HOW DOES PUBLIC DEBT AFFECT ECONOMIC GROWTH IN ALBANIA?

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Abstract: The global recession and the sovereign debt of European countries has triggered an intense debate over the effectiveness of fiscal policy and over the consequences of rising public debt. The purpose of this paper is to determine if there exist a correlation between the public debt and the economic growth in Albania, where the economic growth will be considered as the increase of GDP. The results and the methodologies are different in different countries and periods, as represented by various empirical studies. What is the situation in Albania at about the last 25 years? The SVAR methodology is used for analyzing this relationship. The results indicated that an instantaneous increase in real economic growth might increase the public debt and vice versa.

Keywords: economic growth, public debt, SVAR methodology, Albania

JEL classification: H61, H63, O4, F01

INTRODUCTION

The purpose of this study is to analyze the relationship between the public debt and the economic growth in Albania for the last 25 years. Different authors have used different methodologies for the study of the issue and certainly the obtained results have been different. Some have concluded for a positive relationship between the two indicators and others for a negative relationship. Several other studies have come to the conclusion that the public debt has no impact on the economic growth.

The literature identifies some lines: the Classical and the Neoclassical economics and Ricardian view which consider the public debt as detrimental to the economy, the conventional view, according to which the government debt stimulates

aggregate demand and growth in the short term and promotes the reduction of capital and national income in the long term and the Modern economics which considers the debt as a driver of economic growth if funds are used for productive purposes.

In this paper, firstly each time series will be analyzed and then the model will be estimated. The data was obtained from the International Monetary Fund for the years 1994-2017. The public debt is taken in real terms as a percentage of GDP and the economic growth in real terms as well. The econometric analysis consists on: the stationary tests (unit roots test), the cointegration test, the regression analysis, the Granger test. If, after the unit roots test, no unit root is found and conclude that the time series is stationary, the model can be estimated using the VAR model. The VAR model is proposed by Sims in 1980 [Sims 1980]. Conversely, if the root of the unit is found, cointegration should be tested. If the variables co-exist, then the VEC model should be used. If the variables are neither stationary nor cointegrated, they should be differentiated. If the first difference is stationary, the VAR model in the differentiated form can be estimated.

REVIEW OF EMPIRICAL LITERATURE

Reinhart and others in the work "Debt Intolerance" took the first steps on the concept of debt intolerance [Reinhart et al. 2003]. The authors have assumed that, besides reputable factors, bankruptcy in the series, may create a vicious cycle, where bankruptcy weakens a country's institutions, making a break-in more likely.

Understanding and measuring debt intolerance is essential to assess the problems of debt sustainability, its restructuring, the capital market integration and the international borrowing space to overcome crises.

Reinhart and others in the "A Decade of Debt" study brought evidence that public debt in developed countries has in recent years reached unrecorded levels since the end of World War I or the Depression big [Reinhart et al. 2011]. Historically, these episodes have been accompanied by a slower economic growth and a restructuring of private and public debt.

The results achieved show that high levels of debt undermine the economic growth, although the US may tolerate higher levels of debt compared to other countries, without soliciting solvency.

The main finding is that in developed countries, the high level of public debt / GDP ratio (over 90%) is associated with a lower increase.

Reinhart and others brought the paper "Debt Overhangs: Past and Present", concluding the existence of a weak link between rising and low debt levels, but when the debt in the report with GDP being over 90%, economic growth rates are on average 1% lower than the forecast [Reinhart et al. 2012].

The level of public debt / GDP ratio in developed countries overall exceeds the critical threshold of 90%. The private debt, which, unlike the public, shows a significant growth trend over the last decades, remains close to the pre-crisis levels.

The problem is exacerbated by the fact that in developed countries, a good part of debt, is owed to foreign creditors, which generally limits the government's means to force creditors to absorb losses.

There are identified 26 episodes where the debt ratio public DEBT/ GDP exceeds 90% since 1800 and economic growth averaged 1.2%. The average duration of debt overrun episodes is 23 years.

Clements and others reported a negative correlation between external debt and growth for a panel of 55 low-income countries for a period that spanned from 1970 to 1999 [Clements et al. 2003].

El-Mahdy and others investigated the debt and growth relationship for Egypt's economy using data spanning 1981–2006 and the study revealed a robust negative relationship between debt and growth [El-Mahdy et al. 2009].

Baum and others investigated the relationship between public debt and economic growth using the dynamic threshold panel methodology for 12 European countries for the period 1990-2012 [Baum et al. 2012]. The study reported a positive and high statistically significant impact of debt on GDP when the debt-to-GDP ratio was less than 67 percent; after which point, there was no relationship between debt and GDP.

Egbetunde examined the impact of public debt on economic growth in Nigeria between 1970 and 2012 using a Vector Autoregressive model [Egbetunde 2012]. The findings revealed a positive relationship between public debt and growth. Also, the study reported a bidirectional link between public debt and economic rowth in Nigeria and this indicates that changes in public debt will cause variation in Nigeria's economic growth and vice versa.

Alfredo Schclarek have taken in consideration for his study 59 developing countries and 24 industrial countries during the years 1970-2002 [Schclarek 2004]. He found a linear negative effect of the external debt on growth. Methodologically, the paper uses the GMM estimator, called dynamic system GMM panel estimator.

Sheikh and others analyzed the impact of domestic debt on economic growth in Pakistan for the years 1972-2009 [Sheikh et al. 2010]. The OLS method is been used for their study. The result showed that the stock of domestic debt affects positively the economic growth in Pakistan.

Uzun and others studied the relationship between debt and economic growth in transition countries for the period 1991-2009, using the autoregressive model with distributed delay (ARDL) [Uzun et al. 2012]. The results showed a positive relationship in long term and these countries were positive in the Laffer curve.

DESCRIPTION OF THE DATA

Initially, it is important to provide a detailed description of the data we will use in the empirical model and, specifically, the univariate uniqueness of two time series: real economic growth and public debt expressed as a percentage of GDP. In

this paper, the real economy is in the center, so both of our series will be in real terms, bearing in mind the role of inflation on public debt and GDP.

These data are annual and include the period 1994-2017, given that public debt / GDP was impossible to find data for 1992 and 1993 or earlier. Data sources, for the foregoing analyzes (as mentioned above in the previous chapter) are the BoA, MoF and IMF. What I have found is a discrepancy in the data in these institutions' reports, for the same indicator or a lack of data for several years. The values are different for the same variable and this is a limitation for the model below. I decided to refer to the values published by the IMF, as they are the most complete.

A summary of the descriptive statistics of the variables is presented below:

Table 1. Descriptive Data Statistics of the time series

	The mean	The median	The maximum	The minimum	Dev. Standart	Observations number
The real ec.growth (%)	4.88	5.5	12.9	-10.9	4.4	24
The public debt (%GDP)	66.03	63.99	85.17	53.55	8.6	24

Source: own calculations

From the table we see that for each series we have 24 observations. Real economic growth has fluctuated from -10.9% to 12.9%, with an average annual growth of 4.88%, while public debt as a% of GDP fluctuated from 53.55% of GDP to 85.17% of GDP. GDP has been higher than the public debt. The standard deviation of public debt / GDP is almost double the standard deviation of the economic growth. The dynamic behavior of our series is presented in the following chart.

Figure1. Graphic analysis of time series
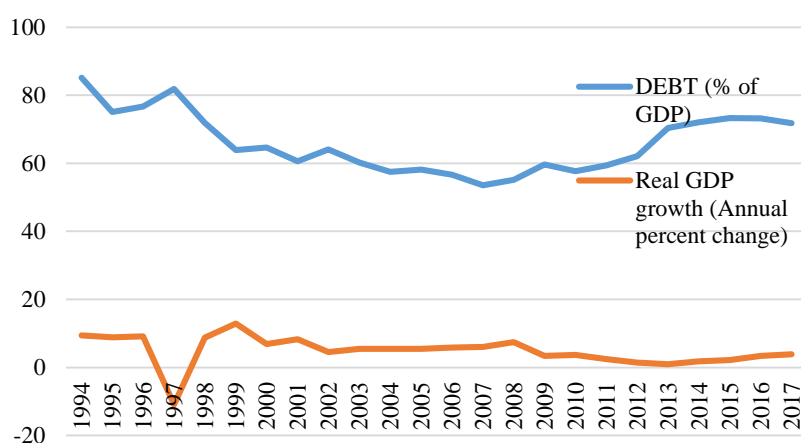
Source: own preparation

The graph shows that there may be a negative relationship between the two indicators and we notice a structural breakdown of both series in 1997 as a result of the economic situation (bankruptcy of pyramid schemes). The highest debt (in relation to GDP) is recorded in 1994 and lower in 2007. The highest economic growth is in 1999 and the lowest in 1997 (for the above mentioned reasons). From the graphs, we expect our series not to be stationary, as we have an upward trend of them all the time, meaning that their average and variance depend on time and are a series of unstable ones. However, complete and accurate conclusions will be drawn after analyzing the model created.

We can also build a graph, placing the two indicators facing each other, to see which value corresponds to the other, for 24 years in a row.

Figure 2. Graphic representation of the relationship between public debt and economic growth
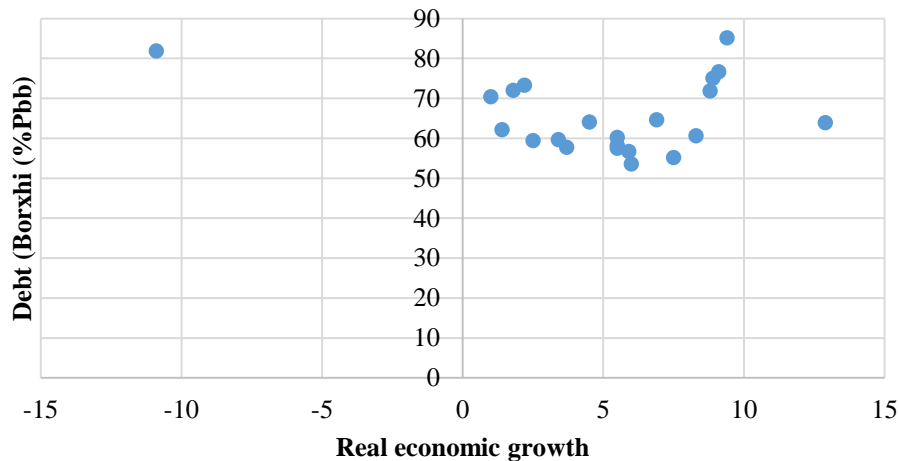
Source: own preparation

From the graph we can see that there is a negative relationship, but it appears at 60% of the debt, since the real economy can't grow fast at the time of debt growth, as debt growth promotes inflation growth instead of the real economy.

HYPOTHESIS OF THE STUDY

There are some important questions: Does public debt affect economic growth?

Does it have a negative or positive effect on economic growth?

The hypothesis to be study is: Public debt has a negative effect on the economic growth. Theoretical frameworks and relevant studies can give some answers, but it is important that the hypothesis be empirically tested.

ECONOMETRIC ANALYSIS

Time series represent a structural breakdown in 1997. In this year, bankruptcy of pyramid schemes occurred. To analyze if the series have unit root I have generated on R software, the Zivot and Andrews test. According to the results in the table, the public debt results I (1) non-stationary and should be differentiated before the regression model is created, while the economic growth is I (0), stationary.

Table 2. Zivot and Andrews test for the model A, B and C

The model	Real economic growth	Public debt	1%	5%	10%
A	-5.5901	-3.021	-5.34	-4.8	-4.58
B	-4.8519	-3.9884	-4.93	-4.42	-4.11
C	-9.6232	-3.817	-5.57	-5.08	-4.82

Source: own calculations

Table 3. Zivot and Andrews test after the first differentiation for the model A, B and C

The model	Public debt first differenced	1%	5%	10%
A	-5.8513	-5.34	-4.8	-4.58
B	-5.8889	-4.93	-4.42	-4.11
C	-6.461	-5.57	-5.08	-4.82

Source: own calculations

The VAR model: $Y_t = A_1 Y_{t-1} + A_2 Y_{t-2} + ... + A_p Y_{t-p} + \varepsilon_t$
Or the matrix form: $Y_t = A(L) Y_{t-i} + \varepsilon_t$

Before estimating a VAR model three conditions will be tested:

- the stationarity of the time series;
- the appriopriate lag length;
- the model should be stable.

The first condition is linked with the calculations of Table 2 and Table 3. The model is stable because all the roots of the polynom A(L) are less than 1. For chosen the appropriate lag length the results of Table 4 will be analyzed:

Table 4. The lag length criteria

Lag length	FPE	AIC	SC	HQ
1	17.616241	2.851891	3.112637	2.798296
2	29.401301	3.297640	3.732216	3.208315
3	44.227400	3.535245	4.143652	3.410190
4	37.496628	2.983986	3.766223	2.823201
5	35.866272	1.994599	2.950668	1.798084

Lag length	FPE	AIC	SC	HQ
6	NaN	-Inf	-Inf	-Inf
7	0	-Inf	-Inf	-Inf
8	0	-Inf	-Inf	-Inf
9	0	-Inf	-Inf	-Inf
10	0	-Inf	-Inf	-Inf

Source: own calculations

The appropriate order of our model is 6. So the equations for our two time series are:

$$Y_{1t} = \alpha_{10} + \beta_{11}Y_{1t-1} + \beta_{12}Y_{2t-1} + \gamma_{11}Y_{1t-2} + \gamma_{12}Y_{2t-2} + \delta_{11}Y_{1t-3} + \delta_{12}Y_{2t-3} +$$
$$\phi_{11}Y_{1t-4} + \phi_{12}Y_{2t-4} + \lambda_{11}Y_{1t-5} + \lambda_{12}Y_{2t-5} + \mu_{11}Y_{1t-6} + \mu_{12}Y_{2t-6} + u_{1t} \qquad (1)$$

$$Y_{2t} = \alpha_{20} + \beta_{21}Y_{1t-1} + \beta_{22}Y_{2t-1} + \gamma_{21}Y_{1t-2} + \gamma_{22}Y_{2t-2} + \delta_{21}Y_{1t-3} + \delta_{22}Y_{2t-3}$$
$$+ \phi_{21}Y_{1t-4} + \phi_{22}Y_{2t-4} + \lambda_{21}Y_{1t-5} + \lambda_{22}Y_{2t-5} + \mu_{21}Y_{1t-6} + \mu_{22}Y_{2t-6} + u_{2t}$$

Matrix form:

$$\begin{pmatrix} Y_{1t} \\ Y_{2t} \end{pmatrix} = \begin{pmatrix} \alpha_{10} \\ \alpha_{20} \end{pmatrix} + \begin{pmatrix} \beta_{11} & \beta_{12} \\ \beta_{21} & \beta_{22} \end{pmatrix} \begin{pmatrix} Y_{1t-1} \\ Y_{2t-1} \end{pmatrix} + \begin{pmatrix} \gamma_{11} & \gamma_{12} \\ \gamma_{21} & \gamma_{22} \end{pmatrix} \begin{pmatrix} Y_{1t-2} \\ Y_{2t-2} \end{pmatrix} + \begin{pmatrix} \delta_{11} & \delta_{12} \\ \delta_{21} & \delta_{22} \end{pmatrix} \begin{pmatrix} Y_{1t-3} \\ Y_{2t-3} \end{pmatrix} +$$
$$\begin{pmatrix} \phi_{11} & \phi_{12} \\ \phi_{21} & \phi_{22} \end{pmatrix} \begin{pmatrix} Y_{1t-4} \\ Y_{2t-4} \end{pmatrix} + \begin{pmatrix} \lambda_{11} & \lambda_{12} \\ \lambda_{21} & \lambda_{22} \end{pmatrix} \begin{pmatrix} Y_{1t-5} \\ Y_{2t-5} \end{pmatrix} + \begin{pmatrix} \mu_{11} & \mu_{12} \\ \mu_{21} & \mu_{22} \end{pmatrix} \begin{pmatrix} Y_{1t-6} \\ Y_{2t-6} \end{pmatrix} + \begin{pmatrix} u_{1t} \\ u_{2t} \end{pmatrix} \qquad (2)$$

Where Y_{1t} and Y_{2t} are the real economic debt and the public debt as percentage of GDP. The final form was estimated using R software. Interpreting all these parameters is not been simple, so for analyzing the relationship of the two variables and their causality, the Granger-causality test and the Impulse Response Analysis were used.

Table 5. Granger Causality test results

	Hypothesis	p-value
1	H_0: The E. G do not Granger cause the P. D	0.8573
2	H_0: The P. D do not Granger cause the P. D	0.6572
3	H_0: No instantaneous causality between E. G and P. D	0.01355
4	H_0: No instantaneous causality between P. D and E. G	0.01355

Source: own calculations

The results show an instantaneous causality between economic growth and public debt from 1994 to 2017. This means that adding observation of economic growth from the period t+1 helps improve the forecast of public debt at t+1. This also works for the reverse direction: adding public debt at t+1 helps improve the forecast of economic growth at time t+1. The null hypothesis of Granger-causality is not been rejected for big value of p-value.

On the graph of IRF analysis, the responses of the Economic growth is represented, after the shocks on the Public debt.

Figure 3. Graphic analysis of IRF

Orthogonal Impulse Response from The.differenced.public.debt

95 % Bootstrap CI, 100 runs
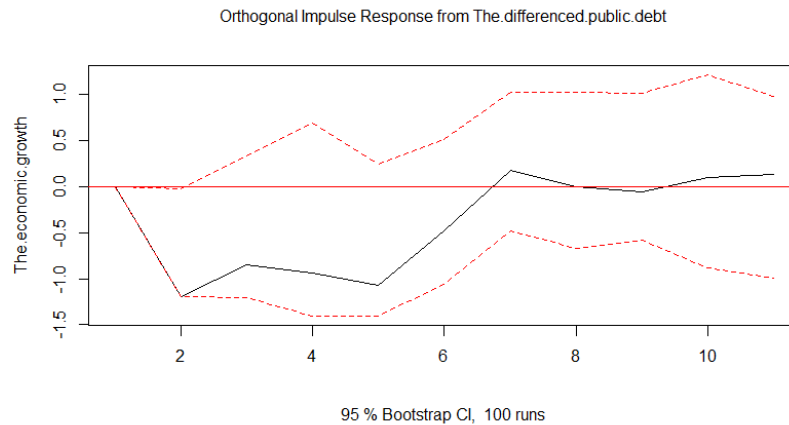
Source: own preparation

For SVAR model, restrictions based on the theory are imposed on the relations between the variables. In a simple VAR no restrictions are imposed in advance and the coefficients of the lagged values of the variables included are identified.

So in one sentence, in a SVAR restrictions are imposed on the variable dynamics beforehand and the rest is considered exogenous shocks, while in the VAR the coefficients of the lags are identified.

The diagnostic tests are verified (the heteroscedasticity, the normality of the residuals and the autocorrelation). The heteroskedasticity has been verified by ARCH-LM test and the null hypothesis has not been rejected (p-value=0.8287>0.05). The normality of the residuals has been verified by Jarque-Bera (p-value=0.5408), Skewness (p-value= 0.3875) and Kurtosis (p-value=0.547) tests. The autocorrelation has been verified by the ACF and PACF graphs.

SUMMARY

This study, conducted for Albania, shows that public debt and economic growth are two parameters that affect each other. High debt levels make the country lose reputation, have difficult access to international markets, not be favorable to foreign investors, etc. It is very important not only the level of debt but also the reason why it is taken and why will be used. The coverage of both indicators is closely related to the political events in the country. It is linked to the monetary and fiscal plot.

The study has shortcomings related to the small number of surveys and the fact that different sources give different data. The results indicated that an

instantaneous increase in real economic growth might increase the public debt and vice versa.

REFERENCES

Baum A., Checcherita-Westphal C., Rother P. (2012) Debt and Growth: New Evidence for the Euro Area. European Central Bank, Working Paper Series, 1450.

Clements B., Bhattacharya R., Nguyen T. Q. (2003) External Debt, Public Investment, and Growth in Low-Income Countries. IMF Working Paper, 03/249.

Egbetunde T. (2012) Public Debt and Economic Growth in Nigeria: Evidence from Granger Causality. American Journal of Economics, 2(6), 101-106.

El-Mahdy M. A., Torayeh M. N. (2009) Debt Sustainability and Economic Growth in Egypt. International Journal of Applied Econometrics and Quantitative Studies, 6(1), 21-55.

IMF Data. http://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ ADVEC/WEOWORLD/ALB.

Reinhart C., Rogoff K., Savastano M. (2003) Debt Intolerance. Working Paper, 9908, National Bureau of Economic Research, Cambridge.

Reinhart C., Rogoff K. (2011) A Decade of Debt. Working Paper, 16827, National Bureau of Economic Research, Cambridge.

Reinhart C., Reinhart V., Rogoff K. (2012) Debt Overhangs: Past and Present. Working Paper, 18015, National Bureau of Economic Research, Cambridge.

Schclarek A. (2004) Debt and Economic Growth in Developing and Industrial Countries. http://project.nek.lu.se/publications/workpap/Papers/WP05_34.pdf.

Sheikh M. et al. (2010) Domestic Debt and Economic Growth in Pakistan: An Empirical Analysis. Pakistan Journal of Social Sciences (PJSS), 30(2), 373-387.

Sims C. A. (1980) Macroeconomics and Reality. Econometrica, 48, 1-48.

Uzun A. et al. (2012) The Impacts of External Debt on Economic Growth in Transition Economies. Chinese Business Review, 11(5), 491-499.