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Procedia Economics and Finance 20 (2015) 163 – 170

Procedia
Economics and Finance

www.elsevier.com/locate/procedia

7th International Conference on Globalization and Higher Education in Economics and Business Administration, GEBA 2013

Romanian fiscal policy sustainability during financial crisis: a cointegration approach

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Abstract

The fiscal policy type depends on the economic stage: recession or expansion. Taking into account these two economic stages, the central authority of each country is adopting different measures in order to stimulate (during recession period) or to temperate (during boom period) the economy. The purpose of these measures is to obtain economic stability of the country for a long period of time. Therefore, this paper is emphasizing fiscal policy sustainability in Romania. Maintaining fiscal sustainability is very important for both macroeconomic stability and financial capacity of the country. Our results reveal that the public expenditure responds better to shocks caused by structural changes in revenue, compared to the opposite case. This fact indicates that there is still a hope in the sustainability of Romanian fiscal policy on long term.

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Peer-review under responsibility of the Faculty of Economics and Business Administration, Alexandru Ioan Cuza University of Iasi.

Keywords: Fiscal policy; budgetary revenues; budgetary expenditures; sustainability; cointegration tests; VEC.

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1. Introduction

Fiscal policy sustainability is an important issue due to the importance of long term relation between establishing the public revenues and allocation of public funds. Each country has to promote a sustainable fiscal policy, through a proper taxation and spending of public money, in order to guarantee the achievement of budget constraints.

Financial crisis affected the Romanian fiscal policy sustainability and, in this context, Romanian authorities had to adopt different measures in order to stimulate the economy, such as decreasing the income tax rate and VAT rate. These measures have been taken in order to achieve budgetary sustainability also because maintaining fiscal sustainability is very important for both macroeconomic stability and financial capacity of the country.

In this context, our study aims to analyze the fiscal policy sustainability in Romania, due to its importance for both macroeconomic stability and financial capacity of the country.

This paper is organized as follows: section 2 reviews the literature on fiscal policy sustainability. In section 3, we describe the methodology used, we show the data selection process and the characteristics of our sample and in section 4 we report our results. Finally, we present the main conclusions of our study.

2. Literature review

Country's sustainability is putting under question when the debt-to-GDP ratio is increasing to an excessive value, or with other words, when revenues are too small to finance the public expenditure regarding new issuance of public debt. Fiscal policy sustainability doesn't mean a constant debt-to-GDP ratio, because according to Blanchard et al. (1990), a fiscal policy is sustainable, if after a period of higher variation of this ratio, its value is returning to initial value.

Another point of view regarding fiscal policy sustainability is presented by Alvarado et al. (2004), who state that, if a fiscal policy will not lead the Government to default on its debt or to monetize the debt: the fiscal policy is sustainable.

Fiscal policy sustainability was studied for a large sample of country by Afonso and Jalles (2012), who revisited this issue for a sample of 18 OECD countries, using annual panel data for public debt, expenditures and revenues, for the period 1970 and 2010. The main results of their paper concluded that even if, in six countries there are evidence for revenues and expenditure cointegration, on overall for the analyzed period the growth rate for expenditure in more than half countries far exceeded the revenues growth rate. This result puts under question the fiscal policy sustainability in OECD countries.

Zaidi and Rejniak's (2010) paper emphasize the strong impact of population ageing on fiscal policy sustainability. Regarding this they conclude that most affected countries regarding this aspect are represented by Czech Republic, Lithuania, Romania and Slovakia.

There are some events which challenge the fiscal policy sustainability of a country. In Romania's case this event is represented by the financial crisis, which has his roots in mortgage subprime crisis in United States of America. Even if, in the USA, the crisis had begun in 2008, in Romania, the effects were felt starting to 2009, when was recorded a decrease in public revenues. This new situation determined Romania's Government to ask for financial assistance from international community, and in March 2009 Romania received a €12.9 billion loan from the International Monetary Fund and European Union. In order to get this loan from IMF and EU, Romania had to adopt budgetary measures starting with July 1, 2010: VAT rate increasing from 19% to 24% and reduction with 25% of all budget sector salaries.

The fragility of public finance in Romania is emphasized by Canagarajab et al. (2012), who pointed out as a main cause the deterioration of fiscal policy's sustainability during the financial crisis. In the same time, the authors emphasized the importance of maintaining fiscal sustainability, due to fact that by not doing that both macroeconomic stability and financial capacity of the country will have to suffer.

In order to achieve budgetary sustainability, there are necessary several actions, as were stated by Kuncoro (2011): fiscal risk identification, risk management, reducing borrowing costs in the long run, risk sharing (insurance and hedging instruments) and the existence of a precise legal and administrative framework.

One of the most used methodologies in determining the fiscal policy sustainability is represented by cointegration approach, by testing the existence of a first order cointegration relation between public revenues and expenditures.

Fiscal policy sustainability in Romania's case was study by Dima et al. (2009), Barna and Mura (2011), Roman et al. (2012) and Sava (2011). Dima et al. (2009) analyzed the fiscal policy stability using annual data for the period 1993 – 2013, expressed as percentage of GDP. They estimated a VEC model, by incorporating the cointegration relation between revenues and expenditures, revealing a rigidity of public expenditure in relation to the dynamics of income tax. Using the same methodology, Barna and Mura (2011), collected monthly data related to income and expenditure for the period January 2003 – November 2009. They concluded that for the period 2003-2009 the fiscal policy in Romania was sustainable.

Furthermore, Roman et al. (2012) demonstrated that the public debt was sustainable over the period 1990-2010. Moreover, they concluded that primary surplus cause an increase in the public debt and a negative reaction on crisis or expenses shocks. The evolution of expenditures in Romania during the financial crisis was analyzed by Sava (2011), who claimed that there are necessary reductions of staff costs, while increasing intellectual and economic investments.

3. Methodology

3.1. The model

In order to check the efficiency of the financial measures applied in Romania, we will test the fiscal policy sustainability, more exactly the cointegration relation between budgetary revenues and expenditures, for the period January 1999 – June 2013. For both variables will be used monthly data expressed in millions RON.

In order to achieve paper's objective, we use the methodology applied by Dima et al. (2009). The cointegration relation between the macroeconomic variables mentioned above can be written as follows:

$$REV_{i,t} = \alpha + \beta \cdot EXP_{i,t} + u_{i,t} \quad (1)$$

where REV_t is the revenues' value for month i , and year t , EXP_t is the expenditures' value for month i , and year t and $u_{i,t}$ is the error term.

In order to obtain a cointegration relation between revenues and expenditures, it is needed that both variables to be first order integrated. To check this assumption we will use Augmented Dickey-Fuller test.

3.2. Data and descriptive statistics

We are using monthly data for the period 1999 (January) – 2013 (June), which is available from National Bank of Romania for both variables: revenues and expenditures included in the state budget. Even if the financial crisis started in September 15th 2008, when Lehman Brothers filed for Chapter 11 bankruptcy protection, in Romania the

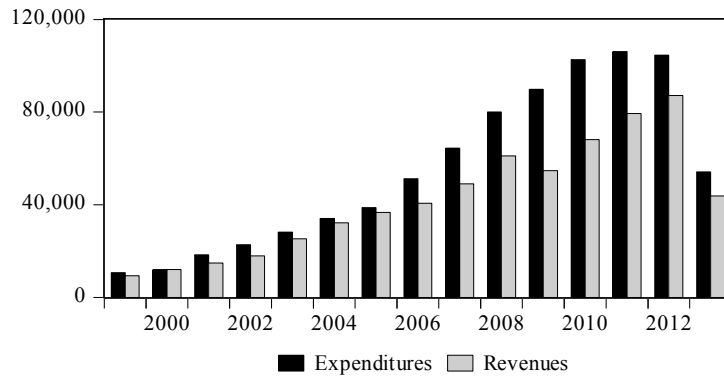


Fig. 1. Revenues and expenditures growth in Romania (1999 - 2013)

crisis’ effects were felt after the beginning of 2009. In 2009, the level of state budget’s revenues decreased with 10.4% compared to the level from 2008. In the same time the state budget’s expenditures increased in 2009 with 12.21% compared to the previous year. The evolution of annual values for state budget revenues and expenditures can be clearly observed in figure 1. In order to check the efficiency of the financial measures applied in Romania, we will test the fiscal policy sustainability, more exactly the cointegration relation between budgetary revenues and expenditures, for the period January 1999 – June 2013. For both variables will be used monthly data expressed in millions RON.

The descriptive statistics for monthly values of revenues and expenditures are presented in Table 1. At first glance we see that the average expenditures’ value is higher with about 29.5% than average revenues’ value. Even if the monthly average value for state budget revenues was about 3,631 million RON, the revenues monthly values varied between 454 million RON (July, 2001) and 8,770 million RON (October, 2012). If we analyse the expenditures’ variation, we are able to see that the highest value (13,659 million RON) was recorded in December, 2011, and the lowest value (691 million RON) was recorded in January, 1999.

Table 1. Descriptive statistics

Variable	Original series		S.A. series		F.L.S.A. series	
	Rev.	Exp.	Rev.	Exp.	Rev.	Exp.
Mean	3,631	4,704	3,787	4,872	43	51
Median	3,133	3,632	3,279	4,001	20	50
Maximum	8,770	13,659	8,597	14,567	2,388	8,558
Minimum	454	691	371	726	-2,594	-6,467
Std. Dev.	2,367	3,241	2,324	3,232	583	1,506
Skewness	0.5871	0.6353	0.3964	0.4712	-0.3049	0.6680
Kurtosis	2.1493	2.3914	1.9520	2.173	8.1288	12.6524

Legend: Rev. – revenues; Exp. – expenditures; S.A. – seasonally adjusted; F.L.S.A. – first level seasonally adjusted; Std. Dev. – standard deviation; Monthly data expressed in million RON.

4. Results

Before testing the cointegration relation between expenditure and revenues in Romania during 1999 – 2013, we are deseasonalizing both time series using the TRAMO/SEATS procedure in EViews.

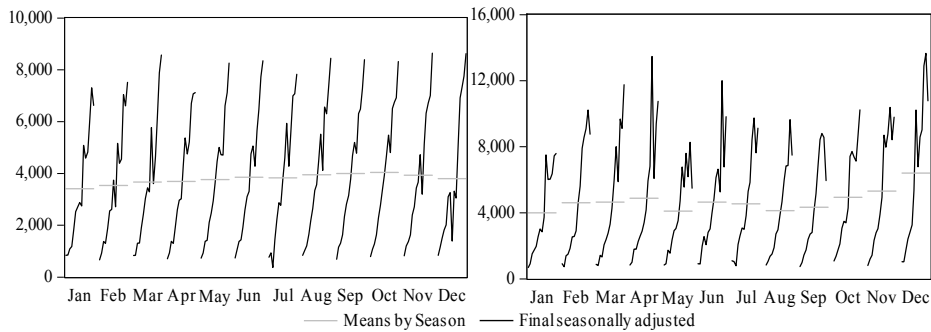


Fig. 2. Final seasonally adjusted (a) revenues and (b) expenditures by season

In order to see if there is a cointegration relation between revenues and expenditures, we apply the Augmented Dickey Fuller (ADF) test to check if the time series are stationary.

Table 2. Stationarity test results

Augmented Dickey Fuller Test ^a		
Variable	H ₀ : I(1)	H ₀ : I(2)
Final seasonally adjusted revenues	0.1414	-14.7041*
Final seasonally adjusted expenditures	0.0175	-9.6425*

a -The 5 percent critical value for the Augmented Dickey Fuller statistic is -3.83

* - Indicates significant at the 0.01 level

According to the results presented in Table 2, we can see that none of the two series are stationary, but in the same time both are integrated of order one, it is therefore possible to apply JOHANSEN Cointegration test for the study of cointegration between the two series. In order to achieve paper’s objective, we use the methodology applied by Dima et al. (2009).

Table 3. Johansen Cointegration test

No. of Cointegration Equation	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
Unrestricted Cointegration Rank Test (<i>Trace</i>)				
<i>None</i>	0.1513	27.7499	15.4947	0.0005
<i>At most 1</i>	5.44E-05	0.0091	3.8414	0.9233
Unrestricted Cointegration Rank Test (<i>Maximum Eigenvalue</i>)				
<i>None</i> *	0.1513	27.7407	14.2646	0.0002
<i>At most 1</i>	5.44E-05	0.0091	3.8414	0.9233

* - denotes rejection of the hypothesis at the 0.05 level; ** - MacKinnon-Haug-Michelis (1999) p-values

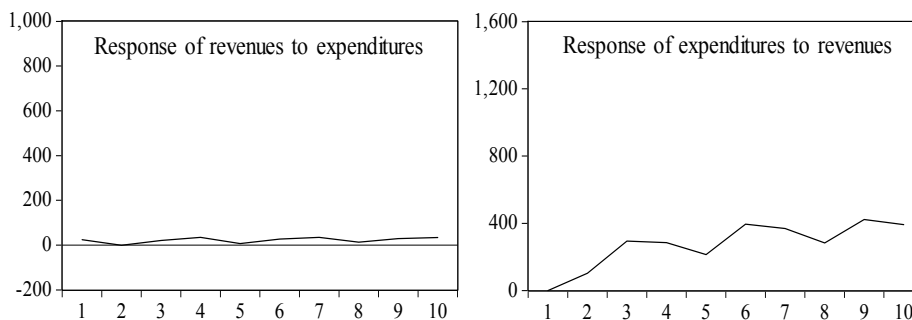


Fig. 3. Response to Cholesky One S.D. Innovations

According to Table 3, which presents both forms of tests for Johansen Cointegration test, more exactly the Trace test and Maximum Eigenvalue test, indicates one Cointegration relationship between state budget expenditures and revenues, which is presented in Table 4. More information regarding Vector Error Correction estimates can be seen in Appendix in Table 5.

Table 4. Cointegration relationship

Cointegrating Equation	CointEq1
<i>CHE(-1)</i>	1.000000
<i>VEN(-1)</i>	-1.376419 (0.09014) [-15.2699]
<i>C</i>	285.5563

() -standard errors; [] - t-statistics.

The Vector error correction model, which shows the cointegration relation between public expenditures and revenues, reveals a rigidity of public revenues in relation to the evolution of public expenditures, as it is presented in Fig. 3.

The cointegration relation denotes the existence of some structural shifts in both variables: revenues and expenditures. This can be explained by all fiscal policy measures applied starting with 2000, because after this year, the fiscal burden has been reduced. We know that in 2000, the income tax rate was reduced from 38% to 25%, and five years later, in 2005, the tax rate was reduced to 16%.

But the change in income tax rate was not the only fiscal measure adopted, because there was applied some changes in VAT rate, which decreased at 19% in 2000, from value of 22%. In order to get a loan from IMF and EU, Romania had to adopt another measure starting with July 1, 2010: VAT rate increasing from 19% to 24%.

5. Conclusions

Our paper improves the existing literature regarding the fiscal policy sustainability by using a large sample of data (January, 1999 – June, 2013) and by using monthly data. Even if, Barna and Mura (2011) used monthly data for a small period (2003-2009), they have used cumulative monthly data, and we think that by using cumulative data, the results can be biased.

The tax rate modifications presented above can be considered to be an explanation for the results obtained in our paper, because the fiscal policy is based on many changes and adjustments in the structure and level of public revenues, compared to decreasing of public expenditures. The purpose of all these changes is to balance the budget in the short term. Despite this is very hard to identify all categories of revenues which were adjusted to obtain a balanced budget, except to the well known examples: income tax rate and VAT rate.

An important drawback is represented by the fact that in achieving the conditions imposed by the Maastricht Treaty and Stability and Growth Pact on short run, Romanian Government forgot to maintain a sustainable economic development.

The results of this paper reveal that the public expenditure responds better to shocks caused by structural changes in revenue, compared to the opposite case. This fact indicates that there is still a hope for the sustainability of Romanian fiscal policy on long term. Despite the fact that our results are similar to Dima et al. (2009) and Barna and Mura (2011), who claimed that the fiscal policy in Romania is sustainable, we found a rigidity of revenues in

relation to the dynamics of expenditures. This result is contrary to Dima et al. (2009) paper, because they revealed a rigidity of expenditures in relation to the dynamics of revenues.

Despite of these results, the paper has several limitations: incomplete definition of concepts, limited time and data. However, the paper validates the assumption of expenditure sustainability based on the revenues, over the period 1999 (January) – 2013 (June). Further research can analyze the sustainability of specific taxation measures.

References

- Afonso, A., Jalles, J. T., 2012. Revisiting Fiscal Sustainability. Panel Cointegration and Structural Breaks in OECD Countries, Working Paper Series, No. 1465, August. European Central Bank.
- Alvarado, C., Izquierdo A., Panizza U., 2004. Fiscal Sustainability in Emerging Market Countries with an Application to Ecuador, Working Paper No. 511, Inter-American Development Bank.
- Barna, F., Mura, O., 2011. Fiscal-Budget Policy Sustainability in Romania (2003-2009), *Economic Sciences Series*, Vol. 63, No. 1, 65-72.
- Blanchard, O., Chouraqui, J., Hagemann, R., Sartor, N., 1990. The sustainability of fiscal policy: new answers to an old question. *OECD Economic Studies*, No. 15, Autumn, 7- 36.
- Canagarajab, S., Brownbridge, M., Paliu, A., Dumitru, I., 2012. The Challenges to Long Run Fiscal Sustainability in Romania, Policy Research Working Paper, No. 5927.
- Dima, B., Lobont, O., Nicolescu, C., 2009. The fiscal revenues and public expenditures: Is their evolution sustainable? The Romanian case, *Annale Universitatis Apulensis Series Oeconomica*, Vol. 11, No. 1, 416-425.
- Kuncoro, H., 2011. The Indonesia's State Budget Sustainability and Its Implication for Financial System Stability, *Romanian Journal of Fiscal Policy*, Vol. 2, No. 1, 36-53.
- Roman, M. D., Roman, M., Talvan, M., 2012. A Macroeconometrical Model of Sustainable Fiscal Policy Study Case on Romania, *International Journal of Trade Economics and Finance*, Vol. 3, No. 1, 73-77.
- Sava, A. S., 2011, Romanian Public Expenditures Policy during the Economic Crisis, *The Annals of "Dunărea de Jos"*, University of Galați, Fascicle I, Economics and Applied Informatics, No 1.
- Zaidi, A. and Rejniak, M., 2010. Fiscal Policy and Sustainability in View of Crisis and Population Ageing in Central and Eastern European Countries, Policy Brief, August, European Centre for Social Welfare Policy and Research, Vienna.
- National Bank of Romania, Monthly Bulletins available on-line at: <http://www.bnro.ro/PublicationDocuments.aspx?icid=6851>.

Appendix

Table 5. Vector Error Correction Estimates

Cointegrating Eq:	CointEq1	
CHE(-1)	1.000000	
VEN(-1)	-1.376419 (0.09014) [-15.2699]	
C	285.5563	
Error Correction: CointEq1	D(CHE) -0.533066 (0.09641) [-5.52897]	D(VEN) 0.020990 (0.05907) [0.35535]
D(CHE(-1))	-0.405622 (0.08980) [-4.51691]	-0.023236 (0.05502) [-0.42233]
D(CHE(-2))	-0.261379	-0.009239

	(0.07268)	(0.04453)
	[-3.59643]	[-0.20749]
D(VEN(-1))	-0.608060	-0.889376
	(0.11738)	(0.07192)
	[-5.18014]	[-12.3669]
D(VEN(-2))	-0.268454	-0.809579
	(0.08845)	(0.05419)
	[-3.03498]	[-14.9392]
C	113.8945	114.4115
	(102.830)	(63.0002)
	[1.10760]	[1.81605]
R-squared	0.508191	0.751486
Adj. R-squared	0.493288	0.743955
Sum sq. resids	2.97E+08	1.11E+08
S.E. equation	1341.124	821.6546
F-statistic	34.09922	99.78904
Log likelihood	-1471.001	-1387.220
Akaike AIC	17.27486	16.29497
Schwarz SC	17.38510	16.40521
Mean dependent	52.27152	44.97883
S.D. dependent	1884.032	1623.794
Determinant resid covariance (dof adj.)		1.21E+12
Determinant resid covariance		1.13E+12
Log likelihood		-2858.147
Akaike information criterion		33.59237
Schwarz criterion		33.84958

() -standard errors; [] - t-statistics.