ANALYSIS OF AUTOMATIC STABILIZERS FOR THE CRITERIA OF THE GENERAL GOVERNMENT DEFICIT AND SURPLUS AS PERCENTAGE OF GDP – CASE STUDY FOR ROMANIA

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Abstract:

The Maastricht Treaty but also the programmatic documents of the European Union require that an automatic stabilization mechanism has to be devised in order to meet the criteria of nominal economic convergence. For the analysis of the budget deficit expressed as a percentage of GDP, the literature does not yet draw up a curdled analysis, but only either an analysis in particular on the revenue side, emphasizing the qualities of the progressive fiscal regimes in the automatic stabilization, or an analysis on the side of the budgetary expenses, recognized in having the capacity of economic stabilization especially in Western economies. Thus, the article is designed to be a plea for designing a rather automatic mechanism for reaching the 3% of GDP threshold imposed by the Maastricht criterion regarding the budget deficit, carrying out an empirical, econometric analysis for Romania starting from the functioning mode of the instruments used by the Ministry of Finance.

Keywords: *convergence, automatic stabilization, Romania*

JEL classification: *E63, H11, H62*

Introduction

In order to accede to the euro area, the member states of the European Union (EU) are evaluated by the European institutions in the light of the nominal economic convergence criteria set out in the Maastricht Treaty. The United Kingdom and Denmark are in the situation of non-accession to the third stage of the Economic and Monetary Union (EMU) and in addition, the United Kingdom, following the referendum from the summer of 2016, is also joining the process of leaving the European Union. This exit phenomenon can cause serious disruptions not only for the United Kingdom, for which the decision is assumed, but especially for the rest of the 27 member countries. Therefore, only a few states in the centre and east of the EU are still in the "competition" of joining the euro area.

Therefore, the sustainability of meeting the criteria of nominal economic convergence is extremely important for a country to join the euro area. Once entered into the EMU, that country will have to be able to remain without problems within the range of variation established by the effective value of the criterion indicator and the reference for that criterion for the time period related to the evaluation.

Although the necessity of non-discretionary mechanisms is invoked, in the respect of the nominal economic convergence criteria, up to the present moment, the political decisions and the discretionary actions outline the management of the compliance with the nominal economic convergence criteria. Moreover, the management is done individually, by each country, when maybe it would be necessary also a centralized management or piloting for the convergence criteria, especially if the variations of them are due to a common shock. Thus, the article wants to highlight through a case study on the situation of Romania, the way to remedy the budget deficit in order to meet the requirement of the fiscal-budget criterion of 3% regarding the balance of the consolidated general budget in GDP.

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Description of the Problem

Meeting nominal economic convergence criteria on the basis of an automatic stabilization mechanism is not only an important EU objective for accessibility within the euro area, but also a clear desire of Member States that are facing successive overruns of nominal convergence criteria. This aspect is extremely well defined in the case of the budget deficit, especially in the new Member States or the south-east flank of the EU.

For the analysis of the budget deficit expressed as a percentage of GDP, the specialized literature does not yet draw up a closed analysis, but only either an analysis in particular on the revenue side, emphasizing the qualities of the progressive fiscal regimes in the automatic stabilization, or an analysis on the part of the budgetary expenses, recognized as having the capacity of economic stabilization especially in Western economies.

Literature review

Numerous works present the qualities of automatic stabilizers, designed of course on Keynesian theory, but they also present the possibility of dissimulation of employment through the prism of "generous" social insurances. The automatic stabilizers are little treated in the topics of monetary policy, being par excellence debated by those who analyse the fiscal-budgetary policy.

Even in the fiscal-budgetary policy, the analysis of automatic stabilizers is often disjoint: some treat exclusively the expenditure part (especially the unemployment benefits) (Melitz and Darby, 2008), others exclusively the income part (especially taxes) (Auerbach and Feenberg, 2000).

In some situations, the rate is the most important for automatic stabilisation, in others, for example, regarding taxes, the basis of the tax, shrinking (both tax basis and tax) in the downfall period of the economic cycle.

Some studies focus on the conjuncture character (pro-cyclic, anti-cyclic a-cyclic) of automatic stabilizers, and others on the rather structural character of automatic stabilizers such as government size (Rodrik, 1998, Fatás and Mihov, 2001). Some studies focus on the size of automatic stabilizers, others on their effectiveness and effects. Also, the progressive taxation is considered a good automatic stabiliser, but there is no agreed view in the literature of what automatic stabilisers are and how they function.

Although there are clear recommendations, in the EU's programmatic documents, regarding the use of automatic stabilizers on convergence, so far there are no models and methods by which Member States can actually do these things.

Methodology and Data

Thus, the article is designed to be a plea for designing a rather automatic mechanism to reach the 3% of GDP threshold imposed by the Maastricht criterion regarding the budget deficit. Empirical, econometric analysis in the case of Romania started from the functioning of the instruments used by the Ministry of Finance. For the easy and practical understanding of the functioning of the automatic stabilizers in the case of the balance of the general budget consolidated in the GDP, we used a case study on the quarterly data in Romania for the period 2007-2019 (June).

Results

Thus, we couple the theoretical case of the automatic stabilizers proposed in the previous works (coordinator Ailincă, 2018, "Automatic stabilizers in the economy - concept, classification, design elements", project of the Centre for Financial and Monetary Research "Victor Slăvescu" and of the work to Dinga coord., 2011) with the structural elements present in the Consolidated General Budget (BGC) (see Table 1).

Table 1

Identification and coupling of theoretical with practical elements regarding automatic stabilizers

Possible automatic stabilizers	Personal income tax	Corporate income tax	Para fiscal withdrawals (contributions)	Transfers (social assistance) (social assistance, social subsidies, minimum guaranteed income, unemployment benefit)
General consolidated budget	Tax on wage and income	Tax on profit	Insurance contributions	Social assistance

Source: author's conception, previous works mentioned and budget execution of the Ministry of Finance. Note in the text: Tax on wages and income with ISV, Tax on profit - TP, Insurance contributions - IC and Social assistance - SA.

During the analysis period, we observe that there are 42 deficit situations, 8 surpluses and 7 excessive deficits. In this material, we consider an excessive deficit to exceed the threshold of -3% of GDP for the balance of the general consolidated budget, whether or not it has been catalogued this way by the European bodies. We find on the basis of the correlation matrix (see Table 2) between the elements selected above, the following:

-All the elements of income and expenditure have a strong negative correlation with the balance of the general consolidated budget, thus recommending them due to the negative feedback as good candidates for the automatic stabilization of the balance,

- Being internal structural elements of the consolidated general budget, all the elements of income and expenditure have positive correlations between them, even stronger than in the case of their connection with the balance of the general consolidated budget,

-Of the revenues and expenses, the expenses seem better candidates for managing the balance of the consolidated general budget, having a slightly higher correlation,

-Among the incomes, we can notice the social insurance contributions, and on the expenses side the social assistance has a correlation with the surplus / deficit (S/D) more intense than the total of the budgetary expenses. This aspect confirms, once again, the economic theory regarding the budgetary elements with the role of automatic stabilization.

It is worth noting that an important role in evaluating the classification in the deficit or surplus situation is the reporting to GDP. Thus, it can be considered necessary to eliminate GDP influence and to refer to the selected budgetary components in absolute form (thousand Lei), as well as to make a linear regression equation based on the above information: S / D = f (TWI, TP, IC, SA) (see Table 3).

Table 2

Correlation matrix between the candidate elements for the status of automatic stabilizers in the case of the balance of the general consolidated budget expressed as a percentage of GDP

	S/D	*I*	*E*	*TWI*	*TP*	*IC*	*SA*
S/D	1						
I	-0.5988	1					
E	-0.7039	0.9904	1				
TWI	-0.5697	0.9707	0.9593	1			
TP	-0.5992	0.9390	0.9364	0.9393	1		
IC	-0.6451	0.9801	0.9807	0.9230	0.9380	1	
SA	-0.7196	0.9747	0.9887	0.9484	0.8964	0.9594	1

Source: author's conception and processing; quarterly data from the budget execution for the period 2007-June 2019, Ministry of Finance of Romania.

Table 3

The result of the regression equation regarding the connection between the balance of the general consolidated budget and the selected items of budgetary components, for the period 2007 - June 2019

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9103792
R Square	0.8287903
Adjusted R Square	0.7958853
Standard Error	6084.0101
Observations	50

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	8.242E+09	2.061E+09	55.669083	7.429E-17
Residual	46	1.703E+09	37015178		
Total	50	9.945E+09			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
TWI	3.320	0.593	5.602	0.000	2.127	4.513	2.127	4.513
TP	-3.133	0.972	-3.223	0.002	-5.090	-1.176	-5.090	-1.176
IC	1.057	0.265	3.984	0.000	0.523	1.591	0.523	1.591
SA	-1.552	0.266	-5.845	0.000	-2.087	-1.018	-2.087	-1.018

Source: author's conception and processing; quarterly data from the budget execution for the period 2007-June 2019, Ministry of Finance of Romania.

Analyzing the value of the coefficient of determination (R2), it is observed that the value of 0.8287903 is extremely satisfactory, and the adjusted R2 of 0.7958853 at the sample level of 50 observations suggests a normal, strong correlation between the variables in the model.

The coefficients are significantly different from zero, the tax on wages and the tax on profit are noticeable with slightly higher values and the tax on profit and social assistance expenses have negative correlations.

The associated probability, or p-value, is well below 0.05 for all the elements in the model, thus, the null hypothesis H0 being rejected. So, we can conclude that the main influence on the balance of the consolidated general budget comes mainly from these factors.

In order to a better clarification regarding the link between the balance of consolidated general budget and the items of income and expenditure analysed, we select only the deficit situations (including the excessive deficit) (see Table 4).

Table 4

The result of the regression equation regarding the link between the budget deficit and the selected elements of budgetary components, for the period 2007 - June 2019

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9461771
R Square	0.8952511
Adjusted R Square	0.8606656
Standard Error	5211.7071
Observations	42

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	8821427857	2.205E+09	81.193059	8.441E-18
Residual	38	1032151838	27161890		
Total	42	9853579695			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
TWI	2.85	0.522	5.454	0.000	1.790	3.903	1.790	3.903
TP	-3.06	0.857	-3.568	0.001	-4.790	-1.322	-4.790	-1.322
IC	1.02	0.231	4.414	0.000	0.551	1.485	0.551	1.485
SA	-1.41	0.235	-6.012	0.000	-1.889	-0.937	-1.889	-0.937

Source: author's conception and processing; quarterly data from the budget execution for the period 2007- June 2019, Ministry of Finance of Romania

The value of the determination coefficient R2 of 0.8952511 and of the adjusted R2 (0.8606656) are extremely satisfactory.

The associated probability, or p-value, is well below 0.05 for all the elements in the model, the null hypothesis H0 being rejected.

The coefficients are significantly different from zero, and the income tax and social assistance expenses have a negative correlation, which propose these elements in the position of automatic stabilizers.

Thus, we can conclude that the main influence on the budget deficit comes mainly from these factors in the form of the equation:

$$S/D=2.85*TWI-3.06*TP+1.02*IC-1.41*SA \quad [1]$$

If we consider only the situations with excessive deficit, the correlation matrix (see Table 5) indicates besides the corporate income tax and the social assistance expenses, especially the tax on wages and income.

Table 5

The correlation matrix between the elements considered automatic stabilizers and the excessive deficit

	S/D	*I*	*E*	*TWI*	*TP*	*IC*	*SA*
S/D	1						
I	-0.5822	1					
E	-0.6784	0.9923	1				
TWI	-0.6706	0.9812	0.9888	1			
TP	-0.6215	0.8563	0.8684	0.9200	1		
IC	-0.6265	0.9806	0.9815	0.9976	0.9225	1	
SA	-0.7252	0.9287	0.9497	0.9078	0.6902	0.8893	1

Source: author's conception and processing; quarterly data from the budget execution for the period 2007-June 2019, Ministry of Finance of Romania

Given the extremely limited number of records on the excessive deficit, we will only use the information in Table 6 for guidance, due to the p-value values well over 0.05, yet formulating the following regression equation: S/D = -5.03*TWI-3.99*TP + 3.34*IC-0.83*SA [2]

In this equation S/D is in fact the excessive deficit. This equation should be subtracted from the above to reflect an "ideal" situation, more exactly the deficit without excessive deficit:

S/D = (2.85+5.03)*TWI+(-3.06+3.99)*TP+(1.02-3.34)*IC+(-1.41+0.83)*SA or

S/D = 7.88*TWI+0.93*TP-2.32*IC-0.58*SA or more rough S/D=8*TWI+TP-2*IC-*SA [3]

This equation is a first element that can help us develop a series of scenarios regarding the evolution of the general consolidated budget balance in order to overcome the excessive deficit situation.

It should be noted that the situation is not very well outlined due to the small number of records for the case of excessive deficit and of budgetary surplus; thus, the equation [3] is therefore also indicative.

If we take into consideration the fact that the expenses with social insurance are a factor of automatic stabilization at the macroeconomic level, and the social contributions represent a delicate aspect for the employees, we consider, beyond the scenario 1, not to intervene with changes on these budgetary fields.

Moreover, we would prefer to do scenarios in particular on the tax on wages and income and less on the tax on profit, considering that the tax on wages and income is sufficiently bidding on the automatic stabilization especially by using the tranches of income and implicitly the rates differentiated on tranches.

Table 6

The result of the regression equation regarding the link between the excessive budget deficit and the selected elements of budgetary components

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9965612
R Square	0.9931342
Adjusted R Square	0.6529351
Standard Error	3427.8787
Observations	7

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	5.099E+09	1274768932	108.48772	0.0091543
Residual	3	35251056	11750352.13		
Total	7	5.134E+09			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
TWI	-5.03	18.02	-0.28	0.80	-62.39	52.33	-62.39	52.33
TP	-3.99	4.86	-0.82	0.47	-19.47	11.48	-19.47	11.48
IC	3.34	4.49	0.74	0.51	-10.96	17.63	-10.96	17.63
SA	-0.83	1.15	-0.72	0.52	-4.48	2.83	-4.48	2.83

Source: author's conception and processing; quarterly data from the budget execution for the period 2008 December - 2011 December, Ministry of Finance of Romania

We set out below the hypotheses for 11 scenarios (see details in Appendix 2), doing simulations to finally solve the problem of excessive deficit:

-Scenario 1 – starts from the equation S/D=8*TWI+TP-2*IC-2*SA,
-Scenario 2 – involves observing the equation S/D=5*TWI+1*TP+1*IC-1*SA,
-Scenario 3 – in which we keep insurance contributions as well as social assistance as they are and we only index TWI and TP with their values,
-Scenario 4 – in which we keep the insurance contributions as they are also the social assistance, we index only TWI and TP with half of their values,
-Scenario 5 – where we keep as in the initial form of the excessive deficit, IC, SA, TP and index only one time TWI,
-Scenario 6 – where we keep as in the initial form the excessive deficit, IC, SA, TP and index only half of its value the TWI,
-Scenario 7 – in which we keep the SA as in the situation of excessive deficit and index TWI with a quarter of its value, IP with a quarter of its value, IC with a quarter of its value,
-Scenario 8 – we do not change any item of income, we do not change from expenses nor SA, but we reduce the total expenses by a quarter of the value of SA,
-Scenario 9 – (mixed) we increase TWI by a quarter, TP by a quarter, we keep the insurance contributions and social assistance contributions, but we reduce the total expenses by a quarter of the value of SA,
-Scenario 10 – (mixed) we leave IC, TP and SA in place and we modify instead only TWI on a progressive regime (on tranches of 20, 40, 50) and reduce the total expenses by a quarter of SA,
-Scenario 11 – (mixed) we leave IC, TP and SA in place; we modify TWI on a progressive basis (in tranches of 16, 32, 50) and reduce the total expenses by a quarter of SA.

Figure 1 is elaborated based on the scenarios.

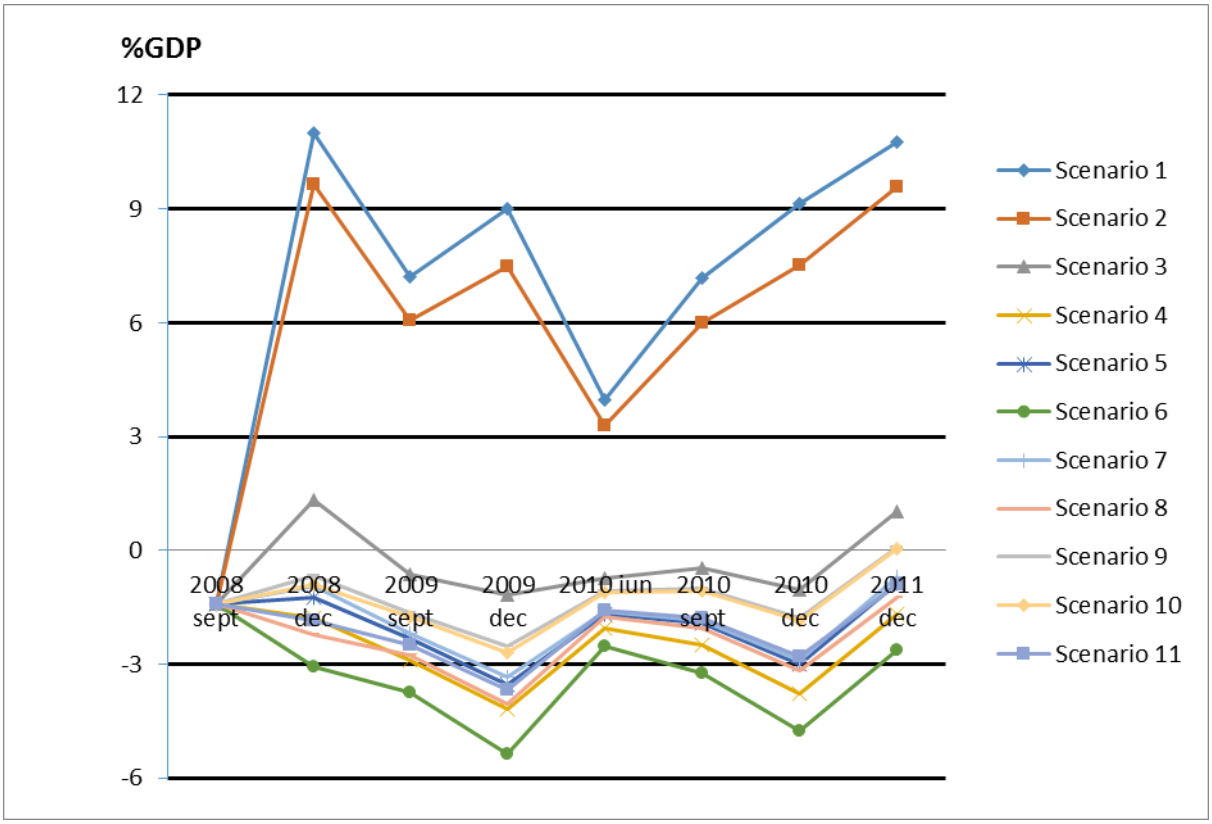

Figure 1–The evolution of the excessive budget deficit through the perspective of the 11 scenarios

Source: author's conception and processing; quarterly data from the budget execution for the period 2008 September - 2011 December, Ministry of Finance of Romania

Can be noted that the initial equation outlines an extremely optimistic scenario (scenario 1), while scenarios 4,5,6,8 and 11 are rather realistic. Scenarios 9, 10 and 11 include simulations on both the revenue side and the expense side (mixed scenarios). Scenario 10 and 11 describe the introduction of progressive rates on wages and income tax.

If we consider the mechanism of automatic adjustment of the wages and income tax as an iterative one, we can easily notice that a number of scenarios can be conceived in a progressive form (see figure 2).

Regarding the design of a progressive wage taxation simultaneously with the reduction of the general expenses with a quarter of the social assistance expenses, the mixed scenarios 11 and 10 can also be conceived as a succession for the gradual reduction of the excessive deficit.

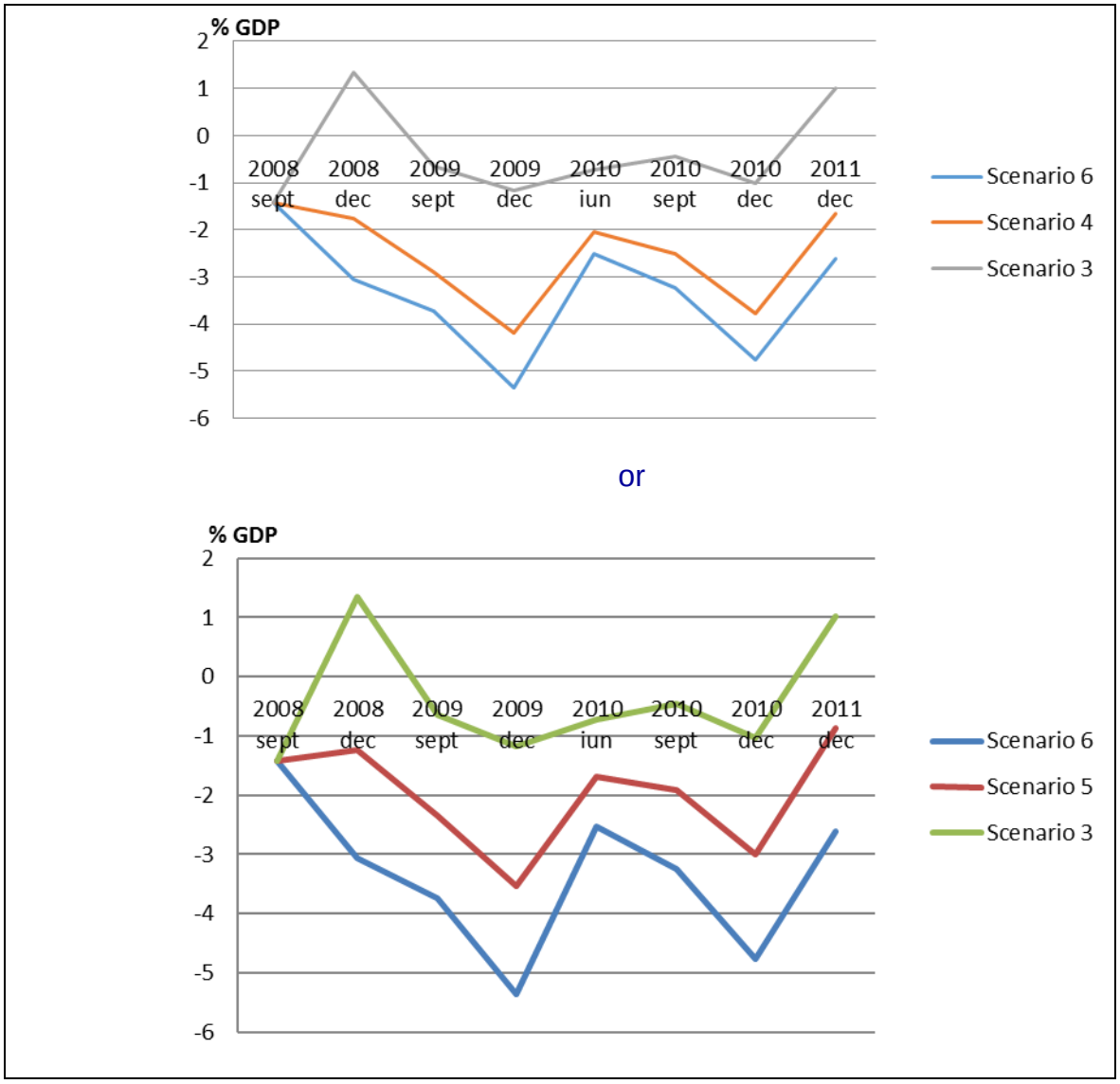

Figure 2 - Evolution of the excessive budget deficit through the prism of several scenarios that can be thought of as successive (focusing on the progressive increase of the tax on wages and income in the equation of the budget deficit)

Source: author's conception and processing; quarterly data from the budget execution for the period 2008 September - 2011 December, Ministry of Finance of Romania

Conclusions

Due to an extremely unfavourable structure of the labour market regarding payroll in Romania, more precisely the formation of a pyramid with an extremely large base of employees with low and very low incomes and a "peak" consisting of several tens of thousands of employees with incomes over 10,000 lei / month, the progressivity is a solution not as happy as it might seem at first sight.

No matter how high the tax rates are on income brackets, they will not be able to bring substantial real benefits to the revenues collected in the state budget considering this "pyramid" of payroll. Therefore, the problem can be solved effectively only in the context where labour market policies aim to increase the range of employees with gross incomes between 3000 and 10,000 lei / month and, to a lesser extent, employees with incomes over 10,000 lei / month . The high rates of tax on progressive structure, especially at the "peak" can smooth the aspect of the salary pyramid in Romania, but it is imperative to increase the middle layer regarding the salary, gradually reducing the number of those with gross incomes below 3000 lei per month (over 90% of the employed population of Romania!).

The shape of this „pyramid" in Romania explains a series of economic and social imbalances, as well as the inability of automatic fiscal-budgetary stabilizers to act in order to improve them and to smooth the excessive budget deficit. Therefore, the action also by reducing the public expenses is extremely necessary for any automatic stabilization program, but in no case by reducing the social insurance expenses.

We also note that the period of excessive deficit is perfectly superimposed over the period of global economic crisis, more precisely December 2008 - December 2011, a fact that recommends besides the automatic mechanism imposing fiscal progression also discretionary measures, well targeted, for smoothing the "collapse" of the deficit and avoiding entering in the state of excessive deficit.

Future Directions

Depending on the availability of data, the analysis can be deepened with simulations and scenarios regarding the corporate income tax revenues for Romania and for other countries. This can be done with alternatives of multiple variants regarding changing either the tax base or the tax rate, or simultaneously, both, so that, by successive adjustments, with or without simultaneous modification of the tax on wages and income or other budgetary fields, the criterion of the consolidated budget balance in the GDP formulated in the Maastricht Treaty to be respected.

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Annex 1 - highlighting the excessive deficit situation as well as the simulations on the scenarios regarding the balance of the general budget consolidated in the GDP (case study for Romania)

Excessive deficit - the initial hypothesis

	Surplus/ Deficit	Surplus/ Deficit	Income	Expenses	Tax on wage and income	Tax on profit	Insurance contributions	Social Assistance
	S/D (%GDP)	S/D	I	E	TWI	TP	IC	SA
2008 Dec.	-4.80	-24654.9	164466.8	189121.7	18365.7	13045.9	48419.8	53592.4
2009 Sept.	-5.10	-25563.2	115770.1	141333.3	13951.0	8440.8	36297.8	47237.9
2009 Dec.	-7.20	-36400.6	156624.9	193025.4	18551.4	11893.0	47872.0	63962.1
2010 Jun.	-3.35	-18070.0	77225.8	95295.8	8953.0	5241.1	23131.1	34934.6
2010 Sept.	-4.56	-23324.5	120385.4	143709.9	13486.0	7521.4	34414.2	51600.5
2010 Dec.	-6.51	-33305.2	168598.5	201903.6	17956.8	10115.1	45697.2	68601.9
2011 Dec.	-4.35	-23836.7	181566.9	205403.6	19076.4	10309.1	50637.3	68007.5

Source: Budget execution, quarterly data, Ministry of Finance of Romania. Where there are no percentages, the data is in millions of lei.

Scenario 1- simulation according to the equation: S/D=8*TWI+TP-2*IC-2*SA

	Surplus/ Deficit (% GDP)	Surplus/ Deficit	Income	Expenses	Tax on wage and income	Tax on profit	Insurance contributions	Social Assistance
	S/D(%GDP)	S/D	I	E	TWI	TP	CA	SA
2008 Dec.	10.99	55485.2	191014.5	135529.3	146925.6	26091.8	-96839.6	107184.8
2009 Sept.	7.20	35796.0	129891.4	94095.4	111608	16881.6	-72595.6	94475.8
2009 Dec.	9.02	45587.3	174650.6	129063.3	148411.2	23786.0	-95744	127924.2
2010 Jun.	3.98	21469.9	81831.1	60361.2	71624	10482.2	-46262.2	69869.2
2010 Sept.	7.17	36663.3	128772.7	92109.4	107888	15042.8	-68828.4	103201.0
2010 Dec.	9.13	46695.2	179997.0	133301.7	143654.4	20230.2	-91394.4	137203.8
2011 Dec.	10.78	59060.8	196456.9	137396.1	152611.2	20618.2	-101274.6	136015.0

Source: author's conception; quarterly data, Ministry of Finance of Romania. Social assistance is of course with the minus sign, being an element of expenses. Where there are no percentages, the data is in millions of lei.

Scenario 2- simulation according to the equation: S/D=5*TWI+1*TP+1*IC-1*SA

	Surplus/ Deficit	Surplus/ Deficit	Income	Expenses	Tax on wage and income	Tax on profit	Insurance contributions	Social Assistance
	S/D (%GDP)	S/D	I	E	TWI	TP	IC	SA
2008 Dec.	9.66	48807.9	237929.6	189121.7	91828.5	13045.9	48419.8	53592.4
2009 Sept.	6.08	30240.8	171574.1	141333.3	69755.0	8440.8	36297.8	47237.9
2009 Dec.	7.48	37805.1	230830.5	193025.4	92757.0	11893.0	47872.0	63962.1
2010 Jun.	3.29	17742.0	113037.8	95295.8	44765.0	5241.1	23131.1	34934.6
2010 Sept.	5.99	30619.5	174329.4	143709.9	67430.0	7521.4	34414.2	51600.5
2010 Dec.	7.53	38522.0	240425.7	201903.6	89784.0	10115.1	45697.2	68601.9
2011 Dec.	9.58	52468.9	257872.5	205403.6	95382.0	10309.1	50637.3	68007.5

Source: author's conception; quarterly data of Ministry of Finance of Romania. Where there are no percentages, the data is in millions of lei.

Scenario 3 - in which we keep the insurance contributions and the social assistance as they are and we index only TWI and TP with their own values

	Surplus/ Deficit	Surplus/ Deficit	Income	Expenses	Tax on wage and income	Tax on profit	Insurance contributions	Social Assistance
	S/D (%GDP)	S/D	I	E	TWI	TP	IC	SA
2008 Dec.	1.34	6756.7	195878.4	189121.7	36731.4	26091.8	48419.8	53592.4
2009 Sept.	-0.64	-3171.4	138161.9	141333.3	27902	16881.6	36297.8	47237.9
2009 Dec.	-1.18	-5956.1	187069.3	193025.4	37102.8	23786	47872.0	63962.1
2010 Jun.	-0.72	-3875.9	91419.9	95295.8	17906	10482.2	23131.1	34934.6
2010 Sept.	-0.45	-2317.1	141392.8	143709.9	26972	15042.8	34414.2	51600.5
2010 Dec.	-1.02	-5233.3	196670.4	201903.6	35913.6	20230.2	45697.2	68601.9
2011 Dec.	1.01	5548.8	210952.4	205403.6	38152.8	20618.2	50637.3	68007.5

Source: author's conception; quarterly data of Ministry of Finance of Romania. Where there are no percentages, the data is in millions of lei.

Scenario 4 - in which we keep the insurance contributions and the social assistance as they are and we index only TWI and TP with half of their values

	Surplus/ Deficit	Surplus/ Deficit	Income	Expenses	Tax on wage and income	Tax on profit	Insurance contributions	Social Assistance
	S/D (%GDP)	S/D	I	E	TWI	TP	IC	SA
2008 Dec.	-1.77	-8949.1	180172.6	189121.7	27548.6	19568.9	48419.8	53592.4
2009 Sept.	-2.89	-14367.3	126966.0	141333.3	20926.5	12661.2	36297.8	47237.9
2009 Dec.	-4.19	-21178.3	171847.1	193025.4	27827.1	17839.5	47872.0	63962.1
2010 Jun.	-2.04	-10973.0	84322.9	95295.8	13429.5	7861.7	23131.1	34934.6
2010 Sept.	-2.51	-12820.8	130889.1	143709.9	20229.0	11282.1	34414.2	51600.5
2010 Dec.	-3.77	-19269.2	182634.4	201903.6	26935.2	15172.7	45697.2	68601.9
2011 Dec.	-1.67	-9144.0	196259.7	205403.6	28614.6	15463.7	50637.3	68007.5

Source: author's conception; quarterly data of Ministry of Finance of Romania. Where there are no percentages, the data is in millions of lei.

Scenario 5 - in which we keep as in the initial form the IC, SA and TP and index only once TWI with its value

	Surplus/ Deficit	Surplus/ Deficit	Income	Expenses	Tax on wage and income	Tax on profit	Insurance contributions	Social Assistance
	S/D (%GDP)	S/D	I	E	TWI	TP	IC	SA
2008 Dec.	-1.25	-6289.2	182832.5	189121.7	36731.4	13045.9	48419.8	53592.4
2009 Sept.	-2.33	-11612.2	129721.1	141333.3	27902	8440.8	36297.8	47237.9
2009 Dec.	-3.53	-17849.1	175176.3	193025.4	37102.8	11893.0	47872.0	63962.1
2010 Jun.	-1.69	-9117.0	86178.8	95295.8	17906	5241.1	23131.1	34934.6
2010 Sept.	-1.92	-9838.5	133871.4	143709.9	26972	7521.4	34414.2	51600.5
2010 Dec.	-3.00	-15348.4	186555.3	201903.6	35913.6	10115.1	45697.2	68601.9
2011 Dec.	-0.87	-4760.3	200643.3	205403.6	38152.8	10309.1	50637.3	68007.5

Source: author's conception; quarterly data of Ministry of Finance of Romania. Where there are no percentages, the data is in millions of lei.

Scenario 6 - in which we keep as in the initial form the IC, SA and TP and index TWI with only half of its value

	Surplus/ Deficit	Surplus/ Deficit	Income	Expenses	Tax on wage and income	Tax on profit	Insurance contributions	Social Assistance
	S/D (%GDP)	S/D	I	E	TWI	TP	IC	SA
2008 Dec.	-3.06	-15472.1	173649.7	189121.7	27548.6	13045.9	48419.8	53592.4
2009 Sept.	-3.74	-18587.7	122745.6	141333.3	20926.5	8440.8	36297.8	47237.9
2009 Dec.	-5.37	-27124.8	165900.6	193025.4	27827.1	11893.0	47872.0	63962.1
2010 Jun.	-2.52	-13593.5	81702.3	95295.8	13429.5	5241.1	23131.1	34934.6
2010 Sept.	-3.24	-16581.5	127128.4	143709.9	20229.0	7521.4	34414.2	51600.5
2010 Dec.	-4.76	-24326.8	177576.9	201903.6	26935.2	10115.1	45697.2	68601.9
2011 Dec.	-2.61	-14298.5	191105.1	205403.6	28614.6	10309.1	50637.3	68007.5

Source: author's conception; quarterly data of Ministry of Finance of Romania. Where there are no percentages, the data is in millions of lei.

Scenario 7 - in which we keep SA as in the situation of excessive deficit and index TWI with a quarter of its value, TP with a quarter of its value, IC with a quarter of its value

	Surplus/ Deficit	Surplus/ Deficit	Income	Expenses	Tax on wage and income	Tax on profit	Insurance contributions	Social Assistance
	S/D (%GDP)	S/D	I	E	TWI	TP	IC	SA
2008 Dec.	-0.93	-4697.1	184424.7	189121.7	22957.1	16307.4	60524.8	53592.4
2009 Sept.	-2.19	-10890.8	130442.5	141333.3	17438.8	10551.0	45372.3	47237.9
2009 Dec.	-3.33	-16821.4	176204.0	193025.4	23189.3	14866.3	59840.0	63962.1
2010 Jun.	-1.62	-8738.7	86557.1	95295.8	11191.3	6551.4	28913.9	34934.6
2010 Sept.	-1.85	-9469.1	134240.8	143709.9	16857.5	9401.8	43017.8	51600.5
2010 Dec.	-2.91	-14862.9	187040.7	201903.6	22446.0	12643.9	57121.5	68601.9
2011 Dec.	-0.70	-3831.0	201572.6	205403.6	23845.5	12886.4	63296.6	68007.5

Source: author's conception; quarterly data of Ministry of Finance of Romania. Where there are no percentages, the data is in millions of lei.

Scenario 8 - we do not change any income items, also we do not change expenses with SA, but we reduce the total expenses by a quarter of the value of SA

	Surplus/ Deficit	Surplus/ Deficit	Income	Expenses	Tax on wage and income	Tax on profit	Insurance contributions	Social Assistance
	S/D (%GDP)	S/D	I	E	TWI	TP	IC	SA
2008 Dec.	-2.23	-11256.8	164466.8	175723.6	18365.7	13045.9	48419.8	53592.4
2009 Sept.	-2.77	-13753.7	115770.1	129523.8	13951.0	8440.8	36297.8	47237.9
2009 Dec.	-4.04	-20410.0	156624.9	177034.9	18551.4	11893.0	47872.0	63962.1
2010 Jun.	-1.73	-9336.4	77225.8	86562.2	8953.0	5241.1	23131.1	34934.6
2010 Sept.	-2.04	-10424.4	120385.4	130809.8	13486.0	7521.4	34414.2	51600.5
2010 Dec.	-3.16	-16154.7	168598.5	184753.2	17956.8	10115.1	45697.2	68601.9
2011 Dec.	-1.25	-6834.8	181566.9	188401.7	19076.4	10309.1	50637.3	68007.5

Source: author's conception; quarterly data of Ministry of Finance of Romania. Where there are no percentages, the data is in millions of lei.

Scenario 9 - (mixed) we increase TWI by a quarter, TP by a quarter, we keep as they are the insurance contributions and social assistance, but we reduce the total expenses by a quarter from the value of SA

	Surplus/ Deficit	Surplus/ Deficit	Income	Expenses	Tax on wage and income	Tax on profit	Insurance contributions	Social Assistance
	S/D (%GDP)	S/D	I	E	TWI	TP	IC	SA
2008 Dec.	-0.67	-3403.9	172319.7	175723.6	22957.1	16307.4	48419.8	53592.4
2009 Sept.	-1.64	-8155.8	121368.1	129523.8	17438.8	10551.0	36297.8	47237.9
2009 Dec.	-2.53	-12798.9	164236.0	177034.9	23189.3	14866.3	47872.0	63962.1
2010 Jun.	-1.07	-5787.8	80774.3	86562.2	11191.3	6551.4	23131.1	34934.6
2010 Sept.	-1.01	-5172.5	125637.3	130809.8	16857.5	9401.8	34414.2	51600.5
2010 Dec.	-1.79	-9136.7	175616.4	184753.2	22446.0	12643.9	45697.2	68601.9
2011 Dec.	0.09	511.5	188913.3	188401.7	23845.5	12886.4	50637.3	68007.5

Source: author's conception; quarterly data of Ministry of Finance of Romania. Where there are no percentages, the data is in millions of lei.

Scenario 10 - we leave IC, TP and SA in place and we modify TWI on a progressive regime (on 20, 40, 50 tranches) and reduce the total expenses by a quarter of SA

	Surplus/ Deficit	Surplus/ Deficit	Income	Expenses	Tax on wage and income	Tax on profit	Insurance contributions	Social Assistance
	S/D (%GDP)	S/D	I	E	TWI	TP	IC	SA
2008 Dec.	-0.89	-4484.4	171239.2	175723.6	25138.1	13045.9	48419.8	53592.4
2009 Sept.	-1.73	-8609.3	120914.5	129523.8	19095.4	8440.8	36297.8	47237.9
2009 Dec.	-2.68	-13569.2	163465.7	177034.9	25392.2	11893.0	47872.0	63962.1
2010 Jun.	-1.12	-6035.0	80527.2	86562.2	12254.4	5241.1	23131.1	34934.6
2010 Sept.	-1.07	-5451.4	125358.4	130809.8	18459	7521.4	34414.2	51600.5
2010 Dec.	-1.86	-9533.1	175220.1	184753.2	24578.4	10115.1	45697.2	68601.9
2011 Dec.	0.04	199.6	188601.3	188401.7	26110.8	10309.1	50637.3	68007.5

Source: author's conception; quarterly data of Ministry of Finance of Romania. Where there are no percentages, the data is in millions of lei.

Scenario 11 - we leave IC, TP and SA in place and we modify TWI on a progressive regime (on 16, 32, 50 tranches) and reduce the total expenses by a quarter of SA

	Surplus/ Deficit	Surplus/ Deficit	Income	Expenses	Tax on wage and income	Tax on profit	Insurance contributions	Social Assistance
	S/D (%GDP)	S/D	I	E	TWI	TP	IC	SA
2008 Dec.	-1.9	-9397.3	166326.3	175723.6	20225.2	13045.9	48419.8	53592.4
2009 Sept.	-2.5	-12341.2	117182.6	129523.8	15363.5	8440.8	36297.8	47237.9
2009 Dec.	-3.7	-18531.7	158503.2	177034.9	20429.7	11893.0	47872.0	63962.1
2010 Jun.	-1.6	-8429.9	78132.3	86562.2	9859.5	5241.1	23131.1	34934.6
2010 Sept.	-1.8	-9058.9	121750.9	130809.8	14851.5	7521.4	34414.2	51600.5
2010 Dec.	-2.8	-14336.6	170416.6	184753.2	19774.9	10115.1	45697.2	68601.9
2011 Dec.	-0.9	-4903.3	183498.4	188401.7	21007.9	10309.1	50637.3	68007.5

Source: author's conception; quarterly data of Ministry of Finance of Romania. Where there are no percentages, the data is in millions of lei.

Annex 2 - explanation of how is design the scenarios 10 and 11 regarding the balance of the consolidated general budget in GDP (case study for Romania)

The basic scenario - the existence of the excessive deficit and the unique share of 16%

		Total number of employees (thousands pers.)	Income from tax on wages and income (TWI, mil Lei)	Tax Rate (%)	Total tax base of income from tax on wages (mil. Lei)	Total tax base of income from tax on wages per employee (lei / persons)
2008	Dec	4738.6	18365.7	16	1147.9	242.2353
2009	Sept	4505.1	13951.0	16	871.9	193.5445
2009	Dec	4367.7	18551.4	16	1159.5	265.4629
2010	Jun	4264.3	8953.0	16	559.6	131.2202
2010	Sept	4194.1	13486.0	16	842.9	200.9668
2010	Dec	4101.6	17956.8	16	1122.3	273.6249
2011	Dec	4172.1	19076.4	16	1192.3	285.7734

Source: author's conception; data of the Ministry of Finance and NIS.

Scenario 11 - the existence of the excessive deficit is improved by the existence of progressive quotas (16, 32, 50), see the difference between the two regimes

	Income tranches	Number of employees on tranches (thousands persons)	Progressive tax rate (%)	Total tax base on tranches (th. Lei)	Income from tax on wages and income on tranches (TWI, th. lei) (progressive)	Total income from tax on wages and income (TWI, th. lei) (progressive)	Income from tax on wages and income (TWI, th. lei)(flat rate)	The difference between the two regimes regarding TWI (th.lei)
2008 Dec	10000lei/ month	47.4	50	11.5	573.9	20225.2	18365.7	1859.5
	3000-10000lei/month	379.1	32	91.8	2938.5			
	Under 3000lei/ month	4312.1	16	1044.5	16712.8			
2009 Sept	10000lei/ month	45.1	50	8.7	436.0	15363.5	13951.0	1412.5
	3000-10000lei/ month	360.4	32	69.8	2232.2			
	Under 3000lei/ month	4099.6	16	793.5	12695.4			
2009 Dec	10000lei/ month	43.7	50	11.6	579.7	20429.7	18551.4	1878.3
	3000-10000lei/ month	349.4	32	92.8	2968.2			
	Under 3000lei/ month	3974.6	16	1055.1	16881.8			
2010 Jun	10000lei/ month	42.6	50	5.6	279.8	9859.5	8953.0	906.5
	3000-10000lei/ month	341.1	32	44.8	1432.5			
	Under 3000lei/ month	3880.5	16	509.2	8147.2			
2010 Sept	10000lei/ month	41.9	50	8.4	421.4	14851.5	13486.0	1365.5
	3000-10000lei/ month	335.5	32	67.4	2157.8			

	Under 3000lei/ month	3816.6	16	767.0	12272.3			
2010 Dec	10000lei/ month	41.0	50	11.2	561.2	19774.9	17956.8	1818.1
	3000-10000lei/ month	328.1	32	89.8	2873.1			
	Under 3000lei/ month	3732.5	16	1021.3	16340.7			
2011 Dec	10000lei/ month	41.7	50	11.9	596.1	21007.9	19076.4	1931.5
	3000-10000lei/ month	333.8	32	95.4	3052.2			
	Under 3000lei/ month	3796.6	16	1085.0	17359.5			

Source: author's conception; data of the Ministry of Finance, NIS and press

Scenario 10 - the existence of the excessive deficit is improved by the existence of progressive quotas (20, 40, 50), see the difference between the two regimes

	Income tranches	Number of employees on tranches (thousands persons)	Progressive tax rate (%)	Total tax base on tranches (th. Lei)	Income from tax on wages and income on tranches (TWI, th. lei) (progressive)	Total income from tax on wages and income (TWI, th. lei) (progressive)	Income from tax on wages and income (TWI, th. lei)(flat rate)	The difference between the two regimes regarding TWI (th.lei)
2008 Dec	10000lei/ month	47.4	50	11.5	573.9	25138.1	18365.7	6772.4
	3000-10000lei/month	379.1	40	91.8	3673.1			
	Under 3000lei/ month	4312.1	20	1044.5	20891.0			
2009 Sept	10000lei/ month	45.1	50	8.7	436.0	19095.4	13951.0	5144.4
	3000-10000lei/ month	360.4	40	69.8	2790.2			
	Under 3000lei/ month	4099.6	20	793.5	15869.3			
2009 Dec	10000lei/ month	43.7	50	11.6	579.7	25392.2	18551.4	6840.8
	3000-10000lei/ month	349.4	40	92.8	3710.3			
	Under 3000lei/ month	3974.6	20	1055.1	21102.2			
2010 Jun	10000lei/ month	42.6	50	5.6	279.8	12254.4	8953.0	3301.4
	3000-10000lei/ month	341.1	40	44.8	1790.6			
	Under 3000lei/ month	3880.5	20	509.2	10184.0			
2010 Sept	10000lei/ month	41.9	50	8.4	421.4	18459.0	13486.0	4973.0
	3000-10000lei/ month	335.5	40	67.4	2697.2			
	Under 3000lei/ month	3816.6	20	767.0	15340.3			
2010 Dec	10000lei/ month	41.0	50	11.2	561.2	24578.4	17956.8	6621.6
	3000-10000lei/ month	328.1	40	89.8	3591.4			
	Under 3000lei/ month	3732.5	20	1021.3	20425.9			
2011 Dec	10000lei/ month	41.7	50	11.9	596.1	26110.8	19076.4	7034.4
	3000-10000lei/ month	333.8	40	95.4	3815.3			
	Under 3000lei/ month	3796.6	20	1085.0	21699.4			

Source: author's conception; data of the Ministry of Finance, NIS and press