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UNRAVELLING THE EU DEBT KNOT OVER 2000-2019: AN INJECTION-LEAKAGE APPROACH[2]

Against the backdrop of a negative relation between the public debt and the economic growth in the EU over 2000-2019, the government budget constraint could clearly outline the transmission channels at work. Firstly, the debt stock weakens the fiscal policy of the government. It is emphasized that a debt stock surpassing 100% of GDP is critical for any government as it renders the budget impulses incapable to generate at least a proportional change in GDP. This conclusion is further strengthened by the proposed decomposition of the expenditure multiplier into several terms. They unambiguously reveal that its value is negatively affected by the budget surplus, the debt ratio's growth rate and the output gap. Secondly, the effects of the public indebtedness are tracked down to the overall economy. Initially, the private sector's cyclical behaviour is found to weaken the higher the average debt position of a country which accounts for the lower economic growth in a high debt environment. Eventually, the nonlinear relationship between the debt ratio and the net private savings is explored by estimating a TAR model for each EU country over 2002-2019. It is inferred that while in the first regimes, the injections and leakages take turns, in the second regimes, the leakages exceed the injections. Furthermore, it is concluded that the higher the debt ratio, the greater the number of regimes a country might fall into and the greater the number of the autoregressive terms suggesting a persistent change in the private agents' behaviour.
JEL: E60; E62

1. Introduction

The conduct of a fiscal policy that systemically does not respect the dynamic government budget constraint is related to the accumulation of debt stock. The Global Financial and Economic Crisis in 2009 outlined the risks of such fiscal policy. Specifically, many EU countries were forced to consider the limited fiscal leeway, which had not been binding up to that moment. Following the crisis, the attempts for debt reduction still remain on the EU agenda. That is why, the objective of the present study is to contribute to a better understanding of the relationship between the government debt stock and the economic activity as well as the implied transmission channels, which are likely to involve

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nonlinearities. The object of the study is the relation between public debt and economic activity in the EU over 2000-2019. The subject of the study is the transmission channels triggered by this relation.

The rest of the paper is organized as follows. Section 2 provides a brief review of the related literature. Section 3 examines the EU governments' budget balances through the lens of the private and external sector. Section 4 explores the general impact of the debt stock on the current GDP, derives a scaling factor for the budget influence, which gives rise to a theoretical indicative debt threshold and to a decomposition of the expenditure multiplier. Section 5 presents the nonlinear econometric methodology following the outlined transmission channels of the debt impact to the private sector. Section 6 presents the results. Finally, section 7 concludes.

2. Literature Review

The debate about the sustainability of a debt burden revolves around the issue of the existence of a debt threshold beyond which the debt stock weighs on the growth rate. This discussion virtually hinges on the issue of reverse causality.

On the one hand, under the assumption of unilateral causality from the debt to the growth rate, the debt threshold is more probable, though its level is still much debatable. Cecchetti et al. (2010) conclude that a potential risk of a higher level of debt is associated with potentially lower growth, which is due to the need of higher distortionary taxation for maintaining a given level of public services and the crowding-out effect caused by higher real interest rates. In a further study using a dataset for 18 OECD countries over 1980-2010, Cecchetti et al. (2011) reach a debt threshold amounting to 96% of GDP above which the economic growth is negatively affected by debt accumulation. While Kumar and Woo (2014) infer that a 10 p.p. of GDP increase in initial public debt is associated with a slowdown in subsequent growth in real GDP per capita of around 0.25 p.p. per year, they also find evidence that the negative effect of debt on growth gains additional statistical significance with higher debt ratio. Similarly, Checherita-Westphal and Rother (2010) use data for a sample of 12 Eurozone countries for 1970-2011. They point to the existence of a concave, inverted U-shaped relationship between public debt and economic growth rate, with the debt turning point at about 90-100% of GDP. Through a threshold model, Égert (2012) finds arguments in favour of a negative nonlinear relationship between indebtedness and economic growth. Although the results are quite sensitive to various assumptions, the negative nonlinear effect begins at very low levels of public debt (between 20% and 60% of GDP).

On the other hand, if the weak growth is attributable for the rising debt dynamics, then a threshold would be less likely to be observed. In this case, the policy should be focused on stimulating growth. Using data of the debt ratios covering the entire IMF membership back to 1875, Pescatori et al. (2014) examine the real GDP growth per capita over the following 1, 4, 10 and 15 years when the gross public debt rose above 90% of GDP. In so doing, they attempt to overcome the reverse causality issue. Specifically, they conclude that the growth drops sharply in the first year after the debt ratio exceeds 90% of GDP, but over longer horizons, the growth performance improves dramatically. Therefore, no clear debt threshold

is found. Interestingly, they add that the initial debt trajectory is important as they do not find any sharp reduction in the growth of countries whose high debt falls below 90% of GDP. Similar conclusions are reached by Lof and Malinen (2014), who estimate panel vector autoregressions (PVAR) that describe the dynamic relation between sovereign debt and economic growth, using annual data on debt and GDP for a panel of 20 developed countries, over the period 1954-2008. They conclude that the negative correlation between debt and GDP results from the negative impact of GDP growth on debt, rather than the negative impact of debt on GDP growth. Analogously, Kempa and Khan (2016) have found causality from growth to debt to be much more prevalent, especially during the global financial crisis.

Considering the government budget constraint, the causal association between economic growth and public indebtedness is bidirectional. On the one hand, it is the low economic growth that deprives a government from budget revenues, thereby spurring debt accumulation, but on the other hand, the high public indebtedness stifles the economic growth by means of higher economic uncertainty, higher interest rates and a crowing-out effect on the private investments. Reinhart and Rogoff (2010a, 2010b) rely on descriptive statistics in order to show that the public debt level above 90% of GDP affects the median economic growth negatively by 1%, while the average rate of economic growth falls even more. Using a dataset of all 28 EU countries, Ferreira (2014) obtains through panel estimations statistically relevant bidirectional causality relations between public debt and economic growth.

A different view is shared by Fatás et al. (2019), who infer that despite the negative correlation between debt and subsequent growth, there is no convincing evidence of causality. According to them, the difficulty to pinpoint a causal effect stems from the fact that not all debts are equal, that is, the assumption whereby any given level of debt has the same consequence on economic growth, regardless of its structure, is too simplistic. Similarly, in a sample of 15 OECD countries over 2001-2017, Atanasov (2019) states that evidence for causality between the long-term debt and the economic growth emerges in less than half of the examined countries.

Due to the endogenous reaction of market interest rates to higher default risk, Ostry et al. (2010) raise the issue of keeping the debt stock at a level well below the debt limit so as to keep the fiscal space in check, which they define as the difference between the current level of public debt and the debt limit implied by the country's historical record of fiscal adjustment. The concept has since been adopted by Moody's in their assessment of fiscal risks in advanced economies.

The path to the safeguarding or the restoration of debt sustainability through the business cycle is not straightforward as various circumstances have to be taken into consideration.

In cases of limited fiscal space, the choice to preserve sustainability, during a crisis, might not be invariably an optimal policy. According to Fatás (2018), the failure to discern between permanent and transitory shocks might lead to a negative loop of fiscal contractions, that can turn out to be self-defeating. The dynamics are amplified by the hysteresis effects and the size of the multiplier. The result is a rising debt ratio despite the initial intentions to adhere to sustainability.

Even in the aftermath of the crisis, the reduction of debt itself should not be at the expense of the growth prospects of the countries. Ostry et al. (2015) argue that for countries that have ample fiscal space, the benefit of reducing debt (by deliberately running overall surpluses) is unlikely to exceed the cost of the necessary distortionary taxation. In such cases, debt-to-GDP ratios should be reduced organically, through output growth. Likewise, Houbenova (2019) claims that in times of economic recovery, the front-loading fiscal tightening through taxes is an inappropriate policy. Taking into account the euro area post-crisis economic recovery, Bobeva and Zlatinov (2019), however, claim that the underestimated various structural factors and reforms cannot continuously be compensated by expansionary fiscal and monetary policies. According to them, the implementation of fiscal incentives without structural reforms can only further deepen the macroeconomic imbalances of the EU countries, thereby increasing their vulnerability to crises.

3. Government's Role in the Debt Accumulation through the Injection-Leakage Approach

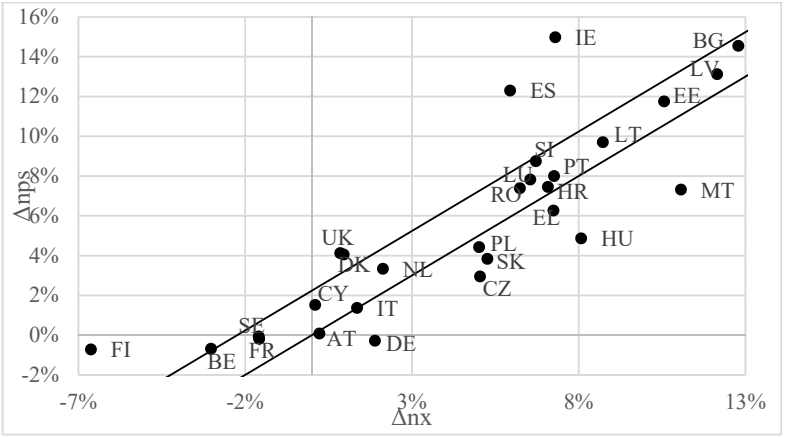
The budget balance is one of the main factors to determine the debt dynamics of a given country. Theoretically, its value could be derived from a framework which allows for the private and external sector. Using the injection-leakage identity, it could be shown that the budget deficit, bd_t, may be presented as follows:

$$bd_t = nps_t - nx_t \quad (1)$$

where bd_t is the budget deficit as % of GDP in period *t;* nps_t is the net private savings as % of GDP in period *t;* nx_t is the net exports as % of GDP in period *t*. It is of a particular interest to trace the determinants that have shaped the budget deficits' dynamics within the EU over 2000-2019. That is why, the equation is explored in its growth form. In particular, the change in the average overall budget deficit is examined between two subperiods. The crisis of 2009 is considered to best separate the two subperiods from one another, because it represents a turning point in the business cycle. For each EU country, there have been constructed the changes in the average net private savings (nps) and net exports as components of the respective change in the budget deficit. Thus, eq. (1) could be presented graphically on a scatter diagram. The area above the line $y = x$ outlines the countries with a budget deficit and vice versa.

What it could be observed in Figure 1 is that 20 countries are positioned above the $y = x$ line, that is, they have worsened their average budget balance between the two subperiods. The budget performance has dropped by 2.2 p.p. on average. This fact shows in a clear way that the EU governments have been fueling the debt dynamics after the outbreak of the crisis. Their fiscal behaviour could only be partially justified. On the one hand, the need to prop up the economy during the slump and the subsequent fear of a potential relapse into the financial and economic crisis due to insufficient fiscal stimuli explains the governments' actions. On the other hand, the usage of excessive debt exerts a largely negative influence on the economy due to rising uncertainty and interest rates.

Figure 1
Decomposed change in the average budget deficit between 2000-2008 and 2009-2019



Source: Eurostat.

The additional upper parallel line depicts clearly the countries whose budget deficits have grown more than the average level. These are Belgium, Denmark, Ireland, Spain, Finland and the United Kingdom. Except for Belgium and Finland, the rest of the countries experience lower investment and/or higher savings. As a matter of fact, the rise in the net private savings after the crisis is a strongly prevailing reason for the soaring deficits in the EU. Such development is observed in 16 member states with deteriorating budget balances. Interestingly, the falling private investments and the surging private savings have an equal contribution to this trend.

The budget surpluses of the remaining 8 EU countries have increased by 1.8 p.p. among the two subperiods. Noteworthy, all of these countries owe their soaring surpluses to the expanding exports that have generated a greater flow of taxable incomes.

Understandably, the underlying dynamics of the budget deficits in the EU has altered among the subperiods because they encompass different cyclical conditions. It seems that the booming economic dynamics before the crisis have translated into buoyant international trade and short-term capital flows impacting the governments' budget balances sizably. Particularly, in the Baltics and Bulgaria, absorption booms financed by capital inflows not only resulted in large output gaps but also spilled over into large external imbalances. Subsequently, these countries have seen their net exports adjust severely upwards since the beginning of the crisis. Atoyan et al. (2012) argue that push factors (low returns in originating countries) rather than pull factors (high returns in destination countries) drove most of the private capital flows to emerging Europe. Nevertheless, they admit that local pull factors also played an important role in some countries.

During the downturn and thereafter, the debt problems afflicting the EU have attracted much more attention and spread worries about the sustainability of the sovereign public finances.

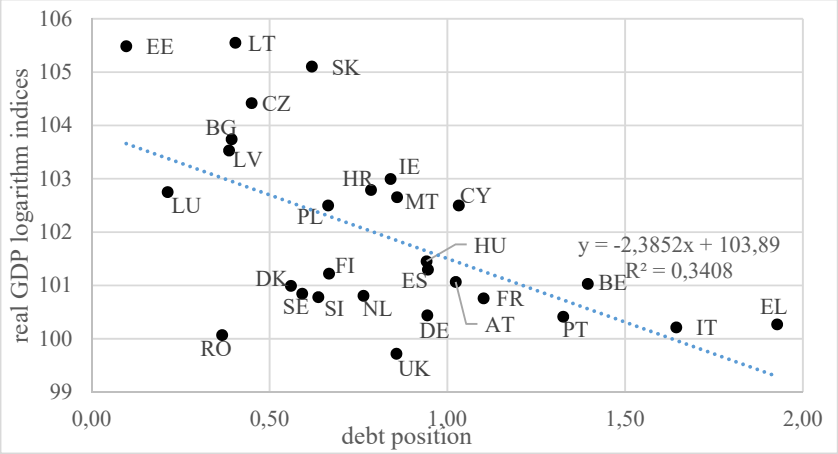
Hence, Yotzov (2016) argues that in the post-crisis period the uncertainty remains a distinctive feature of the global economies. In fact, the negative sentiments of the private agents have by all means dragged the consumption and investments down, which explains the dominant role of the net private savings in the second period. As a whole, the EU countries have systematically been fiscally incontinent throughout the whole period, regardless of the underlying reasons.

4. The Effects of the General Government's Debt on the Economy

Accumulating yet more debt, the EU countries face the prospects of lower economic growth in the future. Figure 2 depicts the negative correlation between the debt position of the EU countries and their average economic growth over 2000-2019, captured by fixed-base indices of the real GDP logarithms. The debt position of a country in a given period reflects the average debt ratio of the respective country as a share of the average EU debt ratio. In practice, countries, which are indebted more than the EU average level, tend to grow at a lower rate and vice versa, all else the same.

Figure 2

Average of real GDP logarithm indices (2000=100) and debt position in 2000-2019



Source: Eurostat, own estimations.

The government budget constraint depicts how the debt evolves through time:

$$\Delta d_t = \lambda d_{t-1} + pd_t + sf_t \quad (2)$$

where λ is the interest rate-growth differential, d_{t-1} is the first lag of the debt ratio; pd_t is the current primary deficit; sf_t is the stock-flow adjustment which relates to all other factors affecting the outstanding stock of debt but are not recorded as part of the primary balance. All variables are denoted by small letters because they are divided by the GDP. After algebraic transformation of eq. 2 the current GDP could be presented as the outcome variable:

$$Y_t = \frac{1}{d_{t-1}} BD_t - \frac{\Delta d_t}{d_{t-1}} Y_t + Y_{t-1} + \frac{SF_t}{d_{t-1}} \quad (3)$$

where BD_t is the current overall budget deficit in absolute terms; Y_t is the current nominal GDP in absolute terms, $\Delta d_t / d_{t-1}$ is the growth rate of the debt ratio in a period t; SF_t is the current stock-flow adjustment in absolute terms. The left-hand side of the equation includes only the current GDP. In contrast, the right-hand side conveys the complex interrelations determining the GDP in the current period. The first term on the right-hand side is effectively this part of the current GDP the government has contributed to. What is really important here is that the overall deficit doesn't exercise a direct influence on the production, but rather it is multiplied by a scaling factor, $1/d_{t-1}$. This quotient reflects the obligation of the government to service its debt by regularly paying interest. In practice, the ratio plays the role of a debt's grip as it may magnify or subdue the impact of the government on the actual GDP depending on whether it falls or rises. The higher the lagged debt, the higher the paid interests, the less available budget funds for public investments or any other productive expenses. The factor actually imposes a penalty for the build-up of debt burden in time, that is, the debt's grip tightens when debt increases. This inference is in line with the conclusion of Bacchiocchi et al. (2011), who find a negative correlation between debt and public investment in countries with a high debt ratio, and a positive correlation between debt and public investment in countries with low debt ratios. As it is readily seen, there is no upper bound for the rising debt, so it systematically reduces the capability of the government sector to stimulate production. Besides, if the lagged debt ratio exceeds the value of 1, the impulses to the aggregate production are less than proportional.

The second term on the right-hand side reflects the production loss due to the rise in the debt ratio expressed as a share of the current GDP. Such a loss might stem from the rise in the interest rates in the economy because of the possibly riskier profile of the country. Alternatively, the debt ratio's negative growth rate might stimulate the level of the economic activity due to the lower cost of borrowed funds.

The third term is the lagged nominal GDP. As a whole, this recursive equation captures the role of the government in the dynamics of GDP.

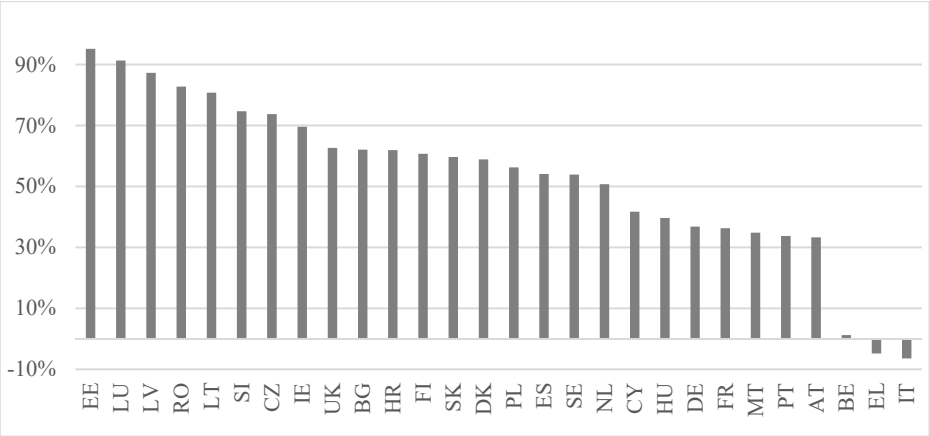
The last term is the stock-flow adjustment which reflects the accumulation of financial liabilities due to banking sector support and differences between cash and accrual accounting. Since these residuals add to the budget deficit, they also increase the GDP.

The unity of the scaling factor leads to a reasonable debt threshold beyond which the country plunges into a spiral of inefficient efforts. As a matter of fact, the implied critical debt value is consistent with the results of a growing empirical literature which shows that the negative correlation between public debt and economic growth becomes particularly strong when public debt approaches 100 percent of GDP (Reinhart, Rogoff, 2010a, 2010b; Kumar, Woo, 2014; Checherita-Westphal, Rother, 2010; Cecchetti et al., 2011). This threshold debt value provides for the opportunity to construct the leeway of each country before the impact of the government on the GDP is downgraded on account of the debt's grip. The government's leeway is virtually the difference between the introduced debt threshold amounting to 100% of GDP and the debt ratio of a country. To some extent, the constricted room before the debt's tighter grip mirrors the "fiscal space" introduced by Ostry et al. (2010). The rising debt

burden is the common cause for the emergence of the two concepts. Figure 3 presents the estimates of the government sector's leeway for each EU country before 2009. In the initial period 2000-2008, the government leeway is positive among 26 EU countries. The average leeway is 57 p.p. Notably, 25 of these countries exhibit a fiscal leeway greater than 30 p.p. The highest leeway is observed in Estonia with 95 p.p, followed by Luxembourg with 91 p.p. The only two countries that have exhausted their leeway due to substantial debt burden are Italy and Greece, which have surpassed the debt threshold by 6 p.p and 5 p.p., respectively. This inference, however, conceals the fact that there is another country on the brink of a tighter debt's grip. This is Belgium with a leeway of 1 p.p.

Figure 3

Difference between the debt threshold and the average debt for 2000-2008

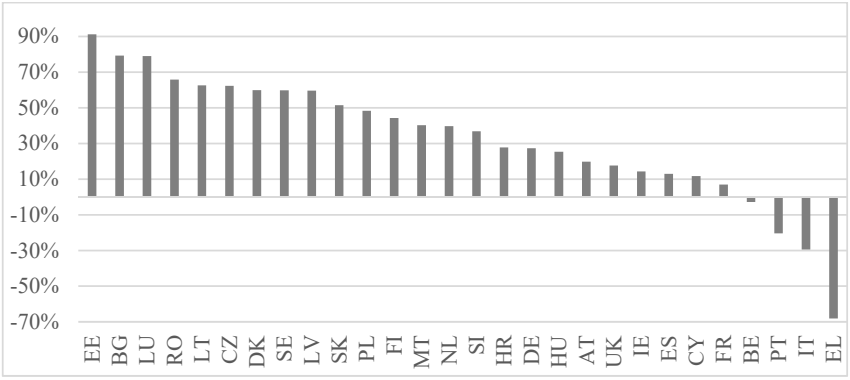


Source: Eurostat, own estimations.

Figure 4 presents the estimates of the government sector's leeway for each EU country after 2009. Over the second period, the inclination of the EU countries towards debt becomes clearer. The average fiscal leeway contracts by 14 p.p. to 43 p.p. This trend might be attributed to the crisis in 2009, which called for substantial fiscal stimulus packages. Therefore, the period is probably too short to expect full recovery of the pre-crisis public finances of the EU countries. Besides, the unusual circumstances in the post-crisis period, like subdued investments against the background of very low-interest rates, don't provide incentives for the countries to reduce the accumulated debt swiftly. Nevertheless, the distinct tendency of more debt usage warns against risks for the public finances ahead. In the second period, Estonia keeps the capacity of the government sector to stimulate the aggregate production at the highest level with 91 p.p, which is by 12 p.p. higher than the next country. The member states with a depleted leeway are Greece with -68 p.p., Italy with -29 p.p., Portugal with -20 p.p. and Belgium with -3 p.p.

Figure 4

Difference between the debt threshold and the average debt for 2009-2019



Source: Eurostat, own estimations.

The tendency for growing indebtedness is ubiquitous within the EU. This development is quite evident because only 4 EU countries have managed to loosen the debt's grip on the economy throughout the whole period. These are Bulgaria with 17 p.p., Sweden with 6 p.p., Malta with 5 p.p. and Denmark with 1 p.p. In contrast to them, the rest of the economies experience a negative change in their fiscal leeway that varies from -4 p.p. to -63 p.p. The lower boundary is mainly expanded by three economies whose fiscal leeway's changes go beyond -50 p.p. These are Greece with -63 p.p., Ireland with -55 p.p. and Portugal with -54 p.p. Noteworthy, along a group of countries which makes attempts to hold back its indebtedness there exists another group of countries which seems not to be able to crack down on its growing debt burden. This inference is supported by the observed variability of the estimates as their standard deviation rises from 27 p.p. to 36 p.p. Overall, the EU countries have not put enough efforts into the reduction of the debt burden, so the debt problems still remain pressing.

The unusual resemblance between the scaling factor from eq. 3 and the fiscal multiplier warrants further scrutiny. Indeed, there could be found an algebraic relationship between these two concepts after further transformation of the budget constraint captured by eq. 3:

$$Y_t = \frac{BD_t}{D_{t-1}(1+g_t)}Y_t - \frac{\Delta d_t}{d_{t-1}}Y_t + \frac{1}{1+g_t}Y_t + \frac{SF_t}{D_{t-1}(1+g_t)}Y_t \quad (4)$$

where g_t is the economic growth in period t and D_{t-1} is the lagged debt stock in absolute terms. The expenditure multiplier (α_t^G) is:

$$\alpha_t^G = \frac{Y_t}{S_t + Im_t} \quad (5)$$

where S_t is the total savings in the economy in period t and Im_t is the imports of the economy in period t. After the division of eq. 4 by $(S_t + Im_t)$, a direct relation between the expenditure multiplier and the debt emerges:

$$\alpha_t^G = \frac{BD_t}{D_{t-1}(1+g_t)}\alpha_t^G - \frac{\Delta d_t}{d_{t-1}}\alpha_t^G{}_t + \frac{1}{1+g_t}\alpha_t^G + \frac{SF_t}{D_{t-1}(1+g_t)}\alpha_t^G \quad (6)$$

The first term could be positive if a deficit is present and growing and vice versa. Specifically, the explanation for a positive sign of the term comes from the fact that the budget deficit stimulates the aggregate production, so the level of the GDP rises, which boosts the expenditure multiplier, all else the same. Nevertheless, the final magnitude of this term is dependent on the level of the lagged debt stock. The accumulated debt stock previously reduces the impact of the government on the economy at present as it decreases the expenditure multiplier, all else being the same. But most importantly, this effect of the debt stock persists regardless of the budget stance. The negative effect of the debt on the fiscal multiplier is supported by previous studies (Kirchner, et al., 2010; Ilzetzki, et al., 2011; among others).

The second term drags the multiplier down whenever the debt ratio soars and vice versa, all else the same. This effect is stronger, the greater the absolute growth in the debt ratio. Theoretically, the crowding-out effect on the private investments underlies this term, that is, the higher interest rates induced by the expansionary fiscal stance suppress the private sector's investment activity.

The third term conveys the nonlinear fiscal effects, that is, the expenditure multiplier rises if the economic growth declines and vice versa, all else the same. This term mirrors the countercyclical nature of the multiplier, which has been of particular interest to many researchers (Auerbach, Gorodnichenko, 2012a, 2012b; Baum, Koester, 2011; Jorda, Taylor, 2013; Canzoneri, et al., 2016; among others).

The decomposed values of the expenditure multipliers within the EU are explored at the beginning of the crisis in Figure 5 and the end of the observed period in Figure 6. In so doing, the behaviour of the expenditure multiplier could be examined in different cyclical conditions.

According to Figure 5 at the outbreak of the crisis, all countries exhibit a budget deficit which contributes positively to the value of the multiplier, though this influence is reduced by the accumulated lagged debt stock. The average influence is 0.32. Romania is the only country whose actions uplift the multiplier by more than 1.

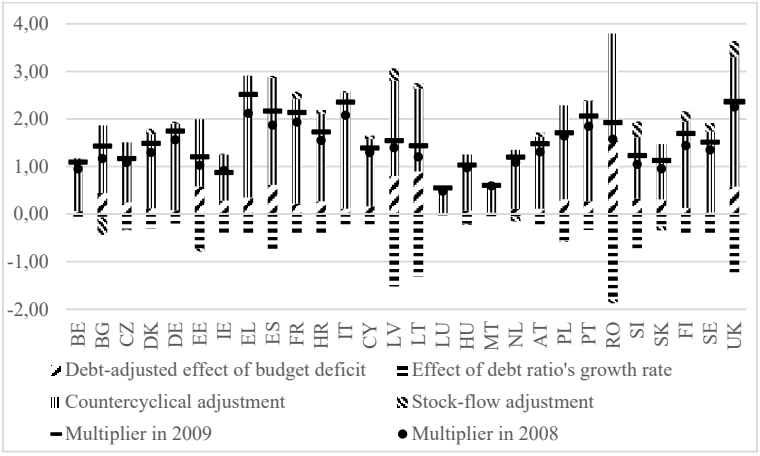
Although the negative influence of the debt ratio's growth rate on the expenditure multiplier is on average -0.49 in 2009, this impact exceeds -1 in several EU countries. These are Romania, Latvia, Lithuania and the United Kingdom. The negative effect is smallest in size in Luxembourg, Netherlands and Malta whose multipliers are reduced by 0.05 the most.

The unfavourable cyclical conditions in 2009 contribute positively to the EU expenditure multipliers' values. The average contribution is 1.65. The multipliers of the UK and Greece are cyclically augmented by more than 2.5.

The stock-flow adjustment pushed the multiplier upwards in 20 EU countries in 2009. Specifically, its positive influence is 0.11 on average and it is the highest in the United Kingdom, amounting to 0.34. The average negative impact is virtually -0.1, though it is perceptibly large in size in Bulgaria, whose multiplier is reduced by -0.37.

Figure 5

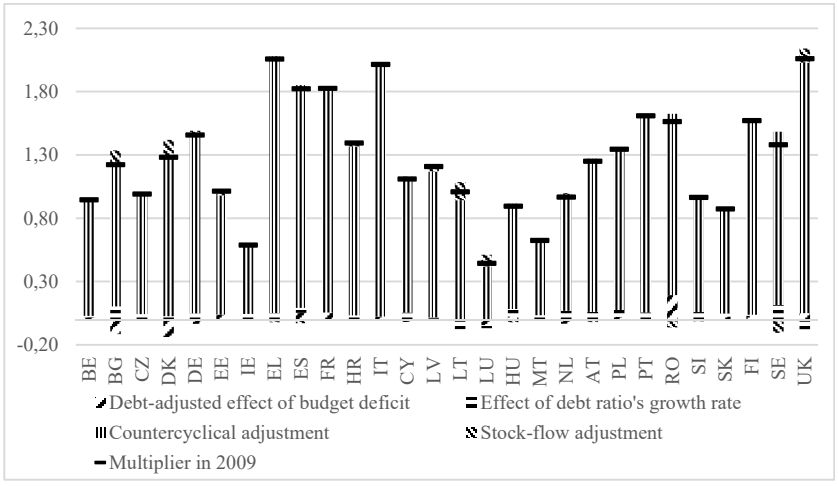
Decomposition of the expenditure multiplier in 2009 against its value in 2008



Source: Eurostat, own estimations.

Figure 6

Decomposition of the expenditure multiplier in 2019



Source: Eurostat, own estimations.

Figure 5 allows for the comparison between the pre-crisis and crisis multipliers' values. As of 2009, in all but one EU countries, the expenditure multipliers have risen. The average increase is by 0.18. Greece's expenditure multiplier soars the most by 0.4. Only the multiplier of Ireland drops, though slightly. In percentage terms, Bulgaria and Romania see their multipliers rise the most by 22%, while the average percentage growth is 13%.

In Figure 6 the contributions of the budget deficit and the debt ratio's growth rate to the magnitude of the EU expenditure multipliers in 2019 have weakened tangibly.

12 out of 28 countries exhibit a budget deficit, so they contribute to the rise in the multiplier. In Romania, the debt-adjusted effect of the budget deficit raises the expenditure multiplier the most by 0.19. This effect is smaller in France and Spain, amounting to 0.06 and 0.05, respectively. In the remaining 16 EU countries, the negative debt-adjusted effect is highest in Denmark, Bulgaria and Luxembourg but is no stronger than -0.14.

The debt ratio's growth effect is positive in 22 EU countries. In this regard, Sweden, Bulgaria and the Netherlands boost the expenditure multiplier the most, as they reduce their debt accumulation. In contrast, the United Kingdom, Lithuania and Luxembourg weigh on the expenditure multiplier by -0.08 the most.

The cyclical adjustment of the expenditure multiplier is highest in Greece, Italy and the United Kingdom and amounts to 2 in all three countries. The effect of the business cycle on the multiplier is smallest in Luxembourg, Ireland and Malta and varies between 0.42 and 0.58.

The exerted average influence of the stock-flow adjustment in 2019 has dropped by half as it is less than 0.05 in absolute value.

As a whole, the expenditure multipliers within the EU exhibit a dramatically altered magnitude and structure in 2019 compared to 2009. Specifically, 27 countries have lower multipliers a decade later. Expectedly, the improvement of the output gap has caused a drop in the multipliers. Malta is the only country whose multiplier has increased subtly.

From the decomposition of the expenditure multiplier, several inferences could be derived:

- The expenditure multipliers of the EU countries could rise by up to one-fifth in a crisis. This is a direct consequence of the multiplier's countercyclical properties within the business cycle.
- The greater the rise in the debt ratio, the lower the value of the expenditure multiplier, all else being the same.
- At any given time, the accumulated debt stock decreases the influence of the budget impulses on the real economy by reducing the expenditure multiplier.
- The implementation of a countercyclical fiscal policy throughout the economic cycle is highly desirable. Such a policy would allow the government to keep in check the accumulated debt stock prior to a crisis, to accumulate enough fiscal buffers and to stimulate the economy by running a cyclically-adjusted deficit in a crisis. These circumstances would ensure that the value of the expenditure multiplier is not reduced by the first two terms in eq. 6.
- Regardless of the prevailing output gap, the cyclical adjustment is a dominant factor for the value of the expenditure multiplier. The lower the economic growth, the higher the expenditure multiplier, all else being the same.

- the stock-flow adjustment (SF) could increase in importance as a determinant for the expenditure multiplier during crises.

In reality, because of its various characteristics, the EU economies have different tolerable levels of debt ratio. The level of indebtedness that is totally bearable for some countries might make some other countries struggle with severe hardships. In fact, these difficulties may not solely pertain to sudden events like a default or a loss of access to capital markets. Rather, such countries begin to experience the deceleration of the economic growth due to high debt stock more tangibly. It is even possible that many countries experience difficulties long before. The prerequisites for such development are various. For instance, the private sector could be debt-averse, because sovereign defaults have already occurred in the past. It could also be the case that the government's fiscal policy lacks credibility, so the economic agents manifest depressed animal spirits. It is even likely that a specific event on an international scale might contribute to lower debt tolerance. This reasoning implies that the transmission mechanisms through which the debt burden stifles the economic growth could be subtle and might involve nonlinearities. To this end, eq. 3 could be viewed from yet another perspective by feeding the injection-leakage identity into it:

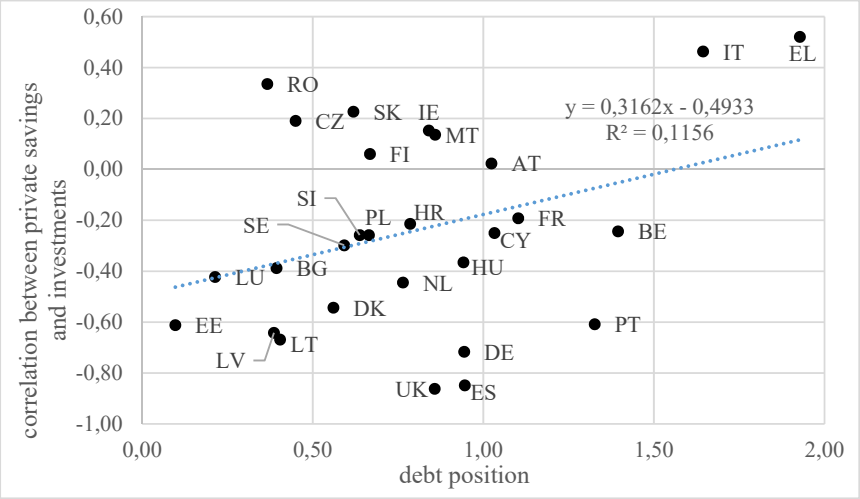
$$Y_t = \frac{1}{d_{t-1}} NPS_t - \frac{1}{d_{t-1}} NX_t - \frac{\Delta d_t}{d_{t-1}} Y_t + Y_{t-1} + \frac{SF_t}{d_{t-1}} \quad (7)$$

From a macroeconomic point of view, the net private savings should be positively, though imperfectly, correlated with the net exports. This is the case because the private sector lends the excessive savings either to the government or to the non-residents. This positive correlation provides for the opportunity to examine whether the private sector's behaviour alters when the general government accumulates debt by focusing solely on the net private savings.

Figure 7 provides evidence that the correlation between private savings and investments is negative and changes in correspondence with the debt position of the country. In countries that are indebted less than the EU average level, the negative correlation is usually stronger, that is, the rise in the savings is associated with a fall in the investments. In fact, when the indebtedness is lower than the EU average level, the private sector behaves more cyclically. Nonetheless, provided that the debt burden rises, this cyclical behaviour weakens, that is, the debt renders the private sector distant from the business cycle. This finding is important as it has serious implications for the future prospects of the given economy. Seemingly, against the backdrop of higher than the average EU indebtedness, the private sector's dynamics steadily loses its capacity to stimulate the economic growth. Specifically, during booms and busts, the distance between the private savings and investments is usually expected to rise as one of these aggregates rises and the other falls and vice versa. Such dynamics propel the economic growth in good times, thereby allowing for the government to accumulate fiscal buffers for bad times. In a situation of high indebtedness, however, the distance between the private savings and investments may not enlarge as it would be in the case of low debt stock. Thus, the economic growth would be relatively lower and the government unable to pile up substantial buffers for possible unfavourable economic conditions. Understandably, the budget stimuli during the crisis would be at the cost of higher debt accumulation.

Figure 7

Private savings-investment correlation and debt position in 2000-2019

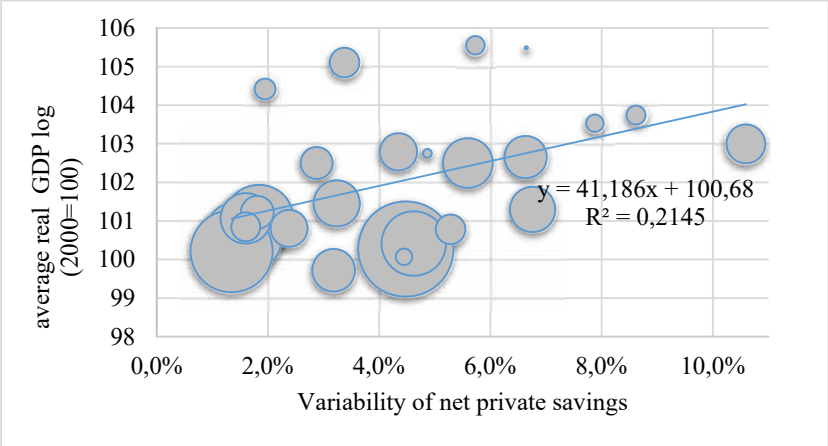


Source: Eurostat, own estimations.

Figure 8 serves to corroborate several important points in the discussion. Firstly, countries whose net private savings tend to be more variable in time exhibit higher economic growth. Secondly, if the indebtedness is measured by the width of the balloons, there could be noticed a general tendency for the indebted above the EU average level countries to position themselves in the lower left area of Figure 8, that is, the variability of the net private savings is lower if the debt stock is larger. This confirms the proposition that the private sector tends to act somehow inconsistently with the business cycle in a high-debt environment. The reason why the private agents slowly become estranged from the business cycle when the debt ratio is higher than the EU average is their expectations about the future. They virtually have to plan their consumption and investment behaviour over a longer horizon, so that they could take into account the probable higher future tax burden and the unfavourable interest dynamics.

Although the debt burden is negatively associated with the correlation between the private savings and investments, up to this point, it remains unclear whether the relationship is linear in nature. If this is the case, then the increase in debt would always exert a constant negative influence on the distance between private savings and investments. Analogously, the negative impact of debt on the economic growth is present at any given time. Therefore, there are direct consequences the moment a country makes use of debt financing. If the debt weakens the negative correlation between private savings and investments in a nonlinear way, that is, there is a certain threshold beyond which the negative correlation weakens exponentially, then the usage of debt becomes yet costlier in terms of output. The next section presents the econometric methodology, which is used later on to address the issue of a possible nonlinearity between the net private savings and the debt stock.

Figure 8
Standard deviation of net private savings and indices of average real GDP logarithm by a degree of indebtedness in 2000-2019



Source: Eurostat.

5. Empirical Methodology and Data

The TAR models are introduced by Tong (1983). They are actually piecewise linear. The threshold process divides one-dimensional Euclidean space into k regimes, with a linear autoregressive model in each regime. Such a process makes the model nonlinear for at least two regimes, but remains locally linear (Tsay, 1989).

$$nps_t = \sum_{j=1}^{J} I_t^{(j)} \left(\varphi_0^{(j)} + \sum_{i=1}^{p_j} \varphi_i^{(j)} nps_{t-i} + u_t^{(j)} \right), r_{j-1} \leq z_{t-d} \leq r_j \qquad (8)$$

where $I_t^{(j)}$ is a Heaviside indicator for j-th regime, npv_t is the net private savings, z_{t-d} is an observed variable determining the switching point and $u_t^{(j)}$ is a zero-mean independently and identically distributed error process. The delay parameter, d, is set to one, as it is presumed that the net private savings in the current period are plausibly determined by the first lag of the debt threshold. Since not all debts are equal, the relation between the net private savings and the debt remains highly country-specific. Hence, a TAR model is estimated for each EU country.

Before 2001, there is incomplete data availability of the total government revenues and expenditures of the EU countries, which are needed to derive the private sector aggregates. Due to this reason, the forthcoming analysis relies on the data from that moment on. Since the data are on a quarterly basis, all the time series are seasonally adjusted. In order to be easily interpretable afterwards, the time series are then transformed into a logarithmic form.

Subsequently, the properties of the net private savings for each country are examined. The data are checked for stationarity using the ADF test and the KPSS test. A specification with an intercept is adopted. The null hypothesis of the ADF test implies a unit root, while the KPSS test cannot reject the stationarity under the null hypothesis. The results from the ADF test are present in Appendix 1.

Although the ADF test cannot reject the null hypothesis for most of the net private savings (nps) at levels, there exist several countries whose time series are under question. These are Belgium, Czech Republic, Denmark Cyprus, Luxembourg and Hungary. After the KPSS test for these time series alone, the results for Czech Republic, Cyprus, Luxembourg and Hungary still remain debatable. Nonetheless, due to the short length of the observed period and the fact that the majority of the examined nps time series already contain a unit root at least at 5% level of significance, the net private savings of the aforementioned countries may also plausibly be viewed as rather nonstationary at levels despite the counterintuitive result from the ADF test.

Under the ADF test, the debt time series of all countries have a unit root at levels of 5%. Most of the time series are rendered stationary after first differencing except these of Ireland, Spain, Latvia, Malta, Portugal, Romania and the United Kingdom. The applied KPSS test for these time series alone confirms that they are rather I(1), though the results for Malta remain not clear-cut. Eventually, the debatable debt time series of the aforementioned EU countries would be assumed to be stationary at first differences.

The specific order *p* of the TAR models is determined by means of the Schwarz information criterion (SIC). The SIC values of the TAR models with various orders are presented in Appendix 2. The chosen order of the autoregressive processes is summarized in Table 1.

Table 1

Order *p* of the AR suggested by the SIC

BE	BG	CZ	DK	DE	EE	IE	EL	ES	FR	HR	IT	CY	LV
p=2	p=1	p=1	p=1	p=1	p=1	p=2	p=3	p=2	p=1	p=1	p=3	p=2	p=1
LT	LU	HU	MT	NL	AT	PL	PT	RO	SI	SK	FI	SE	UK
p=1	p=1	p=2	p=2	p=2	p=2	p=1	p=2	p=1	p=2	p=1	p=1	p=2	p=1

Source: Own estimations

6. Empirical Results

The TAR models of the net private savings for each EU country are displayed in Appendix 3. The first lag of the respective debt ratio is used as a threshold variable in all models except the ones for Spain, France, Italy and Romania.

The analysis of the estimated models leads to the inference that in the one-regime models as well as in the first regime of two-regime models, the parameters of the autoregressive terms are always negative, that is, a 1% increase in the lagged net private savings translates into a drop in the current net private savings. A plausible explanation is that the leakages and the injections in the economy take turns which contributes to sustaining a given level of private sector's activity. In the second regime of the two-regime models, however, there could be

observed that some signs of the autoregressive terms are positive. In other words, in countries that are indebted higher than the EU average level, the leakages prevail over the injections, which could account for their lower economic growth.

In Appendix 4 the adequacy of the models is examined through several diagnostic tests for autocorrelation, heteroskedasticity and normal distribution of the residuals.

Overall, at 5% level, the Breusch-Godfrey test using 4 lags cannot reject the null hypothesis of no serial correlation in all models except in these of Czech Republic and Lithuania. In 5 models, the White test rejects the null hypothesis of a constant variance at 5% level of significance. According to the Jarque-Bera test, the null hypothesis of normally distributed error terms cannot be rejected in 9 models. Due to the small number of observations, the results from the Jarque-Bera test are rather expected. Against the backdrop of a decent performance under the diagnostic tests, the TAR models have in command rather low explanatory power. This means that the debt stock is vital but hardly the only determinant for the net private savings.

The negative influence of the debt stock on the economic growth works through the suppression of the net private savings' cyclical behaviour. This inference raises the question of whether the rising debt burden generates a one-off or lasting effect on the net private savings. This supposition could be tested if the lag length of the autoregressive processes is regressed on the indebtedness of the EU countries. The sign of the parameter shows the persistence of the debt's impact on the net private savings.

$$\underset{}{p_i} = \underset{(0{,}174)}{0{,}6} + \underset{(0{,}192)}{1{,}15} \times dps_i \tag{9}$$

where p_i is the pth order of the TAR model of the given country i; dps_i is the debt position of the given country i. The respective standard errors are in brackets. The constant and the parameter of dps_i are statistically significant at 1% level. Specifically, the higher than the EU average debt burden corresponds directly with the higher persistence present in the models of indebted countries. In other words, the greater debt ratios correlate with higher orders of the TAR models. This observation supports the inference that the private sector becomes yet more aware of the potential hardships following the rising debt stock.

Earlier it was found that the lagged debt ratio above 100% of GDP could serve as an indicative threshold above which a budget impulse of a given size is already unable to generate at least an equiproportional change in output, all else being equal. Also, it was pointed out that from an intuitive standpoint, the threshold might emerge earlier. The mentioned reasons for the occurrence of this event all pertain to the behaviour of the economic agents. A sudden change in their behaviour might trigger an unexpected fall in the budget revenues, thereby leading to a budget deficit. Hence, it is important to examine whether such nonlinearity might emerge as a result of debt stock greater than the EU average level. This hypothesis could be explored as the number of regimes in the TAR models is regressed on the debt positions of the EU countries.

$$\underset{}{nj_i} = \underset{(0{,}169)}{0{,}89} + \underset{(0{,}186)}{0{,}44} \times dps_i \tag{10}$$

where nj_i is the number of regimes in the TAR model of the given country i; dps_i is the debt position of the given country i. The respective standard errors are in brackets. The constant is statistically significant at 1% level, while the parameter of dps_i is significant at 5% level. It seems that the higher than the EU average the debt ratio is, the greater the number of regimes a country might fall into. Such a conclusion comes as no surprise, because the greater debt burden is certainly more likely to stir worries about the sustainability of the government. In such a situation, the economic agents might be stimulated to adjust their spending behaviour.

7. Conclusion

The general economic outlook after the crisis in 2009 reveals the dominant role of the net private savings in the negative change in the budget balances. Some EU governments fail to adjust their budgets in view of the relatively lower revenues, which leads to debt accumulation. Such dynamics is unfavourable for the economic prospects of the country because the higher debt stock is graphically found to correspond to lower economic growth. This is also evidenced by the transformed budget equation, whose outcome variable is the current GDP. There have been discerned two transmission channels through which the debt exerts its negative impact on the aggregate production.

Firstly, the debt stock suppresses the government's capacity to affect the economy as the interest expenses on the growing debt absorb yet greater budget funds. Beyond a certain debt threshold, the budget impulses become unable to generate equipropornial influence on the GDP anymore, because the worsened budget structure is inconsistent with a robust economic growth. It bears emphasizing that the concept of the fiscal multiplier strongly relates to the budget exhaustion induced by the debt accumulation. In fact, the government budget constraint is demonstrated to explicitly outline the negative relation between the expenditure multiplier and the debt.

Secondly, the debt affects the overall economy. In particular, the debt stock modifies the behaviour of the private agents. In usual circumstances, they act consistently with the business cycle. In a high debt environment, however, their spending behaviour alters and might even adjust downwards in a sudden way. Such unexpected change in the private expenditures due to pessimistic expectations effectively triggers a nonlinearity between the debt stock and the economic growth. Actually, in heavily indebted EU countries, such nonlinear private behaviour is confirmed by the estimated threshold autoregressive models. Moreover, the high level of the accumulated debt stock alters the private sector's spending in a persistent way signalling for a self-exciting process. The governments have to be wary about the consequences of the accumulating debt burden. The credibility of the fiscal policy can certainly reduce the likelihood of an upward change in the net private savings. Nonetheless, against the backdrop of consistent fiscal imprudence, the debt tolerance is easily exhaustible.

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Appendix 1

Table 2

Tests for unit roots

Test / Variable	Emp. statistics – ADF – BIC		Test / Variable	Emp. statistics – ADF – BIC	
	at levels	first difference		at levels	first difference
lgnps_01_be_sa	-5,270300***	-8,876650***	lgdebt_01_be_sa	-1,513857	-5,654556***
lgnps_02_bg_sa	-1,515571	-11,85474***	lgdebt_02_bg_sa	-2,200151	-3,003727**
lgnps_03_cz_sa	-5,245569***	-12,75190***	lgdebt_03_cz_sa	-1,283678	-4,001856***
lgnps_04_dk_sa	-2,253678	-11,02319***	lgdebt_04_dk_sa	-1,320096	-7,905678***
lgnps_05_de_sa	-3,012134**	-11,28288***	lgdebt_05_de_sa	-1,144183	-5,787596***
lgnps_06_ee_sa	-2,516552	-11,23889***	lgdebt_06_ee_sa	-1,022607	-6,010656***
lgnps_07_ie_sa	-1,521528	-10,68070***	lgdebt_07_ie_sa	-2,031255	-1,744872
lgnps_08_el_sa	-2,171669	-13,25915***	lgdebt_08_el_sa	-0,656830	-9,638515***
lgnps_09_es_sa	-1,071214	-7,694168***	lgdebt_09_es_sa	-1,153828	-2,371271
lgnps_10_fr_sa	-2,035681	-9,268849***	lgdebt_10_fr_sa	-1,429117	-3,705744***
lgnps_11_hr_sa	-2,222457	-10,78968***	lgdebt_11_hr_sa	-1,413138	-2,997417**
lgnps_12_it_sa	-2,040142	-9,301729***	lgdebt_12_it_sa	-0,520419	-5,595026***
lgnps_13_cy_sa	-3,155950**	-9,074083***	lgdebt_13_cy_sa	-0,889043	-6,305044***
lgnps_14_lv_sa	-1,707657	-4,730750***	lgdebt_14_lv_sa	-2,335774	-2,331706
lgnps_15_lt_sa	-1,949469	-11,88491***	lgdebt_15_lt_sa	-1,436770	-3,009978***
lgnps_16_lu_sa	-4,797065***	-8,517455***	lgdebt_16_lu_sa	-1,084257	-9,180357***
lgnps_17_hu_sa	-7,012065***	-10,15148***	lgdebt_17_hu_sa	-2,443473	-7,873460***
lgnps_18_mt_sa	-2,770939*	-9,499615***	lgdebt_18_mt_sa	2,165241	-2,630590*
lgnps_19_nl_sa	-2,087831	-9,401982***	lgdebt_19_nl_sa	-0,873224	-6,473616***
lgnps_20_at_sa	-1,313894	-10,88160***	lgdebt_20_at_sa	-1,318651	-8,798112***
lgnps_21_pl_sa	-2,741557*	-11,31614***	lgdebt_21_pl_sa	-2,454614	-6,297050***
lgnps_22_pt_sa	-2,148386	-14,88429***	lgdebt_22_pt_sa	-1,559008	-1,849427
lgnps_23_ro_sa	-2,162961	-12,10671***	lgdebt_23_ro_sa	-1,461454	-2,625147*
lgnps_24_si_sa	-1,764282	-10,01324***	lgdebt_24_si_sa	-0,637837	-5,740912***
lgnps_25_sk_sa	-2,826486*	-12,38423***	lgdebt_25_sk_sa	-1,292183	-4,805102***
lgnps_26_fi_sa	-2,685532*	-13,39630***	lgdebt_26_fi_sa	-0,549960	-3,296188**
lgnps_27_se_sa	-1,996230	-13,93945***	lgdebt_27_se_sa	-0,722105	-6,897426***
lgnps_28_uk_sa	-2,056096	-9,510568***	lgdebt_28_uk_sa	-1,760302	-2,244437
KPSS			KPSS		
lgnps_01_be_sa	0,476641**	0,045484	lgdebt_07_ie_sa	0,727285**	0,226926
lgnps_03_cz_sa	0,224040	0,101673	lgdebt_09_es_sa	0,920876***	0,235914
lgnps_05_de_sa	0,833221***	0,051832	lgdebt_14_lv_sa	0,797446***	0,104502
lgnps_13_cy_sa	0,122291	0,050899	lgdebt_18_mt_sa	0,610769**	0,496293**
lgnps_16_lu_sa	0,179983	0,069463	lgdebt_22_pt_sa	1,031320***	0,389192*
lgnps_17_hu_sa	0,144142	0,205007	lgdebt_23_ro_sa	0,675736**	0,160850
			lgdebt_28_uk_sa	1,024439***	0,254589

Source: Own estimations.

*The levels of significance at 1%, 5% and 10% are denoted respectively as ***, ** and *. The empirical statistic of the ADF test is compared with the critical values by MacKinnon (1996).*

Appendix 2

Table 3

BIC values of possible TAR models from 1 to 5 autoregressive terms

	BIC				
	ar(1)	ar(2)	ar(3)	ar(4)	ar(5)
BE	-5,127017	[-5,112497]	-5,034603	-5,035810	-4,964242
BG	-3,460739*	-3,404714	-3,440907	-3,313869	-3,221722
CZ	[-4,839275]	-4,813138	-4,794708	-4,844561	-4,810284
DK	-5,317637*	-5,248268	-5,179181	-5,100910	-5,066392
DE	-5,656193*	-5,610494	-5,539852	-5,490506	-5,433136
EE	-4,022535*	-3,975081	-3,905994	-3,962105	-3,782361
IE	-2,596398	[-2,691072]	-2,671589	-2,708968	-2,730005
EL	-3,662398	-3,644731	-3,683313*	-3,644003	-3,521707
ES	-4,904756	-4,915725*	-4,904780	-4,832284	-4,808469
FR	-6,619383*	-6,492870	-6,440892	-6,426843	-6,411535
HR	-4,570905*	-4,536596	-4,494729	-4,432945	-4,482414
IT	-6,002550	-5,947946	[-5,888948]	-5,843888	-5,544678
CY	-2,583062	[-2,569813]	-2,497433	-2,502066	-2,425102
LV	-4,394320*	-4,350134	-4,255438	-4,199698	-4,137354
LT	-3,897013*	-3,846670	-3,770026	-3,751949	-3,656654
LU	-5,148845*	-5,137640	-5,110225	-5,036605	-5,012891
HU	-4,592597	-4,648981*	-4,629974	-4,577714	-4,557958
MT	-4,087331	-4,158983*	-4,147718	-3,801163	-3,830952
NL	-5,053204	-5,053601*	-4,995237	-5,049499	-5,023647
AT	-5,558998	-5,637346*	-5,616940	-5,574190	-5,543583
PL	-5,268687*	-5,212684	-5,267456	-5,200563	-5,155157
PT	-4,034752	[-4,023107]	-3,960157	-3,929844	-3,911196
RO	[-3,801188]	-3,815582	-3,741321	-3,662677	-3,731443
SI	-3,911453	-3,944516*	-3,878016	-3,799390	-3,790671
SK	-5,474259*	-5,410709	-5,335376	-5,283381	-5,212234
FI	-5,290327*	-5,217871	-5,143292	-5,110680	-5,041754
SE	-6,146518	-6,156846*	-6,108041	-6,041627	-6,119828
UK	-5,879215*	-5,759567	-5,689766	-5,734288	-5,656719

The selected model is either in parentheses as the one chosen by the BIC or in square brackets as the one preferred due to better performance under the diagnostic tests.

Appendix 3

Table 4

TAR models of the EU countries

Country	regime	threshold (Δ in debt ratio)	c	$ar(1)$	$ar(2)$	$ar(3)$
BE	1		-0,00	-0,56***	-0,25**	
BG	1		-0,00	-0,33***		
CZ	1		-0,00	-0,4***		
DK	1		-0,00	-0,28**		
DE	1		-0,00	-0,3**		
EE	1		0,00	-0,3**		
IE	1		-0,00	-0,71***	-0,4***	
EL	1	d_{t-1}<0,015	0,00	-0,28**	-0,01	0,03
	2	d_{t-1} ≥0,015		-0,87***	-0,68*	1,27***
ES	1	d_{t-3}<0,019	0,00	0,28**	0,46***	
	2	d_{t-3} ≥0,019		-0,4**	-0,12	
FR	1	d_{t-5}<0,004	-0,002	0,29		
	2	d_{t-5} ≥0,004		-0,43***		
HR	1		0,00	-0,24**		
IT	1	d_{t-1}<0,002	0,00	-0,13	-0,28*	-0,29*
	2	d_{t-1} ≥0,002		-0,32	0,33**	0,4**
CY	1		-0,00	-0,66***	-0,25**	
LV	1	d_{t-1}<0,008	-0,00	-0,47***		
	2	d_{t-1} ≥0,008		0,29*		
LT	1		0,00	-0,35***		
LU	1		0,00	-0,43***		
HU	1		-0,00	-0,67***	-0,35***	
MT	1	d_{t-1}<0,006	0,00	-0,81***	-0,42***	
	2	d_{t-1} ≥0,006		0,28	0,24*	
NL	1		-0,00	-0,7***	-0,26**	
AT	1		-0,00	-0,84***	-0,38***	
PL	1		0,00	-0,31***		
PT	1		0,00	-0,68***	-0,27**	
RO	1		0,00	-0,37**		
SI	1		0,00	-0,73***	-0,32*	
SK	1		-0,00	-0,38***		
FI	1		-0,00	-0,45***		
SE	1		-0,00	-0,4***	0,01	
UK	1	d_{t-1}<0,005	0,00	-0,42***		
	2	d_{t-1} ≥0,005		0,42*		

Source: Own estimaions.

Appendix 4

Table 5

Diagnostic tests of the TAR models

Country	R-squared	BGT(4)	HWT	JBT
BE	0,25	0,19	0,16	0,00
BG	0,11	0,66	0,25	0,00
CZ	0,17	0,04	0,00	0,00
DK	0,08	0,95	0,75	0,00
DE	0,09	0,68	0,00	0,17
EE	0,09	0,75	0,08	0,00
IE	0,37	0,33	0,76	0,00
EL	0,51	0,48	0,00	0,95
ES	0,24	0,2	0,26	0,76
FR	0,13	0,65	0,26	0,01
HR	0,06	0,64	0,07	0,00
IT	0,2	0,1	0,81	0,96
CY	0,32	0,17	0,13	0,00
LV	0,15	0,11	0,89	0,00
LT	0,12	0,4	0,01	0,00
LU	0,19	0,08	0,99	0,05
HU	0,34	0,27	0,88	0,29
MT	0,43	0,17	0,64	0,00
NL	0,35	0,87	0,03	0,00
AT	0,46	0,14	0,98	0,05
PL	0,1	0,12	0,57	0,00
PT	0,35	0,36	0,54	0,23
RO	0,13	0,64	0,45	0,02
SI	0,38	0,86	0,47	0,00
SK	0,15	0,64	0,51	0,00
FI	0,2	0,97	0,94	0,49
SE	0,18	0,65	0,07	0,64
UK	0,16	0,52	0,5	0,65

Source: Own estimations.