TOMASZ URYSZEK[*]

Long-term Sustainability Of Public Finance In The Central And Eastern EU Member States

Abstract

The main goal of this article is to investigate the level of long-term sustainability of public finance in the Central and Eastern EU Member States. This aim is accompanied by the following hypothesis: an inability to generate primary surpluses and significantly growing public debt volumes prevent the attainment of sustainability in the area of public finance. The research method is based on GDP and public debt growth rates, as well as on the values of discounted primary fiscal balances at the actual and structural level. The research period covers the years 2000–2014. Data were taken from Eurostat, the European Commission's Directorate General for Economic and Financial Affairs and the European Central Bank.

***Keywords:** public debt, primary net lending, sustainability*

[*] Ph.D., University of Łódź, Faculty of Economics and Sociology, Institute of Finance, Department of Public Finance

1. Introduction

Fiscal deficits and public debt are currently immanent characteristics of almost all free market economies. Financing current consumption and investment expenditures via borrowing seems to be attractive to governments, as it is perceived as an alternative to tax burden increases or expenditure cuts. However, public authorities cannot (or at least they shouldn't) incur ever-increasing debt. Despite this, many countries, including some Central and Eastern EU economies, have generated significant (and rapidly rising) volumes of public debt. In such a situation some basic questions arise, such as: Should we consider public finance sectors of indebted economies as sustainable or seeking sustainability? Can indebted public finances be sustainable at all? To answer these questions and compare the outcomes between different countries we should focus on the deficit and debt volume rather than on public revenues and expenditures. The latter are very important, but they are relevant, among other things, to the political system, level of development and fiscal needs of a particular country (and these can be hard to compare). The level of deficit and debt – as the outcomes of fiscal policies in the different economies – are easier to compare.

The main goal of the article is to investigate the degree of long-term sustainability of public finance in the Central and Eastern EU Member States. This aim is accompanied by the following hypothesis: an inability to generate primary surpluses and significantly growing public debt volumes prevent the attainment of sustainability in the area of public finance.

To ensure comparability between countries, the data on overall public finance (General Government) sectors, based on the European System of Accounts methodology, were used. The research period covers yearly observations between 2000 and 2014. Data were taken from Eurostat and the European Commission's Directorate General for Economic and Financial Affairs. They are expressed in nominal values and as a percentage of GDP (at actual and structural levels). The Central and Eastern EU Member States investigated in the article are: Bulgaria (BG), Czech Republic (CZ), Latvia (LV), Lithuania (LT), Hungary (HU), Poland (PL), Romania (RO), Slovenia (SI) and Slovakia (SK). Estonia and Croatia were excluded from the research because of the lack of the reliable and comparable data on their public sectors.

2. The problem of long-term public finance's sustainability

The idea of public finance sustainability is linked directly with the volume of public debt and dates back to the first classical economists, such as Adam Smith, David Hume or David Ricardo (see e.g.: Rowley et al. 2002). They compared the effects of tax and debt financing of public expenditures and then focused on the effects of public debt.

The most common justification for public borrowing derives from the Keynesian approach. According to his model the additional government spending which can be financed through debt becomes an instrument for increasing aggregate demand and national income (see e.g.: Gali 2013, pp. 973-1003).

The classical economist also provided justification (sometimes indirectly) for public debt as an instrument of fiscal policy. In the light of the *Ricardian equivalence theorem*, as reviewed and examined by Robert J. Barro (Barro 1974, pp. 1095–1117; Barro 1989, pp. 37–54), the consequences of public debt can be neutral to an economy. That means that debt and tax financing of government expenditures should be equivalent with respect to capital accumulation (Neck and Strum 2008, p. 2).

Another explanation offered to justify public debt financing of government spending is based on the idea of intergovernmental redistribution in the area of public finance. This idea encompasses the distribution of the tax burden, and transfers and liabilities between different generations (Lindbeck and Weibull 1986, pp. 239–267). The literature review shows that sometimes governments can be forced to postpone debt repayments over time and affect future generations (Miles and Cerny 2006, pp. 549–550; Laffargue 2009, pp. 79–104). This may, however, have negative consequences for the economies (Heller 2003, pp. 2–3), and in addition it does not seem to follow, to some extent, the idea of sustainable development, according to which the government should take into account the welfare of future generations (Uryszek 2014, pp. 448–457). On the other hand, if one assumes that debt is used to finance investment expenditures, then future generations will benefit from them, so they can participate in the financing process (see e.g.: Lindbeck and Weibull, 1986, pp. 239–267). Following this we can assume that the idea of sustainable public finance depends not only on the level of debt but also on the particular expenditures financed by borrowing.

The above-mentioned theories and ideas do not give a clear answer to the question concerning the optimal or maximum value of the deficit and debt. However, according to the literature sustainable public finance can be defined as a situation which excludes financing debt servicing costs exclusively by new borrowing (Fan and Arghyrou 2013, p. 961). The sustainability of public finance should then be based on generating primary budget surpluses (primary net

lending) and – in this way – controlling public debt volume (Gevorkyan 2010, p. 169). In other words governments should not incur ever-increasing debt. This means they cannot run so-called "Ponzi games" (see e.g.: Martins-da-Rocha and Vailakis 2012, pp. 455–488; Wigger 2009, pp. 492–499; Minea and Villieu 2010, pp. 709–711). Based on the literature one can risk saying that indebted public finance can be considered sustainable as long as the future primary balances will be able to cover the already existing debt volume.

3. Research methodology

The research problem undertaken focuses on two steps. The first is connected with the comparison of the growth rate of GDP and the increase in public debt. As long as the GDP rises faster than debt, the debt-to-GDP ratio will decrease. This is particularly important in the light of Maastricht Treaty criterion relevant to public borrowing, which can be pictured as follows:

$$\Delta GDP_t \geq \Delta PD_t \tag{1}$$

where:
- GDP_t - gross domestic product in the period t,
- PD_t - public debt in the period t.

The second step is relevant to a more in-depth analysis based on intertemporal budget constraints (cf. Hall 2014, pp. 4–22; Baglioni and Cherubini 1993, pp. 206–223) and the *no-Ponzi condition*. If we assume that governments cannot run Ponzi games, we deduce that the discounted volume of all the future primary net government lending values should be enough to cover the already existing debt. This idea has been already used to assess fiscal sustainability in practice (see e.g.: Qin et al. 2006, pp. 63–84). The primary balances, as well as the GDP and public debt values, have been already used for in-depth analyses of fiscal stability in Poland and other Central and Eastern EU Member States (see: Molendowski and Stanek 2012, pp. 267–284). The results showed, *inter alia*, that there is a positive correlation between a change in the values of primary balances in a given period and the volume of public debt in the previous period (Molendowski and Stanek 2012, p. 276).

In investigating the problem of public finance sustainability in practice it is necessary to check whether the intertemporal budget constraints work in the reality of the Central and Eastern EU economies. If so, the sum of discounted primary net lending values (*PNL*) should be a positive amount (or at least zero). This can be pictured as follows:

$$\sum_{t=0}^{n} \frac{PNL_t}{(1+r_t)^t} \geq 0 \qquad (2)$$

where:

- PNL_t - primary net lending in the period t,
- r_t - discount rate in the period t.

In theory this formula is relevant to all the future primary balances (which means that $n \rightarrow \infty$ and *PNL* are *ex ante* forecasts). In empirical analyses, however, it is calculated *ex post* using historical data. The cost of public debt service as percentage of gross public debt of the preceding year (according to the excessive deficit procedure, based on ESA 2010) was used as the discount rate (*r*). This properly describes the real cost of the debt service. We should keep in mind that the interest rate in the Central and Eastern European countries was relatively high at the beginning of 21st century, then declined for the next several years. Because of this, the costs of debt service were a significant burden for those economies, especially at the very beginning of the research period.

Calculations were made for two different periods. The first was equal to the average term to maturity (*ATM*) of government debt instruments. The *ATM* is defined as the number of years after which an existing debt must be repaid. (cf. Uryszek 2012, p. 146). Its values for the Central and Eastern EU economies are presented in the Table 1.

Table 1. Average terms to maturity in the Central and Eastern EU economies (in years)

Country	average term to maturity (in years)
Bulgaria	8.05
Czech Republic	n/a*)
Latvia	5.91
Lithuania	6.00
Hungary	4.26
Poland	4.75
Romania	4.59
Slovenia	6.84
Slovakia	n/a

*) n/a – data not available

Source: own elaboration based on European Central Bank database.

Using ATM as the number of years for the formula presented in equation 2, we could check whether the public finance sector remained sustainable over the average period of public debt refinancing (*n=ATM*). The mean value of ATM was used for Slovakia and the Czech Republic, as data for these countries were unavailable.

The second period covered the years 2000–2014 ($n=15$), which seems to be a long enough period to investigate long term sustainability.

The primary net lending was calculated as the difference between the value of public revenue and expenditure, reduced by the costs of debt service. It can be written as follows:

$$PNL_t = \mathrm{Re}\, v_t - (Ex_t - DSC_t) \qquad (3)$$

where:
- Rev_t - public revenue in the period t,
- Ex_t - public expenditure in the period t,
- DSC_t - public debt servicing cost in the period t.

Primary net lending (surplus) causes the volume of public revenue to exceed the sum of current and investment budget expenditures. The existing surplus is able to cover a part of (or even all of) the debt servicing costs. Primary net borrowing (deficit) proves a lack of fiscal balance, resulting from a shortage of the revenues needed for financing current and investment expenditures. A primary deficit results in a rise in the volume of public borrowing (Uryszek 2011, pp. 93–102).

We must take into account that cyclical changes can affect the outcomes of the above-mentioned formula, even to a great extent, especially in the long term. To exclude them from the calculation process, this formula was also estimated using the cyclically adjusted primary net lending values. They were calculated on the basis of the potential GDP, according to the directives of the European Commission's Directorate General for Economic and Financial Affairs. Despite some controversy, the cyclically adjusted fiscal variables (including deficits or surpluses) are often used to assess the economic situation of countries in Europe (Socol 2013, pp. 51–56) and all over the world (Pastor and Villagomez 2007, pp. 1599–1607), for international comparative research (Sterks 1984, 183–203), as well as to study the economic conditions on the regional (Yuhua 2006, pp. 284–305) and to some extent even local government levels (Williams and Onochie 2013, pp. 1–21; Slavin 2013).

4. The Maastricht Treaty criteria in the Central and Eastern EU economies

According to the Maastricht Treaty, primary net borrowing (the fiscal deficit) should not exceed 3% of GDP. The volume of public debt should not be higher than 60% of GDP. In Europe "…fiscal criteria of the Maastricht Treaty (…) are considered major devices to prevent excessive debt increases" (Neck and Sturm

2008, p. 8). The values of General Government net lending/net borrowing and debt in the Central and Eastern EU economies are shown below in Table 2.

Table 2. Net lending and gross public debt in the Central and Eastern EU economies (in % of GDP)

		2000	2004	2008	2012	2014
Bulgaria	Net lending	-0.5	1.8	1.6	-0.7	-2.8
	Debt	70.1	36.1	13.3	18.0	27.6
Czech Rep.	Net lending	-3.5	-2.7	-2.1	-3.9	-2.0
	Debt	17.0	28.5	28.7	44.6	42.6
Latvia	Net lending	-2.8	-1.0	-4.0	-0.8	-1.4
	Debt	12.2	14.2	18.6	40.9	40.0
Lithuania	Net lending	:	-1.4	-3.1	-3.1	-0.7
	Debt	:	18.7	14.6	39.8	40.9
Hungary	Net lending	-3.0	-6.4	-3.7	-2.3	-2.6
	Debt	55.2	58.8	71.9	78.5	76.9
Poland	Net lending	-3.0	-5.2	-3.6	-3.7	-3.2
	Debt	36.5	45.3	46.6	54.4	50.1
Romania	Net lending	-4.7	-1.2	-5.6	-2.9	-1.5
	Debt	22.4	18.6	13.2	37.3	39.8
Slovenia	Net lending	-3.6	-2.0	-1.4	-4.0	-4.9
	Debt	25.9	26.8	21.6	53.7	80.9
Slovakia	Net lending	-12.1	-2.3	-2.4	-4.2	-2.9
	Debt	49.6	40.6	28.2	52.1	53.6

Source: own elaboration based on Eurostat data.

Data analysis proves that the Central and Eastern EU Member States have had problem with balancing their public finance sectors. The recorded deficits affected in a strong increase of the volume of public debt in most investigated economies. Bulgaria was the only country which significantly decreased the total amount of public debt in the years 2000–2014. There were some problems with fulfilling the criterion relevant to the deficit, but the debt criterion was generally met in most countries (except Hungary and Slovenia). In the case of these countries (which are "new" EU members with an approximately 25 year history of a free market economy) the rapid increase of the debt can be recognized as more dangerous than the volume of the debt itself. In this situation a question arises: can we consider the public finance sectors of these countries sustainable or – at least – seeking sustainability in the long run? The first step to check it is to check and compare the GDP and public debt growth rates.

5. GDP and public debt increases

The outcome of the debt-to-GDP ratio is determined by the volume of both the public debt and the gross domestic product. It will diminish if the debt growth rate will be lower than the GDP growth rate. The growth rates for nominal GDP and the nominal volume of General Government debt in the Central and Eastern EU Member States are shown below in Table 3.

Table 3. GDP growth rate vs. public debt increases in the Central and Eastern EU economies (in %)

		2000−2004	2004−2008	2008−2012	2012−2014
Bulgaria	GDP increase	44.0	74.6	0.0	2.6
	Debt increase	-25.9	-35.6	51.8	57.7
Czech Rep.	GDP increase	28.9	31.3	0.8	5.4
	Debt increase	115.4	32.3	56.7	0.7
Latvia	GDP increase	63.9	119.7	-9.7	9.1
	Debt increase	90.5	187.0	98.8	6.9
Lithuania	GDP increase	n/a	79.3	1.9	9.0
	Debt increase	8.4	39.9	178.6	11.8
Hungary	GDP increase	57.3	28.9	5.9	11.7
	Debt increase	67.5	57.5	15.7	9.4
Poland	GDP increase	24.1	37.7	26.5	7.0
	Debt increase	54.1	41.8	47.5	-1.4
Romania	GDP increase	206.1	110.8	13.8	11.7
	Debt increase	154.9	48.9	222.8	19.1
Slovenia	GDP increase	46.4	37.1	-5.1	3.4
	Debt increase	52.0	10.6	135.4	55.8
Slovakia	GDP increase	46.1	47.6	5.9	4.2
	Debt increase	19.4	2.6	95.7	7.1

*) n/a – data not available

Source: own elaboration based on Eurostat data.

The data in Table 3 shows that the rapid increase of GDP values in the years 2000-2008 resulted in relatively low (or even decreasing) values of debt-to-GDP ratios. This changed during the recent financial crisis: very low GDP growth rates were accompanied by significantly rising public debt. It is worth mentioning that, with the exception of Bulgaria (and, to a very limited extent, Poland), all the analysed countries were characterized by continuously rising public debt ratios. Such a situation is interesting in the context of the "no Ponzi games" condition and the aim of long term public finance sustainability.

6. Long term sustainability and intertemporal budget constraints

As the intertemporal budget constraint in this research was based on the primary fiscal (im)balances, we should first check the values of primary net lending for the investigated economies. They are shown in Table 4.

Table 4. Primary net lending values for the Central and Eastern EU economies (in % of GDP)

	BG	CZ	LV	LT	HU	PL	RO	SI	SK
2000	3.5	-2.7	-1.8	n/a	2.2	0.0	-0.7	-1.3	-8.1
2001	5.2	-4.4	-1.1	n/a	0.6	-1.7	-0.1	-1.6	-2.5
2002	1.1	-5.2	-1.5	n/a	-4.9	-2.0	0.5	-0.3	-4.6
2003	1.8	-5.4	-0.8	n/a	-3.1	-3.1	0.1	-0.7	-0.3
2004	3.7	-1.6	-0.3	-0.5	-2.0	-2.4	0.2	-0.6	-0.2
2005	2.6	-2.0	0.1	0.4	-3.8	-1.5	0.1	0.1	-1.2
2006	3.2	-1.2	-0.1	0.4	-5.5	-1.2	-1.4	0.0	-2.1
2007	2.3	0.4	-0.3	-0.2	-1.0	0.3	-2.2	1.2	-0.6
2008	2.5	-1.1	-3.5	-2.4	0.4	-1.5	-4.9	-0.7	-1.1
2009	-3.4	-4.3	-7.5	-7.9	-0.1	-4.8	-7.4	-4.8	-6.5
2010	-2.5	-3.1	-6.3	-5.1	-0.4	-5.1	-5.1	-4.0	-6.2
2011	-1.3	-1.4	-1.6	-7.1	-1.3	-2.4	-3.7	-4.8	-2.6
2012	0.2	-2.5	0.8	-1.2	2.3	-1.1	-1.2	-2.0	-2.4
2013	-0.1	0.2	0.7	-0.9	2.1	-1.5	-0.4	-12.3	-0.7
2014	-2.1	-0.7	-0.1	0.9	1.5	-1.2	0.1	-1.6	-0.9

*) n/a – data not available

Source: own elaboration based on data from the European Commission's Directorate General for
     Economic and Financial Affairs.

The data analyses prove that, with the exception of Bulgaria, the investigated economies recorded significant negative net lending values, i.e. net borrowing values. In such a situation it is hard to talk about sustainability not only in the long run, but also in the short term. To complete the research and to investigate the level of long term unsustainability of the Central and Eastern EU Member States, the formula shown in equation 2 was calculated for them. The results are shown in Table 5.

Table 5. The results for long term sustainability testing in the Central and Eastern EU economies (in % of GDP)

	outcomes for:	
	n=ATM	*n*=15*)
Bulgaria	-3.2	15.9
Czech Rep.	-11.2	-28.8
Latvia	-13.7	-15.7
Lithuania	-20.0	-13.1
Hungary	4.1	-10.1
Poland	-10.7	-19.7
Romania	-16.8	-13.7
Slovenia	-25.7	-20.5
Slovakia	-18.4	-31.2

*) n=11 for Lithuania (because of the lack of comparable data for 2000-2003)

Source: own calculations based on data from Eurostat and the European Commission's Directorate General for Economic and Financial Affairs.

The results show that eight out of nine countries failed the test, with Bulgaria being the only country that recorded a surplus in the 15 year period (2000–2014). Hungary got a positive result for the period equal to the average time to maturity of public debt instruments. The other countries were strongly in the red. They recorded negative results for the sums of the discounted primary net lending values for both periods. This means that their public finances are unsustainable in the long run. Moreover, it is hard to find evidence that they are on the path to recovery.

It is necessary to engage in more detailed research to check whether the lack of sustainability derives from cyclical changes in the global economy or is connected with structural problems of these countries.

7. Long term sustainability and intertemporal budget constraints – cyclically adjusted data

As the research period (years 2000–2014) was strongly affected by cyclical changes (which was especially evident during the financial crisis), the cyclically adjusted data on primary net lending values were used for further research, in order to exclude the impact of these changes. The cyclical component is a temporary phenomenon, while the structural deficit (or surplus) seems to be long-term and – to some extent – permanent in its nature (cf. Józefiak, Krajewski and Mackiewicz 2006, p. 95).

The adjustment was based on potential GDP. This method uses the Cobb-Douglas production function. Global product in this model is dependent on the level of employment, the volume of accumulated capital, and the surplus of unused factors of production and productivity (Denis, Mc Morrow and Roger 2002, p. 7). The level of unemployment is estimated using the NAIRU index (*non-accelerating inflation rate of unemployment*) (cf. Kwiatkowski 2002). This method is used by Eurostat and the European Commission's Directorate General for Economic and Financial Affairs (*Cyclical ...* 2013).

The values of cyclically adjusted net lending for Central and Eastern EU economies are listed below in Table 6.

Table 6. Primary net lending values for the Central and Eastern EU economies (cyclically adjusted values, in % of potential GDP)

	BG	CZ	LV	LT	HU	PL	RO	SI	SK
2000	3.7	-2.6	-1.4	n/a	2.3	-0.2	0.9	-1.5	-7.0
2001	5.2	-4.7	-0.5	n/a	0.5	-0.4	1.0	-1.6	-1.1
2002	0.7	-5.0	-1.3	n/a	-5.4	0.3	0.7	-0.6	-3.5
2003	1.7	-5.4	-1.4	n/a	-3.7	-0.8	-0.3	-0.9	0.3
2004	3.4	-2.0	-1.4	-1.3	-3.2	-1.0	-1.4	-1.2	0.0
2005	2.5	-3.1	-1.9	-1.2	-5.4	-0.2	-1.3	-0.9	-1.5
2006	2.7	-3.3	-3.6	-1.7	-7.8	-1.3	-3.6	-1.9	-3.4
2007	1.2	-2.1	-4.5	-3.9	-2.5	-1.4	-4.5	-2.3	-3.6
2008	1.1	-3.1	-4.7	-5.1	-0.8	-3.1	-7.9	-4.0	-4.1
2009	-2.7	-3.5	-3.3	-3.7	2.2	-5.8	-7.3	-3.5	-5.9
2010	-1.9	-2.6	-1.9	-1.5	1.5	-5.8	-4.3	-3.0	-6.0
2011	-1.2	-1.2	0.8	-5.6	-0.2	-3.3	-2.8	-4.0	-2.1
2012	0.2	-1.7	1.7	-0.7	4.1	-1.2	0.1	-0.1	-1.5
2013	-0.1	1.4	0.4	-1.0	3.5	-1.1	0.3	-10.1	0.5
2014	-2.1	0.2	-0.6	0.7	1.9	-1.0	0.6	-0.3	0.2

*) n/a – data not available

Source: own elaboration based on the data from the European Commission's Directorate General for Economic and Financial Affairs.

The cyclically adjusted primary net lending reflect actual borrowing in the investigated countries in most years, again with the exception of Bulgaria. This means that eight out of the nine countries generated primary deficits even after excluding the cyclical component from the calculation formula. It also shows that the recent financial crisis was not the only reason for public finance instability, and that structural reforms seem to be necessary to improve the situation.

The outcomes do not yield premises for long term sustainability. However, the formula defined in equation 2 was tested for the cyclically adjusted values. The results are shown below in Table 7.

Table 7. The results for long term sustainability tests in the Central and Eastern EU economies (cyclically adjusted values, in % of potential GDP)

	outcomes for:	
	n=ATM	n=15*)
Bulgaria	-4.2	14.4
Czech Rep.	-7.3	-32.0
Latvia	-3.1	-17.3
Lithuania	-11.0	-16.1
Hungary	8.4	-11.4
Poland	-11.9	-16.1
Romania	-13.0	-15.8
Slovenia	-21.9	-23.4
Slovakia	-14.3	-29.8

*) n=11 for Lithuania (because of the lack of comparable data for 2000-2003)

Source: own calculations based on data from Eurostat and the European Commission's Directorate General for Economic and Financial Affairs.

The results are similar to those presented in Section 6. Hungary again passed the test for the period equal to ATM. The Bulgarian public finance sector (despite problems for the years 2007–2014) remained sustainable for the entire analyzed period (years 2000–2014). The other countries did not meet the intertemporal budget constraints for both periods.

8. Conclusions

It is evident that the Central and Eastern EU economies have significant problems with the long term sustainability of their public finance sectors. They mostly fulfil the Maastricht criterion with respect to the maximum volume of public debt, but this is not enough. The relatively low debt-to-GDP ratios in most investigated economies were shaped by significant increases of GDP values. The nominal volumes of gross public debt in the analyzed period were continuously rising, with the exception of Bulgaria and – to a very limited extent – Poland. Therefore the problem is not the volume of the debt itself.

The outcomes of the research prove that the hypothesis put forward in the introduction is true. The real obstacle in the path to achieving sustainability in the area of public finance is the issue of primary deficits. The results show that eight out of the nine investigated countries were unable to generate primary surpluses. The sum of discounted primary net lending values was strongly negative in these eight economies.

Similar results were obtained with cyclically adjusted variables. This proves that the recent financial crisis is not the only reason for the unsustainability of public finances in the Central and Eastern EU economies. There is a problem at the structural level, which means that some significant reforms and tightening of fiscal policies are necessary to recover from permanently imbalanced budgets.

The Central and Eastern EU economies need to generate primary surpluses (instead of primary deficits) in order to have the potential to achieve sustainability in their public finances in the long run.

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Streszczenie

DŁUGOTERMINOWE ZRÓWNOWAŻENIE FINANSÓW PUBLICZNYCH W KRAJACH EUROPY ŚRODKOWEJ I WSCHODNIEJ NALEŻĄCYCH DO UE

Głównym celem artykułu jest zbadanie poziomu długoterminowego zrównoważenia finansów publicznych w krajach Europy Środkowej i Wschodniej należących do Unii Europejskiej. Tak postawionemu celowi towarzyszy następująca hipoteza badawcza: brak zdolności do generowania pierwotnych nadwyżek budżetowych i szybko rosnące wartości zadłużenia publicznego uniemożliwiają osiągnięcie zrównoważonego systemu finansów publicznych. Metoda badawcza oparta jest na wskaźnikach wzrostu PKB i długu publicznego oraz na zdyskontowanych wartościach pierwotnych sald sektora finansów publicznych na poziomie wartości zrealizowanych oraz strukturalnych. Okres badań stanowią lata 2000-2014. Dane pozyskano z Eurostatu, Dyrektoriatu Generalnego Komisji Europejskiej ds. Ekonomicznych i Finansowych oraz z Europejskiego Banku Centralnego.

Słowa kluczowe: dług publiczny, saldo pierwotne, zrównoważenie