role. Macroeconomic theory considers saving as one of the most important determinants of investment generally assuming that causality runs from saving to investment.

The relation between domestic investment and domestic saving according to Feldstein and Horioka (1980) may indicate the degree of capital mobility among countries. Although there is disagreement among researchers on the appropriateness of this indicator for measuring the degree of capital mobility, most agree that it provides at least a partial such measure. There also seems to be general consensus on the importance of the degree of capital mobility for economic policy formulation.

To our knowledge there is no study on this relation for Albania. This study tries to fill this gap by empirically evaluating the domestic saving-domestic investment relation in the post-communist Albania. Ang (2007) clearly states the need for further empirical country-specific studies on this topic, particularly studies that focus on developing countries. This need is justified on the one hand by the contradictory results offered by the cross-country studies and on the other by the relatively small number of studies on this topic for developing countries. The mixed findings provided by the cross-country studies are not totally unexpected considering the heterogeneity among countries and the different time spans considered. Furthermore, Ang (2007) suggests that country-specific studies on this topic are more appropriate for policy formulation in particular countries. Cross-country studies generally fail to properly account for the heterogeneity among countries considered making their findings valid for the average country implying a "one size fits all" approach in policy formulation. This approach is likely to be of little help to policymakers in particular countries who should formulate policies that best fit their respective countries' needs (Ang 2007; Mastroyiannis 2007).

This study provides additional evidence on this relation adding to the small body of existing empirical literature on this topic for developing countries. In addition, it tries to provide some useful insight on the appropriate economic policies that the country needs to adopt. The country policymakers are under immense pressure to set in motion an economy in stagnation that has been performing poorly since the effects of the global economic crisis 2007 began to be felt in the country. Economic growth has fallen sharply after 2008 and government finances have deteriorated substantially during this period resulting in a country record high public debt. The rest of this paper is organized as follows. The next section provides a review of the existing country-specific empirical studies on the domestic saving-domestic investment relation. Section 3 describes the econometric methodology used. Section 4 presents the results of the study and the final section concludes.

LITERATURE REVIEW

The influential work of Feldstein and Horioka (1980) can be considered as the starting point for the large body of existing empirical research on the saving-investment relation. In their study Feldstein and Horioka argue that if there are no barriers among countries to the flow of capital a weak correlation between domestic saving and domestic investment is to be expected as capital will move to countries offering the highest real return ceteris paribus. They tested this hypothesis in a sample of 16 OECD countries generally believed to have relatively high capital mobility but found evidence against it – a contradiction widely known as the Feldstein-Horioka puzzle. Subsequent studies have tried to explain this puzzle focusing on both developed and developing countries but results remain controversial, influenced largely by the choice of countries and time periods considered. As Ang (2007) notes most of the empirical work on this relation constitutes of cross-country studies. However, considering our interest on this relation for a particular country we review only the relatively few existing country-specific studies. Onafowara et al. (2011) assess the gross domestic saving-gross domestic investment relation for 8 advanced EU economies finding evidence of cointegration in 6 of them. They also study the direction of causality between these two variables in each of these countries providing mixed findings. Bordoloi and John (2011) provide further evidence for this relation in developed countries focusing on US and UK. They also use the popular ARDL bounds testing approach to check the presence of cointegration between these two variables. Evidence suggests the presence of a long run cointegration in each of these 2 countries. This study sheds more light on this relation for UK that was not defined in the former study. In addition, the authors also consider 2 large developing countries, namely China and India and find similar results. Their findings for China support Narayan's (2005) findings of high saving-investment correlation in this economy. However, a more recent study of this relation for India by Seshaiah (2012) contradicts their findings regarding the nature of this relation for this country. Ang (2007) also studies this relation for a developing Asian country. The author finds a strong long-run relationship between saving and investment in Malaysia using annual data from 1965 to 2003 and the ARDL technique. Using the same cointegration method and annual WB data from 1970 to 2009, Adebola and Dahalan (2012) find high co-movement between these two variables in Tunisia. Pelagidis and Mastoyiannis (2003) reach similar conclusions for Greece during the period 1960-1997. In a latter study Mastoyiannis (2007) returns to this topic using data for a longer time span (1960-2004). The evidence indicates a weaker link between these two variables during the study period particularly after 1992. The results are contradictory for Turkey. Kaya (2010) find a strong long-run relation between these two variables while Ìyidoğan and Balikçioğlu (2010) using a longer and more recent dataset and ARDL find no cointegration.

ECONOMETRIC METHODOLOGY

Following the majority of the country-specific studies we use the Feldstein-Horioka specification written as:

$$\left(\frac{I}{Y}\right)_t = \alpha + \beta\left(\frac{S}{Y}\right)_t + \varepsilon_t \qquad (1)$$

where I/Y is the ratio of gross capital formation (formerly gross domestic investment) to GDP, S/Y is the ratio of domestic saving to GDP, β is the so-called saving retention coefficient and t denotes time. The data are obtained from the World Development Indicators (2013). Prior to estimation we check the nature of the 2 time series variables under consideration.

It is advantageous to work with series transformed in the natural logarithm form but this conversion is not possible as there are some negative values of S_t. Therefore, the analysis proceeds with the original variables.

We use 4 traditional unit root tests that include ADF, PP, KPSS and DF-GLS. The test equations are chosen based on the visual inspection of the graphs of each variable and their results are presented in the table below.

Table 1. Unit root test results for the variables of the saving-relation equation

Variable	Level				First difference			
	ADF	PP	KPSS	Result	ADF	PP	KPSS	Result
S_t	-3.178897**	-14.52529*	0.491751**	inconclusive	-5.009274*	-10.39823*	0.387093	stationary
I_t	-3.334007	-2.863044	0.176139**	nonstationary	-3.723078*	-4.106831*	0.343177	stationary

** and ** indicate rejection of the null hypothesis (H_0)for the ADF, PP and KPSS tests at 1% and 5% level of significance respectively.*

Notes: Test statistics and critical values are computed by the statistical software EViews 7.1. Lag lengths or bandwidths were automatically selected by the program. Selection of lag lengths for both ADF and PP tests was based on Schwarz Information Criterion (SIC). In the KPSS test Newey-West Bandwidth was selected using Bartlett kernel spectral estimation method. The Critical values in both the ADF and PP tests refer to critical values computed by Mac Kinnon (1996) while those in the KPSS test refer to Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1). Inference is made based on the most frequently used 1% and 5% levels of significance.

Further evidence regarding the nature of time series data is provided by the DF-GLS unit root test, which is more powerful than the ADF unit root test (Elliott et al. 1996). Like in the ADF test the null hypothesis in the DF-GLS test is that the variable under consideration is nonstationary against the alternative that it is stationary. Its results are presented in the table 2.

Table 2. Results of the DF-GLS unit root test for the variables of the saving-relation equation

Variable	Level		First difference	
	DF-GLS	Result	DF-GLS	Result
S_t	-2.504874**	stationary	-2.492476**	stationary
I_t	-3.353246**	stationary	-2.691374**	stationary

** and ** indicate rejection of the null hypothesis (H_0)for the DF-GLS test at 1% and 5% level of significance respectively.*

Notes: Lag lengths are selected automatically by the software EViews 7.1 using SIC. The critical values in this unit root test refer to the Mac Kinnon (1996) critical values.

Most of the evidence suggests that S is I(0) while I is I(1).

Next, we check for cointegration between these two variables. The results of unit root tests have very important implications for the choice of the econometric method. The presence of variables with different orders of integration (but none with order of integration higher than 2), the short span of the time series variables under consideration and its ability to deal with potential omitted variable bias strongly suggest that ARDL (Autoregressive Distributed Lag) is the most appropriate technique to check for cointegration.

Single-country empirical studies that employ the ARDL method on small samples of time series data consisting of 20 or less observations are not uncommon (e.g. Pattichis 1999; Gaikwad and Fathipour 2013).

ARDL bounds test approach to cointegration was developed by Pesaran et al. (2001). ARDL model is a dynamic specification which includes lagged values of the dependent and explanatory variables as well as contemporaneous values of explanatory variables to estimate both long and short run relations among several variables of interest.

According to Choong et al. (2005), who summarize Pesaran et al. (2001), the ARDL model can be expressed as a VAR model of order p:

$$z_t = c_0 + \alpha t + \sum_{i=1}^{p} \eta_i \, z_{t-i} + \varepsilon_t \qquad (2)$$

where

z_t is a column vector of variables y_t and x_t. y_t is the dependent variable while x_t is a column vector of k explanatory variables.

c_0 represents a (k + 1)-component column vector of intercepts,

α represents a (k + 1) component column vector of trend coefficients,

η_i represents a (k + 1) * (k + 1) matrix of VAR parameters for lag i,

ε_t is a (k + 1)-component column vector of white noise error terms,

t represents time while p is the optimal lag length.

It can be written as a VEC (Vector Error Correction) model in the following form:

$$\Delta z_t = c_0 + \alpha t + \lambda z_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \, \Delta y_{t-i} + \sum_{i=0}^{p-1} \Phi_i \, \Delta x_{t-i} + \varepsilon_t \qquad (3)$$

where

Δ is the first difference operator,

λ is a (k + 1) * (k + 1) long-run multiplier matrix, and

Γ_i and Φ_i are a (k +1) column vector and a (k + 1) * k matrix of short-run coefficients respectively.

The long-run multiplier matrix can be partitioned as

$$\lambda = \begin{bmatrix} \lambda_{yy} & \lambda_{yx} \\ \lambda_{xy} & \lambda_{xx} \end{bmatrix}$$

The saving-investment model can be expressed in the ARDL form following the assumptions made by Pesaran et al. (2001) for case v (unrestricted intercepts and unrestricted trends). The restriction $\lambda_{xy} = 0$ should be imposed so that at most as unique long-run relationship between y_t and regressors be examined. It is shown as the following UECM (unrestricted error correction model):

$$\Delta I_t = \beta_0 + \beta_1 t + \beta_2 I_{t-1} + \beta_3 S_{t-1} + \sum_{i=1}^{p} a_i \Delta \mathrm{I}_{t-i} + \sum_{i=0}^{q} b_i \Delta \mathrm{S}_{t-i} + \varepsilon_t \quad (4)$$

The above equation can also be viewed as an ARDL model of order (p, q).

RESULTS

The estimated coefficients of the most appropriate specification are presented in the Table 3.

Table 3. Estimation results of the most appropriate domestic saving-domestic investment specification (EViews 7.1 output)

Dependent Variable: DI
Method: Least Squares
Date: 02/16/14 Time: 20:00
Sample (adjusted): 1994 2012
Included observations: 19 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.116621	3.627022	2.237820	0.0420
I(-1)	-0.353697	0.154814	-2.284661	0.0385
S(-1)	0.273705	0.123232	2.221056	0.0434
DI(-1)	0.187359	0.173556	1.079529	0.2986
DS	0.354734	0.131672	2.694085	0.0175

R-squared	0.576222	Mean dependent var	0.606965
Adjusted R-squared	0.455142	S.D. dependent var	2.890834
S.E. of regression	2.133854	Akaike info criterion	4.574671
Sum squared resid	63.74667	Schwarz criterion	4.823207
Log likelihood	-38.45937	Hannan-Quinn criter.	4.616733
F-statistic	4.759037	Durbin-Watson stat	1.942024
Prob(F-statistic)	0.012355		

A summary of the results of the model diagnostic tests performed in EViews 7.1 is presented below.

Model Diagnostic Checking

AR(1) = 0.001682 [0.9673]

JB = 0.578882 [0.748682]

ARCH(1) = 0.010813 [0.9172]

RESET(2) = 0.056654 [0.9452]

AR, JB, ARCH and RESET stand for the Breusch-Godfrey serial correlation test, the Jarque-Bera normality test, the ARCH test and the Ramsey's RESET test respectively. The numbers in brackets represent the number of lags = 1 and number of fitted terms = 2 included in the Breusch-Godfrey serial correlation test, ARCH test and RESET test respectively. The probabilities of the calculated test statistics are shown in square brackets. The results above indicate that the estimated model does not seem to have any serious diagnostic problems such as serial correlation, ARCH effects, non-normality of the residuals and misspecification. (Similar conclusions are derived even when the number of fitted terms included in the RESET is 1).

In addition, the plots of both CUSUM and CUSUM of Squares Tests that are used to check parameter stability suggest that the model is stable during the sample period. They are provided below.

Figure 1. Plot of the CUSUM test of the estimated model

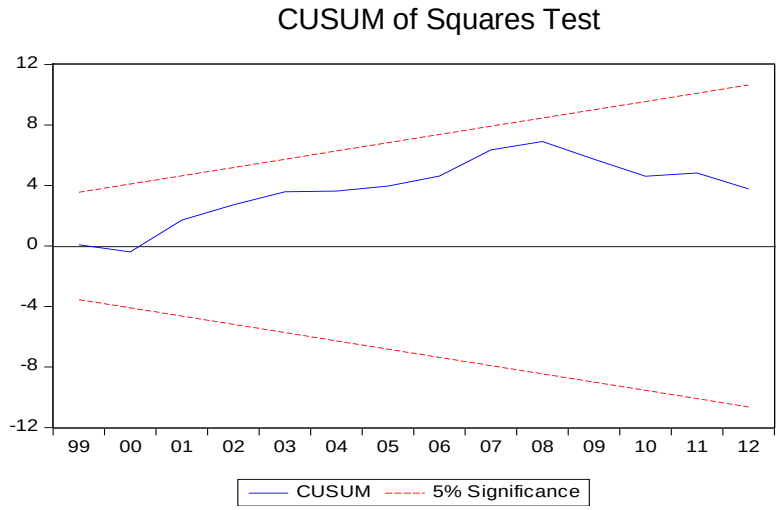
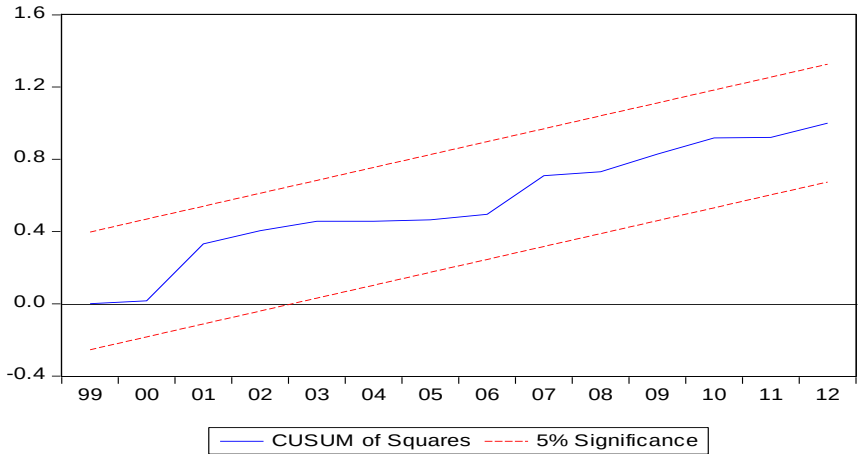


Figure 2. Plot of the CUSUM of Squares test of the estimated model



Thus, the estimated coefficients of the model above are valid for interpretation. The regression model explains nearly 58% of the variation in the dependent variable (R^2 = 0.576). All the estimated coefficients are statistically significant at the 5% level of significance except for the coefficient of ΔI_{t-1}.

Furthermore, the estimated coefficients of the relevant explanatory variables have the expected signs. The presence of a long-run relationship between domestic saving and domestic investment is checked using the Wald test. The decision regarding cointegration is made by comparing the computed F-statistic with the critical values provided by Narayan (2005).

Table 4. Critical values for cointegration analysis provided by Narayan (2005)

Significance level (α)	Lower bound critical value	Upper bound critical value
1%	8.170	9.285
5%	5.395	6.350
10%	4.290	5.080

Note: critical values are cited from Narayan (2005) for case III (unrestricted intercept and no trend) for number of regressors (k) = 1 and number of time periods (n) = 30. Number of time periods in our study is smaller but we use the critical values computed for a sample size of 30 because it is the smallest sample size for which they are calculated by the author. The computed F-statistic is 3.090837. It is lower than the lower bounds at the most common levels of significance implying no long-run relationship between saving and investment.

CONCLUSIONS

This study examines the relation between domestic saving and domestic investment in the post-communist Albania using the ARDL bounds testing approach to cointegration. Results indicate the absence of a long-term relationship between these two variables. This finding implies that economic policies aimed at increasing domestic investment by increasing domestic saving are likely to fail in achieving this goal. Instead the country's policymakers should adopt policies that target directly investment. In this context, policies to increase the inflow of foreign capital in the country would be particularly suitable. By stimulating investment these policies can give a growth impetus to the struggling Albanian economy.

However, despite the recognized ability of the econometric methodology used to provide reliable estimates even when the sample size is as small as ours these findings cannot be considered conclusive and further research can clearly provide more robust conclusions regarding the nature of this important relationship. Moreover, as more data become available, separate analysis of the private and public saving-investment relations could provide more

insights for policy formulation. It is likely that these two components of domestic investment behave differently and their respective relation with domestic saving is worth studying. These can be interesting avenues for future research.

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