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SUSTAINING GOVERNMENT BUDGET DEFICITS AS A CAUSE FOR THE COST OF PUBLIC DEBT SERVICE INCREASE IN WESTERN EUROPEAN COUNTRIES IN THE 1995–2015 PERIOD¹

ABSTRACT

More and more results of econometric modeling research are showing the relationship between the value of general government deficit and the costs of public debt service. The correlation analysis conducted for the purposes of this work confirms strong negative dependence between the average general government balance (in relation to GDP) and the average yield of 10-year treasury bonds in 15 Western countries within the EU in the 1995–2015 period (sustaining higher deficits of general government are accompanied with higher costs of public debt service over a long period of time). Pearson's correlation coefficient for the entire research period amounted to $-0,78$. This dependence increased after the breakout of the financial crisis – within the 2008–2015 period, Pearson's $r = -0,71$, whereas during the 1995–2007 period, it was $-0,63$, which is consistent with the research results pointing out that the condition of public finances affects the decisions of investors in crises greater than in the relatively calm periods.

Keywords: public finance, general government deficit, public debt, cost of public debt service, government bond yields

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¹ belonging to the European Union, meaning the countries of the “EU-15” before the EU's enlargement to the East.

1. INTRODUCTION

As a result of an expansive fiscal policy of many countries around the globe, increasing public debt contributes to the fact that the financial situation of a given country will play a much bigger role in shaping of the level of capital cost in a given economy and in its availability, thus it will determine future development perspectives of a given country. More extensive research confirms the influence of the deficit and public debt levels on the capital cost. Even though in the case of developing countries the speed of the economic growth seems to be a stronger determinant, it is true until the financial situation of a given country is under control. It is also indicated that the state of public finances affects the investors' decisions greater in the times of crises than in the relatively calm periods; also, less discipline when it comes to the finances of a given country generates effects over a longer period of time, which poses a threat of unexpected and significant corrections to the cost of financing debts and capital availability, especially when it comes to tensions that are present in different economies. Thus, it increases the risk of functioning of weaker, less stable economies in terms of economy and policy, with more expansive fiscal policy and higher public debt by increasing the capital cost, limiting its availability; it also exposes them to more frequent limitations in availability of sources for financing both debts and development, with lowering the speed of economic growth.

The main aim of the following paper is to synthesize the results of the econometric modeling research, by analyzing the influence of the situation in a state's finances over the costs of the public debt service, and later on to verify the hypothesis on the dependency between the average balance in public finances and average cost of financing of public debt in 15 Western European countries which belong to the European Union (that is, among the countries of the "EU-15", before the EU enlarged to the East) in the 1995–2015 period; this paper is to determine (due to high emission of treasury bonds in most of those countries), the level of the market interest rate with the use of the Pearson's and Spearman's correlation coefficients and regression analysis.

2. THE REVIEW OF THE RESEARCH RESULTS ON THE RELATIONSHIP BETWEEN THE STATE OF PUBLIC FINANCES AND THE COST OF CAPITAL

More and more research are pointing out to the relationship between the situation of public finances and the cost of public debt service. Canzoneri, Cumba, Diba 2002 point out to the strong relationship between the amount of the budget deficit and the amount of the market interest rates in the USA. Laubach 2009 indicated that deficit has influence on the interest rates of treasury bonds in the USA. Faini 2006 demonstrated the relationship between the level of deficit and public debt and the level of interest rates and bonus spreads for the risk for the Eurozone, whereas Wolff, Bernoth et al. 2004 and Bernoth, Wolff 2006 demonstrated that for the countries of the "EU-15". Baldacci, Gupta, Mati 2008 indicated for 30 growing economies (1997–2007) that all actions towards the consolidation of public finances lower credit spreads towards Western government bonds. Corresponding studies for developing economies provide significant conclusions, enabling for better understanding of financial markets and foreseeing the effects of actions within economic policy or events at international

markets for the costs of public debt service of different countries; thus, of future situation in public finances and development perspectives. Most importantly, as it was pointed out by Izák 2004 who used an example of Hungary, the Czech Republic, Slovakia and Poland in the 90's of the 20th century – in the case of developing countries, the level of economic growth is a much stronger determining factor than the financial situation of the country. This conclusion corresponds to the results obtained by Heinz, Sun 2014 who indicated that the situation of public finances (and other macroeconomic factors) play a significantly stronger role in the case of countries with weaker perspective of economic growth. Thus, as long as there is economic growth, markets are willing to accept certain economical imbalances, especially in the case of developing countries. This is all confirmed by results of Baldacci, Gupta, Mati 2008, who indicated that the increase of public investment expenses towards relatively stable finances of a given country may result in lowering of credit spreads in relation to Western government bonds.

Nonetheless, the financial situation of a state plays a significant role in shaping the costs of public debt service in all countries. The research results show that there are several factors strengthening the importance of financial situation: high public debt level (Caselli, Giovannini, Lane 1998, Heinz, Sun 2014), weaker developed financial system (Ardagna, Caselli, Lane 2004), higher political risk and uncertainty towards future economic policy (Moser 2007, Baldacci, Gupta, Mati 2008), less transparent public finances increasing uncertainty towards fiscal policy (Bernoth, Wolff 2006), recent crises (Baldacci, Gupta, Mati 2008) or stronger external imbalances (Dumičić, Ridzak 2011, Alexopoulou, Bunda, Fernando 2009, Moser 2007). It must be added that, as Beirne, Fratzscher 2012 indicated, economical factors affect investment decisions in crises greater than in the relatively calm periods. This is confirmed by results of Heinz, Sun 2014 who pointed out that, although in the East-Central Europe in the 2007–2012 period the CDS spreads were determined mainly by global investment tendencies, the macroeconomic factors and CDS market fluidity which were characteristic for a given country played an important role as well. What is more, among all macroeconomic factors, alongside the forecasted speed of economic growth, the perspective of next-year's situation in the country's budget was the main determinant. These conclusions correspond to the view of International Monetary Fund 2013 according to which CDS spreads reflect economic fundamentals.

3. OTHER THREATS CONNECTED TO FISCAL EXPANSION

It must be noted that the deterioration of the situation on public finances of a given country influences not only the costs of public debt service, but also the global market situation and the costs of public debt service in other economies (Ardagna, Caselli, Lane 2004), which signifies the integration of markets when it comes to public debt. Zugravu, Dobranschi 2012 (using Romania as an example) showed that, along with increase of public debt, public expenses are moved towards unproductive categories; it leads to limitations in public financing of education, health or public investments which may have positive influence over future economic growth. Significant implications are also present in the research performed by Ardagna, Caselli, Lane 2004, who indicated that decrease of discipline in a country's finances generates effects over a longer period of time, which raises concerns over future effects of significant increase in public debt of many economies as a result of the crisis of 2008.

Finally, one other threat must be indicated – the possibility of underestimated risk in the case of some economies, as a result of searching for higher profitability which is a phenomenon present after the period of aversion towards risk. In accordance with the results of Heinz, Sun 2014, the strongest undervaluation of CDS spreads takes place in the case of countries with weak foundations. However, it must be noted that even though such underestimated risk may occur, in the end the correction of spreads will cause the increase in capital cost. Thus, countries in this situation, instead of being content with a low risk estimate, should implement policy adjustment to convince the market of the prospective improvement and to prevent painful spread increase. No matter if the correction takes place or not, the periods of underestimated risk lead to the increase of imbalances and improper capital allocation. This is all confirmed by the research of Dumičić, Ridzak 2011 who, with Bulgaria, Croatia, Hungary, Lithuania and Romania set as an example, indicated that underestimated spreads enabled the use of cheaper capital until the crisis of 2008, but it also led to presence of both phenomena in some countries. Growing debt, public and private sector included, in addition in foreign currencies due to lower cost, not only limits future possibilities of economical development, but it also increases future risk bonuses, lowers the economy's shock resistance and provokes speculators to play with bonds or CDS and furthermore to cash profits at the moment of correction; it also increases fluctuations of instrument price, correction results and investment risks, it also discourages long-term investors and attracts short-term investors with its full spectrum of consequences for financing of future development and growing debt.

4. AN ANALYSIS OF DEPENDENCY BETWEEN THE VALUE OF GENERAL GOVERNMENT DEFICIT AND THE COST LEVEL OF PUBLIC DEBT SERVICE IN THE WESTERN EUROPEAN COUNTRIES BELONGING TO THE EUROPEAN UNION WITHIN THE 1995–2015 PERIOD

An increasing number of results of econometric research confirm the dependency between the country budget's balance and the level of risk bonus which is reflected not only in the interest level of treasury bonds which means in the costs of public debt service, but also in the general level of market capital cost which influences the investment tendencies and development possibilities. All factors above led to the verification of the hypothesis on the relation between the average balance of general government (the balance of government and local government institutions according to ESA 2010 in relation to GDP) and average yield of 10-year government bonds in the Western European countries which belonged to the European Union in the 1995–2015 period with the use of the Pearson's and Spearman's correlation coefficients and regression analysis.

The analysis of the general government balance and government bond yields among the countries of the "EU-15" within the last 21 years enables to see that the crisis of 2008 did not affect analyzed economies evenly in the context of public finances. Significant balance decrease in the 2008–2015 period took place in Ireland, Spain or United Kingdom, whereas in Sweden, Austria and Italy it was sustained on the average level from the 1995–2007 period; Germany noted a balance increase (tab. 1). Secondly, the radical reduction of interest rates in central banks after the crisis led to significant decrease in market interest rates and in profitability of treasury bonds in the majority of countries (except for Portugal and Greece).

Tab. 1. General government deficit/surplus (% GDP) and EMU convergence criterion bond yields (%) in EU-15 (in the years 1995–2015).

	general government deficit/surplus (% GDP)					EMU convergence criterion bond yields (%)		
	number of years with government surplus	number of years with government deficit <1% GDP	on average in the years			on average in the years		
			1995–2007	2008–2015	1995–2015	1995–2007	2008–2015	1995–2015
Luxembourg	18	2	2,6	0,9	1,9	4,61	2,54	3,82
Finland	11	1	1,9	-1,6	0,6	5,12	2,50	4,12
Denmark	10	2	1,0	-1,2	0,2	5,19	2,34	4,10
Sweden	10	4	-0,1	-0,4	-0,2	5,46	2,35	4,27
Netherlands	5	3	-1,3	-3,1	-2,0	4,83	2,49	3,94
Belgium	4	4	-1,2	-3,4	-2,1	4,99	3,00	4,23
Germany	5	3	-3,0	-1,0	-2,2	4,77	2,16	3,78
Austria	0	2	-2,8	-2,7	-2,7	4,91	2,68	4,06
Ireland	10	2	1,2	-10,6	-3,3	5,11	4,83	5,00
Italy	0	0	-3,5	-3,4	-3,5	5,73	4,11	5,11
France	0	0	-2,9	-4,8	-3,6	4,89	2,70	4,06
Spain	4	4	-1,3	-7,9	-3,8	5,48	4,11	4,96
United Kingdom	3	1	-2,0	-7,0	-3,9	5,59	2,72	4,50
Portugal	0	0	-4,3	-6,8	-5,3	5,53	5,92	5,68
Greece	0	0	-6,7	-10,0	-8,0	7,18	10,50	8,44

Source: own calculations on the basis of Eurostat 2016a and Eurostat 2016b.

It is worth noting that the surplus in country's finances is not a new phenomenon to the majority of Western European countries. Within the last 21 years, Luxembourg closed its public finances with a surplus 18 times, Finland 11 times, Denmark, Sweden and Ireland 10 times, and Netherlands, Germany, Spain, Belgium and United Kingdom 3–5 times. If years with very low deficit (up to 1% GDP) are added to the equation, the results are even more favorable (tab. 1). This is, without a doubt, a result of the consolidation of public finances, to which quite a lot of the countries (Ireland, Belgium, Denmark, Spain, Netherlands, Finland, Sweden) were made by convergence criteria from Maastricht and the Stability and Growth Pact, thanks to which a large group of countries managed to reduce public debt before the crisis of 2008 (Redo et al. 2015a). This reduced further the risk premium and the market level of the cost of capital.

The analysis of dependency between the average level of general government balance and the average yield of 10-year government bonds within the 1995–2015 period in the EU countries of the “EU-15” with the use of Pearson's correlation coefficient proves strong negative dependency between these values; it means that sustaining higher deficits of general government are accompanied by higher costs of public debt service over the long period of

time. Pearson's correlation coefficient for the dependency between the average general government balance (in relation to GDP) and average yield of 10-year government bonds over the entire research period amounted to -0.78 (tab. 2).

Tab. 2. Pearson's correlation coefficient for EU-15 countries.

	1995–2015		1995–2007		2008–2015		critical value $t_{\alpha=0,05, n-2}$
	Pearson's r	Student's t-distribution	Pearson's r	Student's t-distribution	Pearson's r	Student's t-distribution	
EU-15	$-0,7822$	$-4,5266$	$-0,6264$	$-2,8971$	$-0,7125$	$-3,6614$	2,1604

Source: own calculations.

It is worth noting that Pearson's correlation coefficient was lower before the crisis (1995–2007) than after the crisis (2008–2015), which can be explained through higher risk tendency and underestimated market interest rates in some economies after the dot-com bubble burst and the real estate market bubble burst. All three results are statistically significant.

These conclusions are confirmed by the analysis of dependency with the use of Spearman's correlation coefficient (tab. 3) which indicates also the negative relation between analyzed values in the Western European countries ($-0,67$). High Spearman's correlation coefficient for the period since 2008 ($-0,85$) is worth pointing out, as it is confirmed by Beirne, Fratzscher 2012 and Heinz, Sun 2014, that economical factors influence the decisions of investors in crises much greater than in the relatively calm periods (both results are statistically significant).

Tab. 3. Spearman's rho for EU-15 countries.

	1995–2015		1995–2007		2008–2015		critical value $t_{\alpha=0,05, n-2}$
	Spearman rho	Student's t-distribution	Spearman rho	Student's t-distribution	Spearman rho	Student's t-distribution	
EU-15	$-0,6652$	$-3,2120$	$-0,4250$	$-1,6929$	$-0,8536$	$-5,9074$	2,1604

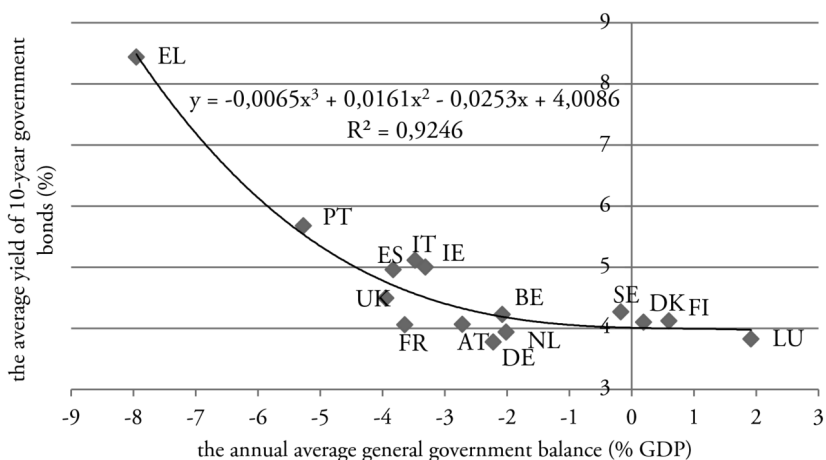
Source: own calculations.

For the 1995–2007 period, Spearman's correlation coefficient is also weaker (and statistically insignificant) which confirms the presence of risk underestimation during bull market periods on international financial markets, especially in the case of weaker countries belonging to the Eurozone which use the creditworthiness of economies which serve as foundation to the EU, mainly Germany.

The above mentioned results confirm the view that lower financial discipline is reflected in higher deficits, results in the increase of risk bonuses demanded by investors and with the increase of the market capital cost which serves as a financing instrument not only for public debt, but also for private entities and, most importantly, economic development (Redo 2016).

A scattergram of data for analyzed countries confirms strength of the above mentioned dependencies (fig. 1). Concentration of points around the negatively angled trend line reflects strong negative correlation between the average general government balance in relation to GDP and the average yield of 10-year government bonds in 15 countries of Western Europe within the 1995–2015 period.

Fig. 1. The average general government balance in relation to GDP and the average yield of 10-year government bonds in 15 countries of Western Europe within the 1995–2015 period.



Source: self-reported data on the basis of own calculations.

High level of regression adjustment must be noted – the R^2 coefficient of determination amounts to 0,92.

As the indicated above regression function is a concave polynomial function (third degree) with negative angle in analyzed database, it might be concluded that the higher the end level of budget deficit with relation to GDP, the higher the decrease in capital cost which finances public debt (profitability of treasury bonds) as a result of the financial improvement over a long period of time (deficit reduction). It corresponds to the results and conclusions made by Redo 2017, indicating that consolidation of public finances (mainly significant and permanent public expense cuts in relation to GDP) should enhance economic growth – especially in countries with relatively high end level of profit and public expenses as well as public debt in relation to GDP.

5. CONCLUSIONS

The results of a number of research confirm the dependency between the financial situation and the level of market capital cost which determine not only the present value of debt service (both public and private), but also creditworthiness of economic entities (also in the future due to faster increase of debt resulting from higher service costs) and the amount of risk bonuses in the future and future possibilities of economic development as well as the quality of life of next generations. The above analysis of correlation confirms strong negative dependence between average general government balance (in relation to GDP) and average yield of 10-year government bonds in 15 Western EU countries over the 1995–2015 period (Pearson's $r = -0,78$). Sustaining higher general government deficits among the “EU-15” were accompanied by higher costs of public debt service over the last 21 years.

Deficits in public finances in Poland which are permanent and are one of the highest within the EU – also in the good periods before 2008 (which led to the accumulation of significant public debt when in contrast to other countries in the region of Central and Eastern Europe – Redo 2015b), result in higher pricing of investment risk which is reflected in lower rating, higher CDS spreads, higher profitability of treasury bonds and higher level of capital cost – not only the cost of public debt service but also the cost of investment and consumption credits (Redo 2016). It must be noted that sustaining expansive character of fiscal policy in Poland, strengthened by recent decisions of lowering the retirement rate, introduction of the 500+ program or free drugs for seniors impact the investments in negative way, also by influencing expectations of businessmen and investors in terms of their future profits and taxes. This is, unfortunately, confirmed by the sustaining investment decrease of almost 10 percent in Poland since the increase in fiscal expansion after parliamentary elections in October 2015 (GUS 2016). It corresponds to the results of research confirming the presence of the non-Keynesian economy reaction towards the changes on the level of public expenses and very strong negative dependence indicated by Redo 2017 between the average level of public expenses (and profit) in relation to GDP and the average speed of economic growth in the 2001–2015 period in 11 countries of the region.

The above proves that investors base their investment decisions and the amount of risk bonus highly on the level of general government deficits. A permanent and significant reduction of public finance deficit in Poland through the decrease in public expenses (especially transfers and salaries) in order to achieve the decrease in market capital cost would be recommended, and also to strengthen the non-Keynesian economical reaction towards fiscal consolidation. It is necessary in the situation of financial market globalization which forces issuers to compete harder over the investment inflow who possess a wide range of (not only) treasury bonds; as this range has been significantly decreased after the crisis of 2008, slightly higher interest rates for bonds do not guarantee the bonds will be sold. What is more, the growing competition on international financial markets increases the risk of the breakdown of financing availability in terms of crises phenomena not necessarily in given economy, financial market turmoil or simply changes in the level of investors' risk tendencies, their interest in given region or changes in the risk pricing criteria. This applies to developing countries, especially those with lower credibility level and relatively high credit needs (like Poland), where these needs condition continuous debt financing, development and quality of life of present and future generations.

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