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FISCAL POLICY AND ECONOMIC GROWTH IN ROMANIA

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ABSTRACT: The connection between fiscal policy and economic growth is not a strong one, taking into account that fiscal policy is not a fundamental source of growth. Even so, government authorities could use fiscal policy to affect in an indirect manner the economic growth. We will try to highlight this indirect connection and its strength on Romania's case using a specific econometric methodology which takes into account the restrictions imposed by the government's budget constraint and we will identify the specific fiscal policy measures which could enhance economic growth in Romania.

Key words: fiscal policy, economic growth, government budget constraint

JEL codes: E62, O40, C20

Introduction

Theoretical and empirical studies from the literature envisage the fact that between fiscal policy promoted by the governments and economic growth process could be a connection, but, this is an ambiguous one, from the perspective of its strength and its length.

This ambiguity of the connection between fiscal policy and economic growth is due, in the main part, to the fact that fiscal policy is not a fundamental source of economic growth. The fundamental sources of economic growth are represented by economic factors like accumulation of physical capital, labor force, human capital and technological knowledge, and by non-economic, social, cultural, political geographical factors, like the quality of institutions, the availability of natural resources or the dominant cultural paradigm in the society. From this point of view, fiscal policy represents just a tool for the government authorities, which could be used to influence these fundamental sources of economic growth.

As Vito Tanzi (1997) puts it: "while a multiplicity of factors, some of which are of a noneconomic nature, could plausibly affect the performance of an economy from period to period, a country's growth over a reasonably long period of time is ultimately determined by three factors: (1) given the state of technical know-how in that country, the efficiency with which any existing stock of resources is utilized (which would depend, among other things, on cultural, institutional, and political, as well as economic, parameters); (2) the accumulation over time of productive resources (which would include human and other forms of intangible capital); and (3) technological progress (which for most countries would depend, among other things, on their ability to absorb new technology from abroad)".

Even if regarding the effects of fiscal policy on long-term economic growth (in the stationary state of the economy) the diversity of the models from the literature do not converge on the same results, all these models prove that fiscal policy could influence at least the level (if not the growing pace) of some important economic macro-variables, like income per capita, the capital stock per capital or the consumption per capita. We consider that the importance of this finding of these economic growth models was a little bit neglected in the empirical and theoretical studies realized so far, because the vast majority of these studies were focused on the developed economies, which have high values for these variables that could be affected during the "transition" phase to stationary state of the economy. Of course, in developing countries, the level of income per capital

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or the level of consumption per capita are extremely important, because both directly influence the quality of life of the individuals. So, the importance of fiscal policy for the economic growth process should not be underestimated, at least for the developing economies. More, it worth consider the fact that in economic growth models without scale effects, the process of the asymptotic convergence of economic growth rate to the level corresponding to the stationary state of the economy is extremely slow, which implies a considerable length for the transition period to the stationary state of the economy, and by consequence, a stronger and more persistent impact of fiscal policy on the level of income per capita (Eicher and Turnovski, 1999).

Literature review

Having in mind that fiscal policy is not a fundamental source of economic growth, it only could influence in an indirect manner the process of economic growth, through its main instruments (public expenditure, public revenues, budgetary balance and public debt).

Public expenditures could have a direct impact on long-term economic growth if they materialize in goods that enter as argument in the production function of economic agents (infrastructure public expenditures) or in the utility function of the individuals.

But, more important are the indirect effects of the public expenditures on economic growth, which are due to their influence on private capital formation, and to their influence on the productivity of the private inputs in the production function. Regarding the public expenditure effects on private capital formation one could identify several well documented transmission mechanisms, like: the well-known crowding-out effect, the complementarity effect (as shown in Aschauer (1989), Agénor (2004) or Sala-i-Martin, Doppelhofer and Miller (2004) the infrastructure public expenditures could positively - or negatively, when their level is not the optimal one - affect the productivity of private capital usage in the economy), the effect on adjustment costs (Turnovsky (1996) and Agénor (2006)) and the effect on the durability of private capital (Agénor and Moreno-Dodson (2006), Agénor (2008)). The public expenditures could influence also the productivity of the private inputs in the production functions, and hence, the economic growth (Afonso and Alegre (2008)). On the one hand, public infrastructure could positively influence the productivity of the private physical capital as shown in theoretical studies like Caning and Pedroni (1999) or in empirical studies like Demetriades and Mamuneas (2004), Fedderke and Bogetic (2006) or Zou et al (2008). On the other hand, the productivity of the human capital is strongly influenced by public education (Bils and Klenow (2000), de la Fuente (2003), Blankenau and Simpson (2004), Creedy and Gemmel (2005)) and by publicly provided health services (Arora (2001) and Agénor (2008)).

More, public expenditures with general services, national defense, public order and national security, housing and community amenities represents “core” expenditures, absolutely necessary for limiting the inefficiencies induced by diverse market failures and for a good functioning of the economy (Tanzi and Schuknecht, 2003).

Having in mind all these issues, Barro (1990) group the public expenditures based on their impact on economic growth in productive public expenditures (which have a positive impact on economic growth), unproductive public expenditures (which are neutral or have an insignificant impact on economic growth), and other public expenditures (which have an insignificant impact on economic growth).

Table no. 1

Public expenditures classification based on the impact on economic growth

Productive public expenditures	Unproductive public expenditures	Other public expenditures
Education Health Justice General public services Housing Transport and communications	Social security contributions Recreation, culture and religion Other economic actions	Other

The possible effects of public revenues (especially fiscal revenues) on long-term economic growth, and the transmission mechanisms of these effects

Regarding public revenues, from a general perspective, any tax has a potential or real distorsionary impact on economic growth, because it affects the choices of individual economic subjects (firms and individuals) regarding the activities which they carry on (production, investment, consumption, or savings). The corporate tax negatively affects the incentives and the investment resources of the firms, the tax on wage income negatively influences both individual consumption and saving, and individual investment in human capital. The taxes on consumption affect individual choices between work time and leisure time (Mendoza et al. (1997), Milesi-Ferretti and Roubini (1998)).

Having in mind all these features of the taxation, Barro and Sala-i-Martin (2004) group the public revenues based on their impact on economic growth in: distorsionary public revenues (which have negative effects on economic growth), non-distorsionary public revenues (which are neutral or have an insignificant impact on economic growth), and other public revenues expenditures (which have an insignificant impact on economic growth).

Table no. 2

Public revenues classification based on the impact on economic growth

Distorsionary public revenues	Non-distorsionary public revenues	Other public revenues
Corporate tax Income tax Social security taxes Wealth taxes	Value-added tax (General taxes on sales) Excises	Custom duties Other fiscal revenues Non-fiscal current revenues Capital revenues Other revenues

Finally, the budget deficit could influence economic growth through a transmission channel represented by the interest rate. More, the continuous accumulation of public debt could undermine long-term sustainability of the fiscal policy promoted by the government authorities, with a negative impact on economic growth also.

Research methodology

In order to envisage the connection between fiscal policy and economic growth in the Romania's case, we will follow the next methodological steps:

– first, we will use the neoclassical growth model to identify the main determinants of economic growth for the Romania's case, and then we build an econometric model for the evolution of real GDP growth rate;

– second, we will identify the specific public expenditures and revenues which have an impact on economic growth, and we will include them in the original model;

– third, we will test the effects of some changes in public expenditures and revenues on the

real GDP growth rate dynamic, and, in the same time, keeping in order the budgetary constraint.

For a specific country, the economic growth determinants could be tested using the following general regression:

$$VD_t = \alpha + \sum_{i=1}^{n} \beta_i VI_{it} + \varepsilon_{it} \quad (1)$$

where:

VD - dependent variable;
α - free term (constant);
β - vector of length n of independent variables coefficients;
VI - vector of length n of independent variables;
ε - vector of length n of stochastic perturbations.

Applying this very simple econometric methodology on the Romania's case is a difficult thing to realize, due to unavailability of long enough time series for the relevant variables. In order to surpass this difficulty we used the existing time series for selected variables extended with some forecasted values, so the time span covers the 1992-2013 period.

Having such a short period of analysis we consider as primary determinants for economic growth in Romania (quantified by the annual real GDP growth rate - RPIBR) only the physical capital accumulation (quantified by the fixed capital formation – in % of GDP - FBCF) and labor force accumulation (quantified by the annual rate of employed population - RPO). The sources for the statistical data used are:

- for real GDP growth rate – IMF Country Reports for Romania;
- for fixed capital formation – in % of GDP, and for growth rate of employed population – National Statistical Institute and National Prognosis Commission.

In order to highlight the long term induced effects of these economic growth determinants, the original data were "cleaned" by uni-periodic shocks, taking into account only their trend. The estimation methodology for the trend is based on weighted moving average (MMP), because such approach offers the possibility to take into account the possible structural breaks in the data sets:

$$MMP(X_t) = \sum_{i=1}^{t} \frac{i}{\sum_{j=1}^{t} j} X_i \quad (2)$$

So, the relation which will be tested is the following:

$$RPIBR = \alpha + \beta_1 FBCF + \beta_2 RPO + \varepsilon_t \quad (3)$$

The obtained results obtained using E-Views 5.1. are reported in the following table:

Table no. 3

Regression results for the determinants of economic growth in Romania

Dependent Variable: RPIBR
Method: Least Squares
Sample: 1992 2013
Included observations: 22

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FBCF	0.579344	0.147752	3.921048	0.0009
RPO	-1.301486	0.678312	-1.918713	0.0702
C	-12.55856	4.003669	-3.136763	0.0054

R-squared	0.466772	Mean dependent var	2.384455
Adjusted R-squared	0.410643	S.D. dependent var	3.961440
S.E. of regression	3.041182	Akaike info criterion	5.188493
Sum squared resid	175.7269	Schwarz criterion	5.337272
Log likelihood	-54.07342	F-statistic	8.316025
Durbin-Watson stat	0.286841	Prob(F-statistic)	0.002545

Results generated using E-Views 5.1.

As it could be observed, the general level of significance of the model is not extremely high (R2 = 0,466772). The coefficients for the two independent variables were correctly estimated and have statistical significance. The sign for the fixed capital formation coefficient is the expected one (+), confirming the direct relation with real GDP growth rate. The sign for the growth rate of employed population coefficient is (-), which indicates an inverse relation with real GDP growth rate. This result is at odds with theoretical predictions, but it could be explained if one have in mind the structural adjustments realized in Romania during the transition period, which imposed a re-scaling of labor force to the real economic performance.

The impact of the public sector size (quantified by the public expenditures in % of GDP - CHP_T), and of the ways of financing them (given by the public revenues – VEN_T, and budgetary balance – SB, both in % of GDP) on economic growth in Romania could be envisaged by testing the following relations:

$$RPIBR = \alpha + \beta_1 FBCF + \beta_2 RPO + \beta_3 CHP\_T + \varepsilon_t \quad (4)$$

$$RPIBR = \alpha + \beta_1 FBCF + \beta_2 RPO + \beta_3 VEN\_T + \beta_4 SB + \varepsilon_t \quad (5)$$

The results obtained for the two regressions are the following:

Table no. 4

Estimated results: the impact of public sector size on economic growth in Romania

Dependent Variable: RPIBR
Method: Least Squares
Sample: 1992 2013
Included observations: 22

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FBCF	0.488947	0.049614	9.855035	0.0000
RPO	-0.040026	0.247147	-0.161954	0.8731
CHP_T	-1.184332	0.095370	-12.41826	0.0000
C	32.07804	3.832550	8.369895	0.0000

R-squared	0.944266	Mean dependent var	2.384455
Adjusted R-squared	0.934977	S.D. dependent var	3.961440
S.E. of regression	1.010150	Akaike info criterion	3.021041
Sum squared resid	18.36726	Schwarz criterion	3.219412
Log likelihood	-29.23145	F-statistic	101.6545
Durbin-Watson stat	0.654517	Prob(F-statistic)	0.000000

Results generated using E-Views 5.1.

The obtained results show a negative and significant impact of the public sector size on economic growth. Moreover, introducing public expenditures in the original model raises the overall significance level of the model (R^2 = 0,899895).

Table no. 5

Estimated results: the impact of public revenues and budgetary balance on economic growth in Romania

Dependent Variable: RPIBR
Method: Least Squares
Sample: 1992 2013
Included observations: 22

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FBCF	0.488002	0.036375	13.41588	0.0000
RPO	-0.662268	0.237305	-2.790784	0.0125
VEN_T	-0.861577	0.105862	-8.138706	0.0000
SB	1.909752	0.191845	9.954671	0.0000
C	23.36324	3.535709	6.607795	0.0000

R-squared	0.971707	Mean dependent var	2.384455
Adjusted R-squared	0.965050	S.D. dependent var	3.961440
S.E. of regression	0.740587	Akaike info criterion	2.433968
Sum squared resid	9.323963	Schwarz criterion	2.681932
Log likelihood	-21.77365	F-statistic	145.9652
Durbin-Watson stat	0.963351	Prob(F-statistic)	0.000000

Results generated using E-Views 5.1.

The obtained results show a negative and significant impact on economic growth in Romania of public revenues. In the same time, the size of budgetary balance in positively correlated with real GDP growth rate, fact which indicates that a reduction of the budget deficit has a positive impact on economic growth. More, introducing public revenues and budgetary balance in the initial model leads to an increased level of significance (R2 = 0, 971707).

Next, in order to envisage the specific effects of diverse budgetary variables on economic growth, we grouped the public expenditures and the public revenues following Barro and Sala-i-Martin (2004). So, the public revenues were divided in *distorsionary* (VEN_DIST), *non-distorsionary* (VEN_NOND) and *other public revenues* (VEN_ALTE) (see Table no. 2). Due to the unavailability of the appropriate time series for the public expenditures, it was impossible to group them using the scheme presented in Table no. 1. As an alternative solution, we use economic classification of the public expenditures, considering as *productive* the capital expenditures (CHP_PROD), as *unproductive* the expenditures with wages, with the acquisition of goods and services, subventions and transfers (CHP_NEPR) and as *other* the interest paid for the public debt and other public expenditures, (CHP_ALTE).

In order to decide which of these aggregated budgetary variables could be included in the initial economic growth model without any reduction in the level of its statistical significance, we realized for every one of them an *omitted variable test*. This test indicates in which measure the initially omitted variable adds to the model explanatory power. The results of the omitted variable test are synthesized in the following table:

Table no. 6

Estimated results: Omitted variable test

Omitted variable	Null hypothesis: The variable is not significant for the model			
	F statistic	F statistic probability	Log likelihood rate	Log likelihood probability
CHP_PROD	9,802649	0,005775	9,564710	0,001984
CHP_NEPR	33,97193	0,000016	23,32731	0,000001
CHP_ALTE	0,243898	0,627377	0,296096	0,586340
VEN_DIST	27,55249	0,000054	20,42686	0,000006
VEN_NOND	34,30852	0,000015	23,46933	0,000001
VEN_ALTE	86,48010	0,000000	38,68975	0,000000
SB	51,28429	0,000001	29,6526	0,000000

Synthesis of the results generated using E-Views 5.1.

The results show that we could not to include the other public expenditures in the initial model (the values for *F statistic* and *Log likelihood* are extremely low, and probabilities that the null hypothesis to be true are 62,74%, and, respectively, 58,63%).

Now, we can construct and estimate a model for the real GDP growth rate which includes along the initial variables the selected aggregated budgetary variables (all excepting other public expenditures). The general relation of the model is the following:

$$g_{it} = \alpha + \sum_{i=1}^{n} \beta_i VE_{it} + \sum_{j=1}^{m} \delta_j VB_{jt} + \varepsilon_{it} \quad (6)$$

where:

g - real GDP growth rate;
VE - the vector of economic independent variables;
VB - the vector of budgetary independent variables.

The specific relation of the model is the following:

$$RPIBR = \alpha + \beta_1 FBCF + \beta_2 RPO + \beta_3 CHP\_PROD + \beta_4 CHP\_NEPR + \\ + \beta_5 VEN\_DIST + \beta_6 VEN\_NOND + \beta_7 VEN\_ALTE + \beta_8 SB + \varepsilon_t \quad (7)$$

Estimation results for the presented model are reported in the following table:

Table no. 7

Estimation results: Regression with relevant budgetary variables

Dependent Variable: RPIBR
Method: Least Squares
Sample: 1992 2013
Included observations: 22

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FBCF	0.406439	0.239578	1.696479	0.1136
RPO	-0.490038	0.421077	-1.163774	0.2654
CHP_PROD	-1.321467	0.950435	-1.390382	0.1878
CHP_NEPR	0.736039	0.584625	1.258993	0.2302
VEN_DIST	-2.159091	0.979632	-2.203981	0.0462
VEN_NOND	-2.472221	1.538599	-1.606800	0.1321
VEN_ALTE	2.198748	1.158244	1.898346	0.0801
SB	3.333916	0.691193	4.823424	0.0003
C	34.32025	15.19075	2.259287	0.0417

R-squared	0.985190	Mean dependent var	2.384455
Adjusted R-squared	0.976076	S.D. dependent var	3.961440
S.E. of regression	0.612732	Akaike info criterion	2.150310
Sum squared resid	4.880724	Schwarz criterion	2.596645
Log likelihood	-14.65341	F-statistic	108.0972
Durbin-Watson stat	2.273701	Prob(F-statistic)	0.000000

Results generated using E-Views 5.1.

Analyzing the obtained results one could notice that the general statistical significance of the model is high (R2 = 0, 985190). Moreover, only distorsionary public revenues and budgetary balance have a significant impact on real GDP growth rate. The distorsionary public revenues have the expected negative impact on economic growth – a 1% raise of these public revenues determines a 2.16% reduction in the real GDP growth rate. The budgetary balance has a positive impact on economic growth – a 1% reduction in the budget deficit determines a 3.33% raise in the real GDP growth rate.

Another fact worth noticed is that the productive public expenditures coefficient, although is not statistically significant, has a negative value, which is against theoretical predictions. On the one hand, this situation could be due to the inclusion of capital expenditure in this category. Because these expenditures contribute to the fixed capital formation in the economy, this could induce some redundancies into the model. This situation could not be avoided because there were not available data on private fixed capital formation. On the other hand, such a result could be appreciated as an expression of the inefficient way of spending public money in Romania. The same situation repeats for the other public revenues variable, its coefficient being a positive one.

Next, we could highlight the impact on economic growth of some changes in the structure of public expenditures and in the structure of public revenues. But, if we have in mind that in the relation 6, the budgetary constraint implies $\sum_{j=1}^{m} VB_{jt} = 0$, it follows that at least one of the budgetary variables has to be excluded from the model in order to avoid the perfect colinearity (Kneller et al. (1999)). This exclusion also offers a proper way to interpret any changes in a budgetary variable included in the model: the change is realized based on a corresponding change of the omitted variable from the model, such as the budgetary constraint to hold. Examining the results of the real GDP growth rate model which includes the budgetary variables, one could noticed that of all public expenditures and revenues, the unproductive public expenditures and non-distorsionary public revenues have the lowest statistical significance, as it is predicted by the theoretical predictions. So, next, we will eliminate both these variables from the model, one at a time, and we will analyze the results.

The results obtained from the estimation of the model given in relation (7), changed by elimination of unproductive public expenditures are reported in the following table:

Table no. 8

Estimation results: Regression with budgetary variables – omitted variable: Unproductive public expenditures

Dependent Variable: RPIBR
Method: Least Squares
Sample: 1992 2013
Included observations: 22

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FBCF	0.399091	0.244460	1.632541	0.1248
RPO	-0.709260	0.391317	-1.812495	0.0914
CHP_PROD	-0.884887	0.903218	-0.979705	0.3439
VEN_DIST	-0.962924	0.243669	-3.951770	0.0014
VEN_NOND	-0.911700	0.930404	-0.979897	0.3438
VEN_ALTE	1.276996	0.916063	1.394005	0.1850
SB	2.590310	0.366448	7.068705	0.0000
C	21.50773	11.51116	1.868424	0.0828

R-squared	0.983384	Mean dependent var	2.384455
Adjusted R-squared	0.975076	S.D. dependent var	3.961440
S.E. of regression	0.625404	Akaike info criterion	2.174449
Sum squared resid	5.475820	Schwarz criterion	2.571192
Log likelihood	-15.91894	F-statistic	118.3667
Durbin-Watson stat	2.149949	Prob(F-statistic)	0.000000

Results generated using E-Views 5.1.

Analyzing the obtained results one could notice that, of all budgetary variables coefficients, only those for distorsionary public revenues and budgetary balance are statistically significant. Having in mind the budgetary constraint, which is supposed to hold:

- a 1% reduction (increase) of distorsionary public revenues compensated by a similar reduction in unproductive public expenditures will determine a 0.96% raise (decline) in the real GDP growth rate;
- a 1% reduction (increase) in the budgetary balance (equivalent to a 1% increase (decrease) of the budget deficit) used to finance some unproductive public expenditures will determine a 2.59% reduction (increase) of the real GDP growth rate.

The results obtained from the estimation of the model given in relation (7), changed by elimination of non-distorsionary public revenues are reported in the following table:

Table no. 9

Estimation results: Regression with budgetary variables – omitted variable: Non-distorsionary public revenues

Dependent Variable: RPIBR
Method: Least Squares
Sample: 1992 2013
Included observations: 22

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FBCF	0.206264	0.215891	0.955406	0.3556
RPO	-0.993738	0.296590	-3.350541	0.0048
CHP_PROD	-0.129278	0.626640	-0.206303	0.8395
CHP_NEPR	-0.020725	0.365408	-0.056717	0.9556
VEN_DIST	-0.760388	0.474070	-1.603957	0.1310
VEN_ALTE	1.336534	1.082879	1.234241	0.2374
SB	2.395135	0.389621	6.147346	0.0000
C	10.66720	3.956261	2.696284	0.0174

R-squared	0.982249	Mean dependent var	2.384455
Adjusted R-squared	0.973373	S.D. dependent var	3.961440
S.E. of regression	0.646421	Akaike info criterion	2.240556
Sum squared resid	5.850038	Schwarz criterion	2.637298
Log likelihood	-16.64611	F-statistic	110.6670
Durbin-Watson stat	2.214576	Prob(F-statistic)	0.000000

Results generated using E-Views 5.1.

If we omit from the model only the non-distorsionary public revenues, the only budgetary variable for that the estimated coefficient is statistically significant is represented by the budgetary balance. Hence, a 1% increase (decrease) in budgetary balance (equivalent to a 1% reduction (increase) of the public deficit) based on a corresponding raise in non-distorsionary public revenues will trigger a 2.40% increase (reduction) of the real GDP growth rate.

Conclusions

In conclusion, in Romania, there are several fiscal policy measures that could lead to an increase in the real GDP growth rate:

- a reduction of distorsionary public revenues compensated by a reduction of unproductive public expenditures;
- a reduction of the budget deficit compensated by a reduction of the unproductive public expenditures;
- a reduction of the budget deficit compensated by a corresponding increase in the non-distorsionary public revenues.

The results of this study should be interpreted with caution. On the one hand, the reduced length of data sets used in the estimations could lead to a drop in the overall statistical significance of the estimations. On the other hand, the base model used in our econometric estimations, which was augmented to take into account the budgetary variables, is a reduced form of the neoclassical growth model and does not include a variable for technological progress, a very important source of economic growth. This omission could introduce some distortions in our estimations.

Even so, the obtained results give us an indication on the main possible positive effects of fiscal policy on economic growth in Romania.

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