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EFFECTIVENESS OF FISCAL POLICY MEASURES IN DIFFERENT PUBLIC DEBT REGIMES

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Abstract. The aim of the research is to illustrate how the degree of effectiveness of fiscal policy measures varies depending on the level of public debt within a group of Central and Eastern European (CEE) states. To this end, a T-SVAR (Threshold Structural Vector Autoregressive) model was implemented, based on two regimes, calibrated as a function of the evolution of public debt. The results illustrate that, in most of the countries analysed, increasing government expenditure generates a stronger increase in economic growth under the low public debt regime in comparison with the situation at the level of the high public debt regime. Thus, the effectiveness of fiscal policy measures declines as the level of government debt rises. Another result obtained within the analysis highlights that the positive effect of public debt reduction on economic growth is more strongly felt in the higher public debt regime than under a low public debt regime. On the basis of these results, it is recommended that the CEE countries continue their efforts to reduce public debt in order to increase the effectiveness of fiscal policy measures.

Keywords: fiscal policy, public debt, Threshold Structural Vector Autoregressive, Central and Eastern Europe, government expenditure, economic growth.

JEL Classification: E62, H50, H63.

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1. Introduction

One of the main problems at the level of the states is balancing public expenditure, whether for investment or consumption, with the level of current public financial resources, dominated by revenues of a fiscal nature. Economic growth requires state intervention in the economy as a priority, especially in terms of spending on long-term public objectives in the form of investment in infrastructure or in public areas such as health or education.

Also, the increase in social welfare, amidst the diversification and modernisation of collective needs, calls for substantial public spending. In these conditions of strong growth in public spending, marked by development, civilisation or even crises, the states of the world are facing budget deficits, in the sense that the public revenues collected are not sufficient to meet the needs of the population.

In this context, studying the impact of indebtedness on economic growth becomes extremely important, as the aggressive call on public indebtedness comes amidst strong budget

deficits, claiming either weak economic growth or problems in the collection of compulsory levies. Excessive taxation cannot compensate for the severe shortage of public money, and so states have to become much more careful, restrictive and even coercive about public spending.

In conditions of increasing need for public expenditure due to the adoption of various social welfare schemes, natural disasters, or financial crises, especially in countries with fragile economies, there is consistent pressure on the need for additional public resources, the current ones being constrained by fiscal problems. Fiscal issues have a higher level of importance in the case of developing countries, for which the spillover effects on different parts of the economy are more intense. In this sense, the analysis is focused on a group of developing countries from Central and Eastern Europe. The countries selected are also the ones that encountered fiscal problems during the studied period, for the last 2 years covered in the analysis, all of them registering a government deficit higher than the limit of 3 percent and an increasing level of public debt. At the same time, amid growing deficits, countries have had to resort to indebtedness and, despite reservations about increasing public debt, national governments have hoped that indebtedness will facilitate economic growth (Augustine & Rafi, 2023).

The magnitude of the effect of increasing productive expenditure on economic growth depends largely on the share of government debt in GDP. In countries with this high level, the increase of productive expenditure is associated with an increase in the cost of capital, i.e. the interest rate, with an effect on the size of the public debt service. Teles and Mussolini (2014) point out that this phenomenon is similar in impact to the operation of the public pension system, in the pay as you go formula. Young people invest their savings in government bonds used by the state to pay off the public debt and interest, while the elderly, for whom the debt was contracted, most likely do not have high incomes and cannot make these savings and investments in government securities. So, there is a financial transfer between generations. Miller and Modigliani (1961) pointed out that indebtedness is a burden on future generations and considered it fair for the younger generation to bear the burden of public debt only when it finances the income of future generations through allocations to productive, value-added capital.

In this context, the present research aims to test the impact of shocks induced by government spending and debt financing on national fiscal policy and economic growth. The sustainability of public debt requires the establishment and respect of debt thresholds, precisely in order to achieve the objectives of public finances under conditions of efficient use of fiscal instruments and sustained economic progress.

The paper is organized as follows: in Section 2, a summary of the main findings from the literature is presented; in Section 3, the research methodology and data sets used in the analysis are presented; in Section 4, the main findings of the research are presented; and in Section 5, the conclusions are presented.

2. Literature review

The research presents a topic of great interest given its approach in the works of a large number of economic specialists, who in their studies have analysed the effectiveness of fiscal policy measures in various public debt regimes, both for developed countries and for developing or even poor countries, insisting on the importance of debt consolidation in general and public debt in particular, so that it does not harm economic growth. Researchers, using

different mathematical models, taking into account different national contexts and different time frames, have found the determinants of economic growth or decline through indebtedness and have recommended debt thresholds to be taken into account by governments in holding back access to borrowing, as signals of adverse effects on the economy.

Against the backdrop of the aggressive manifestation of the 2008 economic crisis on the fiscal and monetary policy of countries and the level of indebtedness used excessively to ease the process of economic stabilization, international concerns about financial sustainability have increased and it has become important to investigate the impact that debt in general, public or private, domestic or foreign, and continuously increasing, may have on economic progress and economic stability. For example, in 2011, Japan's public debt was 233% of GDP, the highest level recorded by developed countries (Kourtellos et al., 2013). In 2020, global debt rose to $226 trillion, representing 256% of global GDP, against the backdrop of the health crisis induced by the COVID-19 pandemic, which deepened the recession. While in developed economies total debt reached 300% of GDP, in developing and emerging countries total debt reached 206% of GDP. Public debt reached 120% in advanced economies and 60% in emerging and developing countries (Kose et al., 2021). From a political perspective, a negative impact of indebtedness on economic growth underlines the need for greater determination by governments to reduce indebtedness through fiscal consolidation. Using debt at an optimal level, by knowing thresholds, will support healthy economic growth, with costs that can be sustained fiscally (Asteriou et al., 2021). The research results are very important because the debt crossroads is a factor that needs to be taken into account in the design of fiscal policy, in order to avoid excessive indebtedness with a negative impact. This situation has made urgent the concern of governments, central banks and international political-economic organisations to understand and apply the effects of public indebtedness on the economy. These can manifest themselves through a multitude of channels such as: high interest rates (Gale & Orszag, 2003; Kumar & Baldacci, 2010; Kumar & Woo, 2010), an increase and future distortion of taxation (Barro, 1979; Dotsey, 1994), rising inflation (Sargent & Wallace, 1981; Barro, 1995), uncertainty and vulnerability to crises (Kumar & Woo, 2010). If economic developments are adversely affected, fiscal sustainability issues become acute, of major importance, and will involve fiscal adjustment towards efforts to reduce indebtedness to acceptable levels (Kumar & Woo, 2010). The fear of sending the wrong signals to investors on fiscal policy or inflation policy through the high share of public debt in GDP led to immediate measures to establish austerity in public spending, combined with increased fiscal discipline. Thus, a solution is being sought to increase the credibility of the national economy, even if side-effects such as rising unemployment and even a new economic recession are looming (Kourtellos et al., 2013).

In many extreme cases of debt crisis, by interfering with a banking or currency crisis, the already existing negative effects are exacerbated (Burnside et al., 2001; Hemming & Ter-Minassian, 2003). Heavy indebtedness appears to be coercive with countercyclical fiscal policies, which will generate high market volatility and lower future growth (Kharroubi & Aghion, 2008; Woo, 2009; Heylen et al., 2013), exemplified by an analysis of 21 OECD countries for the period 1981–2008, highlights the role of the public sector for the success of fiscal consolidation, stressing the importance of prioritizing public spending for investment and giving greater importance to actions aimed at supporting the consumer and labour markets, in a context where indebtedness is often a crisis solution. At the same time, subsequent capitalization of public revenues obtained from the collection of taxes and charges paid by population and economic agents and their allocation as public expenditure is imperiously

necessary for making investments that lead to an increase in the level of economic development (Jora et al., 2017).

Other authors (Eminidou et al., 2023), based on the conducted research, highlight that the impact of fiscal policy shocks varies with the level of public debt characterizing an economy. Therefore, macroeconomic variables, such as production and consumption, increase in response to the positive shock of governmental spending in a high-indebted state, unlike those in a low-indebted state. The existence of fiscal rules, more flexible exchange rates can be associated with lower fiscal policy volatility (Arroyo et al., 2024).

As expected, the 2008–2009 crisis has exerted strong pressures on public finances at the level of the euro area, but especially in the area of government debt. Many European countries are still at risk regarding fiscal sustainability. In the face of an extreme challenge that governments had to face, scientific research focused on the impact factors for economic braking. They have shown that with a debt of more than 90% of GDP, economic growth is significantly reduced. Thus, the analysis carried out for the period 1946–2009, considering a group of 44 developed countries, reveals a 2 percent reduction in economic growth with the increase in the share of public debt in GDP, which is one percentage point above the identified threshold. According to the same authors, emerging countries are characterized by the fact that they have a lower threshold, i.e. 60% of GDP, so the impact of high indebtedness is more severe and occurs faster in the process of debt accumulation, unlike developed countries, and in their case it has also been determined a strong link between rising inflation and rising public debt. Other studies have concluded the same threshold, namely that a public debt of around 90% of GDP represents a turning point for economic development. For example, Checherita-Westphal and Rother (2010) set the threshold between 90% and 100% of GDP for 12 European countries. The impact of indebtedness on public investment and private savings occurs even at a threshold below 90–100% and the government deficit and the interest rate associated with government credit are negatively associated with the indebtedness rate, suggesting that indebtedness has a strong detrimental impact on the economy, even when it is below that threshold. In addition, Baum et al. (2013) show that the increase in debt is clearly a stimulus to the economy, but the stimulus decreases strongly when the initial debt is at the high level. According to the authors, the impact of additional debt is therefore determined by the level at which it starts.

After 2008, studies carried out concerning the debt threshold mainly focused on OECD countries. Baum et al. (2013) set the threshold at 67%, beyond which indebtedness has no positive effects. Égert (2015) finds a threshold of 20% for central government indebtedness and 50% for total public debt. Lee et al. (2017), for a set of developed countries, identify a threshold of 30%. Cecchetti et al. (2011), using data for the years 1980–2010 and considering 18 OECD countries, obtained a result showing that the critical point of public debt is 85% of GDP. Similarly, Minea and Parent (2012) identified negative effects of indebtedness after exceeding a level of 90–115% of GDP. Elmeskov and Sutherland (2012), performing an analysis for OECD countries, identified a threshold of 66%. Greiner (2011) identified that, for OECD countries, the optimal level of indebtedness in a context of good economic development ranges between 43 and 63% of GDP. Chang and Chiang (2009) analysed 15 OECD countries for the period 1990–2004 and found two key thresholds: 32.3% and 66.25%. The positive impact of indebtedness, however, occurs in all three ranges determined by these two thresholds, being more intense in the middle range. Cecchetti et al. (2011) used data for 18 OECD countries over the period 1980–2010 and determined a threshold of 85%. However, the nonlinear and inverse link between debt levels and economic growth did not pass the

robustness test in all cases (Minea & Parent, 2012; Baglan & Yoldas, 2013; Eberhardt & Presbitero, 2013; Pescatori et al., 2014), showing that the hypothesis of causality is not consistent.

A number of studies have also looked at developing countries compared to developed countries. Thus, Caner et al. (2011), analysing 101 developed and emerging countries, found a threshold of 77% for developed countries and 63% for emerging countries. Thus, for every 1% increase in public debt, economic growth falls by 0.017% for developed countries and 0.02% for emerging countries. Kumar and Woo (2010) conducted an analysis by structuring countries into three categories, those with low debt (up to 30% of GDP), those with medium debt (30%–90% of GDP) and those with high debt (over 90% of GDP).

Chudik et al. (2017) found differences in debt thresholds for different levels of development: 80% for the advanced economies considered (19 in number) and between 30% and 60% for developing economies (21 in number). It appears, according to the same authors, that in general the threshold is much higher for developed countries than for developing countries, which underlines the pronounced sensitivity of small economies to borrowing.

In the context of a more pronounced sensitivity to borrowing as a form of activity financing, Ndoricimpa (2020) set the debt threshold between 58% and 63% for a range of 39 African countries and Mensah et al. (2019) set the critical threshold between 20% and 50%, but using different methods of determination. The studies confirm what Imbs and Ranciere (2005) had previously concluded for a range of developing countries, namely that the threshold is 60%. Similarly, analysing 93 developing countries, Patillo and Ricci (2011) identified a threshold of 35%–40% of GDP. Chudik et al. (2017) set the threshold between 30% and 60% and Elbadawi (1997) calculated a level of 97%, in another study, extended to 99 developing countries. Tran (2018) identified a threshold of 40–55% of GDP for a group of 14 emerging countries. Lau et al. (2022) focused their analysis on 16 Asian countries, using data from 1980–2016, finding a significant and negative relationship between indebtedness and economic growth for a threshold of 30%. They recommend greater fiscal discipline to prevent domestic economic shocks, to which Asian countries are prone, due to their dependence on external finance, the high level of which is a red flag for foreign investors.

The first generation of studies, extensively highlighted above, includes papers that study non-linearity and the negative impact of debt above a certain threshold on economic growth. The thresholds depend on the econometric methods used, the number of countries, their specifics and the period of analysis, but in general the results are similar, namely that for a 1% increase in indebtedness, economic growth falls by 0.1–0.2% (Woo & Kumar, 2015). In addition, Égert (2015) shows that the Reinhart and Rogoff threshold, considered representative, is highly sensitive to the size and number of countries considered, i.e. the number of observations processed, which is generally true, moreover, for the dozens of studies that target different countries with different organizational characteristics, stronger or weaker economies and data characterizing different time horizons. Thus, the impact of indebtedness on the economy may depend on the particular macroeconomic, financial and institutional situation of each country. Gómez-Puig et al. (2022) analyse the relationship between indebtedness and growth for 115 countries between 1995 and 2016. According to the authors, the impact of indebtedness is sensitive to institutional quality and the category of public expenditure, preferably a productive one, with the effects of indebtedness being intensified by the degree of indebtedness and the maturity of government borrowing. Cordella et al. (2005) shows that countries with high policy and institutional quality manage debt crises better for moderate increases in borrowing (between 15 and 20% of GDP), and Presbitero (2012) argues that the nonlinear effect of indebtedness on economic growth may be driven by country-specific factors, as

debt shock is a factor of growth especially in countries with stable macroeconomic policies and institutional organization. Masuch et al. (2017) support institutional quality as an important factor of long-term economic growth in a study considering European countries. They show that a high level of initial indebtedness combined with a level of institutional quality below the European average tends to generate very poor long-term growth performance. Cooray et al. (2017) pointed out that the shadow economy and high corruption underpin the growth of public debt and are mutually reinforcing. Aizenman et al. (2007) also point to the importance of institutional power, order and control factors to limit the effects of poor tax collection on debt. Kourtellos et al. (2013) demonstrated the impact of democracy and institutional quality on the debt threshold, where a country with a better institutional organization has a greater ability to collect taxes and avoid high indebtedness to compensate for deficits.

One of the authors' studies (Nuță & Nuță, 2020) assesses the impact of various economic, demographic, and institutional factors on the global fiscal burden, by using a panel analysis of 38 countries during 2000–2017. Based on the conducted research, the results show that demographic and institutional factors help identify some variables that influence global or social fiscal burden. Other authors, Barro (1990) and Saint-Paul (1992), Glomm and Ravikumar (1997), Teles and Mussolini (2014) show that an increase in public spending on investment positively affects economic productivity growth, but also has negative effects, as it increases the tax burden and public indebtedness needed to finance spending, with implications such as lower incomes and savings of the population, negatively affecting economic growth. Sala-i-Martin (1997) points out that a high level of public spending cancels out the effects of private investment and inhibits growth, a fact also highlighted by Seleteng et al. (2013). According to Checherita-Westphal and Rother (2010), the channels through which indebtedness affects economic growth are private savings, public investment, factor productivity and the long-term sovereign interest rate. Among these, the long-term sovereign interest rate, as a result of new public borrowing to finance the budget deficit, can limit the level of private investment, lowering household consumption and output and thus affecting the economy (Elmendorf & Mankiw, 1999).

Chen et al. (2017) study the optimal levels of government spending and public indebtedness using data from 65 developed and developing countries for the period 1991–2014. According to the authors, the effect of government spending on economic growth decreases as government spending increases, but also depends on the structure of government spending. The outcome of financing government spending through indebtedness certainly depends on the nature of spending, with those with a contribution to value added in the economy being preferable. Thus, many studies have shown that the allocation of public funds to education, health and infrastructure leads to positive effects on economic growth (Aschauer, 1989; Easterly & Rebelo, 1993; Gupta et al., 2005). It is very important that borrowing is not used for non-productive activities, as it contributes to economic decline. Similarly, Perlo-Freeman and Webber (2009) insist that government allocations should be made through channels that improve health, education, in other words the authorities should give priority to supporting citizens' rights, with the increase of which will come economic development.

The authors (Coman et al., 2023) conducted an analysis of the relationship between education and economic growth over a 30-year period (1990–2000) for Eastern European countries, by using the ARDL methodology with structural break. The results show a mixed relationship between public education expenditures and economic growth both in the short term and in the long term.

An increasing growth of public debt generates a decrease in economic development, as the associated public interest rates affect the size of public funds allocated to productive expenditure. In this context, Checherita-Westphal and Rother (2010) show that after a certain debt threshold, i.e. 73.8%, the additional accumulation of debt puts pressure on the interest rate, which increases.

In another study, the authors (Miricescu et al., 2016), identify the determinants of the sovereign rating for a panel of 25 European Union member states, during 2005–2012. The results of the study show that the short-term influence of inflation, unemployment, public debt/GDP ratio, real growth rate, GDP per capita and corruption control are robust determinants of sovereign debt rating. At the same time, the key socioeconomic and political indicators of sovereign credit risk vary according to the state's level of development.

Some authors have proposed a return to the policy used in the Great Recession, namely fiscal expansion (Krugman & Eggertsson, 2011; Berg et al., 2012; Delong et al., 2012), other authors argue that once the economic downturn occurs as an effect of indebtedness, fiscal consolidation is extremely important to restore confidence in the economy and improve expectations about its future development (Cochrane, 2011). According to Arellano et al. (2017), the government cannot adjust taxes excessively to raise additional resources, but it can adjust public consumption and external credit. Appreciation supporting austerity measures is widespread among EMU countries (Reinhart & Rogoff, 2010).

3. Research methodology

The research covers the analysis of five countries in Central and Eastern Europe: Romania, Bulgaria, Hungary, Slovenia, and Latvia. We have selected these countries because we want to conduct the analysis at the level of a group of developing countries, unlike other studies from the literature that analyze already developed countries (Baum et al., 2013). The second rationale was that we targeted countries from the same geographical region so that they belonged to the same peer group, both in terms of economic development and in terms of position, unlike studies that analyze countries from different parts of the world with a very different economic structure (Kourtellos et al., 2013). Taking into consideration these aspects and the advantage of having comparable data for the countries through the Eurostat database, we chose the Central and Eastern Europe region (CEE). The reason for choosing those specific countries from the CEE was to select the ones that encountered fiscal problems during the analyzed period and consider the data availability aspect. Variables on aggregate macroeconomic dynamics, such as economic growth, but also variables on fiscal policy, such as public debt or government expenditure, were used in the models. The selection of variables but also the way of data processing was done considering the practices used in the literature (Égert, 2015; Ndoricimpa, 2020).

Fiscal variables in nominal values were initially logarithmed, then the difference operator was applied to arrive at series of data representing annual growth rates, after which they were transformed by the GDP deflator into real growth rates. In the case of variables defined as real growth rates, as in the case of economic growth, no further processing was required. To do these transformations, we performed some tests to check the characteristics of the data sets. As noted, the nominal value of government expenditure and the public debt were not stationary in level; for this reason, the processing mentioned in Table 1 was applied to transform them into the annual growth rate, which is a stationary variable.

Table 1. Main variables included in the analysis

Variable	Data processing	Source
Economic growth	–	Eurostat
Government expenditure	– data were passed through the logarithm operator; – then the difference operator was applied for transforming them in annual growth rates; – then the variable was transformed in real annual growth rate through the GDP deflator.	Eurostat
Public debt	– data were passed through the logarithm operator; – then the difference operator was applied for transforming them in annual growth rates; – then the variable was transformed in real annual growth rate through the GDP deflator.	Eurostat

The data series were collected from the Eurostat database, the analyzed time period was from 2000 to 2021, and quarterly data were used. We chose that period because we wanted to highlight the results of the analysis for the recent time span, with a long enough set of historical observations. The econometric software used for the analysis was Eviews 11.

The econometric model used in the analysis is a Threshold Structural Vector Autoregressive (T-SVAR) model, in which the analysis is carried out at the level of two regimes, an upper and a lower regime, with the aim of identifying whether there are significant differences between the two regimes associated with certain economic phases. Even though this approach is not new in the literature, and analysis based on models with threshold have been applied also by Baum et al. (2013), Kourtellos et al. (2013) or Checherita and Rother (2010), the novelty of the research comes from the countries we analyzed, and that we put more emphasis on the way in which the fiscal variables influence the economic dynamics in developing economies. Another different aspect than other studies such as Kumar and Woo (2010) or Égert (2015) is that we did not assess the entire group of countries through an aggregate panel model, but we evaluated each country's situation separately. The threshold variable used in the analysis was the public debt variable. Thus, the results of the model are intended to illustrate whether the impact on the real economy of fiscal policy shocks differs significantly in a period when the growth rate of public debt is high compared to the impact of a similar shock in a period when the growth rate of public debt is low.

One of the first authors to use VAR models with threshold is Balke (2000), and the form of his model is:

$$Y_t = A^1 Y_t + B^1(L) Y_{t-1} + \left(A^2 Y_t + B^2(L) Y_{t-1}\right) I\left(c_{t-d} > \gamma\right) + U_t. \quad (1)$$

A peculiarity of the T-SVAR model is that the threshold value is not specified apriori by the author but is determined within the model. In order to do this step, T-SVAR models are estimated for several possible threshold values γ. Following the estimations, the level selected as threshold is the one that maximizes the logarithmic value of the determinant of the residuals U_t in the structural VAR.

In general, for the case of models with regimes, and in particular for the case of the T-SVAR model the structural residuals U_t are non-linear, taking into account that any shock can generate a transition from one regime to the other. This is the reason why the results provided by the model will not be in the form of IRF type figures, but NIRF type figures (nonlinear impulse response functions). A NIRF representation depicts the difference between

the estimated value of the dependent variable when the shock materializes versus when the shock does not occur:

$$NIRF_y\left(k,\varepsilon_t,\Omega_{t-1}\right)=E\left(Y_{t+k}|\varepsilon_t,\Omega_{t-1}\right)-E\left(Y_{t+k}|\Omega_{t-1}\right), \quad (2)$$

where Y_{t+k} is the vector of variables at time $t+k$, Ω_{t-1} is the information available at time $t-1$ (the period before the shock occurred) and ε_t is the fiscal shock that occurred at time *t*.

4. Research results

The paper has analyzed how fiscal policy shocks affect the real economy, conditional on the level of public debt at which a state is placed. The first representation is where the fiscal shock occurs at the level of government spending.

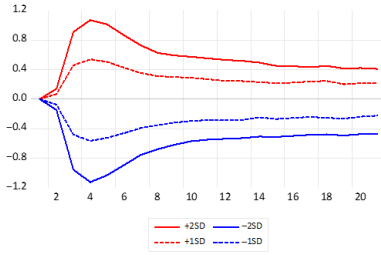

Figure 1. Economic growth response to a shock occurring at the level of government spending, under a high public debt regime – Romania (source: authors' own processing based on Eurostat data)

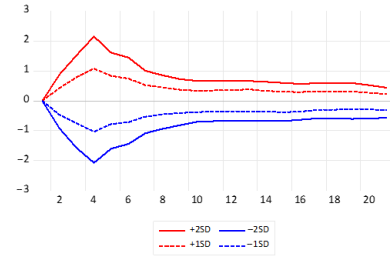

Figure 2. Economic growth response to a shock occurring at the level of government spending, under a low public debt regime – Romania (source: authors' own processing based on Eurostat data)

Analyzing Figure 1 and Figure 2, using Romania as a case study, it can be seen that following a growth shock to government spending, economic growth responds positively both under a high public debt regime and a low public debt regime. However, the magnitude of the response is different between the two regimes. Under the low public debt regime, the positive impact on economic growth from the fiscal shock is much stronger, almost double that under the high public debt regime. Thus, if we consider a magnitude of the fiscal shock of 2 standard deviations, 4 quarters after the occurrence of the shock, economic growth increases by one percentage point more in a low public debt period compared to the increase recorded if public debt were high.

One conclusion that can be drawn from these results is that in periods of low public debt, the efficiency of fiscal policy is much higher than in periods of high public debt. Thus, one of the national authorities' objectives should be to reduce public debt, bearing in mind that, as public debt falls, the efficiency of fiscal policy, in terms of its impact on the real economy, increases. A similar result, but for Eurozone economies, was also obtained by Baum et al. (2013) in a study by the European Central Bank. Such an effect could be explained by the way in which a higher level of public debt is influencing the private sector decisions. First, it could affect the companies, which should be more cautious when planning new investments. Second, it could affect foreign investors which will be less incentivized to invest in a country with a higher risk, based on a higher public debt level. Third, it could affect the domestic household's expectations, because a high public debt could be associated with future

restrictive fiscal measures, in this way incentivizing the current saving behavior. In a context like the one already presented, even if the authorities want to stimulate the economy with expansive fiscal policies, it will be hard to reach the expected positive impact.

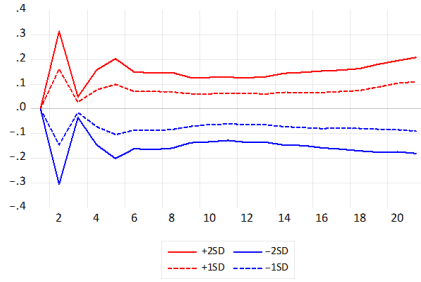

Figure 3. Economic growth response to a shock occurring at the level of government spending, under a high public debt regime – Bulgaria (source: authors' own processing based on Eurostat data)

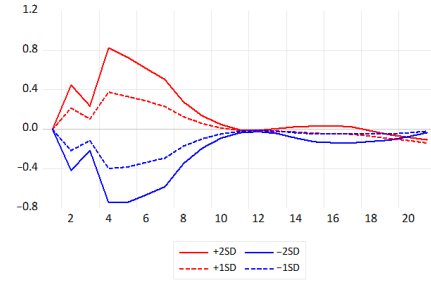

Figure 4. Economic growth response to a shock occurring at the level of government spending, under a low public debt regime – Bulgaria (source: authors' own processing based on Eurostat data)

Another Central and Eastern European state included in the analysis is Bulgaria (Figure 3 and Figure 4). Similar to the situation in Romania, fiscal policy shocks in the form of increased government spending have a positive effect on economic growth in both the high public debt and low public debt regimes. However, under a low public debt regime, as a result of an increase in government spending, the response of economic growth is much stronger than if a similar shock were to occur under a high public debt regime.

This is, among other reasons, one of the reasons why it is recommended to set a limit on the sustainability of public debt, which should not be exceeded if fiscal policy is to be used as an effective tool to achieve economic objectives. In quantitative terms, a shock of one standard deviation in government expenditure 4 quarters after its occurrence generates a 4 times larger impact on economic growth in a low public debt regime than in a high public debt regime. In this way, the quantitative results justify that fiscal policy measures are much more effective in a low public debt environment than in a case of high public debt. In line with this conclusion, Checherita and Rother (2010) identified in an analysis of 12 Eurozone countries that a high level of public debt could be on average associated with lower long-term economic growth.

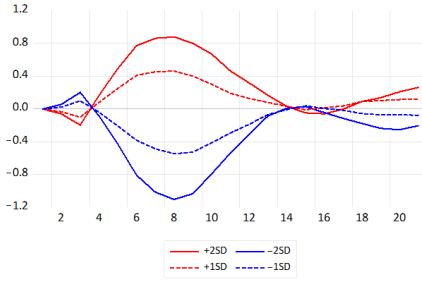

Figure 5. Economic growth response to a shock occurring at the level of government spending, under a high public debt regime – Slovenia (source: authors' own processing based on Eurostat data)

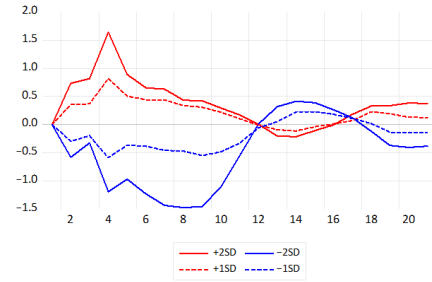

Figure 6. Economic growth response to a shock occurring at the level of government spending, under a low public debt regime – Slovenia (source: authors' own processing based on Eurostat data)

The third country analyzed is Slovenia. In this case, similar to Romania and Bulgaria, fiscal policy shocks positively influence economic growth under both public debt regimes. It should be noted, however, that when comparing the results, the stimulating effect on the economy is much stronger as a result of increased government spending under a low public debt regime compared to the high public debt regime. The results for this country confirm the conclusion already found for Romania and Bulgaria that the effectiveness of fiscal policy measures is much higher under a lower public debt level. Analyzing the peaks in Figure 5 and Figure 6, it can be seen that the response of economic growth as a result of the fiscal policy shock is under a low public debt regime approximately double that under a high public debt regime.

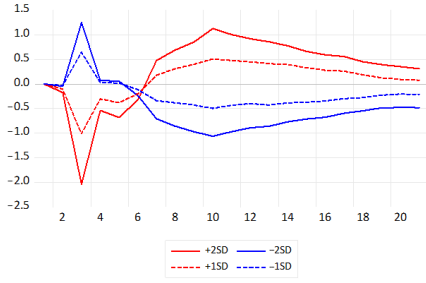

Figure 7. Economic growth response to a shock occurring at the level of government spending, under a high public debt regime – Latvia (source: authors' own processing based on Eurostat data)

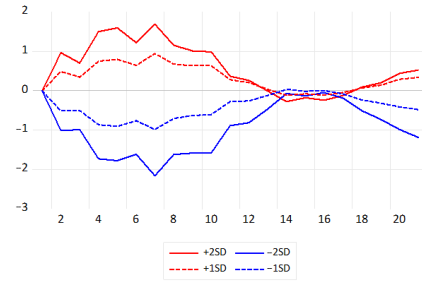

Figure 8. Economic growth response to a shock occurring at the level of government spending, under a low public debt regime – Latvia (source: authors' own processing based on Eurostat data)

The fourth state analyzed is Latvia. Similar to the results for the first three states, also in this case the response of economic growth as a result of the fiscal policy shock to government spending was positive under both public debt regimes (Figure 7 and Figure 8). In terms of magnitude, the response of economic growth as a result of the fiscal policy shock to government spending tends to be much higher under a low public debt regime than under a high public debt regime. At the same time, while under a low public debt regime the peak of the impact on the real economy occurs shortly after the shock, under a high public debt regime the peak impact tends to be felt much later.

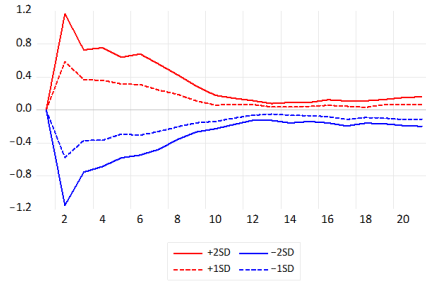

Figure 9. Economic growth response to a shock occurring at the level of government spending, under a high public debt regime – Hungary (source: authors' own processing based on Eurostat data)

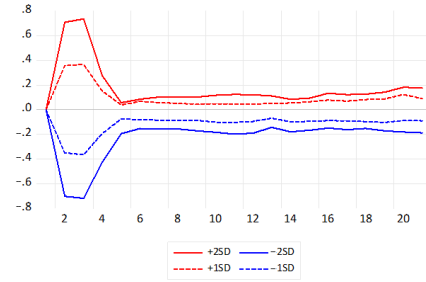

Figure 10. Economic growth response to a shock occurring at the level of government spending, under a low public debt regime – Hungary (source: authors' own processing based on Eurostat data)

The last state where the analysis was carried out is Hungary. Similar to the situation in the first four countries, the response of economic growth in Hungary to fiscal policy shocks to government spending is positive. This result holds for both the high and low public debt regimes (Figure 9 and Figure 10). However, looking at the magnitude of the response, it can be seen that, different from the four countries analyzed above, in Hungary the real economy is a bit more strongly stimulated in the short term by the fiscal shock in periods of high public debt rates, compared to the impact of a similar shock in periods of low public debt. The summarized numerical results for all 5 states analyzed are presented in Table 2.

Table 2. The response of economic growth to a two standard deviation shock to government spending (source: authors' own processing based on Eurostat data)

State	Regime	Response one quarter after occurrence of shock (p.p.)	Response four quarters after occurrence of shock (p.p.)	Response 20 quarters after occurrence of shock (p.p)
Romania	High debt	0.14	1.07	0.41
	Low debt	0.9	2.2	0.4
Bulgaria	High debt	0.31	0.16	0.21
	Low debt	0.45	0.83	–0.11
Slovenia	High debt	–0.06	0.16	0.26
	Low debt	0.74	1.64	0.38
Latvia	High debt	–0.17	–0.54	0.31
	Low debt	1.01	1.5	0.52
Hungary	High debt	1.17	0.76	0.16
	Low debt	0.71	0.27	0.18

Another important issue analyzed within the paper is the impact of a shock occurring in public debt on economic growth at the level of the two regimes. A first representation of the results, for the case of Romania, is made in the figures below.

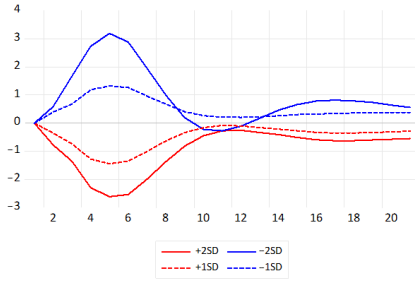

Figure 11. Economic growth response to a shock occurring in public debt, under a high public debt regime – Romania (source: authors' own processing based on Eurostat data)

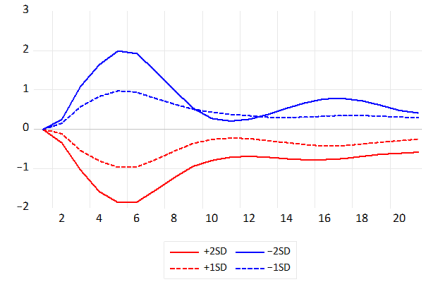

Figure 12. Economic growth response to a shock occurring in public debt, under a low public debt regime – Romania (source: authors' own processing based on Eurostat data)

A comparative analysis of Figure 11 and Figure 12 shows that a shock in the growth direction in public debt has a stronger negative effect on the level of economic growth under a

high public debt regime than in a low public debt regime. Symmetrically, a decrease in public debt has a stronger effect in stimulating economic growth in a high public debt regime in comparison to a low public debt regime. An important conclusion that could be drawn from the results is that an increase in public debt when public debt is already at a high level has a much stronger negative effect on the real economy than a similar increase in debt when public debt is low. Symmetrically, a decrease in public debt tends to generate a stronger positive effect on the real economy under high public debt than under low public debt. The conclusion is in line with one of the important results obtained by Reinhart and Rogoff (2010), namely that a high level of public debt is associated with lower levels of economic growth in both advanced and emerging economies.

The second state analyzed from this perspective is Hungary. Following a shock in the form of an increase in public debt, there is a short-term increase in the level of economic growth. However, in the medium term, the impact on economic growth becomes negative in both regimes. A comparative analysis of the response of economic growth to the public debt shock in the two regimes (Figure 13 and Figure 14) shows that the medium-term negative impact on economic growth is higher under a high public debt regime than under a low public debt regime. Thus, an increase in the level of public debt under an already high level of this indicator generates a stronger negative impact on economic growth compared to a similar increase under low public debt.

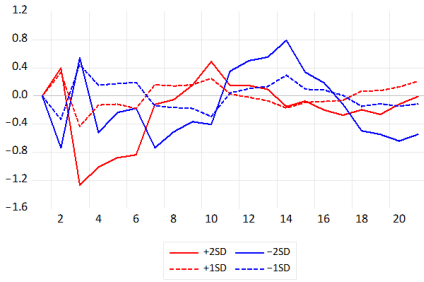

Figure 13. Economic growth response to a shock occurring in public debt, under a high public debt regime – Hungary (source: authors' own processing based on Eurostat data)

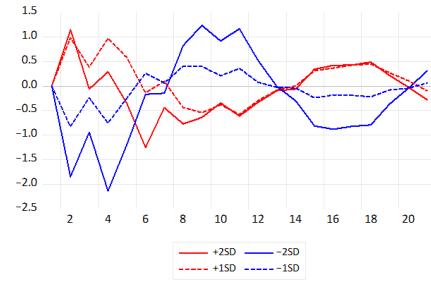

Figure 14. Economic growth response to a shock occurring in public debt, under a low public debt regime – Hungary (source: authors' own processing based on Eurostat data)

A similar result was obtained also in the case of Latvia (Figure 15 and Figure 16) where, following a shock of one standard deviation in the direction of increasing public debt, the negative impact 2 quarters after its occurrence is 4 times higher under a high public debt regime than under a low public debt regime. In this sense, whenever the level of public debt is high, an additional increase is generating a stronger negative impact in comparison with the situation when the starting point of the public debt level was lower. One of the reasons that could support this result is the way in which the domestic companies are calibrating their investments decisions, and the domestic households their consumption and savings behavior based on this type of change.

Slovenia is one of the states where there is no significant difference in the magnitude of the impact on economic growth caused by the shock occurring in the level of public debt in the two regimes. It should be noted, however, that a decrease in the level of public debt is more effective in terms of its impact on the real economy, when starting from a higher level

of public debt, compared to a similar decrease when starting from a low level of public debt (Figure 17 and Figure 18). This type of effect is seen specifically in the short term when the economy tends to be more sensitive to this type of changes.

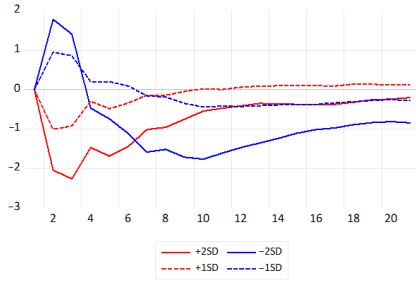

Figure 15. Economic growth response to a shock occurring in public debt, under a high public debt regime – Latvia (source: authors' own processing based on Eurostat data)

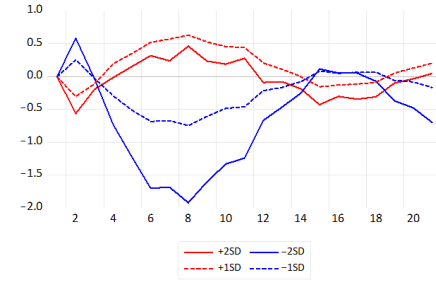

Figure 16. Economic growth response to a shock occurring in public debt, under a low public debt regime – Latvia (source: authors' own processing based on Eurostat data)

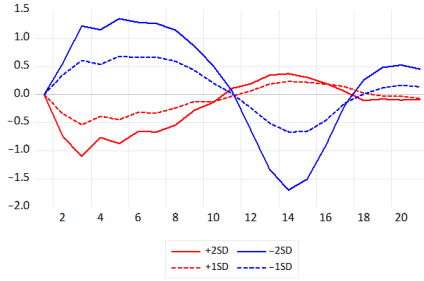

Figure 17. Economic growth response to a shock occurring in public debt, under a high public debt regime – Slovenia (source: authors' own processing based on Eurostat data)

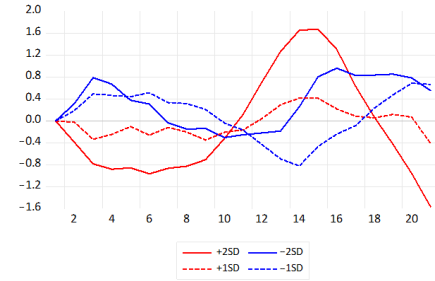

Figure 18. Economic growth response to a shock occurring in public debt, under a low public debt regime – Slovenia (source: authors' own processing based on Eurostat data)

In the case of Bulgaria, one of the conclusions already presented previously is maintained, namely that a decrease of public debt starting from a high level generates a stronger long-term positive impact on economic growth than starting from a low level of public debt (Figure 19 and Figure 20). This result could be justified by different reasons, one of them is the way in which foreign investors interpret this type of dynamics. In a country in which one of the economic problems is the high public debt level, every improvement in this area could represent an important step forward, because this variable is of high interest in determining the country's risk level. This will not be the case at the level of a country with significantly lower public debt, at the level of which other variables, related to the real most important economic problems, would be of more interest in determining the country's risk level. In this sense, one of the perspectives through which this result could be interpreted is the investors expectation channel.

Thus, in the case of states that have a high level of public debt, the process of debt reduction can have a stronger positive economic effect compared to a similar approach that could be taken by a state with a low level of public debt.

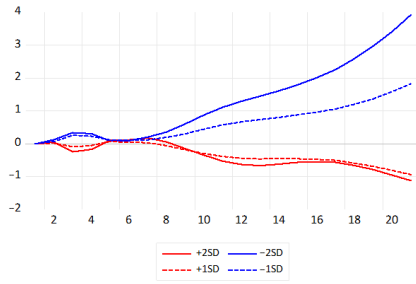

Figure 19. Economic growth response to a shock occurring in public debt, under a high public debt regime – Bulgaria (source: authors' own processing based on Eurostat data)

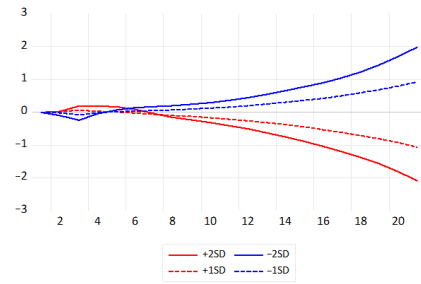

Figure 20. Economic growth response to a shock occurring in public debt, under a low public debt regime – Bulgaria (source: authors' own processing based on Eurostat data)

Summarizing the results presented above, an important conclusion to be drawn is that, with a high level of public debt, further increases in public debt have a stronger negative effect on the economy than with a low level of public debt. Moreover, a decrease in public debt, assuming that it starts from a high level, has a stronger stimulating effect on the economy than if a similar decrease weas achieved assuming a low level of public debt.

5. Conclusions

Based on the analysis, the authors of the research identified how fiscal policy shocks affect the real economy, conditional on the level of public debt. To this end, a T-SVAR (*Threshold Structural Vector Autoregressive*) model was implemented, based on two regimes, calibrated to the evolution of public debt. By means of this, the impact of fiscal policy shocks in the high public debt regime was compared to the impact of the same shock under a low public debt regime in order to identify similarities and/or differences. We selected the countries in order to conduct the analysis at the level of a group of developing states from the same region and the same peer group. Moreover, for this specific group of countries, the subject analyzed in the paper was not fully studied in the literature, which represented a novelty in the research on this subject.

The results on the impact of the government expenditure shock illustrate that, in most of the CEE countries analyzed, increased government expenditure generates a stronger increase in economic growth under the low public debt regime than under the high public debt regime. Thus, in order to maintain a high degree of efficiency of fiscal policy, it is recommended to keep the level of public debt low and to strictly respect the sustainability limits for public debt.

Another aspect highlights the way in which economic growth responds to shocks occurring at the level of public debt. In this respect, a common element for most of the CEE states analyzed is that, under the high public debt regime, a shock in the form of an additional increase in public debt generates a stronger medium-term negative impact under the high public debt regime than under the low public debt regime. Thus, the results recommend maintaining a low level of public debt.

The analysis also took into account the hypothesis that the shock to the level of public debt does not manifest itself in an increase but in a decrease in the level. In this hypothesis,

it could be observed that the positive effect of a decrease in public debt on economic growth is much more strongly felt in the higher public debt regime than under a low public debt regime. Thus, steps to reduce public debt within a state that already has a high level of public debt generate stronger positive effects on economic growth than if this were done on the same scale within the same state but in a period of low public debt.

The conclusions already presented above confirm that the CEE countries should continue their efforts to reduce public debt, thereby increasing the efficiency of fiscal measures. This recommendation has a higher importance for the countries which are standing at a high level of public debt because, in their case, the level of efficiency of this process could be even higher, in terms of the effects on the real economy dynamics. Another recommendation is to be more aware of the national specific level of debt sustainability; in this sense, an analysis should be conducted in order to, first of all, identify the threshold, and second of all, take the necessary decisions in order not to pass it. Moreover, the level of efficiency of the future fiscal policy measures should be analyzed considering also, besides others, the effects generated by the current public debt regime of the country. As a future research direction, the analysis can be extended to the other states of the European Union, using other econometric methods involving regime-based analysis.

The paper has two main limitations. The first limitation is related to the analyzed period; in T-SVAR type analyses, a high number of observations are necessary, and the second limitation is related to the number of states analyzed. Due to the lack of complete data for other developing states in Central and Eastern Europe, the study was limited to only 5 of them.

Disclosure statement

The authors declare that they don't have any competing financial, professional, or personal interests from other parties.

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