FISCAL STRESS ANALYSIS IN THE REPUBLIC OF SERBIA

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Abstract: The goal is to examine the level of fiscal stress in the Republic of Serbia and to investigate whetherit suggests a crisis of public debt. The empirical analysis of annual data has been done for the period 2007 to 2014, in two cases: (i) charging indicators of the vulnerability boundaries to the fiscal crisis using the signal approach (ii) an assessment of whether the public debt is reduced at a satisfactory pace by applying the criterion of the operationalisation of debt. The resulting composite indicator points to a crisis of public debt in the Republic of Serbia. The investigation of fiscal and macro-financial variables showed that the public sector and private sector (macro-financial side) have over-consumption followed the process of the accumulation of the public debt. The outputs suggest that the level of the public debt in 2016 is above the benchmarks, which means that there is a violation of the operationalisation of the debt criterion in 2014.

1. Introduction

The relevance of topic is reflected in the stability of the public debt in the Republic of Serbia (in December 2015 amounted to 75.5% of GDP) and fiscal deficit (7.1%

of GDP), which represents the trigger of the fiscal crisis. In the first half of 2016, the public debt was reduced by 3.6%. The aim is to examine whether the fiscal and macroeconomic variables indicate a crisis in the public debt with the help of a signal approach and whether the public debt is reduced in accordance with the operationalisation of the debt criterion.

As part of the public debt sustainability indicators, the European Commission has developed models and risk of a fiscal crisis aimed at a timely warning to the crisis of a public debt. Apart from the European Commission the International Monetary Fund uses these models in its institutional framework, in three cases as well. First, models of the risk of the fiscal crisis provide relevant information for MMF about the assessment of fiscal sustainability in countries. Second, the models can contribute to the determination of the upper threshold of movement of fiscal and macroeconomic variables. Thirdly, risk models from the fiscal crisis have recently become an integral element of the so-called joint of the IMF.

As an additional security of the forthcoming fiscal crisis, the European Commission has defined the operationalisation of public debt criteria. The criterion aims to monitor whether the public debt is reduced at a satisfactory pace. Public debt as a% of GDP is decreasing and approaching the reference value at a satisfactory pace if it significantly decreases compared to the average reference value in the last three years. The reference value is taken one twentieth of the annual rate of growth of public debt, based on changes in the last three years (European Commission, 2011, p. 93).

The basic idea of the signal approach is the identification of critical limits of vulnerability to the fiscal crisis, as the government quickly recognizes the risk and unable to coordinate a timely response. The European Commission has identified critical limit values of movement variables (called threshold) based on the movements of these variables from a sample of selected countries each year. Movement above variables both defined threshold increases fiscal stress and implies fiscal crisis.

The indicator value above the threshold for a country in a given year means a warning to the risk of a fiscal crisis in the coming year. Based on the value of the thematic grouping of indicators (fiscal, macroeconomic and competitiveness index) and the value of individual variables in relation to their limits obtained information about the source of the crisis and detect areas that need timely intervention of economic policy. The greater the value of indicators the greater vulnerability.

The operationalisation of the debt criteria has the function of control over the further movement of the public debt. The justification for the introduction of this criterion, as an independent rule, is the fact that the growth of GDP in many countries, including the Republic of Serbia in the medium term is likely to be around 2%, so that public debt remains the focus of fiscal surveillance.

The first part provides an overview of the relevant literature on the subject of the fiscal crisis. The second part explains the methodology applied and the data used. The results of the signal approach in Serbia are given in the third part of the paper. The fourth part of the paper interprets the results of the application of the operationalisation of the public debt criteria in the Republic of Serbia. The last part systematises conclusions.

2. Review of Literature

The empirical literature is very significant given the fiscal crisis and puts the focus of interest in the modern research. The relevance of topic is reflected in the increasing fiscal problems of countries, in which it has pushed the global economic crisis. The growing fiscal stress causes the accumulation of public debt and increasing fiscal deficit now but also in the short term, leading to a fiscal crisis. The authors Auerbach & Gale (2009) point out that the economic policy response to the fiscal crisis is prevailing based on the deepening of the fiscal gap. Direct and permanent tax increases or spending cuts increased the proportion of debt to the GDP. According to the author Kickert (2012) fiscal crisis consists of three phases. First, the financial crisis is forcing the government to financially support the bank and save them from bankruptcy. Second, the economic crisis imposes an obligation on the government to take measures for economic recovery. Third, the fiscal crisis causes an increase in public debt and fiscal deficit, which is why the government is taking measures of fiscal cuts.

The global economic crisis has forced the government to respond exclusively using fiscal policy as an instrument. Peters (2011) examines a range of responses to the crisis by identifying several contradictory fiscal choices governments. From fiscal responses that have deepened the crisis rather than prevent (Bergin et al, 2011; Buiter&Rahbari, 2011), through the struggle to distribute the costs of the crisis within the EU (Onaran, 2010) to the eventual stabilization of the financial assistance from the IMF (Voskeritsian&Kornelakis, 2011; Baldacci et al., 2009).

The empirical literature provides numerous definitions of fiscal crisis (Hemming et al., 2003; Frankel &Saravelos, 2010; Cotarelli, 2011). This paper uses the definition Baldacci et al. (2011). Accordingly, the episode of the crisis is identified if there is any of the following four criteria: (i) annual inflation rate is above 35%; (ii) interest on government bonds is two standard deviations above the standards specific to transition countries, highlighting the significant pressure on market financing; (iii) failure in servicing public debt, exchange the payment of overdue debt problem, the application of restructuring or rescheduling of debt (and the changing conditions of the contract with the creditor debt); (iv) non-concessional loans taken from the IMF as part of the fiscal adjustment.

The modelling of the risk of a fiscal crisis was developed by the authors Kaminski, Lizondo and Reinhart (1998) on the basis of the non-parameter signal approach. The model is used in a number of early warning systems to different types of crises, including the banking and fiscal crisis (Baldacci, et al., 2011). Relevance, objectivity and systematic approach to predicting fiscal crisis provides a model that includes a number of economic variables. The signal approach determines different functioning of the economy in the period before the onset of a fiscal crisis. In this way it is possible to identify a variable or group of variables whose movements signaled the emergence of a fiscal crisis.

The primary factor in the development of a fiscal crisis is the high level of a public debt. There is a widespread opinion that a high level of a public debt threatens the country due to the impact of economic shocks and the numerous ways interfere with the EBRD growth. Reducing high levels of public debt also remains one of the main objectives of economic policy. The Maastricht Treaty defined the rule operationalisation of the debt, which is practically realised only with the outbreak of the global economic crisis (Alt et al., 2012; Mody, 2013; European Central Bank ECB, 2016).

3. Methodology and Data

3.1. Methodology of Indicators Threshold of Vulnerability to the Fiscal Crisis

The methodology includes the following steps: a) a list of the main variables that were analysed in correlation with crisis events, b) defining criteria for the calculation of critical limits for each variable so that the value of the variables above (below) the threshold sends a crisis signal, g) determining the window signaling that we possibly suggest the prediction that the crisis will be prolonged. The integration of these methodologies in the assessment of the sustainability of the overall fiscal allows expression to using its benefits. The disadvantages of methodology the indicators threshold of vulnerability to the fiscal crisis are compensated using complementary model.

The main variables that were analysed in correlation with crisis event are grouped into two groups of variables: fiscal variables and macro variables. This confirms the theoretical assumptions about the impact of macroeconomic and financial variables on purely fiscal variables. The choice of variables was based on the economic theory of fiscal crisis in the context of date methodology. The application of date methodology in selected variables aims to assess the movement of variables on the eve of the recession and send a signal of increasing fiscal stress. We selected the period from 2007 to 2014, which is divided into two sub-periods: before the crisis of 2007-2010 and the crisis period of 2010-2014. The complete list

of variables is presented in Table1, column 1.   In order to obtain a more comprehensive composite indicator which signals the fiscal crisis, future research can test the impact of other economic variables. The group of fiscal variable type includes: the general government gross debt (and its changes), short-term debt, total and primary fiscal balance, cyclically adjusted balance, changes in expenditures and changes in final consumption at the level of governments. Macro-financial variables that are analysed are: Gross savings of households, Private sector debt, Real short-term interest rate, Real GDP growth and GDP per capita. The variables that represent the country's competitiveness are the following: changes in the real effective exchange rate, changes in nominal unit labor costs and the balance of payments.

The methodology for the calculation of limit values of the variables is based on calculating the value of indicators of vulnerability. The value of indicators of vulnerability to the fiscal crisis in a given year for a given country is the sum of weighted signals sent from the variables that are available for that country and year. The methodology for determining the limit value refers to the composite indicator. The optimal threshold value for a particular country and year signaled the fiscal crisis in the country next year. Also, the optimal threshold for different subsets of variables (fiscal and financial-mark) are thematically designed exactly in the same way as a composite indicator. The limit values of indicators calculated for EU member states have been taken from the publication of the European Commission (2011) and serve as a benchmark when compared to the calculated value of indicators in the Republic of Serbia.

3.2. Methodology for Estimate of the Optimisation Debt Criterion

In order to implement the operationalisation of the debt criteria, the European Commission has defined numerical rules to assess whether public debt is reduced at a satisfactory pace. Debt levels above 60% of GDP are sufficiently reduced if its difference to 60% of GDP decreases over a period of 3 years, at a rate of 1/20 per year. This definition provides an unambiguous rule that can be used in all cases of the assessment if the path of debt is adjusted or if it does not comply with the requirements of the debt. In particular, the debt is in line with the criteria if they reduced each year by more than 1/20 of the difference (between the achieved level of public debt and the Maastricht limit). However, there are a number of possible interpretations of a situation where the debt is reduced more or less than required. If the debt in year t is below that benchmark, we conclude that a violation of breaching the SGP requirement.If the debt in year t is below that benchmark, we conclude that a violation of breaching the SGP requirement.

The benchmark debt level can be represented as follows (European Commission, 2011, p. 94-95):

$$bb_t = 60\% + \frac{0.95}{3}(b_{t-1} - 60\%) + \frac{0.95^2}{3}(b_{t-2} - 60\%) + \frac{0.95^3}{3}(b_{t-3} - 60\%) \quad (1)$$

Equation (1) represents a weighted average that considers the relationship in the debt-to-GDP)) and each of the two years preceding the year of observation. Also, in equation (1) implies the compliance with the requirements for the one-year decrease by 5% of the distance between the debt in year t-1 and the 60% threshold Treaty GDP, which can be represented by the following identity:

$$b_t - b_{t-1} = -(b_{t-1} - 60\%) \cdot 0.05 \quad (2)$$

If the change public debt, b_t - b_{t-1}, labeled with bb_t^{1y}, rearranging formula (2) we obtain that a one-year rapper t is equal to:

$$bb_t^{1y} = -(b_1 - 60\%)0.05 + b_{t-1} = b_{t-1}(1 - 0.05) + 0.05 \cdot 60\%$$
$$= b_{t-1} \cdot 0.95 + (1 - 0.95) \cdot 60\% \quad (3)$$

$$bb_t^{1y} = 60\% + (b_{t-1} - 60\%) \cdot 0.95 \quad (4)$$

where *b* represents a public debt and *y* represents GDP.

On the basis of equation (4), the two-year benchmark bb_t^{2y} for an annual reduction of 0.05 of the distance between the debt ratio and 60% for two years would be:

$$bb_t^{2y} = 60\% + (b_{t-2} - 60\%)0.95^2. \quad (5)$$

By further iteration, the three-year period benchmark bb_t^{3y}, for an annual reduction of 0.05 of the distance between the debt ratio and 60% for three years would be:

$$bb_t^{3y} = 60\% + (b_{t-3} - 60\%)0.95^3. \quad (6)$$

Finally, the identity of rappers public debt represents the average of the three benchmarks:

$$bb_t = \frac{[bb_t^{1y} + bb_t^{2y} + bb_t^{3y}]}{3}$$
$$= 60\% + \frac{0.95}{3}(b_{t-1} - 60\%) + \frac{0.95^2}{3}(b_{t-2} - 60\%) \quad (7)$$
$$+ \frac{0.95^3}{3}(b_{t-3} - 60\%)$$

The European Commission uses to assess the operationalisation of the debt equation (7).

4. The Signaling of the Fiscal Crisis in the Republic of Serbia

The preliminary results of signaling in the Republic of Serbia are listed in Table 1, for the individual variables of which were built three composite indicators (fiscal, financial and indicator of competitiveness) as well as the overall composite indicator. For the overall composite indicator the average in research of the European Commission is 1.91, which means that the value of the index in the period t is greater than 0.45, the fiscal crisis will be a certain period $t+1$. The deterioration of the fiscal index in Serbia is still evident in the pre-crisis period, i.e. since 2008. Macrofinancial index exceeds the threshold in the last two years of the sample. The index of competitiveness is improving during the period, due to improved foreign trade balance, and as a result of a reduction in imports due to the fall in aggregate demand in the country.

For the Republic of Serbia, the results in Table 1 show that almost all variables after fiscal 2008 signal a fiscal crisis, while the change in the share of gross debt to the GDP ratio began to signal in 2010. Fiscal balance represents the amount of money government has from tax revenue and the proceeds of assets sold, minus any government spending. When the balance is negative, the government has a fiscal deficit. When the balance is positive, the government has a fiscal surplus. The fiscal balance is still below the EU average, because their fiscal deficit more strongly affected by the economic crisis. However, a worry is the tendency of its movement: the fiscal deficit in Serbia since 2011 has been growing, while in almost all other European countries has been falling.

The primary fiscal balance is the difference between the consolidated revenues and consolidated public expenditure net of interest expense. The primary balance in Serbia is below the EU threshold only in 2007 and 2008 (in surplus), and the rest of the observed period was above the threshold (in deficit).

The cyclical balance is part of the fiscal balance that automatically adjusts to cyclical fluctuations of the economy (GDP). The high degree of consistency of fiscal balance and cyclically adjusted balance in Serbia indicates that most of the fiscal deficit in Serbia systemic in nature, that is not the result of cyclical fluctuations in GDP. This is not the case in the EU countries, which are very dominant structural measures that reduce the cyclical part of the overall fiscal deficit and increase its structural deficit.

The public debt has not exceeded the threshold of Europe, with the ratio of public debt to GDP significantly increased in the period 2009-2014. Although the average public debt in the EU is higher than in Serbia, according to the

development level and the credit rating of Serbia is considered to be highly indebted desire. The concern is the structure of public debt in Serbia. External debt dominates the domestic and foreign currency debt is dominant in relation to the dinar. In the public debt structure is dominated the debt with fixed interest rates, which is favorable from the perspective of exchange rate risk.

Table 1. The fiscal crisis vulnerability analysis for Serbia 2007-2014

Variable		Threshold	2007	2008	2009	2010	2011	2012	2013	2014
Fiscal index		0.35	0.30	0.72	0.80	1.00	0.97	1.31	2.12	3.1
Fiscal balance	% GDP	-10.1	-2	-2.6	-4.5	-4.7	-5	-6.4	-5.0	-8.4
Primary balance	% GDP	0.44	0.81	1.05	-2.2	2.5	-2.8	-3.9	-4.7	-4.5
Cyclically adjusted balance	% GDP	-3.31	-2.7	-4	-3.9	-4.4	-5.1	-5.7	-4.1	-3.5
Gross debt	% GDP	103.62	34.6	33.4	38.1	46.5	49.5	61.8	65.5	63.7
Change in gross debt	% GDP	6.59	0	-1.2	4.67	8.42	3.011	12.3	15.1	13.6
Short-term debt, government	% GDP	14.55	3.6	6.4	6.7	6.4	2.7	2.1	1.4	4.5
Net debt	%GDP	58.11	34.6	33.4	38.1	46.5	49.5	61.8	63.8	62.3
Interest rate-growth rate differential	% GDP	5.94	-0.5	6.32	1.96	3.85	5.82	6.38	7.18	7.62
Change in expenditure of general government	% GDP	2.26	0.08	-0.5	1.22	0.36	-1.42	3.8	3.0	2.1
Change in final consumption expenditure of general government	%GDP	0.52	0	0.11	0.32	0	1.01	-0.12	-1.0	-1.5
Macro-financial index		1.58	1.34	1.05	1.5	1.72	1.5	0.76	1.56	1.98
Gross savings of households	% GDP	3.1	/	4.1	8.3	10.1	/	12.7	9.3	8.2
Private sector debt	% GDP	73.44	73.4	81.5	75.2	68.3	65.5	59.1	55.1	52.5
Real short-term interest rate	%	5.56	10.3	5.6	11	3.1	12.4	13.3	13.4	13.9
Real GDP growth	% GDP	2.96	5.4	3.8	-3.5	1	1.6	-1.7	2.5	1.0
GDP per capita		73.21	45.3	44.8	46	46.4	44.9	48.7	46.3	45.3
Competitiveness index		-0.02	0.16	0.20	-0.04	-0.05	-0.07	-0.09	-0.05	-0.07
Current account	% GDP	-4.95	-18	-22	-6.6	-6.8	-9.1	-11	-5.0	-4.8
Average growth rate of real effective exchange rate, based on exports deflator	%	1.97	0.99	1.0	1.01	1.0	0.99	1.03	1.01	0.98
Average growth rate of nominal unit labour cost over last 3 years	%	2.96	1.01	1.0	1	1	1.01	1.00	1.00	1.00
Overall composite indicator		1.91	1.77	2.01	3.30	3.75	3.44	3.06	3.03	3.01

Source: Data from the database of the Ministry of Finance of the Republic of Serbia, National Bank of Serbia and the IMF's World Economic Outlook bases. Other calculations are carried out by the authors.

In the structure of public spending in Serbia is dominated the current expenditures, compared to capital expenditures. Change in expenditure of general government in Serbia are generally below the European average, because the developed countries have a greater fiscal space to increase public spending in order to stimulate the growth of aggregate demand. Only in 2012 evident sharp increase in public spending (3.8), which was held in 2013 and (3.0) above the European threshold, as a result of the election campaign. Additional pressure on public spending and the interest expense, which have increased significantly since 2009. In 2013, interest expense amounted to 2.5% of GDP in 2014 and close to 3% of GDP.

The signals are sent to the fiscal crisis and by the macrofinancial variables in Table 1. The net savings of households and the private sector debt warn of the vulnerability since 2008, which signals a short-term real interest rates and real GDP began to warn as early as 2007.

Net household savings and private debt warn of vulnerabilities since 2008, indicating short-term real interest rates and real GDP began to warn as early as 2007. The general impression is that the current level of savings is low. According to estimates of the National Bank of Serbia for 2010, the Serbian economy, the share of national savings is about 11% of GDP 2, while the world average is around 23% of GDP. At the same time, the level of savings in our country is lower compared to all regions of the world.

Channel of interest rates in developed economies is the most important channel of monetary policy transmission. With us there is still no great importance. Hence, the short-term interest rates in Serbia are significantly higher than the European average (5.56%). Changes in interest rates of the central bank lead to changes in short-term interest rates in the money and financial markets. Bearing in mind the inflationary expectations, nominal short-term interest rates affect the real short-term interest rate. The current and expected real short-term interest rates affect the long-term real interest rates. Longer-term real interest rates taking affect the scope and structure of consumption, especially the tendency towards saving and investment of economic entities.

While the public sector is borrowing, the private sector is deleveraging, as is evident from the 2012 decrease in the share of long-term debt in the GDP (from 65.5% in 2011 to 59.1% in 2012, with a downward trend). Real GDP growth in Serbia is mostly below the already low EU average (2.96%). Only in the years 2007- 2008 real GDP growth in Serbia is above the EU average due to its strong economic expansion, in 2009 there is a severe recession, followed by a mild recovery of GDP.

On the side of competitiveness, the variable balance of payments is above the treshold during all six years. Since public debt is the debt nominated in foreign

currency, then the appreciation of the real exchange rate, reducing the ratio of debt to facilitate, which facilitates the refunded debt. Depreciation of the real exchange rate increases the ratio of debt to GDP, which makes it difficult to restore debt. How in the reporting period was present appreciation of the real exchange rate, hence Average growth rate of real effective exchange rate in Serbia has a tendency to move below the European threshold. As for the variable Average growth rate of nominal unit labor cost over last 3 years in Serbia, it is below the European threshold and her identical value in the period. The reason for the regulation to limit growth in the public sector wages and pensions, which is in effect in Serbia from 2009.So it is not only a composite indicator, in Table 1, correctly pointed to the crisis of public debt in the Republic of Serbia, but also the analysis of sub-indices and individual variables showed that both the government (fiscal side) and private sector (macro-financial side) have followed the process of over-consumption accumulation of debts.

5. Estimate of the Optimisation Debt Criterion in the Republic of Serbia

The analysis of trends in the public debt in the Republic of Serbia by the method of benchmark goes in two directions: (i) assessing whether the benchmark debt breached and, if so (ii) a detailed report. The first phase requires the calculation of benchmarks debt (Table 2). The aim of this calculation is that the available data on public debt, check whether the rapper violated. This will be a clear signal that the current economic policy leads to the reduction of debt in the next two years. This is not certainly the case in Serbia. In Figure 1 we can see that in the period from 2002 to 2012 the actual level of debt below the benchmarks, which means that there are no violations of the rules of 60% of GDP. However, since the second quarter of 2011 the actual level of debt is above the benchmark which means that the rule is violated. This is indicated by the projection of its further movement. The fact that numerical rule of the benchmark of debt recognises this, it takes several years to meet the demands of the actual debt benchmarks.

Serbia's public debt at the end of 2016 reached 74% of GDP. During 2015 and 2016, a successful fiscal consolidation was conducted, which resulted in a reduction of the fiscal deficit from 6.7% of GDP in 2014 to around 1.5% of GDP in 2016.In this way, in 2016 the growth of public debt relative to GDP stopped. However, public debt in 2017 and 2018 were one-time increase when the state issues bonds based on restitution. Due to the inability of the state to reduce the fiscal deficit to 0.5% of GDP and public debt will in the coming period exceed its landmark.

Table 2. The proposed benchmark debt level in Serbia, the three-year period

Year (t)	Public debt (b)	Public debt (b-1)	Public debt (b-2)	Public debt (b-3)	Benchmarks (bb)
2003	77,771	81,232	114,487	241,657	77,69265
2004	65,364	77,771	81,232	114,487	69,44453
2005	56,291	65,364	77,771	81,232	64,13054
2006	42,209	56,291	65,364	77,771	59,88265
2007	34,584	42,209	56,291	65,364	54,0969
2008	33,393	34,584	42,209	56,291	49,97651
2009	38,067	33,393	34,584	42,209	48,41043
2010	46,488	38,067	33,393	34,584	49,55826
2011	49,499	46,488	38,067	33,393	52,68465
2012	61,767	49,499	46,488	38,067	54,63049
2013	66,629	61,767	49,499	46,488	59,10998
2014	71,25	66,629	61,767	49,499	61,98295
2015	74,317	71,25	66,629	61,767	64,31591
2016	79,174	74,317	71,25	66,629	65,90531
2017	82,758	79,174	74,317	71,25	67,90488
2018	87,934	82,758	79,174	74,317	69,62947

Source: data for actual debt is from World Economic Outlook; debt benchmark is calculated by the authors according to the equation (7).

Figure 1 illustrates the actual level of public debt and its benchmarks for Serbia, calculated on the basis of identity (7). The blue line represents the actual level of public debt, while the red line shows the benchmark with the circles of the public debt. Compared with simple rules, the selection of the three-year horizon aims to avoid simple traps, especially the instability of the benchmark and its susceptibility to manipulation. Rule three-year benchmarks, as the average rate underlines the importance of the previous three-year results from the present level of public debt. This is a very popular measure, especially under conditions where the reduction of public debt, the result of high inflation and a positive gap of GDP. The output gap is a measure of demand, which is defined as the difference between the level of GDP and its equilibrium level, ie. trend. A positive output gap means the inflationary pressures coming from the demand, and vice versa (Đurović-Todorović& Vuković, 2016, p. 220).

Figure 1. Illustration of the proposed three-year average debt reduction benchmark in the Republic of Serbia
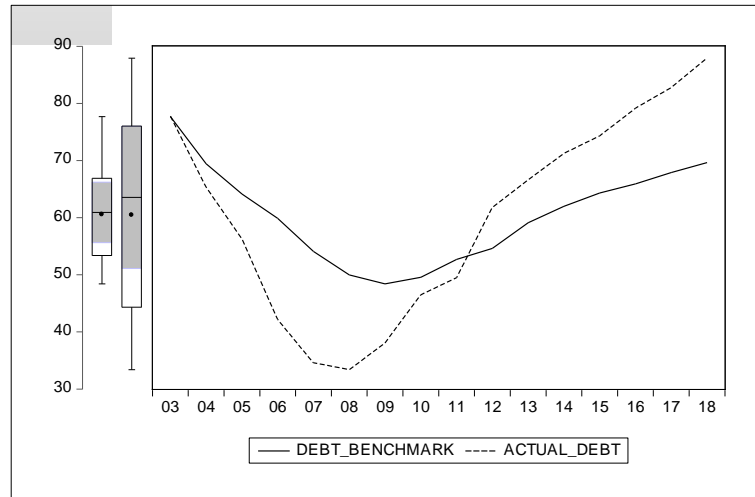
Source: data for actual debt is from World Economic Outlook; debt benchmark is calculated by the authors according to the equation (7).

The next step is to determine whether the current budget situation indicates that the rapper debt will enter unchanged economic policy, exceed the benchmark debt in future. Although it seems that the fiscal policy in 2014 designed to sufficiently reduce the ratio of public debt to GDP in 2016 is not considered to be a breach of the debt criterion. This occurs because the country has already taken the necessary measures to adjust its fiscal policy, which in the Republic of Serbia is not the case. Since it is evident in Figure 1 that the prognosis of the public debt to GDP for the year 2016 is above the benchmarks, there is a violation of the criteria for 2014.

The sustainability of the public debt in the future is threatened and other risks. As the largest part of public debt in foreign currency, there is a risk of depreciation of the dinar. On the other hand, public revenues from which are paid by the public debt collected in dinars. The Government of the Republic of Serbia takes over the debts of state-owned enterprises, which means to borrow to get them serviced. With the necessity of borrowing of the Republic of Serbia goes low credit rating but the interest rates at which the government borrows high.

The analysis of the economic and budgetary situation takes into account all factors relevant to the assessment of past events in relation of public debt to GDP and the prospects of its further evaluation. This will allow a balanced overall assessment of all relevant factors of the public debt. In particular, it will show to what extent factors affect the fulfillment of the criteria of fiscal deficit and public debt, whether as aggravating or mitigating circumstances. From the analysis, it is concluded that the Government of the Republic of Serbia does not respect the

operationalisation of the debt criterion; on the contrary, they continue to increase public debt. Hence, in the Republic of Serbia, the control over the movement of public debt is based on the criteria of the European Commission, which becomes a real challenge.

6. Conclusion

The analysis of fiscal stress in the Republic of Serbia warns the unsustainable public debt and confirms the vulnerability of the fiscal crisis. The most important finding in the current context is that financial variables and variables of competitiveness tend to have a stronger predictive power than purely fiscal variables. This observation is an argument that the macrofinancial risk indicators should be more comprehensive by including an index of interdependence between the variables themselves. In the case of the Republic of Serbia, the fiscal crisis is warned by numerous indicators, which may be a sign that the crisis will be very difficult. The narrative conclusions that can be drawn from the indicators apparently depend on the variables that constitute them. The users of information need to be aware of the restrictions of the signal approach. First, the signal approach does not analyse the correlation between variables. Second, it does not allow econometric testing the statistical significance of individual variables. Public debt was reduced in 2016 by 3.5% as a result of not respecting of the criterion of the operationalisation of the debt in 2014.

References

Alt J., Dreyer-Lassen D., Wehner J. (2012). Politics and Economics of Fiscal Gimmickry in Europe, https://www.bc.edu/content/dam/files/schools/cas_sites/economics/pdf/Seminars/SemS2012/Alt.pdf

Auerbach A., Gale J. W.G. (2009). The Economic Crisis and the Fiscal Crisis: 2009 and Beyond, http://eml.berkeley.edu/~auerbach/fiscal_future2.pdf

Baldacci E., Kumar S.M. (2010).Fiscal Deficits, Public Debt, and Sovereign Bond Yields.IMF Working Paper, WP/10/184.

Baldacci E., McHugh J., Petrova I. (2011). Measuring Fiscal Vulnerability and Fiscal Stress: A Proposed Set of Indicators. IMF Working Paper WP/11/94.

Baldacci E., Petrova I., Belhocine N., Dobrescu G., Mazraani S. (2011) Assessing Fiscal Stres. IMF Working paper 11/100.

Baldacci, E., Gupta, S., Mulas-Granados, C. (2009). How Effective is Fiscal Policy Response in Systemic Banking Crises. IMF Working Paper WP/09/160.

Bergin A. Gerald J. F. Kearney I., O'Sullivan C. (2011).The Irish Fiscal Crisis. National Institute Economic Review No. 217.

Buiter W. ,Rahbari E. (2011).Greece and the fiscal crisis in the EMU.Published in Greek in Gikas A. Hardouvelis.ed."From the International Crisis to the Greek and Euro Area Crisis: what lies ahead? EkdotikosOikos A. A. Libane, Athens.

Cottarelli, C. (2011). The Risk Octagon: A Compehensive Framework for Assessing Soverign Risks, presented in University of Rome "La Sapineza", January. http://www.imf.org/external/np/fad/news/2011/docs/Cottarelli1.pdf

Đurović-Todorović, J., Vuković, M. (2016).Empirical evaluation of the fiscal position in Serbia.Ekonomsketeme, 51(2): 217-232.

European Central Bank - ECB (2016).Government debt reduction strategies in the euro area. Economic Bulletin, Issue 3/2016 – Article 2, https://www.ecb.europa.eu/pub/pdf/other/eb201603_article02.en.pdf

European Commission. (2011). Public finances in EMU – 2012. European Economy, 3/2011.

Frankel, J., Saravelos, G. (2010). Are Leading Indicators of Financial Crises Useful for Assessing Coutry Vulnerability? Evidence from the 2008-09 Global Crisis.NBER Working Paper 16047.

Hemming, R., Kell, M., Schimmelpfennig, A. (2003).Fiscal Vulnerability and Financial Crises in Emerging Market Economies.IMF Occasional Paper 218.

International Monetary Fund (2011).Euro Area Policies: Spillover Report for the 2011 Article IV Consultation and Selected. IMF Country Report No. 11/185.

Kaminsky, G., Lizondo S., Reinhart G. (1998).Leading indicators of currency crisis. IMF Staff Papers,Vol.45, No.1, p.1-48.

Kickert, S. (2012).State Responses to the Fiscal Crisis in Britain, Germany and the Netherlands.Public Management Review.Volume 14.Issue 3.p.299-309.

Kumhof M. (2004).Fiscal Crisis Resolution: Taxation versus Inflation.Stanford University.

Lavigne R. (2011). The political and institutional determinants of fiscal adjustment: Entering and exiting fiscal distress. European Journal of Political Economy 27, p.17-35.

Mody A. (2013).Sovereign Debt and its Restructuring Framework in the Euro Area.Bruegel Working Paper 2013/05, http://bruegel.org/wp-content/uploads/imported/publications/WP_2013_05.pdf

Onaran O. (2010).Fiscal Crisis in Europe or a Crisis of Distribution?Research on Money and Finance. Discussion Paper no 18. Department of Economics and Statistics.Middles University. London, http://eprints.mdx.ac.uk/6930/1/Fiscal_crisis_Europe-Onaran%5B1%5D.pdf

Peters B. G. (2011). Governance responses to the fiscal crisis—comparative perspectives.Public Money & Management.Volume 31. Issue 1.pages 75-80.

Voskeritsian, H., Kornelakis, A. (2011).Institutional change in Greek industrial relations in an era of fiscal crisis.GreeSE papers, 52. London School of Economics and Political Science, Hellenic Observatory, London, UK.

ANALIZA FISKALNOG STRESA U REPUBLICI SRBIJI

Apstrakt: Cilj rada je da utvrdi nivo fiskalnog stresa u Republici Srbiji i ispita da li nagoveštava krizu javnog duga. Empirijska analiza godišnjih podataka urađena je za period 2007-2014. godina, u dva slučaja: (i)obračunavanje indikatora ranjivosti na fiskalnu krizu korišćenjem signalnog pristupa i (ii) ocena da li se javni dug smanjuje zadovoljavajućom dinamikom primenom kriterijuma operacionalizacije duga.Kompozitni indikator ukazuje na krizu

javnog duga u Republici Srbiji. Analiza pod-indeksa i pojedinačnih varijabli pokazala je da su i Vlada (fiskalna strana) i privatni sektor (makro-finansijska strana) imali prekomernu potrošnju praćenu procesom akumulacije javnog duga.Rezultati sugerišu da je nivo javnog duga u 2016. godini iznad repera, što znači da je prisutna povreda kriterijuma operacionalizacije duga za 2014. godinu.

Ključne reči: fiskalna politika, operacionalizacija duga, kompozitni indikator, fiskalne varijable, makroekonomske varijable.

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