

4.

PUBLIC DEBT-TO-GDP RATIO IN NEW EU MEMBER STATES: CUT THE NUMERATOR OR INCREASE THE DENOMINATOR?

Tomislav GLOBAN¹
Marina MATOŠEĆ²

Abstract

This paper analyses public debt determinants in EU new member states. The aim is to examine the fiscal position of these countries, as well as to offer proposals for a more successful containment of the rising debt levels. The paper attempts to answer the key question: does fiscal consolidation (the numerator) or economic growth (the denominator) have a stronger impact in determining the debt-to-GDP ratio? Results of the panel data analysis showed that by achieving a more balanced government budget, public debt growth decreases, but the effect is rather small. Conversely, estimated GDP growth parameters are much greater. Results imply that the sovereign debt crisis should be resolved by stimulating economic growth, while bearing in mind the high price of potentially irresponsible public finance management.

Keywords: debt crisis, economic growth, fiscal consolidation, new EU member states, sovereign debt

JEL Classification: H60, H62, H63

I. Introduction

Financial crisis, which had spread worldwide after Lehman Brothers bankruptcy in 2008, caused large-scale recessions across the world. Although the crisis in Europe started as a financial one, its character has changed over the years. In the succeeding periods it developed into a dominantly economic crisis, since economic activity slowed down in almost all member states, and then grew into a sovereign debt crisis, as budget deficits and public debts began to reach extreme values. Consequently, in the last few years

¹ Corresponding author. Faculty of Economics and Business, University of Zagreb, Trg J. F. Kennedyja 6, 10000 Zagreb, Croatia. E-mail: tgloban@efzg.hr.

² Faculty of Economics and Business, University of Zagreb, Trg J. F. Kennedyja 6, 10000 Zagreb, Croatia. E-mail: marina.matosec@hotmail.com.

Europe has undoubtedly been shaken up by a crisis of a socio-political nature, but also by an existential one in the context of sustainability of European integration itself. The relevance of the crisis for the EU is exceptional – it is not just one in a series, but the crisis that could forever change the economic (and political) position of this globally important integration. Therefore, its effects and the success of macroeconomic policy in mitigating them should be a subject of a thorough analysis.

The shock in the financial and economic systems that followed the outbreak of the crisis made fast and decisive action to resolve the piled economic problems an imperative. The fear of the crisis having the proportions of the Great Depression soon appeared and policy makers did not want to repeat mistakes made in 1930s. However, with time it became apparent that prolonged recession would not be avoided, regardless of the countercyclical macroeconomic policy induced by the crisis. Taking into account the fact that the Eurozone is a common currency area, a common monetary policy as a countercyclical tool has had limited effects due to asymmetric shocks. For that reason the main emphasis was on implementing harsh fiscal policy measures.

Although the most indebted peripheral Eurozone countries are understandably in the spotlight of academic research, the story of the EU new member states (NMS) during the recent crisis unjustifiably stays untold in the economic literature. Those countries were the generators of economic growth in Europe before the crisis, overthrowing even the core economic forces of the Union. At the same time, they had accumulated relatively low levels of debt. After the onset of the crisis, most NMS experienced a strong economic "knock-out", mainly as a consequence of openness of their economies and financial dependence on the rest of the European Union. After a sharp decline of GDP, an unemployment surge and public debt escalation, they put tremendous effort into severe fiscal consolidation measures, especially comparing to the EU average. Everything stated above ensures enough motivation to analyse an interesting, yet insufficiently explored case of fiscal consolidation in NMS.

The main purpose of this paper is to provide a deeper analysis of public debt determinants in NMS and examine the fiscal consolidation effects on public debt-to-GDP ratio. The goal is to determine the most relevant determinants of consolidated government gross debt reduction, and to examine the importance of a primary budget deficit reduction, as well as GDP growth, in curbing debt-to-GDP ratio. The method used is panel data analysis. Thereby it will be possible to answer the key question: is it more important to acquire a balanced government budget or to initiate economic growth in order to achieve lower values of the debt-to-GDP ratio? In other words, the results of the analysis will indicate whether the numerator or the denominator has had a more decisive role in determining the behaviour of public debt in NMS. By obtaining these results, new horizons will potentially be opened for policy makers, as well as alternative and overlooked possibilities in anti-recession action.

The above stated represents the main contribution of this paper. Considering the scarce recent literature on fiscal consolidation effects in NMS, no papers, to our knowledge, have posited the main question in the same or similar way, or carried out a similar panel data analysis for the chosen group of countries. Although some authors did discuss the issue of fiscal sustainability in NMS, their analysis came down to examining the public debt and Eurozone membership relationship (Stanek, 2014), and mostly to determining the effects of fiscal policy shocks on economic output or the relationship between debt

and economic GDP per capita growth (e.g. Dinca & Dinca, 2015; Mencinger *et al.*, 2014; Borys *et al.*, 2014). Thus, this paper represents a contribution to the existing literature, as it evaluates the efficiency of fiscal consolidation by providing a more comprehensive analysis of public debt determinants and offer new insights into potential solutions to the sovereign debt crisis.

The paper is structured as follows. Section 2 provides a literature review on fiscal consolidation impacts on public debt and other macroeconomic variables. The third section descriptively analyses fiscal positions of NMS during the crisis and serves as an introduction to the econometric analysis. The fourth section offers details on data and methodology used in the empirical part of the paper, while section 5 presents the obtained results. The final section discusses economic policy implications of this research and provides policy recommendations.

II. Literature Review

Six years after embracing first austerity measures it is possible to evaluate their (short-term) results, but there is still much disagreement regarding the validity and desirability of their implementation in economies hit by the crisis. To put it mildly, points of view of many different economic and political experts vary considerably when it comes to choosing the preferred fiscal policy direction in times of crisis.

Overall, restrictive fiscal policies in the EU did not deliver desired results as reported by many authors. Putting them into effect in 2010 caused a sharp unemployment rise in all countries struck by the crisis, claimed by Horn *et al.* (2012). They believe that extremely rigorous austerity policies lower economic growth and could delay a beneficial medium-term reduction of debt-to-GDP ratio. As a main argument against these policies, authors claim that they have always resulted in raised unemployment, particularly long-term, while wage-earners lost significantly more than capital owners. The IMF (2003) study indicates there is in general very little evidence showing positive effects of austerity measures on investors' confidence. It is further claimed that such policies hinder economic growth and have no considerable impact on public debt reduction. According to Krugman (2009), austerity suppresses economic growth since expenditure cuts and efforts to regain investors' trust are offset by the income loss due to delayed investments and private consumption decrease. Considering the failure of anti-recession strategies used by countries adopting austerity, some economists have become convinced that such policies actually led to a prolonged recession. On top of that, common critiques are based on emphasizing severe social problems caused by austerity. It is claimed that such measures tend to cut public expenses on education and health care, which could harm the long-term competitiveness (Pelle, 2013).

However, the other group of authors, the so-called supply side economists, suggest there are positive effects of austerity. They are worried about the economic damage caused by large fiscal stimulus. Their main arguments relate to the over-indebtedness and moral hazard in countries that support their high living standard on the accumulated debt (Inman *et al.*, 2012). Greece is, for example, often criticised on that matter. If some government accumulates debt so huge that investors start to question its solvency, expectations could increase interest rates substantially and lead to a vicious circle. By adopting policies to curb the deficit, government could send a positive signal to bond

markets and achieve much lower interest rates, which would lower the servicing costs of the government debt and stimulate private investment (Murphy, 2013). Also, in line with the traditional assumption, reduction of public expenditures weakens the crowding out effect, and therefore the private sector expansion could take place (Giavazzi & Pagano, 1990).

Many different aims of austerity measures have been brought up, like maintaining a solid base for implementing a common currency or boosting competitiveness potential of European economies. Yet the key purpose of austerity-based crisis management was to restore the market confidence. According to advocates of this theory the primary way of regaining investors' confidence is by attaining a balanced fiscal position. Nevertheless, a larger part of the literature is engaged in determining the relationship between fiscal consolidation and economic growth. Although this link is truly important, it could be described as an indirect effect as one automatically assumes that austerity leads to reducing government deficit and debt. Interestingly, Alesina & de Rugy (2014) claim that the majority of fiscal adjustment episodes so far have been unsuccessful according to the criterion of decreasing debt-to-GDP ratio. This paper tends to provide a more extensive and thorough analysis of different economic effects of fiscal consolidation, as well as inevitable assessment of success in achieving the main objective – reducing the deficit and public debt-to-GDP ratio.

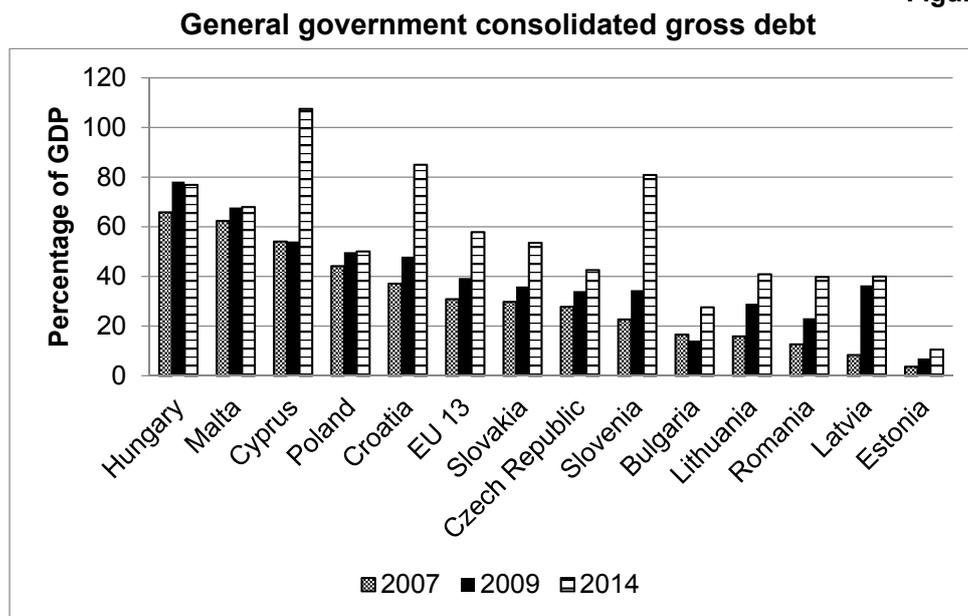
III. Fiscal position in NMS – Descriptive statistics

Despite having certain common characteristics (close geographical position, similar historical and political heritage, joining the EU in the 21st century), economies of NMS still differ and faced some distinct problems and challenges in the recent crisis. In order to detect economic specificities and also analyse causes and consequences of increased sovereign debt levels, this section presents a fiscal position overview for the countries of interest. Based on their undertaken fiscal anti-recession measures, often followed by the Excessive deficit procedure (EDP), the aim is to establish if there were some common fiscal behaviour patterns amongst NMS. Economic situation of NMS in the pre-crisis period was more than favourable – unemployment was declining, GDP and foreign direct investment moved along an upward path, and public finance seemed to be rather stable. In every sense it could be stated that NMS had been converging with western countries. Indeed, while before the crisis many old member states (OMS) recorded excessive levels of public debt, including even Germany and France, NMS had almost no indebtedness problem. Figure 1 shows that amongst NMS only Hungary and Malta had excessive sovereign debt before the crisis, but the 60% Maastricht threshold was not breached by much.

Though almost all NMS experienced a sovereign debt increase in 2009, the two previously mentioned countries were still the only ones not meeting the public debt criterion. Debt growth could logically be explained with fiscal stimulus policies and automatic stabilisers effect. However, in 2014 five countries exceeded the public debt benchmark value, and Cypriot debt-to-GDP ratio went beyond 100%. Although the 13 NMS retain relatively favourable position in comparison to the rest of EU, especially peripheral Eurozone countries, public debt growth rates give cause for great concern. Though Baltic countries and Romania have been placed at the bottom of the list of

countries regarding sovereign debt levels, they are at the top in terms of debt growth. The most controversial period is between 2009 and 2014. It was the time of austerity measures implementation but, contrary to expectations, in those years public debt was continuously rising in all NMS except Hungary. Some countries experienced an alarming debt growth, e.g. Slovenia, Cyprus and Croatia (Figure 1).

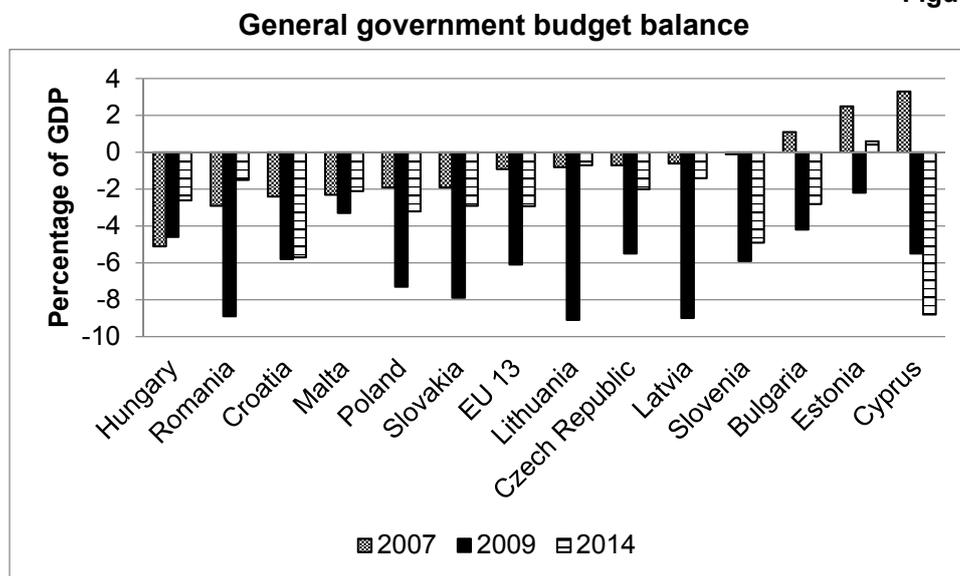
Figure 1



Source: Eurostat.

Figure 2 reveals that (except for Bulgaria, Estonia and Cyprus in 2007) no budget surplus has been attained in NMS, as is understandable given the above described indebtedness growth. Before the crisis, when it seemed that nothing could stop the high GDP growth, only a few countries pursued the Keynesian countercyclical fiscal policy. However, budget deficits were within the allowed limits in all countries except Hungary. Though the crisis expectedly worsened the public finance situation, in 2009 none of the NMS had a double digit budget deficit, as was the case with several OMS. Also, in average terms these 13 countries cut down their budget deficit by half during the period of austerity (from 2009 to 2014). The most significant deficit reductions were achieved in Romania, Latvia and Lithuania, while Estonia even recorded a surplus in 2014. Only Cyprus experienced a notable deficit upsurge in the observed period, and Croatian deficit reduction of 0.1 percentage points could not be interpreted as approaching the budget balance. Yet, overall it seems that NMS have been successful in balancing government budget, but not quite when it comes to curbing the debt-to-GDP ratio.

Figure 2



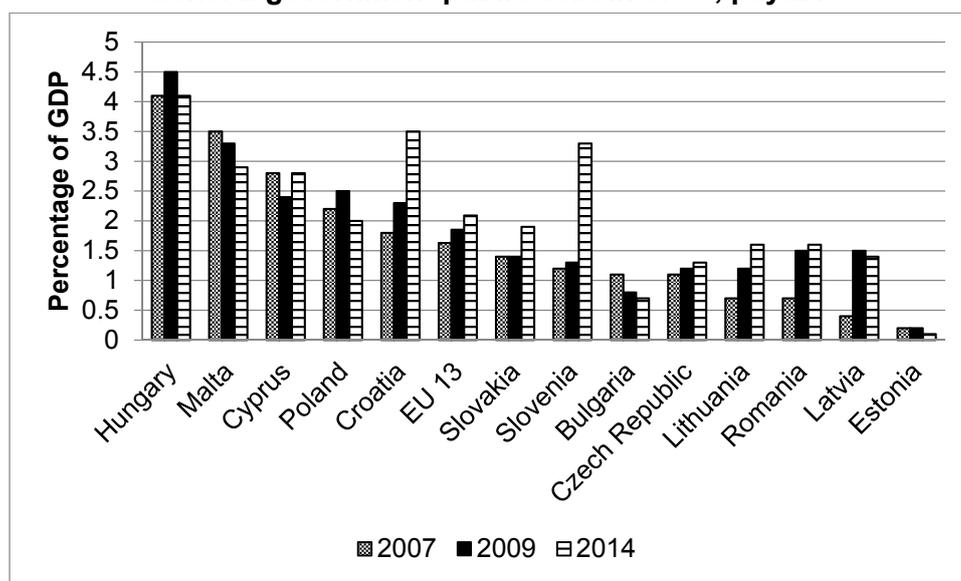
Source: Eurostat.

Another relevant indicator of government debt (un)sustainability is interest paid on debt, shown in Figure 3. The largest public debt interest expenses have been observed in Hungary. On average, the crisis caused an increasing amount of interest due to growing indebtedness, but Bulgaria and Mediterranean countries Malta and Cyprus recorded lower public debt interest expenses in 2009 comparing to 2007. Explanations could be found in Figure 1, clearly showing public debt reduction in Bulgaria between 2007 and 2009, while Cyprus had zero debt growth and Maltese debt just slightly grew in the same period. It could be that investors consequently demanded lower government bond yields in those countries as a result. Studying the average NMS data, the amount of interest was growing in the post-2009 period, mainly owing to a substantial increase of public debt interest in Slovenia and Croatia. Indeed, due to the enormous government debt growth (from 2009 to 2014), which amounted to 134% in Slovenia and 77% in Croatia, investors reasonably became mistrustful of their national public finance. The issue for these countries has been a persistently high budget deficit as well. Along with Cyprus, those were the only NMS to breach the 3% benchmark value in 2014 (Figure 2). To complete the picture of public finance positions in NMS, it is necessary to analyse government expenditures. Becker et al. (2010) suggest that state budget expenditures in central, eastern and south-eastern Europe have been very high. They assert that, according to Wagner's Law, public expenditure in those countries is too high considering their level of development. However, authors cautiously add that this needs to be controlled for by the differences in demography. Specifically, NMS have had the age structures of the population pretty similar to the ones of developed western countries (these two groups are much more alike than comparing NMS with certain

Asian countries at the same level of development). The result of the rising old to young population ratio is a greater need for social spending.

Figure 3

General government public debt interest, payable

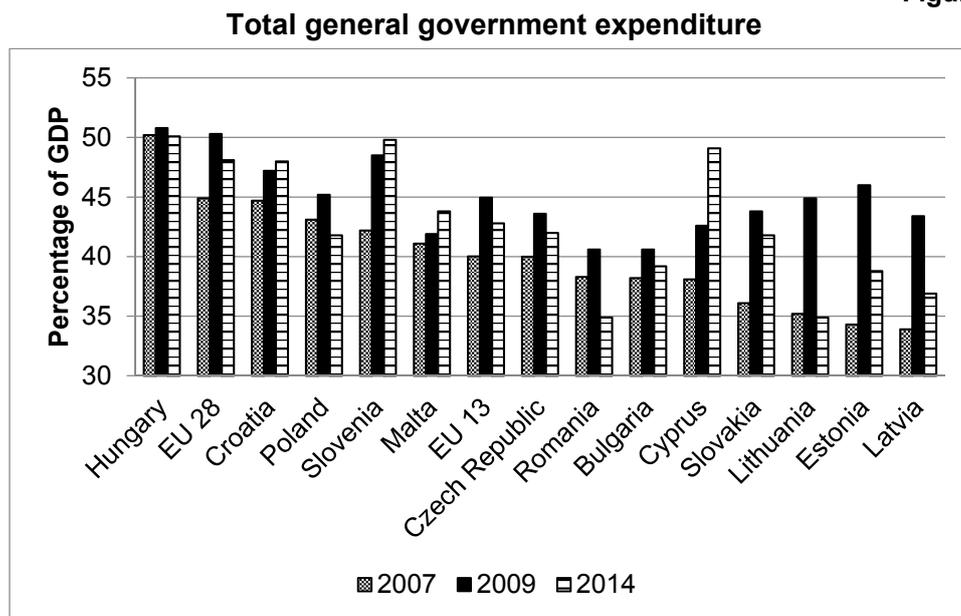


Source: Eurostat.

Government expenditure-to-GDP ratio was higher in 2009 than in 2007 in all NMS (Figure 4), as a reflection of the above mentioned fiscal stimulus and the automatic stabilisers effect. Baltic countries experienced a massive government expenditure growth – in each of the three countries it rose by about 10 percentage points. Nonetheless, when comparing the NMS with EU averages, it is evident that it is OMS who increase the EU-28 expenditure averages with their immense public expenditures. Given the obvious public finance worsening, which therefore raised the question of its sustainability; in 2009 it became apparent that certain measures are required in order to contain further public expenditure and indebtedness growth. In such a way most countries embraced austerity policies and *de facto* reduced government expenditures between 2009 and 2014. The reduction was most severe and far-reaching in three Baltic countries, but none of these countries has reached its pre-crisis levels of expenditures (Figure 4). On the other hand, the fact that public spending has relentlessly been rising in Croatia, Slovenia, Malta and Cyprus is a cause for concern, as all of the above have made some effort in implementing austerity measures. Public finance deterioration following the outbreak of the crisis most certainly had crucial implications for economic policy in NMS. Since most of them started to violate the budget deficit criterion, they entered EDP enforced by the Council of the EU. Summarizing the findings of authors who analysed the single countries' experiences in EDP (Stoiciu, 2012; Roháč, 2014; Golias, 2015; Toporowski, 2015), all NMS carried out measures to boost public

revenues and downsize government expenses. Apart from that, no strict common pattern of behaviour could be detected when it comes to NMS. There are only some general tendencies of the group. They include the propensity to raise the VAT rate as well as public sector rationalisations – wage freezes for state officials and certain benefits, subsidies and social transfer cutbacks.

Figure 4



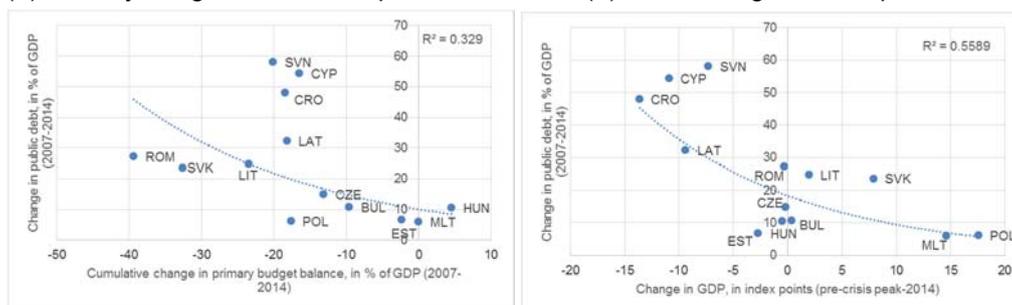
Source: Eurostat.

Although the 2014 stock of public debt increased in all NMS when compared to the 2007 levels, there is a clear division between different sub-groups of countries within. As the vertical axes of Figure 5 panels a-b show, public debt in six countries increased by less than 20 percentage points of respective GDPs over that period – Estonia, Poland, Malta, Hungary, Bulgaria and Czech Republic. In additional four countries the growth of public debt was more pronounced – Slovakia, Lithuania, Romania and Latvia – where it grew between 20 and 40 percentage points of GDP. Finally, there is a group of three countries which stand out in the level of increased indebtedness – Croatia, Cyprus and Slovenia – where the growth of public debt was very high, between 48 and 58 percentage points of GDP between 2007 and 2014.

Figure 5

Correlation between primary budget balance and economic growth vs. public debt

(a) Primary budget balance vs. public debt (b) Economic growth vs. public debt



Source: Eurostat, authors' calculations.

Public debt growth of NMS in current crisis, even during periods of fiscal consolidation, raises the issue of debt sustainability. Taking that into account, the efficiency of fiscal consolidation in lowering government debt-to-GDP ratio is arguable. The question now is, how much of the movements in the level of public debt could be contributed to the worsening fiscal positions in terms of cumulative primary budget deficits (essentially the numerator in the change of the debt-to-GDP ratio) and how much to developments in economic activity, i.e. GDP (the denominator). Figure 5 reveals that both variables display a significant correlation with the change in public indebtedness of NMS. Specifically, analysis shows that countries with more balanced primary budgets (Figure 5a) and better GDP performance (Figure 5b) expectedly experienced on average lower increase in the level of public debt between 2007 and 2014. However, the R^2 in the plots with the change in GDP on the horizontal axis is higher than in the model with a cumulative change in primary budget balances (0.56 and 0.33, respectively), suggesting that the denominator could play a bigger role in the movements of debt-to-GDP ratio. However, no strong conclusions could be drawn from these descriptive statistics, which is why this hypothesis is tested more formally, employing econometric analysis on a panel of 13 NMS. The methodology used and results obtained are presented in the next two sections.

IV. Data and Methodology

The analysis includes quarterly data from 2000:Q1 to 2015:Q1 and covers all 13 NMS (Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia). All data was seasonally adjusted using the moving average method. The dependent variable in the analysis below is the public debt-to-GDP growth rate. Key independent variables are real GDP growth rate and fiscal consolidation, approximated by the primary budget balance as a share of GDP. Since the primary balance does not include public debt interest, it is assumed to be a suitable variable for assessing discretionary measures made to achieve a balanced

government budget. Control variables are mostly selected following the example of authors who in some way analysed public debt determinants (Mota et al, 2012; Sinha et al., 2011; Bandiera, 2008). These are the following: government expenditures as a share of GDP, public investment as a share of GDP, foreign direct investment inflow, inflation measured as a change in the harmonised index of consumer prices (HICP), net exports as a share of GDP as a proxy variable for current account balance and long-term interest rates on government bonds. Primary budget balance data are retrieved from ECB database, whereas Eurostat database has been used to gather all other data. The estimated models included a number of dummy variables that indicate: Eurozone membership, EDP implementation, the crisis (quarters of declining GDP) and parliamentary election quarters¹ in which growing public expenses are expected. For easier interpretation, dummy variables appear in interaction with the primary budget balance variable.

Panel data models estimated in this paper are unbalanced as some data are missing. In order to estimate an adequate type of a model, several tests needed to be done, results of which are available upon request. The results of an F-test, which is normally used to decide if pooled regression model or fixed effects model is appropriate, indicated the inadequacy of using the fixed effects model. Furthermore, Hausman test compared estimated coefficients of fixed effects model to random effects model coefficients and the results once again proved the unsuitability of the fixed effects model. To finally determine if random effects model or pooled regression model was appropriate, Breusch-Pagan LM test was run to test for heterogeneity across countries. The outcome of the above mentioned Lagrange multiplier test suggested that random effects model with a following general form should be adequate:

$$y_{it} = \mu + \beta_1 x_{it1} + \beta_2 x_{it2} + \dots + \beta_k x_{itk} + \alpha_i + \varepsilon_{it}; \quad i = 1, \dots, N; \quad t = 1, \dots, T \quad (1)$$

where μ is a common constant for all countries, α_i country-specific random effect, while ε_{it} is an error term for country i and time period t .

The equation to be estimated in the model is given as:

$$PDEBT_{it} = \mu + \beta_1 PBBALANCE_{it} + \beta_2 GDP_{it} + \beta_3 X_{it} + \alpha_i + \varepsilon_{it} \quad (2)$$

where $PDEBT_{it}$ represents the public debt-to-GDP growth rate for country i and period t ; $PBBALANCE_{it}$ is the primary budget balance-to-GDP ratio, GDP_{it} is the real GDP growth rate, and X_{it} is a vector of control variables including:

- GDP per capita growth rate, $GDPPC_{it}$;
- government expenditure-to-GDP growth rate, $GOVSPE_{it}$;

¹ The issue of length of the pre-election period, when government expenditure becomes larger than usual, is in fact an empirical question, with no consensus in the literature. Mota et al. (2012) use a dummy variable marking every quarter that belongs to the election year with the value of 1. However, considering some elections inevitably take place at the beginning of a year, a sufficient number of preceding periods is not taken into account. Additionally, the fact that extensive expenditure usually does not continue in quarters after the early-year election is also neglected. Hence in this paper the quarters in which elections are held and the two preceding quarters are marked with the value of 1.

- public investment-to-GDP growth rate, $GOVINV_{it}$;
- foreign direct investment inflows, FDI_{it} ;
- inflation rate, $INFLATION_{it}$;
- long-term interest rates on government bonds, $YBOND_{it}$;
- net exports-to-GDP growth rate, NX_{it} ;
- interaction term of primary budget balance and EDP membership dummy variable, $PBBALANCE_{it} \times EDP_{it}$;
- interaction term of primary budget balance and Eurozone membership dummy variable $PBBALANCE_{it} \times EUROZONE_{it}$;
- interaction term of primary budget balance and election year dummy variable $PBBALANCE_{it} \times ELECYEAR_{it}$;
- interaction term of primary budget balance and crisis (falling GDP) dummy variable $PBBALANCE_{it} \times CRISIS_{it}$.

Stationarity of all variables has been tested and variables which initially proved to be non-stationary were transformed by taking first differences. The results of stationarity tests are available upon request. For the purpose of testing the robustness of obtained results, 10 different variations of the model have been estimated. The models differ with respect to the number of variables included in the estimation.

V. Results

The results of estimated models are shown in Table 1. It is evident that primary budget balance is significant at all levels of significance in all models, and its effect on public debt growth rate is approximately the same in all cases. Since the government debt stock is an accumulation of budget deficits, even when interest is abstracted, it is intuitive to expect a negative relationship. A budget balance improvement should lead to decreasing levels of public debt, respectively. Furthermore, the variable that also appeared to be highly significant is the GDP growth rate, which is expected and consistent with economic theory – higher economic growth should certainly diminish the pressure on internal and external borrowing. In most models long-term interest rates on government bonds also proved to be significant (positively impacting the public debt growth rate), as well as primary budget balance and election year interaction term indicating that, in accordance with the political-budget cycles theory, greater public expenditure in pre-election quarters generates a public debt increase.

GDP per capita growth rate is significant in estimated models as well. Though one should expect for higher living standard to reduce public indebtedness, a positive relationship obtained could be explained as follows. Enhanced living standard might provide overall better chances and easier access to education and health care, and if these sectors are to some extent funded publicly, as is the case in most NMS, this could result in higher government debt growth. On the other hand, it is much harder to find a meaningful interpretation of a negative correlation between government expenditure growth and debt growth. Additionally, finding that primary budget balance and EDP interaction term is significant in five out of ten models, where the sign is positive in all

five cases, seems pretty interesting. It indicates that budgetary interventions during EDP episodes in fact increased debt to GDP ratio, likely due to a negative effect on economic growth. The rest of the variables listed in Table 1 proved to be insignificant in all or most of the models.

Estimated models addressed the issue of fiscal consolidation effects, measured by the primary budget balance, on public debt growth. Though the expected negative relationship has been confirmed, the size of the primary budget balance coefficient is somewhat surprising. Namely, one can conclude that the impact of primary budget balance improvement (deficit reduction) of a one GDP percentage point on reducing the public debt growth is quite small. Accordingly, the analysis has revealed the fact that some positive effects of fiscal austerity in NMS cannot be denied, but the extent to which it really leads to improving the overall picture of national public finance is very questionable. In other words, it probably does not contribute much to achieving public debt sustainability. This result is in accordance with conclusions obtained from the descriptive analysis. Regardless of successful (efficient) government budget deficit reduction, the problem that lingers in NMS is related to the ability of restraining public debt growth rate. The clarification of such a scenario could be found in the increasing financing costs of growing government debts.

Hence the possibility of the so called “snowball effect” being present in NMS is quite real. Growing debt raises government's interest expenses, then financed by some additional government bond issuance, which causes the vicious circle and harms public finance sustainability (Hartwig Lojsch *et al.*, 2011). In addition, the seriousness of this problem is not just reflected on the public sector situation, but is a threat to overall economic conditions. Hartwig Lojsch *et al.* (2011) assert that the rise of interest expenses could crowd out other expenditures, potentially much more beneficial to economic growth, such as public investment.

Another important result refers to the GDP growth rate variable, which is statistically significant at the level of 1% in every estimated model. The important outcome here is that the value of GDP growth coefficients proved to be much greater comparing with the primary budget balance ones. It is a clear confirmation of our initial expectations – the impact of GDP growth on the reduction of public debt growth rates is stronger than the effect of attaining a balanced state budget, as descriptive analysis suggested as well. Such a conclusion could be very important for macroeconomic policy of NMS when it comes to choosing the right instruments to curb the excessive public debt.

Table 1

Results of the estimated panel model with random effects (dependent variable: $PDEBT_{it}$)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	0.016*** (0.005)	0.018*** (0.005)	0.018*** (0.006)	0.017*** (0.006)	0.018*** (0.006)	0.015*** (0.003)	0.015*** (0.003)	0.017*** (0.003)	0.019*** (0.005)	0.022*** (0.004)
$PBBALANCE_{it}$	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.003*** (0.000)	-0.004*** (0.001)	-0.004*** (0.001)	-0.005*** (0.001)
GDP_{it}	-0.684*** (0.168)	-0.799*** (0.217)	-0.708*** (0.166)	-0.534*** (0.108)	-0.570*** (0.125)	-0.556*** (0.099)	-0.542*** (0.097)	-0.587*** (0.066)	-0.596*** (0.128)	-0.608*** (0.109)
$GDPPC_{it}$	0.165** (0.082)	0.211** (0.094)	0.193*** (0.073)	-	-	-	-	-	-	-
$GOVSPE_{it}$	-0.093*** (0.034)	-0.074*** (0.027)	-	-	-	-0.090*** (0.034)	-	-	-	-
$GOVINV_{it}$	0.010 (0.006)	0.010 (0.006)	-	-	-	-	-	-0.003 (0.008)	-0.002 (0.009)	-0.009 (0.010)
FDI_{it}	-	-	-	-	-0.000 0.000	-	-	-	-	-0.000 0.000
$INFLATION_{it}$	-0.001 (0.002)	-0.000 (0.002)	-0.001 (0.002)	-0.000 (0.002)	0.001 (0.002)	-	-	-	-0.000 (0.002)	-
$YBOND_{it}$	0.035** (0.017)	0.038* (0.020)	0.042** (0.019)	0.036* (0.019)	0.034* (0.020)	0.030 (0.026)	-	-	0.040* (0.021)	0.041 (0.029)
NX_{it}	-	0.000 (0.000)	-	-	-	-	0.000*** (0.000)	-	-	0.000 (0.000)
$PBBALANCE_{it} \times EDP_{it}$	0.004*** (0.001)	0.004*** (0.001)	0.002* (0.001)	0.001 (0.001)	0.002 (0.001)	0.002* (0.001)	-	0.001* (0.001)	0.001 (0.001)	0.002 (0.002)
$PBBALANCE_{it} \times EUROZONE_{it}$	-0.002 (0.002)	-0.004*** (0.001)	0.000 (0.002)	0.001 (0.002)	-	-	-	-0.001 (0.001)	-0.000 (0.002)	-
$PBBALANCE_{it} \times ELECYEAR_{it}$	-	-	0.002** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.003*** (0.001)	0.003*** (0.000)	0.003*** (0.001)	0.003** (0.001)	0.003*** (0.001)
$PBBALANCE_{it} \times CRISIS_{it}$	-0.003 (0.002)	-	-0.002 (0.002)	-0.003 (0.002)	-0.002 (0.001)	-0.003** (0.001)	-0.002 (0.002)	-	-	-
R ²	0.2144	0.2017	0.2063	0.2287	0.2226	0.2435	0.2038	0.1990	0.2202	0.2189
Observations	536	536	537	576	444	575	682	679	575	443

Note: Parameter significant at the level of significance: ***1%, **5%, *10%. Standard errors in parentheses

VI. Conclusion and Policy implication

This paper carries out a panel data analysis aiming to shed more light into public debt determinants of EU new member states and discover their relative importance in the movements of public indebtedness. The results of the analysis have confirmed the assumptions based on economic theory. By achieving a more balanced government budget, the growth rate of public debt should decrease, but the effect appears to be rather small. On the other hand, estimated parameters of GDP growth are much greater. The results imply that sovereign debt crisis should be resolved by stimulating economic growth, not by reaching for some short-term effective measures of filling the state budget, while the interest expenses unstopably grow due to the persisting lack of investors' confidence.

Based on the results obtained, one might reasonably wonder about the potential sources of economic growth in NMS. Considering the upward path of national domestic products in recent years, while austerity policies were being implemented, it could be easily assumed that the given trend is actually the outcome of fiscal consolidation. However, in this moment one should be reminded of the way fiscal consolidation works and how it is supposed to aid economic growth. The key point in this process is investors' confidence formed on their expectations – economic boom can only be achieved by improving overall investment position due to rational public finance management.

As it is still too soon to see the results of structural reforms (where implemented), they also cannot be considered as generators of economic growth – at least for now. Meanwhile it is possible to offer some other explanations of a moderate economic take-off in observed countries. After a long period of current account deficit accumulation in the pre-crisis period, NMS have started to accumulate more and more surpluses in the international trade of goods, which is an important determinant of economic growth. Likewise, the last few years were marked by low prices of oil and generally cheap money, i.e. low interest rates in the world markets as well as in Europe. Though economic environment has only been showing the first signs of recovery, the results of panel data analysis lead to a following conclusion: once the economic growth gains its momentum, it is precisely where one should find the solution to high and rapidly growing public debts. Especially in a well designed foreign trade strategy, based on high competitiveness that leads to accelerating current account surpluses. At the same time, however, the priority of balanced fiscal position should not be neglected. Regardless of the size of estimated parameters arising from econometric analysis in this paper, responsible government budget management is a fundamental basis of every stable and competitive economy.

Since a recent mild economic recovery of NMS could be attributed to growing trade surpluses, further competitiveness boost might as well serve as a recipe for reducing public debt growth. Although austerity measures proved to be costly in both economic and social terms, the price of completely irresponsible public finance governing is even higher. The key is in a compromise – a prudent state budget management must be attained by economizing where there are inefficiencies, while not suppressing economic growth, but rather stimulating it in accordance with country's own potentials.

Acknowledgement

This work has been supported by the Croatian Science Foundation under the project no. 7031.

References

- Alesina, A. and de Rugy, V., 2014. A Review of the Scholarship on Austerity. In: S. Furth, ed. *Europe's Fiscal Crisis Revealed: An In-Depth Analysis of Spending, Austerity, and Growth*. Washington: The Heritage Foundation, pp. 3-11.
- Bandiera, L., 2008. *Public Debt and Its Determinants in Low Income Countries. Results from 7 Country Case Studies*. Washington: World Bank.
- Becker, T. Daianu, D. Darvas, Z. Gligorov, V. Landesmann, M. Petrovic, P. et al., 2010. *Whither growth in central and eastern Europe? Policy lessons for an integrated Europe*. Bruxelles: Bruegel Blueprint Series.
- Borys, P. Cizkowitz, P. and Rzonca, A., 2014. Panel Data Evidence on the Effects of Fiscal Policy Shocks in the EU New Member States. *Fiscal Studies*, 35(2), pp. 189–224.
- Dinca, G. and Dinca, M.S., 2015. Public Debt and Economic Growth in the EU Post-Communist Countries. *Romanian Journal of Economic Forecasting*, 14(4), pp. 15-29.
- European Commission, 2015. *General Government Data: General Government Revenue, Expenditure, Balances and Gross Debt*. Bruxelles: European Commission.
- Giavazzi, F. and Pagano, M., 1990. Can Severe Fiscal Contractions Be Expansionary? Tales of Two Small European Countries. *NBER Macroeconomics Annual*, 5, pp. 75–111.
- Golias, P., 2015. *Public finance consolidation in Slovakia*. Bratislava: Institute for Economic and Social Reforms.
- Hartwig Lojsch, D. Rodríguez-Vives, M. and Slavik, M., 2011. *The size and composition of government debt in the Euro area*. Frankfurt: European Central Bank.
- Horn, G. Lindner, F. Tober, S. and Watt, A., 2012. *Where now for the euro area crisis? Interim assessment and a model for a stable euro area*. Düsseldorf: Macroeconomic Policy Institute (IMK) at the Hans Boeckler Foundation.
- IMF, 2003. *Fiscal Adjustment in IMF Supported Programs*. Washington D.C.: IMF.
- Inman, P. Traynor, I. and Rushe, D., 2012. UK austerity v US stimulus: divide deepens as eurozone cuts continue. Available at: <<http://www.theguardian.com/business/2012/feb/14/austerity-stimulus-divide-eurozone-cuts>> [Accessed on 5 October 2015].
- Krugman, P., 2009. *The Return of Depression Economics and the Crisis of 2008*. New York: W. W. Norton & Company.
- Mencinger, J. Aristovnik, A. and Verbic, M., 2014. The Impact of Growing Public Debt on Economic Growth in the European Union. *Amfiteatru Economics*, 16(35), pp. 403-414.

- Mota, P.R. Costa Fernandes, A. and Nicolescu, A.C., 2012. The Recent Dynamics of Public Debt in the European Union: A Matter of Fundamentals or the Result of a Failed Monetary Experiment? Porto: *FEP Working Paper*.
- Murphy, R.P., 2013. What Economic Research Says About Fiscal Austerity and Higher Tax Rates. Available at: <<http://www.econlib.org/library/Columns/y2013/Murphytaxrates.html>> [Accessed on 5 August 2015].
- Pelle, A., 2013. The European Social Market Model in Crisis: At a Crossroads or at the End of the Road? *Social Sciences*, 2, pp. 131-146.
- Roháč, D., 2014. Hungary. In: S. Furth (ed.), *Europe's Fiscal Crisis Revealed: An In-Depth Analysis of Spending, Austerity, and Growth*. Washington: The Heritage Foundation, pp. 67-69.
- Sinha, P. Arora, V. and Bansal, V., 2011. Determinants of Public Debt for middle income and high income group countries using Panel Data regression. Munich: *Munich Personal RePEc Archive*.
- Stanek, P., 2014. Public debt sustainability and the participation of the new member states in the euro area. *Poznan University of Economics Review*, 14(4), pp. 22-37.
- Stoiciu, V., 2012. *Austerity and Structural Reforms in Romania. Severe Measures, Questionable Economic Results and Negative Social Consequences*. Berlin: Friedrich Ebert Stiftung.
- Toporowski, P., 2015. *Public finance consolidation in Poland*. Warsaw: The Polish Institute of International Affairs.