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Revenue and Expenditure Nexus: A Case Study of Romania

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ABSTRACT

This study determines the causal relationship between the expenditure and revenue of government in the case of Romania by using the autoregressive distributive lag approach to cointegration, variance decomposition and rolling regression method. The results indicate that bidirectional long run relationship exist between expenditure and revenue of government. The variance decomposition method suggests government revenue shock has more sharply impact on the government expenditure as compared to the shock in government expenditure and response of government revenue collection.

Keywords: Government revenue, government expenditure, cointegration
JEL codes: E_{62}, C_4

1.Introduction

Nowadays the most important debate in macroeconomics is the mode of the association between government expenditure and government revenues. Recently, the question has been prominent with rising government budget deficits in developing countries where government expenditure plays a vital part of an economy. Government expenditure is the engine of economic development in every sector of the economy and enhances the standard of living of the masses. Since last few years in Romania, there is a significant increase in government expenditure around 6 percent of GDP while a percentage of government revenue remains constant around at 35 percent, thus the management of budget deficit is the major challenge for the government of Romania. On the revenue side, there is a need to be addressed tax administration system and tax reforms, while on the expenditure side there is a need to be addressed inadequacy in public expenditures. On the other hand tax revenue can be raised by rising government expenditure as a result of economic development. Thus the objective of this

study is to determine the link between the revenue and expenditure in the case of Romanian economy by using the autoregressive distributed lag approach to cointegration, variance decomposition and rolling window regression method. The remaining article is structured as follows: section 2 represents the literature review Section 3 discusses methodology. Section 4 explains empirical results and final section 5 gives conclusion.

2. Literature Review

The empirical literature shows the different type of explanation about the relationship between the expenditure and revenue of government. Jao (2000) analyzed the impact of social welfare expenditures and revenue on the income distribution in case of Taiwan and found that social welfare expenditure has the major determinant which restricts the income gap and this cause to tax revenue. Xiaoming (2001) empirically investigated the relationship between government revenue and expenditure in a case of China and suggested bidirectional causality between change in government revenue and expenditures. Gaiha (2002) evaluated a result of Income and Expenditure Switching policy reforms among the three Indian states, i.e. Maharashtra, Andhra Pradesh, and Karnataka and found that household expenditure on food; education and medical care caused expenditure switching occurred.

Narayan and Narayan (2006), investigated the causal relationship between government revenue and expenditure for 12 developing countries including Mauritius, El Salvador, Haiti, Chile, Venezuela, Peru, South Africa, Guatemala, Uruguay and Ecuador by employing KPSS unit root test and augmented Granger Causality Test. They observed no causality in the cases of South Africa, Peru, Uruguay, Guatemala and Ecuador it implies that the revenue decisions are taken independently from expenditures, while for Haiti, Mauritius, El Salvador, Chile and Venezuela government revenue causes government expenditures. Chen (2008) investigated the association among disaggregate real government expenditures, revenue and output. He concluded that association between government revenue and expenditure has neutral with economic development, causality between government revenue to expenditures has unidirectional with national defense, culture, science and education, causality between output and revenue is unidirectional. Gil-Alana (2009) examined the association between the US government expenditures and revenues applying fractional cointegration and ECM techniques, have not found any evidence of cointegration at any degree while at a structural break in 1973 fractional cointegration is found. Eita and Mbazima (2008) evaluated the casual association between government expenditure and revenue in a case of Namibia using Granger causality test through cointegrated vector autoregression (VAR) techniques from the period 1977 to 2007 and found unidirectional causality between government expenditure and revenue and suggested that weak fiscal deficit (imbalances) can be moderated by policies.

Stoian (2008) investigated the association between revenue and expenditures in the case of Romania by employing Johansen cointegration and Error Correction model, and concluded long run equilibrium relationship between revenue and expenditures and revenue and expenditures do not influence massive fiscal imbalances. Zapf and Payne (2009) evaluated the long-run association between aggregate state and local government revenue and expenditures in the case of US by using Engle Granger cointegration test associated with the threshold autoregressive (TAR) and momentum threshold autoregressive (MTAR) cointegration techniques and error correction model (ECM). They indicated that state and local government expenditures reflect the budget disequilibrium in the long run, while in the short run; state and local government expenditures have a significant affect on the state and local government revenues. Yan and Gong (2009) examined the effect of fiscal policy on economic growth using panel data of 31provinces from 1997 to 2007 in a case of China and concluded that the structure of taxation and government expenditure can influence the long run growth rate through labor-leisure choice and saving-choice while the growth rate and the income tax rate contain an inverted-U association does not always exist. Stallmann and Deller (2010) analyzed the impact of constitutional Tax and Expenditure Limits (TELs) on growth rates of convergence using a panel techniques in a case of US data from 1987 to 2004, suggested that state revenue and expenditure limits have negatively affected income growth and slowed down convergence.

3. **Estimation Procedure and Results**

This study utilizes quarterly time series data from 1998:1 to 2008:3. Data of both variables i.e. government expenditures and government revenue is used as a percentage of GDP. The data has been taken from the EUROSTAT. In empirical research the determination of integration level is very important in order to choose the appropriate cointegration technique. This study is used the augmented dickey fuller (ADF) unit root test to the determination of integration order. The ADF unit root test is based on the following regression equation.

$$\Delta X_t = \delta_0 + \delta_1 X_{t-1} + \sum_{j=1}^{\rho} d_j \Delta X_{t-j} + \mu_t \quad (1)$$

Where X_t , Δ , δ_0 and ρ are presented a time series variable data, first difference operator, constant term and optimum lags of the dependent variable respectively. The hypothesis of non-stationary [H_0: $\delta_1 = 0$] is tested against the hypothesis of stationary [$H_1: \delta_1 \neq 0$][1]. After that autoregressive distributive lag (ARDL) technique to cointegration is utilized in order to test the long run relationship/ long run causal relationship. The main advantage of ARDL technique is that it can applicable weather the variables are integrated order one or order zero or mutually integrated (see more detail Pesaran et al. 2001). This study also employs variance

[1] The Decision of order of integration is taken by following way. If the t- Statistic of estimated coefficient δ_1 is grater than the critical value the hypothesis of stationary could be accepted.

decompositions (VDC) approach for causal inferences. The VDC approach is important when the main objective is to investigate the power of causal relationship among variables. The stability of causal relationship over the sample is determined by employing the rolling window regression method.

Table 1 presents the result of augmented dickey fuller (ADF) unit root test. The results indicate that the both variables (LGE and LGR) are integrated order one.

Table1 Results of Unit root Test

Variable	ADF
LGE	-0.84
ΔLGE	-11.37*
LGR	-1.85
ΔLGR	-18.67*

*Note: *: 1% level of significant*

Table 2 shows the results of autoregressive distributed lag (ARDL) approach to cointegration. The result demonstrates that bidirectional long run relationship or bidirectional long run causal relation exists among the government expenditure and revenue of government in the case of Romania. Because in the both case when government expenditure is dependent variable and on the other hand when government revenue is dependent variable the calculated F-statistical is greater than critical values at 5% and 1% respectively.

Table 2 Long Run Relationship

Dependent Variable			**Computed F-Statistic**		**Long run Causality Decision**
LGE			**7.56**		**LR→LG**
L GR			**25.43**		**LG→LR**
Level Of Significance	**Critical Value Bounds**				
	Pesaran et.al (2001)		Paresh Kumar Narayn(2005)		
	Lower Bound	Upper Bound	Lower Bound	Upper Bound	
1%	4.13	5.0	6.19	7.88	
5%	3.10	3.87	4.19	5.34	
10%	2.63	3.35	3.39	4.42	

Next we apply the variance decomposition approach. This technique is more efficient in order to determine the strength of causal relationship. In table-3 the first part-A shows the variance decomposition of government expenditure. This indicates that first shock in government expenditure as results in the first quarter the complete change in government expenditure represents by government expenditure innovation. In the third quarter 18.71% is explain by the government revenue of the shock of government expenditure. As the time horizon increase government expenditure shock's effect on government revenue also increases. In part-B demonstrates the shock in government revenue, and 38.75% explain by the innovation of government expenditure in the first quarter. In the (third, fourth, fifth) remaining time horizon the causal effect of government revenue on government expenditure increase very slow pace.

Table 3 Results of Variance Decomposition

Part-A Variance Decomposition of LGE		
Time Horizon	**LGE**	**LGR**
1	100.00	0.00
3	81.29	18.71
5	75.63	24.36
7	72.77	27.22
9	71.17	28.82
Part-B Variance Decomposition of LGR		
Time Horizon	**LGE**	**LGR**
1	38.75	61.25
3	41.14	58.86
5	41.59	58.41
7	41.73	58.27
9	41.77	58.23

This study also employs the rolling window regression method in order to confirm the stability of correlation between the expenditure and revenue of government in the case of Romania. The other econometric techniques are assumed that the economic condition of the country remains fixed over the sample size. But in the reality the economic condition cannot remains same. When the condition cannot remains same so the relationship among the variables cannot remains constant. Thus technique captures this instability by estimating the coefficient of each observation in the sample. The Figure 1 and Figure 2 are presented the graph of coefficients. The Figure 1 shows that the graph of coefficients of government expenditure variable when the government revenue is dependent variable that indicates in 2006 the coefficient is sharply decline and than showing increasing trend from the mid of 2007. The Figure 2 shows the graph of coefficients of government revenue when government expenditure is dependent variable that demonstrates the coefficient is showed the variation in the whole sample but it decline in the end of 2006 and from the end of 2007.

Figure 1 Coefficient of LG and its two*S.E. bands based on rolling OLS (Dependent Variable: LR ; Total no. of Regressors: 2)

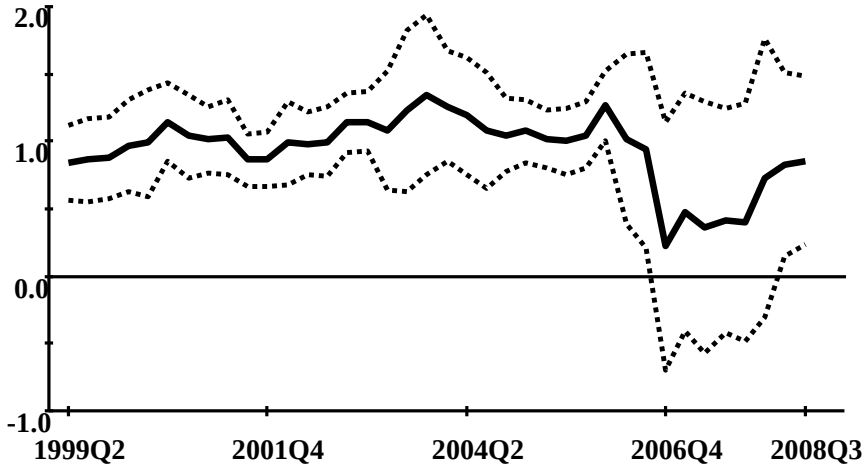
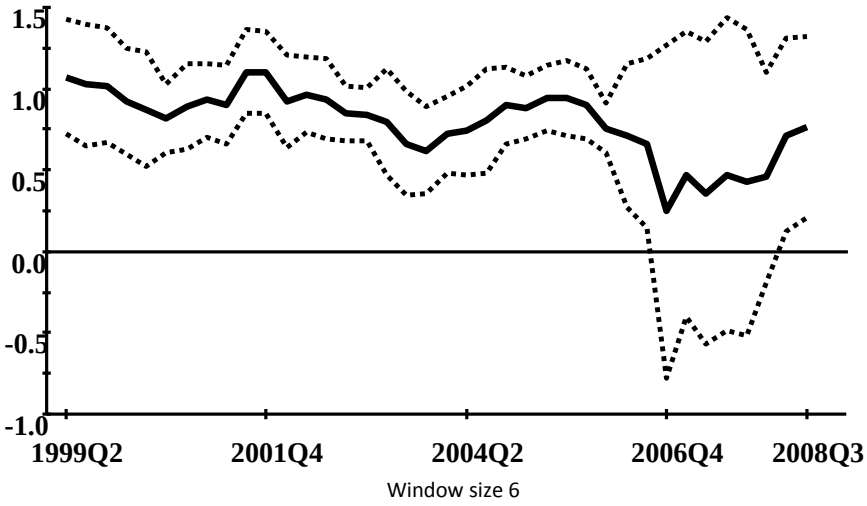


Figure 2 Coefficient of LR and its two*S.E. bands based on rolling (Dependent Variable:LG ; Total no. of Regressors: 2)



4.Conclusion

The objective of this empirical investigation is to determine the causal relationship between the expenditure and revenue of government in the case of Romania by using the modern cointegration techniques. This study draws three important conclusions on the basis empirical estimation. *First,* there is bidirectional long run causal relationship exists between the expenditure and revenue of government. *Second,* the government revenue shock has more sharply impact on the government expenditure as compare to the shock to the shock in government expenditure and response of government revenue collection. *Third* the rolling window results shows from end of 2006 to the end of 2007 the government expenditure and government revenue coefficients remains lower as compare to the other sample size.

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