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## **How Vulnerable is Fiscal Policy in Central and Eastern European Countries?\***

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### **ABSTRACT**

The aim of this paper is to investigate the vulnerability of fiscal policy in the case of 10 Central and Eastern European countries. We use a newly introduced indicator named Cumulative Excess of the Primary Balance (CEPB) which shows the deviations of current fiscal policy from a fiscal rule implying the stabilization of the public debt. Using annual data extracted for 1996-2010 period, we find no evidence of fiscal vulnerability in the case of Bulgaria and Estonia. For rest of the countries the results indicate more or less fiscal vulnerability depending how large CEPB is.

**Keywords:** Fiscal policy, Primary balance, Public debt, Fiscal sustainability

**JEL codes:** E62, H62, H63

### **1. Introduction**

There is a large body of research bringing into attention multiple difficulties that fiscal policy of the advanced economies has confronted for many decades: growing social spending, large budgetary deficits, increasing public debt, ageing population. But, what is the situation for Central and Eastern European (CEE) countries that recently joined the European Union (EU)? For the last twenty years, they have faced growing challenges in their ongoing economic development: the transition from the state-owned economy to the market economy; the efforts of catching up the gap from the advanced EU economies; the process of joining the European Union; the challenge of achieving the constraints imposed by Maastricht Treaty (MT). Hence, government's interventions were strongly needed also

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requiring large spending. The data show that even if the government expenditure was below the average size recorded for the advanced economies, the increase rate was higher in the case of CEE<sup>1</sup>. There are also previous studies revealing some particularities of CEE fiscal policy. In that sense, Cuaresma, Eller and Mehrotra (2011) found that fiscal stance in the Czech Republic, Hungary, Poland, Slovakia and Slovenia is affected by the fiscal policy changes in Germany, and, if German government undertakes a fiscal expansion, than all the five countries will by fiscal easing, more on the public spending than on the revenue side. Concerned on keeping a low taxation rate to stimulate economic growth and investments, on one hand, and concerned on satisfying the growing needs due to the structural changes by public investments, CEE governments might have run a too expansionary fiscal policy that led to large fiscal imbalances and accumulation of public debt.

Afonso, Nickel and Rother (2005) also pointed out that public debt-to-GDP ratio in Central and Eastern European countries was below the indebtedness ratio for the advanced European economies, but, in exchange, the increasing rate of public debt was much higher. Hence, the authors argued that fiscal consolidation is strongly needed. Moreover, Mihaljek (2009) showed that CEE countries financed their long expansion to a great extent by foreign borrowing, and, given the scarcity of external sources of funding in the latest years, private consumption and investment in the region will have to adjust. In addition, according to Ciarlone and Trebeschi (2006) if there is a wrong balance between internal and external borrowings, this could lead to a sharply increase in the cost of capital, hence exposing economy to a debt crisis.

Governments' fiscal response to various shocks has a great importance in order to absorb them and to avoid transforming them into systemic risk. Thus, a flexible and healthy fiscal policy which reacts immediately and as expected represents a comparative advantage. Concerning the CEE countries, Stoian and Câmpeanu (2010) found that for the cases of Bulgaria, the Czech Republic, Estonia, Hungary, and Lithuania, governments have the ability to run a primary surplus – in the short term - when a shock on public debt occurs. On contrary, in the case of Latvia, Poland, Romania, and Slovakia, governments' response is opposite as expected: they have the tendency to lower surpluses when public debt increases.

Previous literature suggests that fiscal policy of Central and Eastern European had to face various challenges during these decades. Therefore, we aim in examining whether these difficulties made fiscal policy more vulnerable in the sense of having a solvency risk exposure<sup>2</sup>. This paper focuses on ten Central and Eastern European countries, namely, Bulgaria, the Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Romania, Slovakia and Slovenia, in the following referred to as CEE-10<sup>3</sup>. We investigate fiscal vulnerability using the methodology newly introduced by Stoian (2011a,b) which allows indicating the deviations of current fiscal policy from a fiscal rule implying the stabilization of the public debt. The rest of the paper is structured as follows: Section 2 describes the methodology used for assessing fiscal vulnerability in CEE-10. Section 3 presents a general overview of some key fiscal variables which could affect public debt dynamic, hence increasing the solvency

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<sup>1</sup> We computed annual averages and the average of the increase rate of government total expenditures to-GDP ratio for CEE and for EU15 using annual data extracted for 1996-2010 and available from Ameco.

<sup>2</sup> We refer to fiscal solvency risk exposure considering government's ability for meeting the intertemporal budget constraint.

<sup>3</sup> We use the following acronyms: Bulgaria-BG; the Czech Republic-CZ; Estonia-EE; Latvia-LV; Lithuania-LT; Hungary-HU; Poland-PL; Romania-RO; Slovenia-SI; Slovakia-SK.

risk exposure. Section 4 comprises of the empirical results and further discussions. Section 5 gives the concluding remarks of the study.

## 2. Methodology

Reviewing the existing literature investigating fiscal vulnerability we found only few papers providing a comprehensive or explicit definition of this concept or related (Hemming and Petrie, 2000; Brix, Shatalov and Zlaoui, 2000; Detragiache and Spilimbergo, 2001; Hemming, Kell and Schimmelpfennig, 2003; Rial and Vicente, 2004; Frankel and Saravelos, 2010; Greene, 2011; Hayes, 2011). But all the debates converge to a general accepted view which suggests that fiscal policy is vulnerable whenever there is an increased probability that governments fail in achieving intertemporal budget constraint (IBC). At this point, one might legitimately ask which the distinction between fiscal vulnerability and fiscal sustainability is considering that both concepts rely on the solvency criteria. We may argue that fiscal sustainability considers the fulfillment of IBC on the long run whilst fiscal vulnerability indicates how IBC is affected on short term due to some changes of the key fiscal indicators. Hence, the understanding of fiscal vulnerability gives also useful insights about the factors that could endanger fiscal sustainability.

Concerning the methodology of studying the vulnerability of fiscal policy, we also found only few approaches. For instance, Hemming and Petrie (2000) and Hemming, Kell and Schimmelpfennig (2003) provided a list of factors and various aspects affecting fiscal policy that should be considered when analyzing fiscal vulnerability. Rial and Vicente (2004) examined fiscal vulnerability for the case of Uruguay using sensitivity analysis of public debt to changes in the key variables affecting its dynamic: GDP growth rate, interest rate and real devaluation. Baldacci, McHugh and Petrova (2011) and Baldacci, Petrova, Belhocine, Dobrescu and Mazraani (2011) developed a fiscal vulnerability index indicating the deviations of key fiscal variables from their historical norm defined as 10 years cross country averages.

Stoian (2011a,b) also introduced a new method of studying fiscal vulnerability which bases on the assumption that governments aim in stabilizing public debt when confronting large indebtedness ratios or increasing indebtedness rate. Basically, we can check whether government is able to generate sufficient revenues to finance the primary expenditures without increasing public debt. Thus, this method firstly uses a public debt dynamic equation that estimates the primary balance which stabilizes public debt. At time  $t$ , government has to borrow money ( $B_t$ ) to finance the primary deficit (the difference between primary expenditures,  $G_t$ , and government revenues,  $V_t$ ), interest payment related to previous year ( $i \cdot B_{t-1}$ ) and public debt from previous year ( $B_{t-1}$ ):

$$B_t = G_t - R_t + B_{t-1} + i \cdot B_{t-1} \quad (1)$$

where  $i$  is the nominal interest rate.

Rearranging equation (1), a different form is obtained:

$$B_t - B_{t-1} = G_t - R_t + i \cdot B_{t-1} \quad (2)$$

Considering the variables as ratios to GDP (small caps denote that) and using GDP deflator ( $P_t$ ) and real GDP ( $Y_t$ ), equation (1) becomes:

$$\frac{B_t}{P_t Y_t} - \frac{B_{t-1}}{P_{t-1} Y_{t-1}} \cdot \frac{P_{t-1} Y_{t-1}}{P_t Y_t} = \left( \frac{G_t}{P_t Y_t} - \frac{R_t}{P_t Y_t} \right) + i \cdot \frac{B_{t-1}}{P_{t-1} Y_{t-1}} \cdot \frac{P_{t-1} Y_{t-1}}{P_t Y_t} \quad (3)$$

Defining inflation rate as:  $\pi_t = \frac{P_t}{P_{t-1}} - 1$ , and real growth rate as:  $g_t = \frac{Y_t}{Y_{t-1}} - 1$ , equation (3) can be

written as:

$$b_t - \frac{1}{(1+\pi)(1+g)} b_{t-1} = p_t + \frac{i}{(1+\pi)(1+g)} b_{t-1} \quad (4)$$

where  $p_t$ =primary balance-to-GDP ratio, at time  $t$ .

If we assume that government aims at stabilizing public debt, then it will ensure that public debt-to-GDP ratio remains unchanged ( $b_t = b_{t-1}$ ). In this context, equation (4) becomes:

$$-p_t = \frac{i}{(1+\pi)(1+g)} b_{t-1} - \frac{(1+\pi)(1+g)-1}{(1+\pi)(1+g)} b_{t-1} \quad (5)$$

Rearranging terms in equation (5), it becomes:

$$p_t = \frac{i - [(1+\pi)(1+g) - 1]}{(1+\pi)(1+g)} b_{t-1} \quad (6)$$

Considering small variations of  $\pi \cdot g$  equation (6) can be re-written as:

$$p_t^* = \frac{i - \pi - g}{(1+\pi)(1+g)} b_{t-1} \quad (7)$$

Equation (7) gives the required primary balance that stabilizes public debt. It can be viewed as a fiscal rule<sup>4</sup> that sets the financing requirements for the government considering the rate of growth, the price movement, the implicit rate on public debt and the public debt from previous year. As a matter of fact, Claves (2008) found that a combination of procedural and numerical rules that was introduced in Sweden to response to 1991 fiscal crisis proved to be effective and, consequently, the public debt went down.

Comparing the stabilizing primary balance ( $p_t^*$ ) with the current one ( $p_t$ ), we can state that fiscal policy is 'good' and non-vulnerable whenever  $p_t^* = p_t$ , or  $p_t^* < p_t$ . If governments aim at keeping the increasing rate of public debt down to zero then it should achieve the stabilizing primary balance.

Taking into consideration that we use time series of macroeconomic data which is subject to business cycle, we can apply the Hodrick-Prescott (HP) filter to remove its influence

By definition, we can decompose the primary balance ( $p_t$ ) into a structural ( $\bar{p}_t$ ) and a cyclical ( $\alpha y_{1t}$ ) component as shown in (8):

<sup>4</sup> We refer here only on the numerical fiscal rule that impose a certain size for a headline fiscal indicator (e.g. the budgetary deficit, public debt, structural deficit, primary balance). The numerical fiscal rule can be imposed by national governments, or by supranational organization (e.g. European Commission). The size of the fiscal rule can be derived from economic models. A comprehensive discussion on fiscal rules is provided by Wyplosz (2012).

$$p_t = \bar{p}_t + \alpha y_t \quad (8)$$

where  $\alpha$  is the elasticity of the primary balance with respect to output ( $y_t$ ).

By subtracting the cyclical component ( $y_t$ ) from the primary balance ( $p_t$ ) we obtain the structural component of the primary balance which is independent of the business cycle and gives the measure of the discretionary fiscal policy:

$$p_t - \alpha y_t = \bar{p}_t \quad (9)$$

The simplest method for this decomposition is the one proposed by Hodrick and Prescott in their original work of 1981<sup>5</sup>. According to their study, a time series  $x_t$  is given by a growth component  $g_t$  and a cycle component  $c_t$ .

$$x_t = g_t + c_t, \quad t = 1, \dots, T \quad (10)$$

The smoothness of the growth component of the time series is given by the sum of the squares of its second difference. Hodrick and Prescott (1981) argued that the average deviations of the cycle component from the growth component over the long time periods are nearly zero. The growth component is given by the solution of the following optimization problem:

$$\min \left\{ \sum_{t=1}^T c_t^2 + \lambda \sum_{t=1}^T [(g_t - g_{t-1}) + (g_{t-1} - g_{t-2})]^2, \lambda > 0, c_t = y_t - g_t \right. \quad (11)$$

We extract the cycle component from the stabilizing and the current primary balance. Then, applying equation (9) we calculate the structural component of the balance. The resulting components are named the adjusted stabilizing primary balance ( $\hat{p}_t^*$ ), and, respectively, the adjusted current primary balance ( $\hat{p}_t$ ).

Following Blanchard (1990) who suggested primary gap for the study of fiscal sustainability, we can measure the deviations of the current fiscal policy from the fiscal rule by calculating the difference between the adjusted stabilizing primary balance ( $\hat{p}_t^*$ ) and the adjusted current primary balance ( $\hat{p}_t$ ). The gap represents The Excess of the Primary Balance (EPB):

$$EPB_t = \hat{p}_t^* - \hat{p}_t \quad (12)$$

Depending on the sign of EPB, different situations may occur:

- I. The adjusted stabilizing primary balance ( $\hat{p}_t^*$ ) and the adjusted current primary balance  $\hat{p}_t$  are both positive (which means surplus)
  - a. If,  $\hat{p}_t^* \leq \hat{p}_t$ , then  $\hat{p}_t^* - \hat{p}_t \leq 0$ , implying a 'good' fiscal policy;
  - b. If,  $\hat{p}_t^* > \hat{p}_t$ , then  $\hat{p}_t^* - \hat{p}_t > 0$ , implying a 'vulnerable' fiscal policy.

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<sup>5</sup> There is a large debate on the methodology used to extract the cyclical component and to calculate the structural balance. The main difficulty is to estimate the potential output. In that sense, International Monetary Fund uses an equilibrium model for Non Accelerating Inflation Rate of Unemployment, Organisation For Economic Cooperation and Development estimate potential output based on Cobb-Douglas production function while European Commission applies Hodrick-Prescott filter (for further discussions see, for instance, Brandner, Diebalek și Schubert, 1998). We choose to use HP given its simplicity and the possibility to apply, analogously, both on the actual and stabilizing primary balance.

- II. The stabilizing primary balance ( $\widehat{p}_t^*$ ) and the current primary balance ( $\widehat{p}_t$ ) are both negative (which means deficit)
  - a. If,  $\widehat{p}_t^* \leq \widehat{p}_t$ , then  $\widehat{p}_t^* - \widehat{p}_t \leq 0$ , implying a 'good' fiscal policy;
  - b. If,  $\widehat{p}_t^* > \widehat{p}_t$ , then  $\widehat{p}_t^* - \widehat{p}_t > 0$ , implying a 'vulnerable' fiscal policy.
- III. The stabilizing primary balance ( $\widehat{p}_t^*$ ) is on surplus (+) and the current primary balance ( $\widehat{p}_t$ ) is on deficit (-), then  $\widehat{p}_t^* - \widehat{p}_t > 0$ , implying a 'vulnerable' fiscal policy.
- IV. The stabilizing primary balance ( $\widehat{p}_t^*$ ) = deficit (+) and the current primary balance ( $\widehat{p}_t$ ) = surplus (+), then  $\widehat{p}_t^* - \widehat{p}_t < 0$ , implying a 'good' fiscal policy.

Whenever government achieves exactly or exceeds the fiscal rule, then we state that fiscal policy is a 'good'. Thus, we assume that the financing requirements are met and the intertemporal budget constraint can be fulfilled in the long run implying no exposure to the solvency risk. If government fulfills the fiscal rule for many consecutive years, then fiscal position might consolidate and fiscal policy is said to be non-vulnerable. Contrary, when government does not achieve the stabilizing primary balance, and postpones the adjustment actions, fiscal position is deteriorating. Hence, the budgetary deficit becomes larger and the public debt-to-GDP ratio is increasing. In this situation, fiscal policy is more exposed to solvency risk, and is said to be 'vulnerable'.

To avoid the occasional deviations from the fiscal rule we use the event studies approach for the capital markets introduced by Fama, Fisher, Jensen and Roll (1969). The Cumulative Excess of the Primary Balance (CEPB) is calculated by summing up all the gaps in order to capture the effects of the drifting fiscal policy from the fiscal rule in the long run.

$$CEPB_t = \begin{cases} EPB_1, t = 1 \\ EPB_1 + \sum_{i=2}^N EPB_i \end{cases} \quad (13)$$

where N is the number of observations

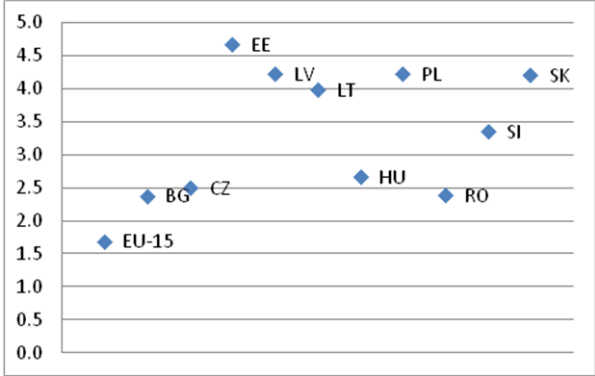
We consider that fiscal policy is non-vulnerable when CEPB has negative values. When CEPB is positive and increasing, we argue that fiscal policy is vulnerable implying that government cannot meet anymore the financing requirements imposed by the fiscal rule, and, therefore, fiscal policy is much exposed to solvency risk. If government decides to adjust fiscal policy and to restore it to the fiscal rule, then CEPB will start decreasing.

### 3. General Overview of Key Fiscal Variables for CEE-10

Stoian (2011b) pointed out that many of EU advanced economies have confronted difficulties since the early '70, determined by the increasing public debt starting in the early '70s and late '80s. The author also found that larger indebtedness ratios were much higher after imposing the Maastricht Treaty than before and that the economic growth rate was below the interest rate on public debt. These represent some key variables that could affect public debt dynamic and, hence, the intertemporal budget constrained.

Analyzing the same variables for CEE-10 using annual data from 1996 to 2010, we found a significant different context. Figure 1 shows that the real growth rate for each Central and Eastern European country considered for investigation was higher than the average growth rate for EU-15. This may be explained considering the catching up process for reducing the existing development gap. Therefore, governments pushed up the demand side to reach economic growth. But, there are cases where this strategy led to ‘overheating’ economy, as Zaidi and Rejniak (2010) noticed for the Baltic countries.

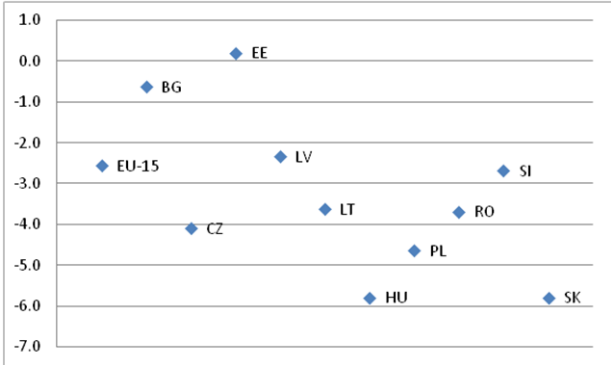
**Figure 1 Real growth rate for EU-15 vs. CEE-10**



Source: real growth rate annual average calculated on annual data spanned on 1996-2010 provided by AMECO

With respect to budgetary deficits, most of CEE-10 recorded on average higher levels than EU-15 did for the same period, except the cases of Bulgaria and Estonia (see Figure 2). We may assume that these developments are due to the structural changes determined by the transition from a state-owned economy to market economy. Moreover, CEE-10 governments might have kept a lower taxation rate compared to EU-15, in order to stimulate investments and economic growth. Finally, the rate of growth of government revenue and expenditures for CEE-10 was higher than for EU-15, and the expenditures overrated the revenues<sup>6</sup>.

**Figure 2 Budgetary deficit-to-GDP ratio for EU-15 vs. CEE-10**



Source: annual average calculated on annual data spanned on 1996-2010 available from AMECO

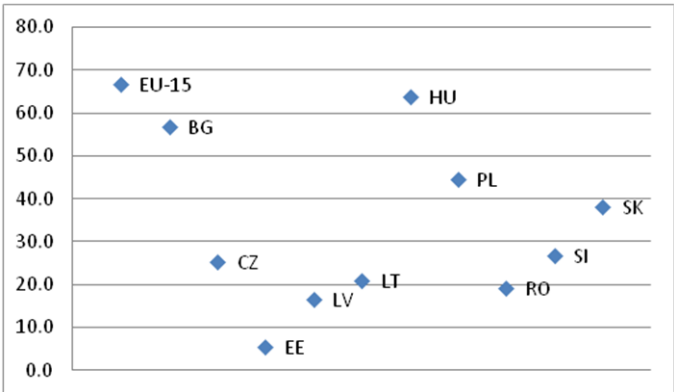
Contrary to what data for the budgetary deficit for CEE-10 show, the situation for the indebtedness ratio looks differently (see Figure 3). The annual average of public debt-to-GDP ratio for EU-15 was higher than 60% of GDP. Except Hungary, the rest of CEE-10 had on average small ratios below 60%.

<sup>6</sup> Based on annual data from Ameco, ranged on 1996-2010, we calculated: (i) the annual average of taxation rate, including social security contributions (EU-15: 41% GDP; CEE-10: 33% GDP); (ii) the rate of growth of government revenues (EU-15: 3.2%; CEE-10: 9.6%); and (iii) the rate of growth of government expenditures (EU-15: 3.5%; CEE-10: 9.9%).



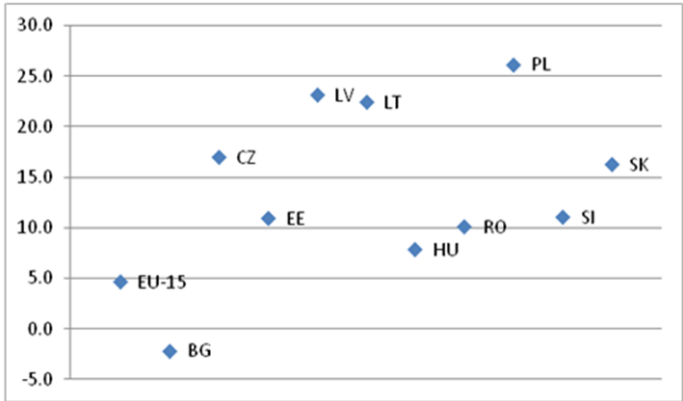
To some extent, the context may look peculiar, considering the correlation with the large fiscal deficits. This may be explained taking into account that most of the CEE-10 had very small public debt-to-GDP ratios in the early '90s due to some special arrangements with their creditors (e.g., Poland did not default its debt, but seized to repay it) or because they had already repaid the debt before 1990 (e.g., Romania repaid all the external debt in 1989). Hence, they did not have time for public debt accumulation. But, nevertheless, the increasing rate of public debt for CEE-10 was higher than for EU-15 (see Figure 4). Consequently, public debt accumulated in the last decade, and keeps rising due to the recent economic recession.

**Figure 3 Public debt-to-GDP ratio for EU-15 vs. CEE-10**



Source: annual average calculated on annual data spanned on 1996-2010 available from AMECO. For Bulgaria data ranges from 1997. For Slovenia data ranges from 2002.

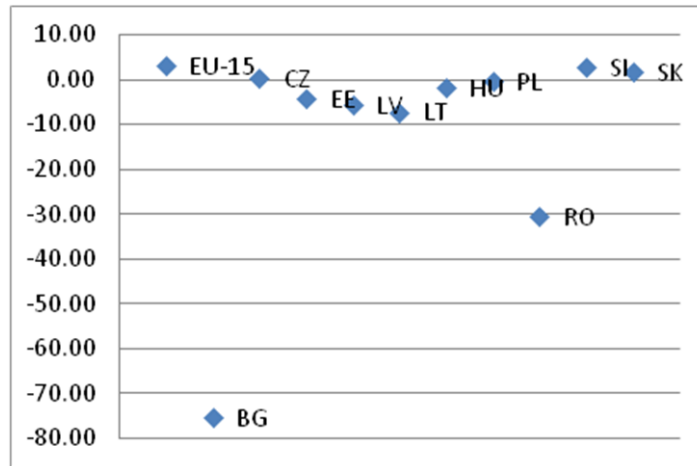
**Figure 4 Increasing rate of public debt for EU-15 vs. CEE-10**



Source: average annual increase rate calculated on annual data spanned on 1996-2010 available from AMECO. For Bulgaria data ranges from 1998. For Slovenia data ranges from 2002.

The high increasing rate of public debt in CEE-10 could be determined by the cheap money borrowed for financing fiscal deficits and public debt. Considering the real implicit interest rate on public debt as a proxy for the cost of government borrowings, we may notice that CEE-10 had lower costs than EU-15 (see Figure 5).

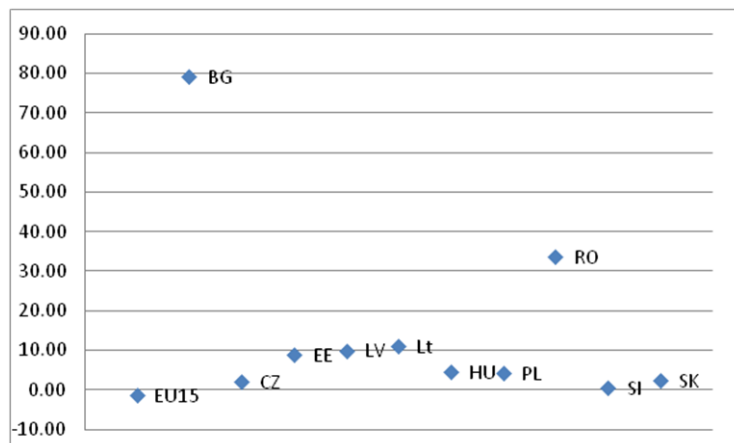
**Figure 5 Real implicit interest rate on public debt EU-15 vs. CEE-10**



Source: annual average calculated on annual data spanned on 1996-2010 available from AMECO. The implicit interest rate was calculated as ratio of interest payments on public debt to public debt from previous year. The real implicit interest rate was calculated by subtracting the inflation rate. For Bulgaria and Romania data ranges from 1998; for Latvia, Poland and Slovenia data ranges from 1997.

Moreover, the gap between the real growth rate and the real implicit interest rate was positive for all CEE-10 (see Figure 6). The advanced European countries borrowed more expansive money compared to what their economies could have sustained. On the other hand, Central and Eastern European countries accessed cheap money for financing budgetary deficits or public debt. But cheap money and rising public debt could, somehow, be tricky and fool the governments! If they do not make all the efforts to generate primary surpluses in the long run, to assure the financial resources for meeting the payment obligations without increasing public debt, the fiscal policy will be exposed to solvency risks, and hence could become unsustainable in the long run.

**Figure 6 The gap of financing for EU-15 vs. CEE-10**



Source: the gap calculated as difference between the real growth rate and the real implicit interest rate on public debt. Annual average calculated on annual data spanned on 1996-2010 available from AMECO. For Bulgaria and Romania data ranges from 1998; for Latvia, Poland and Slovenia data ranges from 1997.

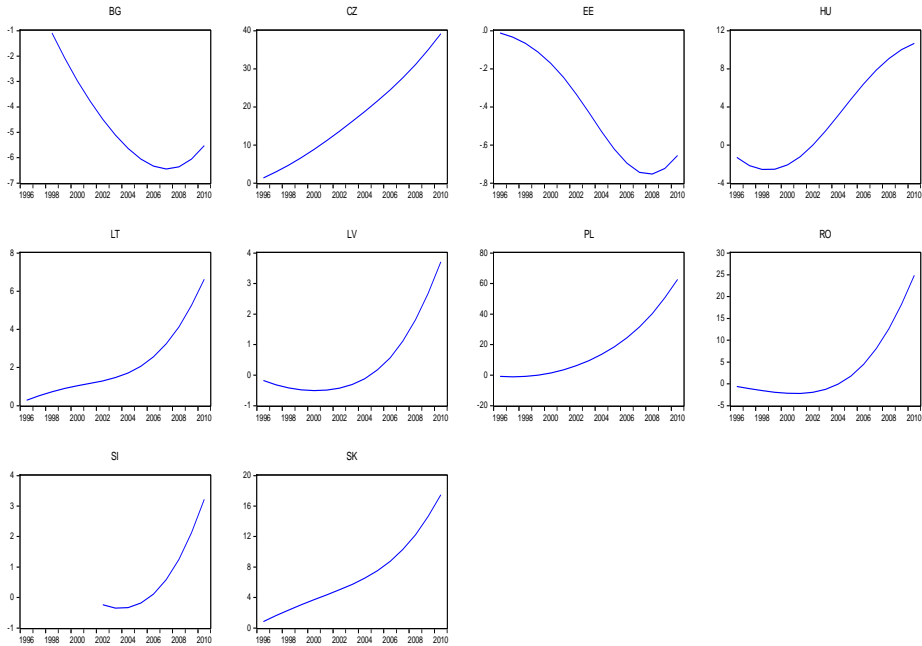
Considering the previous discussion, one might state that the key macroeconomic variables show a good picture of CEE-10, but a closer look of them highlights some issues that could make fiscal policy vulnerable with respect to the intertemporal budget constraint.

### 4. Empirical Results and Discussions

Stoian (2011a) indicated fiscal vulnerabilities for 27 European Union countries using annual data ranged from 1970 to 2012 using an earlier version of the methodology. The model used to estimate the required primary balance assumes that government does not aim in stabilizing public debt. Therefore, the primary balance is estimated using the growth rate of public debt which is different from zero. But, making this hypothesis we also may assume Ponzi games on undetermined time for financing government expenditures which violates, to some extent, the transversality condition implied by achieving fiscal sustainability. This condition implies that on long run public debt converges to zero. Stoian (2011b) re-evaluated the methodology presented in her paper of 2011a and proposed a public debt dynamic model that stabilizes public debt. Then using an analogous approach as presented in this paper, the author showed the times when fiscal policy was vulnerable for ten advanced economies in the European Union.

Refining the previous work, the current paper studies fiscal vulnerability only for Central and Eastern European countries employing the methodology described in Section 2 on annual data extracted for the 1996-2010 period. The variables implied are primary balance, public debt, implicit interest rate on public debt and GDP growth rate and inflation rate. Data is available from Ameco. The stabilizing primary balance is estimated using equation (7). Then, we apply Hodrick-Prescott filter for both the stabilizing and the current primary balance to remove the cycle component and to obtain the adjusted values there are to be compared. The deviations from the fiscal rule are calculated using equation (12) and then The Cumulative Excess of the Primary Balance using equation (13) .The results are illustrated in the figure below:

**Figure 7 Cumulative Excess of the Primary Balance (CEPB)**

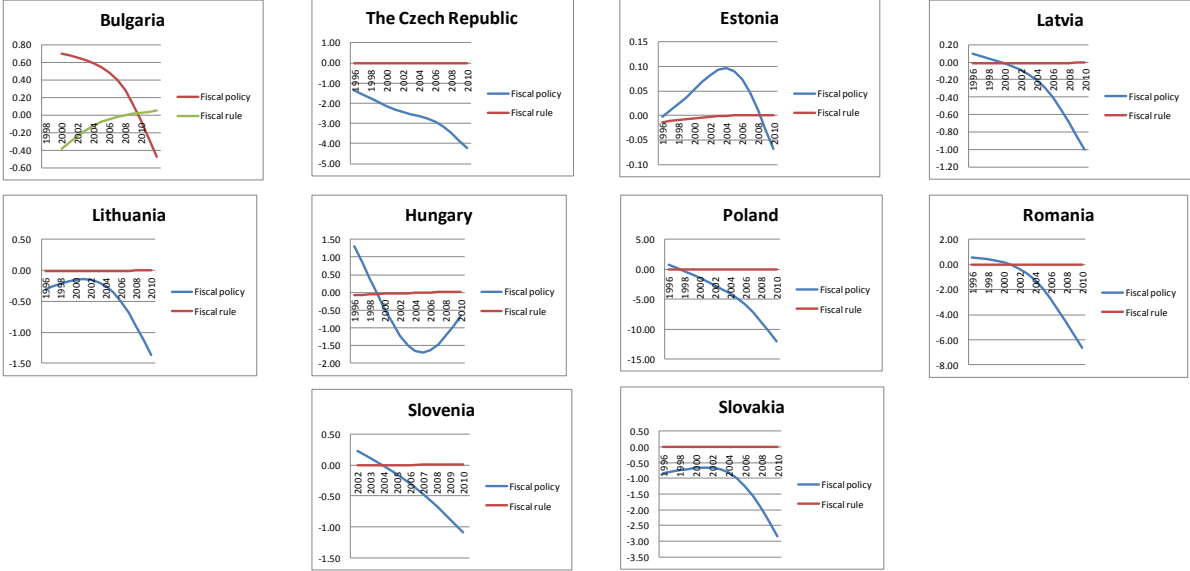


The graphs show fiscal vulnerability for CEE-10 during the period under investigation. Generally, when CEPB has positive values and starts increasing indicates that fiscal policy turns into a vulnerable state. Large values for positive CEPB show that governments systematically failed in achieving the stabilizing primary balance for many consecutive years. When CEPB starts decreasing, it indicates that governments carried out adjustment measures in order to restore the primary balance to the stabilizer one showing that they aim at stabilizing public debt

CEPB indicates fiscal vulnerability for the case of the Czech Republic, Lithuania and Slovakia since the beginning of the analyzed period. For the rest of the countries, fiscal policy turned into a vulnerable condition later: Bulgaria in 2008; Latvia in 2001; Hungary in 2000; Poland in 1998; Romania in 2002; and Slovenia in 2004.

A closer look to the values for the adjusted stabilizing primary balance,  $\hat{P}_t^*$  which sets up the fiscal rule, and for the adjusted current primary balance,  $\hat{P}_t$  representing the current fiscal policy that government runs is illustrated by Figure 8:

**Figure 8 Fiscal policy vs. fiscal rule**



In the case of Bulgaria, CEPB is decreasing up to 2008, showing that current fiscal policy managed to meet revenues requirements imposed by the fiscal rule. In 2008, the negative deviations start accumulating. We can consider it as a first signal indicating that fiscal policy might move towards a ‘vulnerable’ state. For the Czech Republic, CEPB shows fiscal vulnerability for the entire analyzed period which worsened to 2010. The Czech Republic had low indebtedness ratio, but the increasing rate of public debt was one of the highest. Government might not have aimed at stabilizing public debt considering its low ratio but if it had to be prudent considering that the increasing rate and that the cost of public debt was closer to the economic growth rate, it would have tried to adjust the primary balance in order not to increase the exposure to fiscal solvency risk in the long run. Now, fiscal adjustment actions are required to restore the fiscal policy to the ‘good’ path and to avoid unsustainability in the long run. Estonia is the only country for which CEPB indicates a non-vulnerable fiscal policy. We can argue this situation considering its key fiscal variables: Estonia had the lowest public debt-to-GDP ratio among the CEE and also among the 27 European countries; also one of the lowest increasing rate and the economic growth rate was higher than the interest rate on public debt. Given this context, it would have been logically that government hadn’t aimed at stabilizing

public debt. In addition, given the low values of the variables implied by the public debt dynamic equation it was easier for Estonian government to run primary surpluses. The cases of Latvia, Poland, Romania and Slovenia are somehow similar. CEPB indicates comparable patterns and the behavior of current fiscal policy with the respect to fiscal rule is also the same. It performed better than the fiscal rule for few years at the beginning of the analyzed period, and then, the current primary balance largely deviated from the stabilizing one. This suggests that government could not manage to fulfill the fiscal rule anymore due to changes that occurred: increasing public debt that required larger primary surplus than the government was able to realize. Lithuania and Slovakia are also similar to the case of the Czech Republic. Current fiscal policy under-performed the fiscal rule for the entire investigated period. The degree of vulnerability increased over the time and reached the maximum in 2010 suggesting that the fiscal policy largely diverged from the fiscal rule. The case of Hungary presents some interesting features. CEPB early warns on fiscal vulnerability in 2000. Between 1996 and 2000, current fiscal policy overachieved repeatedly the stabilizing primary balance, but then under-performed. Since 2006, the current primary deficit has begun to decrease and also the deviations from the fiscal rule. CEPB still indicates a vulnerable fiscal policy. The adjustment efforts should be consistent, to place fiscal policy into the 'good' path.

Concerning the recent financial turmoil that hit worldwide, we may state that Bulgaria and Estonia are less exposed to that shock, considering that CEPB gives some signals in 2008, and respectively, in 2009 but it still have negative values. Zaidi and Rejniak (2010) argued that in Bulgaria's case the situation with the crisis is not dire because of considerable public sector buffers, high foreign exchange reserves, and also fiscal surplus. Estonia's case looks somehow similar. The policies during the boom years that maintained the bursting economy relatively under control, allowed Estonia to run fiscal surplus that led to accumulation of sizeable fiscal reserves, and practically the country had virtually no public debt going into the crisis, fact also mentioned by Zaidi and Rejniak in their paper of 2010. The rest of the investigated countries are much exposed to the solvency risk and, consequently, the ability of the fiscal policy to absorb the possible shocks on increasing public debt has weakened. The CEPB shows large accumulation of the deviations from the fiscal rule that make governments' task in these countries more difficult. Fiscal adjustments would have to be more severe and consistent so that the fiscal policy is restored to the 'soundness' of the fiscal rule.

The Cumulative Excess of the Primary Balance may be a better indicator for studying fiscal vulnerability than the primary balance or public debt. Government can run primary surplus but the size of it says nothing about the solvency if we not compare it with a relevant benchmark. High public debt-to-GDP ratio can also point out some difficulties for fiscal policy particularly when it is associated with an increasing tendency. We may presume that fiscal policy could have some exposure to solvency risk but we cannot indicate the degree of vulnerability. Moreover, compared to the advanced economies in European Union, Central and Eastern European countries have lower public debt-to-GDP ratio, but the increasing rate is higher. The Czech Republic, for instance had an indebtedness ratio of 12% of GDP in 1996. The ratio increased during the reviewed period and it reached to a maximum of 40% of GDP in 2010. Primary balance ran on deficit but varied. Analyzing these indicators is much difficult to state whether fiscal policy was vulnerable. CEPB for the Czech Republic is positive and increasing over the period indicating the increasing exposure of fiscal policy to solvency risk. Bulgaria had large public debt-to-GDP ratios in the late '90s and when it started decreasing. The government ran primary surpluses below 1% of GDP. CEPB indicates a non-

vulnerable fiscal policy until 2008 when the first signal warned on a possible change of the fiscal policy condition.

## 5. Concluding remarks

This study aimed at examining whether fiscal policy for the case of ten Central and Eastern European countries is vulnerable in the sense indicating by Stoian (2011). CEE performed better than the advanced European economies considering that during 1996 and 2010 they had lower public debt-to-GDP ratios and the economic growth rate was higher than the interest rate on public debt. But the increasing rate of public debt was larger than for EU15. Therefore, we investigated if CEE governments have the ability to fulfill intertemporal budgetary constraint and to keep out fiscal policy from the solvency risks. We used a newly introduced methodology which indicates when current fiscal policy departs from a particular fiscal rule. Using annual data for 1996-2010 period, the results show fiscal vulnerability for Central and Eastern European. Depending on the size of CEPB, the degree of vulnerability differs from country to country. Negative values of CEPB suggest 'good' and non-vulnerable fiscal policy while positive values point towards fiscal vulnerability. The results indicate that Bulgaria and Estonia are the only countries for which we found no evidence for fiscal vulnerability even when financial turmoil hit worldwide. For the rest of the countries under investigation, we observed more or less fiscal vulnerability depending on the size of CEPB. In these cases, unfortunately, governments has to face the challenges derived from the recent crisis using a vulnerable fiscal policy which makes more difficult the way of recovery.

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