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Article

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Abstract: The article aims to determine the optimal level of tax burden in order to maximize the level of GDP. The value obtained from a regression analysis that followed the mathematical modeling of the Laffer curve is 17.39%

Keywords: Laffer curve, fiscal pressure

1 Introduction

Long before the known curve of the economist Arthur Laffer, we find on economic literature studies dedicated to the analysis of expenses, income and public debt of the state, supporting the idea that moderate taxes and non-oppressive quick production. We an mention here Jean Baptiste Colbert, David Hume, Adam Smith and many others.

Concerned about the individual utility and its measurement, Arsene Dupuit, for the same reason, expands its research to the utility of public work. Considered one of the pioneers of "welfare economics", he admits that social usefulness is measured by the amounts paid by taxpayers for public services provided . What we read in his article from 1844 “De l'utilité et de sa mesure”, “if a tax increase progressively from 0 to the point where it becomes prohibitive, its yield, at first zero, increases to reach a maximum, then start to fall to 0. For the state there are always two levels of fees that bring income: one below and another above the tax that brings maximum efficiency” and in article “Peáge” (1853) “there exist, for any or price, a certain level that brings the highest income[...] In determining the level of duties, there are two different positions. A company will pursue that level of fees ensures maximization of turnover [...] On the contrary, if the state manages a particular sector, will seek to minimize the level of fees. Or, as the fee is lower, the service is often used frequently” , also found in the article by Jude Wanniski “Taxes, Revenues and the Laffer Curve” (1978), this time also in a graphic transposition of the relationship between tax rates and tax revenues.

The ensure of a optimal and efficient tax system has been and remains an actual and complex problem at both theoretical and especially practical level. A fundamental problem which lies in the macroeconomic level, consist in effective economic policy mix which should support a sustainable economic growth and at the same time to attenuate business cycle fluctuations. The efficiency of the economic policy mix which we refer is given, mainly, from the conduct of monetary policy and fiscal, which together can lead to qualitative and quantitative changes in the economy.

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A study on optimality of fiscal and monetary policy in the various neoclassical growth models revealed the following:

1. taxing capital income should be reduced progressively (toll higher at the beginning and almost zero on long term);

2. the tax rates on labor and consumption should be approximately constant;

3. monetary policy should aim and maintain interest rates near zero .

In this article we intend to examine the impact of fiscal policy on the Romanian economy during 2001-2014 and to determine also, using Laffer curve, an optimal tax level. The approach is complex, due to the fact that in the analyzed time series we find present the main stages of the economic cycle: growth (unsustainable), economic crisis over which overlapped phases of the electoral cycle. All they printed a strongly pro-cyclical fiscal policy.

The absence of toxic assets in the Romanian banking system (one of the main causes of the world economic crisis) was not enough for Romania to be avoided by recession. It was felt in the real economy downturn after a period of 8 years of artificial growth, also accompanied by the accumulation of macroeconomic imbalances: the current account deficit, budget deficit, public debt.

The main macroeconomic imbalances accumulated in Romania, the current account deficit and budget deficit generate a vulnerable economic system and, after the beginning of economic crisis took a difficult adjustment process. Although there have been periods of growth, they were not accompanied by structural reforms to print the growth process sustainable component.

Table 1

Year	The annual change in GDP (%)	The current account deficit (% of GDP)	The budget deficit (% of GDP)	Public Debt (% of GDP)
2000	2.4	7.5	3.7	31.2
2001	5.7	5.8	3.3	28.6
2002	5.1	3.4	2.6	28.8
2003	5.2	5.7	2.3	26
2004	8.5	8.4	1.1	22.5
2005	4.2	8.7	0.8	20.4
2006	7.9	10.3	1.7	18.3
2007	6.3	14	2.5	19.7
2008	7.3	12.3	4.8	21.3
2009	-6.6	4.5	7.2	29.5
2010	-1.6	4.1	6.5	37.8
2011	2.2	6.5	4.35	39.5
2012	0.6	4.5	2.52	40.4
2013	3.4	0.8	2.1	41.9
2014	2.8	-	2.5	44.1

Source: *INSSE, BNR*

From the data above, we observe that the current account deficit widened in 2004-2008, when they occurred massive capital inflows. Unsustainability of the current account deficit is explained by the pro-cyclicality of fiscal policy. A prudent fiscal policy could mitigate some vulnerabilities (currency appreciation in nominal and real terms negative impact on external competitiveness) generated by massive capital inflows, on the understanding that often these large capital inflows followed by financial crisis[1].

The role of fiscal policy in economic and social terms, is one of great importance, especially in the current context characterized by instability when taxes are the main drivers that act as automatic stabilizers of economic growth to alleviate economic cycle fluctuations.

The role of automatic stabilizers is particularly important, contributing to smoothing the economic cycle and lowering GDP volatility. The mechanism is more effective in progressive tax systems. The role of these stabilizers is visible also in the flat tax system, such as Romania in 2004. The budget balance contribute through cyclical fluctuations automatically to smoothing fluctuations in economic activity:

1. stabilizers automatic reduce (without the intervention of policy makers) the amount by which the gross domestic product changes in response to a shock to the economy;
2. in the phase of economic boom, budget surpluses and vice-versa;
3. diminish the liquidity preference of the population during the economic boom and an increase in the recession;
4. stimulate aggregate demand when the economy is on the downward economic cycle and limit its expansion during the boom.

Table 2

Year	GDP in current prices (mil. lei)	Tax revenues (TR) in current prices (mil. lei)	GDP Deflator (compared to 2000)*	GDP in constant prices of 2000 (mil. lei)*	Tax revenues (TR) in constant prices of 2000 (mil. lei)*	Fiscal pressure (FP) (%) (TR/GDP)
2001	118327.2	13727.7	0.728	86142.20	9993.77	11.6
2002	152630	16775.3	0.59	90051.7	9897.43	10.99
2003	198761.1	23602.3	0.476	94610.28	11234.69	11.87
2004	248747.6	30252.7	0.414	102981.50	12524.62	12.16
2005	290488.8	34531.2	0.369	107190.36	12742.01	11.89
2006	347004.3	63792.4	0.333	115552.43	21242.87	18.38
2007	418257.9	76365.8	0.295	123386.08	22527.91	18.26
2008	524388.7	94044.4	0.264	138438.61	24827.72	17.93
2009	510522.8	88324.3	0.248	126609.65	21904.43	17.3
2010	533881.1	93060.1	0.239	127597.58	22241.36	17.43

[1] Reinhart Carmen, Reinhart. Vincent *"Capital Flow Bonanzas: An Encompassing View of the Past and Present"*, NBER Working Paper, 2008, p.16

2011	565097.2	104687	0.223	126016.67	23345.2	18.53
2012	596681.5	114044.6	0.212	126496.47	24177.46	19.11
2013	637583.1	119109.7	0.202	128791.78	24060.16	18.68
2014	666637.3	124973.9	0.195	129994.27	24369.91	18.75

** Own calculations based on data from NIS, World Bank*

2. The relationship between tax revenues and fiscal pressure

Considering the data in from the table 2, we obtain the following dependence between tax revenues and fiscal pressure as is shown in figure 1.

We shall try to find a link between tax revenues (TR) and fiscal pressure (FP). Analyzing different regression curves, we find that a better approximation for this link is given by a second degree polynomial. Let therefore:

$$TR = aFP^2 + bFP + c\ ,\ a,b,c \in \mathbf{R}$$

Let now: $F(a,b,c) = \sum_{i=1}^{n}\left(aFP_i^2 + bFP_i + c - TR_i\right)^2$ where $(FP_i,TR_i)_{i=1,\dots,n}$ are given by the table 2 and n=14.

After the condition that dF=0 we find that:

$$\begin{cases} a\sum_{i=1}^{n} FP_i^4 + b\sum_{i=1}^{n} FP_i^3 + c\sum_{i=1}^{n} FP_i^2 = \sum_{i=1}^{n} FP_i^2 TR_i \\ a\sum_{i=1}^{n} FP_i^3 + b\sum_{i=1}^{n} FP_i^2 + c\sum_{i=1}^{n} FP_i = \sum_{i=1}^{n} FP_i TR_i \\ a\sum_{i=1}^{n} FP_i^2 + b\sum_{i=1}^{n} FP_i + nc = \sum_{i=1}^{n} TR_i \end{cases}$$

and finally:

SUMMARY OUTPUT						
Regression Statistics						
Multiple R	0.9873					
R Square	0.9749					
Adjusted R Square	0.9703					
Standard Error	1043.0087					
Observations	14					
ANOVA						
	df	*SS*	*MS*	*F*	*Significance F*	
Regression	2	463845307	231922653	213.1902	$1.59563 \cdot 10^{-9}$	
Residual	11	11966538	1087867			
Total	13	475811845				
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 79.0%*	*Upper 79.0%*

Intercept		-33945.708	18132.0873	-1.8721	0.0880	-58086.24291	-9805.1734
X Variable (FP)	**1**	5180.9470	2526.9461	2.0503	0.0650	1816.64431	8545.2496
X Variable (FP^2)	**2**	-112.2924	83.9481	-1.3376	0.2080	-224.0584769	-0.5264

The regression is therefore:

$$TR = -112.2924FP^2 + 5180.9470FP - 33945.708$$

Because $FP=\frac{TR}{GDP}$ we find: $GDP = 100\frac{aFP^2 + bFP + c}{FP}$.

We have now: $GDP' = 100\left(a - \frac{c}{FP^2}\right)$, $GDP'' = 200\frac{c}{FP^3} < 0$ therefore the function GDP is concave. But from this relations, GDP reach its maximum for GDP'=0 that is: $FP_{max} = \sqrt{\frac{c}{a}} = 17.39\%$.

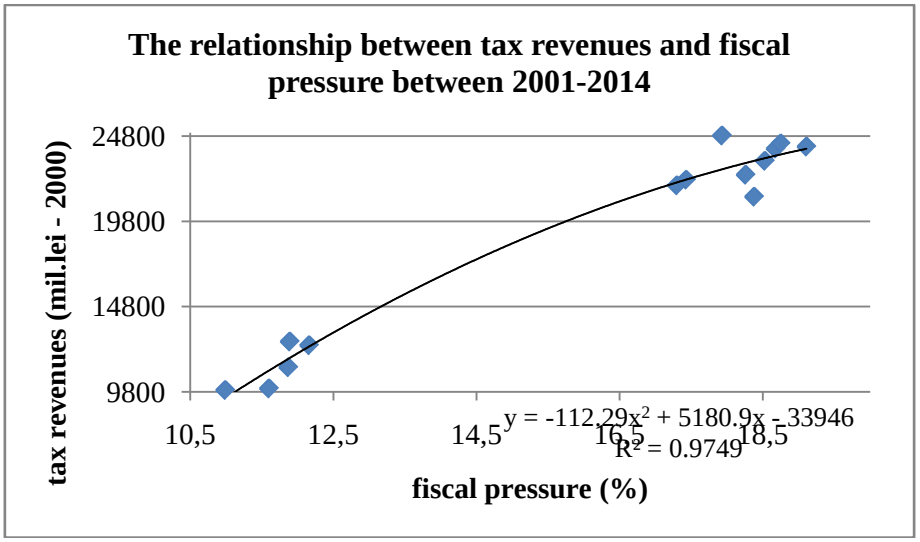

Figure 1

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3. Conclusions

Analysis of taxation from the period 2001-2014 reveals that on excessive taxation the real level of GDP decreases. It reaches a maximum (for data adjusted following regression analysis) at 17.39%. A high level of fiscal pressure generates a decrease in investment activity, so by default will have unwanted consequences in the medium and long term.

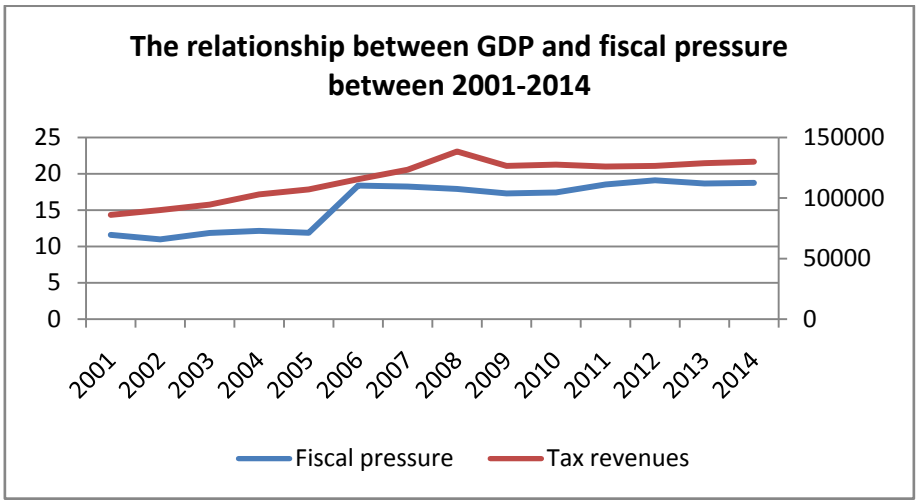

Figure 2

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