PUBLIC DEBT BOUNDARIES: A REVIEW OF THEORIES AND METHODS OF THE ASSESSMENT OF PUBLIC DEBT SUSTAINABILITY [*]

Sandra Švaljek[**]

1
INTRODUCTION

"*The progress of the enormous debts which at present oppress, and will in the long-run probably ruin, all the great nations of Europe, has been pretty uniform*".[1] Although this was said two centuries ago, it is still equally applicable. In the majority of countries, public debt is accumulating and is still considered as a calamity for macroeconomic stability; in many countries, especially the ones that have experienced debt crisis, it causes fear of great disturbances and the breakdown of the state. However, due to a number of advantages over taxes, countries unwillingly renounce debt as a source of financing, especially in periods of extremely high, although short-term demand for public expenditures (wars, natural disasters, economic crises). The attraction of debt on the one hand and the danger lurking as a consequence of excessively enjoying in the benefits of the debt on the other hand, require constant caution and attention when using this fiscal policy instrument.

[*] *Sandra Švaljek, Institute of Economics, Zagreb.*

[1] *Adam Smith (1776), **An Inquiry into the Causes and Nature of the Wealth of Nations**, Volume 5, Chapter 3.*

It was this very necessity of rational debt management that stimulated economic science to study the public debt phenomenon, its causes and consequences, and to set optimal levels and sustainable boundaries of debt. Regardless of how fruitful this studying was, its accomplishments today merely enable the understanding of the debt-related problems, without providing unique guidelines for conducting fiscal policy, i.e. borrowing policy.

The paper consists of five chapters. The first chapter deals with some simple ways of determining limits to public debt. Chapter two deals with methods of assessment of long-term public debt sustainability, grouping them into three basic groups: methods of assessment by adopting the solvency approach; methods of monitoring dynamics of the debt/GDP ratio; and time series analysis methods. The third chapter explains the Maastricht fiscal criterion for admission to the European Monetary Union. The fourth chapter gives a short overview of theories which, by applying the positive, i.e. standard approach, try to explain the causes of the appearance of public debt. The fifth chapter contains a review of the methods of assessment of public debt sustainability and the appraisal of their applicability in the case of the Republic of Croatia.

2
SOME SIMPLE METHODS OF ASSESSMENT OF PUBLIC DEBT SUSTAINABILITY

History has shown that different economies cope with the debt burden in different ways. Sometimes crises appear even at low levels of share in the debt of the gross domestic product (GDP), whereas some economies function very well even when their public debt significantly exceeds the value of the total one-year production in the country. Consequently, we can not talk about the existence of absolute and universal boundaries of public debt. However, it can be said that these boundaries are reached when fiscal policy objectives are jeopardized. In general, it is sometimes said that the optimum of public debt is not reached until additional public expenditures (total or a specific form of public expenditures, e.g., public investments) that are financed by debt:

- increase the use of production capacities,
- increase or improve production capacity of the economy, and
- enable the approaching to the desired distribution (Brümmerhoff, 1996)

Similarly, sometimes it is simply considered that new borrowing is a "wise" move if it is consistent with other macroeconomic goals (current account balance, growth of private investments, inflation control, maintaining external credibility). If one assumes that all investments in economy should equal the total savings of residents and foreigners, and if new public sector borrowing, i.e. public sector deficit, is considered as the difference between public investments and public savings, then this deficit is balanced by savings of other sectors of domestic economy and/or external deficit (deficit on balance-of-payments current account). Consequently, the wisdom of new borrowing depends on the level of private savings, on the desired levels of private investments, and the desired deficit on the balance-of-payments current account.[2]

Since the above mentioned criteria of desirability of borrowing are hard to quantify, some simpler ratios are often applied as indicators of borrowing and the possibility of further borrowing, such as:

- the ratio of interest paid on public debt and collected taxes. This ratio shows to what extent the burden of interest is covered with tax revenues.
- the ratio of interest and public expenditures. This indicator shows which share of public expenditures is "tied" due to public debt repayment obligation.
- the interest/GDP ratio. Interest is put into a ratio with GDP because the tax revenues from which the debt obligation needs to be met depend on GDP.
- the new borrowing/public expenditures ratio.
- the share of new borrowing (i.e. deficit) in GDP, and
- the share of total debt in GDP.

The last two are the most frequent and most important ones, and they also serve to define the criteria for admission to the European Monetary Union (Brümmerhoff, 1996).

These indicators do not show whether the public debt limit has been reached; however, if they are monitored over a longer period of time, they can be used for monitoring the dynamics of borrowing. Besides, these indicators are used in international debt comparisons.

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[2] *The basic macroeconomic identities $Y = C + I + G + X = C + S + T + U$ serve as the starting point. It follows therefore that $(G - T) = (S - I) + (U - X)$. The expression on the left-hand side is fiscal deficit/surplus, i.e. the difference between public investments and public savings, and the second expression in brackets on the right-hand side of the equation is the deficit/surplus on the balance-of-payments current account.*

Public debt may be divided in internal and external public debt. In many countries, when possibilities of borrowing in the country are exhausted, the government turns to borrowing abroad. Since foreign debt can be serviced only through exports, the external public debt/exports ratio is used as an indicator of the external foreign debt level sustainability.[3]

Besides the above simple indicators of indebtedness, a whole array of methods has been developed for assessing the long-term sustainability of the existing borrowing policy. These methods can be divided into three basic categories:

- methods of assessment by using the solvency approach,
- methods of monitoring the trend of debt as a share of GDP,
- time series analysis methods (Heinemann, 1992).

It should be explained at the very beginning what sustainability of a borrowing policy means. There is no unique and generally acceptable definition of the sustainability of borrowing policy. At the same time, there is a higher degree of agreement about unsustainability. Any borrowing policy that is not unsustainable is frequently considered sustainable. In simple terms, a government debt policy is unsustainable if private subjects, both domestic and foreign, consider it as such. This means, for instance, that creditors, doubting a country's credibility, i.e. its ability to repay loans, will suspend further granting of loans and demand risk premiums. Domestic creditors may, for instance, expect a tax increase and emission of money in the future, as well as related inflation, and even devaluation, which can all lead to reduced domestic currency savings, taking capital abroad, and finally to a financial crisis or balance-of-payments crisis. This scenario is common for countries with undeveloped financial markets (the IMF Institute, 1993). In countries with developed financial markets an unsustainable borrowing policy may cause a rise in the supply of government bonds, which leads to a drop in their prices and a rise in interest rates. State creditors will demand an even higher increase in interest rates if bonds are not indexed, and will also seek protection from possible loss by demanding risk premiums (Masson, 1985). In the Sargent and Wallace (1981) scenario, under the same conditions, an unsustainable debt policy will lead to a drop in the demand for government bonds and an increase in

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[3] *Experience of many countries has shown that there is a close link between the levels, i.e. trends, of the total public debt and total external debt. This link exists because the state itself creates a large portion of the external debt. Besides, with its policy of accumulating debt, it makes people expect tax increase, inflation and devaluation, thus encouraging the private sector to take the capital out of the country, which creates a need for external borrowing in the private sector as well.*

bond interest rates, which will prevent the state from possibility to control the money supply growth rate and the inflation rate.

3
METHODS OF ASSESSMENT OF THE SUSTAINABILITY OF THE PUBLIC DEBT POLICY

3.1 Methods of assessment by using the solvency approach

Methods of assessment of sustainability of the public debt policy by using the solvency approach take a country's "budget constraint" as the starting point. The government budget identity was "discovered" in the 1960's and 1970's and was a result of the critique of the Keynesian model (Haliassos and Tobin, 1990). Unlike the Keynesian approach to deficit and debt, the methods of analysis of the financial policy of a country, which use the budget identity of that country as a starting point, stress the importance of the form of financing of the budget deficit, i.e. debt.

Budget identity is actually the balance of government receipts and expenditures. Although the budget identity is often called budget constraint, it does not represent a constraint in itself, but the constraint consists of the limits explicitly or implicitly set for a country's possibility to issue a new debt, of the minimum level of the foreign exchange reserves set by the government itself , and also of the limitations of real resources that the government (under given political and economic circumstances) may collect by issuing money (Buiter, 1985).

In the most general form, budget identity in a given period of time contains the following elements:

money issue + new debt issue + sale of state property ≡
≡ government expenditures + interest on existing public debt - taxes -
- revenues from government property

The right side of this identity actually represents the financial deficit of the public sector, while the left side shows in what ways this deficit can be financed (Buiter, 1985).

In the literature on sustainable debt level, the above identity is mostly presented in a simplified way, such as:

$$(1) \quad M_t^N - M_{t-1}^N + B_t^N - B_{t-1}^N = G_t^N + iB_{t-1}^N - T_t^N \ ,$$

where M is the monetary base, B is the total public debt, G is government expenditures (minus interest), and is the nominal interest rate, T is government revenues, and t is the period of time. N in superscript indicates that these are nominal values.

For the sake of simplicity, budget identity for a certain period of time is most frequently used in the following form:

$$(2) \quad B_t - B_{t-1} = G_t + rB_{t-1} - T_t \ ,$$

where real values for B, G, and T appear, and where r is the real interest rate ($r = i - \pi$), and where the possibility of financing deficit by issue of money is neglected. From this identity the usual debt sustainability criterion is derived; therefore:

$$(3) \quad d_t = b_t - b_{t-1} = -p + (r - n) b_{t-1}{}^4 \ ,$$

where d is the share of the total real deficit in real output, b is the share of real debt in real output, p is the share of primary deficit in output ($g_t - t_t$,

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[4] *This expression is obtained starting from expression (2). If elements of expression (2) are shown as a share of Y_t, and $Y_t = (1 + n) Y_{t-1}$, then:*

$$(2a) \quad \frac{B_t}{Y_t} - \frac{B_{t-1} \ (1 + n)}{Y_{t-1} \ (1 + n)} = \frac{G_t - T_t}{Y_t} \ .$$

For sufficiently small r and n, we can say that $(1+r) / (1+n) = 1 + r - n$, so the expression (2a) can be written as

$$b_t - b_{t-1} \ (1 + r - n) = g_t - t_t \ , \ i.e.$$
$$(2b) \quad b_t - b_{t-1} = \ g_t - t_t + (r - n) b_{t-1}$$

If the government borrows again, and $b_t - b_{t-1}$ is a new fiscal deficit, the difference $g_t - t_t$ is positive and equal to primary surplus (negative primary deficit), and from the expression (2b) follows that

$$(3) \quad d_t = b_t - b_{t-1} = - p + (r-n) b_{t-1}$$

In these expressions Y is the real output, g is the share of government expenditures (without interest) in the output, and t is the share of government revenues in the output.

where g_t is bigger than t_t), and n is the real output growth rate.[5] This expression shows that, if the growth rate is lower than the interest rate and if the government wants to keep the proportion of public debt in GDP the same as in the previous period, then it has to run the primary surplus. In case that the growth rate is higher than the interest rate, the government can run the primary deficit, too, without increasing the proportion of the debt in GDP. It is said that in that case the government can play the "honest Ponzi game"[6] and continually repay old debt by issuing new debt, without increasing its debt/GDP ratio (Buiter, 1985; Spaventa, 1987).

If the possibility of monetary financing of deficit is taken into account, the expression (3) changes into

(4) $b_t - b_{t-1} = - p + (r - n) b_{t-1} - (M_t - M_{t-1}) / Y_t$

Due to cyclical oscillations in the economy, a fiscal deficit in a period of time, or in a few subsequent periods of time, does not need to be considered as a sign of long-term unsustainability of fiscal policy if there is a probability that a period of surplus will follow after that. Therefore, as a rule, rather than meeting the budgetary constraint in a certain period of time, the meeting of intertemporal budgetary constraint is considered more important, which requires balancing of the total realized deficits and surpluses in a longer period.

Intertemporal budgetary constraint is shown in a discontinuous form as

(5) $B_j = \sum_{t=1}^{j} (G_t - T_t)^{j-t} + B_0 (1 + r)^j$,

or in a continual form and in output expressions as

(6) $b_j = \int_0^j p_j e^{(r-n)(j-t)} dt + b_0 e^{(r-n)j}$,

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[5] *Primary deficit/surplus is the difference between the total revenues of the government and total expenditures less interest payments. Primary deficit/surplus is calculated in order to gain an insight into current activities of the state, i.e. in order to eliminate the effects of earlier activities (earlier borrowing) on the government budget.*

[6] *Ponzi games or schemes - an investment scam where high and quick profits from fictitious sources are promised. A profit is paid to the first investors from the funds received from the stakes of subsequent investors. The term was named after Charles Ponzi (1882-1949), a speculator who organized such schemes in the USA 1919-20. The terms usually used in Croatia are fraudulent investment scheme and fortune chains.*

where this form is obtained by discounting of expressions (2) and (3), respectively, and adding up the corresponding expressions for each future period. The subscript j in the above expressions marks the total number of periods.

If the sustainable fiscal policy requirement is that debt, or a share of the debt in the output, converges to the initial level B0, it means that the sustainability condition is in the discontinuous form

$$(7) \quad \lim_{j \to \infty} \frac{B_j}{(1 + r)^j} = 0$$

or in the continual form

$$(8) \quad \lim_{j \to \infty} b_j \, e^{-(r-n)j} = 0 \quad [7]$$

Accordingly, inter-temporal budgetary constraint is met if

$$(9) \quad \frac{\sum_{t=1}^{j} (G_t - T_t)}{(1 + r)^t} = -B_0 \, ,$$

i.e. if

$$(10) \quad \int_0^\infty p_j \, e^{-(r-n)j} \, dt = -b_0$$

This means that fiscal policy is sustainable if present discounted value of expected future debt converges toward zero, i.e. if the present discounted value of the share of primary deficit in output equals the negative current value of the share of output. Accordingly, an indebted government sooner or later needs to run a primary surplus big enough to meet the above equations (Heinemann, 1992; Blanchard et al., 1990; Spaventa, 1987). Conditions (7) or (8) respectively, that current value of future debt should equal zero, allows financing of the existing debt by new borrowing ("rolling over" into the future), but in such case it requires that

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[7] *The expressions (7) and (8) are obtained by discounting the expressions (5) and (6) to period 0, and the limit value is sought when j converges toward the infinite, because the sustainability condition is met when b_j converges toward b_0 when j converges toward the infinite.*

real debt should grow at a rate lower than the real interest rate (Heinemann, 1992).

If the possibility of monetary financing of the deficit is allowed, the intertemporal budgetary constraint implies that the public debt value should be equal to the sum of the present value of expected future primary surpluses and the present value of expected future receipts from issuing money (seigniorage) (Buiter, 1985).

Intertemporal budgetary identity may also be understood as public sector balance, where government liabilities consist of the current stock of public debt and present value of expected future expenditures (without interest payments). Government assets consist of the current stock of (domestic and foreign) government assets and the present value of expected future government revenues. The difference between assets and liabilities is the net value of a government. A government is solvent, i.e. public debt is sustainable in the long-term if the net value of the government is positive. A balance of the government may be presented as the following identity

(11) $eA^f + T/(1+r) = G/(1+r) + B^d + eB^f + K$, [8]

from which follows sustainability condition

(12) $(T-G)/(1+r) + eA^f - (B + eB^f) = K_0$,

where A is the foreign exchange reserves expressed in foreign currency, e is the real exchange rate of domestic currency, K is the government net value, while the superscripts f and d next to B indicate the foreign, i.e. domestic component of public debt. All the values in the above expressions are stated in present values, which are obtained by discounting, where interest rate decreased by GDP long-term growth rate is used as the discount rate (Guidotti and Kumar, 1991).

Despite the fact that solvency approach, i.e. public sector balance approach is most frequently used as a method of assessment of borrowing policy, the application of that approach causes a number of technical obstacles. The basic obstacle is that this approach implies selection of a long-term real interest rate and a long-term real output growth rate, as well as the forecast of future primary deficits (Masson, 1985). Besides, the sustainability criterion which requires that debt growth rate should be lower than the interest rate, can also be satisfied if the share of the debt in the output grows, as in a case when the output growth rate is

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[8] *For the sake of simplicity, revenues from seigniorage are included into tax revenues as a special type of tax.*

lower than the debt growth rate, which in turn, is lower than the real interest rate. However, with the ever-increasing ratio of debt and output, the share of primary surplus in the output must grow constantly so that the debt growth rate remains lower than the interest rate. This, of course, is difficult to achieve, primarily if we keep in mind the distorting character of taxes and rigidity of public expenditures (Heinemann, 1992).

This is why we sometime use the sustainability approach, the aim of which is to stabilize the existing ratio of debt and output.

3.2 Methods of monitoring the trends of debt as a share of GDP

In order for the borrowing policy to be sustainable, it is sometimes considered that the deficit does not necessarily have to be zero; instead, the aim is to stabilize the ratio of the nominal debt (B) and the nominal GDP (PY). The simplest approach to such conception of debt sustainability says that the growth rate of debt share in nominal output should be equal to the sum of the price growth rate and the real output growth rate (Gordon, 1993)

(13) $\beta = \pi + n$ [9] ,

where β is the growth rate of nominal debt.

From expression (13) follows that, if debt stability requirement is accepted, deficit may be as high as:

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[9] *The condition that the ratio of debt and nominal GDP be stable can be written as:*

(13a) $$\frac{d\,(B/PY)\,/\,dt}{B/PY} = 0$$

The numerator of this expression is:

(13b) $$\frac{d\,(B/PY)}{dt} = \frac{dB}{PY}\,\frac{B}{B} - \left(\frac{BdP}{PYP} + \frac{BdY}{YPY} \right)$$

If dP/P=Π, dY/Y=n, and dB/B= β, then expression (13b) may be written as

(13c) $$\frac{d\,(B/PY)}{dt} = \frac{B}{PY}\,[\,\beta - (\pi + n)\,]\,,$$

so the condition of stability (13a) becomes $\beta = \pi + n$.

(14) $\beta B = (\pi + n) B$.

Domar (1944) also took the idea of unchangeable debt/GDP ratio as his starting point and he created one of the first models of rise in debt burden. With that model Domar showed that the higher the growth rate is, the lower the interest rate on that debt is, and the higher portion of income that citizens are ready to put aside for buying state bonds is, the smaller the debt burden (tax rate required for debt servicing) will be (Domar, 1944).

Expressed in symbols:

(15) $\lim\limits_{t \to \infty} k = \dfrac{r}{\dfrac{n}{\alpha} + r} \approx \dfrac{\alpha}{n} r$. [10]

Stabilization of the debt/GDP ratio is the aim of the European Commission (1990) in evaluating the current public debt policy. It also takes as its starting point the budget identity of a country for a certain period of time expressed as a portion in GDP, thus coming to the expression for primary surplus, s0, required for stabilizing the debt/GDP ratio, provided that the interest rate is higher than the output growth rate (in the opposite case each primary surplus is sustainable because each debt/GDP ratio converges toward a finite value).

This expression can be presented as follows:

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[10] *Domar assumes a constant growth rate of n% annually, i.e. $Y = ae^{nt}$. Then:*

(15a) $\quad \int\limits_{0}^{t} Ydt = a \int\limits_{0}^{t} e^{nt} dt = \dfrac{a}{n} (e^{nt} - 1)$

If the debt is a constant part of revenues, it is clear that the debt will also rise at the rate of n%, so total debt in a certain period of time totals

(15b) $\quad B_t = B_0 + \alpha \dfrac{a}{n} (e^{nt} - 1)$.

Then the ratio of debt and output is

(15c) $\quad \dfrac{B_t}{Y_t} = \dfrac{B_0}{a (e^{nt} - 1)} + \dfrac{\alpha}{n} (1 - e^{-nt})$.

Consequently, there follows

(15d) $\quad \lim\limits_{t \to \infty} \dfrac{B}{Y} = \dfrac{\alpha}{n}$, *and* $\quad \lim\limits_{t \to \infty} k = \dfrac{r}{\dfrac{n}{\alpha} r} \approx \dfrac{\alpha}{n} r$,

where k is the tax rate required for debt servicing.

$$(16) \quad s^0 = \frac{b_0 \, (r-n)}{1 + r} \, . \quad [11]$$

The difference between s^0 (the desirable primary surplus in GDP) and s (the real primary surplus) may be applied as a sustainability indicator. One shortcoming of that indicator is that it can show that any debt level is sustainable as long as it is stable.

3.3   Time series analysis methods

In the last decade, debt sustainability has been tested by the time series analysis method. This method starts from the idea that long-term debt trend is of key importance for the sustainability issue. A debt is sustainable if it can be shown that during a longer period of time with unchanged debt policy, primary deficit and surplus values are balanced. A review of possible sustainability tests by using the time series analysis method was first provided by Hamilton and Flavin (Heinemann, 1992). They suggest testing of a hypothesis that the expected present value of future debt equals zero, which means that the current debt is equal to the present value of future surpluses

$$(17a) \quad H_0 : B_0 = E_j \sum_{t=1}^{j} \frac{(G_t - T_t)}{(1 + r)^t} \, ,$$

or equivalently, that the expected debt issue will not grow at a rate higher than the interest rate

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[11] *Intertemporal budget constraint may be written as*

$$(16a) \quad \frac{B_{t+1}}{Y_{t+1}} - \frac{(1+r) \, B_t \, Y_t}{Y_{t+1} \, Y_t} = \frac{(1+r) \, (G_t - T_t) \, Y_t}{Y_{t+1} \, Y_t} \, ,$$

i.e. in GDP terms, as

$$(16b) \quad b_{t+1} - \frac{(1+r)}{(1+n)} \, b_t = \frac{(1+r)}{(1+n)} \, s$$

The solution of this differential equation is:

$$(16c) \quad b_t = \left[b_0 - \frac{s(1+r)}{r-n} \right] \left[\frac{1+r}{1+n} \right]^t + \frac{s \, (1+r)}{r - n} \, .$$

Hence the expression (16) for surplus s^0, with which the share of debt in GDP is not changed, i.e., $b_t = b_0$.

(17b) $\quad H_0 : E_j \lim_{j \to \infty} \dfrac{B_j}{(1 + r)^j} = 0$,

where E is the expected value.

If tests show that this hypothesis can be accepted, then the debt policy is sustainable. For testing the null-hypothesis, Hamilton and Flavin propose the Dickey-Fuller unit root test for testing the non-stationarity of real debt and surplus, the generalized Flood-Garber test and the limited Flood-Garber test (Hamilton and Flavin, 1986).

The Hamilton- Flavin evaluation of sustainability is not applicable to growing economies, in which it makes no sense to assume the stationarity of primary surplus series and expect stationary series of real debt. Therefore, Trehan and Walsh (1988) propose a more general approach to the evaluation of sustainability with the time series analysis method, assuming stochastic behavior of government revenues and expenditures.

Although they are appropriate because they monitor long-term behavior of debt, which is in line with the approach of intertemporal budget constraint, the time series analysis methods face criticism because they look at the past movements of debt and use them as a basis for conclusions about future sustainability of these trends.

4
MAASTRICHT CRITERION
OF PUBLIC DEBT SUSTAINABILITY

In 1991 the European Community Governments agreed that the countries would have to meet four convergence criteria in order to be admitted to the European Monetary Union (EMU). Apart from the four monetary criteria - low inflation, stable exchange rate and low interest rates, the fiscal criterion appears as the fourth one. According to that criterion, the general government deficit should be lower than 3 percent of annual GDP, and public debt of the overall public sector should be lower than 60 percent of GDP, so that a country could join the EMU. The Delors Report states that monetary union without fiscal convergence could cause monetary and economic instability (Buiter, Corsetti and Roubini, 1993).

Since a large number of the EU countries currently do not meet the above mentioned fiscal criterion, same as the majority of "candidates" for admission to the EMU, fiscal rules are alleviated by allowing the possibility of

"multilateral supervision", which leaves certain discretionary space for national fiscal policy activities.

Although reference values of 3 percent of GDP for deficit and 60 percent of GDP for public debt seem to be determined arbitrarily, they follow certain logic. First, these values of debt and deficit are close to average values in the countries of the European Community, which in 1991 were 61.7 percent of GDP for public debt and 4.3 percent of GDP for deficit.

There is also a link between the values of 3 percent of GDP for deficit and 60 percent of GDP for public debt. More precisely, if we take that a normal long-term GDP growth rate in the European Union is 3 percent, and inflation is 2 percent, this nominally implies a growth rate of (approximately) 5 percent. By applying the sustainability conditions referred to in expressions (2b) and (3), we can easily show that, with this nominal GDP growth rate, the debt of 60 percent of GDP is compatible with the very deficit of 3 percent of GDP (Buiter, Corsetti and Roubini, 1993; "Institut Finanzen und Steuern", 1993).[12]

Despite the fact that these criteria of convergence have not been determined randomly, they are still not the best choice and they are already being questioned in the EU countries. There are several reasons for this. First, it is difficult to find a reason for their existence; second, they are too restrictive even for the EU members, and third, countries differ significantly in their economic structure and initial conditions, so what is optimal (or sustainable) for one economy does not necessarily have to be optimal for the other. Finally, experience shows that countries are very resourceful in finding ways of how to formally avoid the criteria formed in this manner (Von Hagen, 1990).

Nevertheless, each country (including Croatia) that intends to become a member of the EMU one day should, while implementing a borrowing policy, take into account whether it meets the Maastricht criterion of fiscal policy

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[12] *According to the sustainability criteria*

(2b) $\quad bt^N - b_{t-1}^N = g_t^N - t_t^N + ib_{t-1}^N - wb_{t-1}^N$

where $g_t^N - t_t^N + ib_{t-1}^N$ is total (conventional) deficit, so

$b_t^N - b_{t-1}^N = d_t^N - wb_{t-1}^N$.

If the sustainability request is set according to which the debt/GDP ratio should be constant, i.e.,

$b_t^N - b_{t-1}^N = 0$, *then* $d_t^N = wb_{t-1}^N$.

Accordingly, with the debt of 0.60 and nominal growth rate 0.05 (0.03 + 0.02), deficit according to this formula should amount to 0.03 (3 percent) of GDP.

convergence. On the other hand, it is equally necessary for each country, even if it meets that criterion, to take care of the sustainability of its current deficit and debt policies in given circumstances.

5
POLITICAL ECONOMY OF PUBLIC DEBT

The sustainability of public debt policy has not always been a central topic in the studies of public debt. Classical research areas related to public debt were on the debt burden and the intertemporal debt effects. Only lately has the focus been shifted to public debt determinants, and the explanation of these determinants has taken two courses, one using the normative approach and the other using the positive approach. Reviewing the sustainability issues is a part of the positive approach to determining the causes of public debt.

The main advocate of the normative approach to public debt is Robert Barro (1979), and Lucas and Stockey are close to him in their ways of thinking. Barro and his followers observe the state as a "benevolent social planner" whose aim is to maximize the welfare of members of the society. They believe that the effects of fiscal policy (that is - taxation) are least distorted if tax rates are constantly kept on the same level. Since economies pass through periods of expansion and periods of recession, with constant tax rates they will undergo alternate periods of budget deficit and budget surplus. Also, the appearance of deficit or surplus will depend on the effect that some external factors have on public expenditures. Thus, debt will be used in periods of temporary increase in public expenditures (especially in periods of war and big crises), while in post-war (post-crisis) periods unchanged rates will generate budget surplus which will compensate for the present deficit in terms of its current value (Heinemann, 1992; Alesina and Perotti, 1994). In other words, the idea of this approach is that tax rates "smoothed out with time" will have the most neutral effect on the economy. This is why this approach is sometimes called "equilibrium approach to fiscal policy" or "tax smoothing policy". The appearance of public debt is only a logical result of pursuing such a policy in the periods when it is justified.

This is the explanation of the appearance of debt in line with Barro's theory of neutrality of debt, i.e. of equal effects of tax financing and debt financing (1974). According to Barro, debt issuance has no influence on wealth, aggregate demand, interest rates and formation of capital, its only function is to provide greater flexibility for the government in intertemporal balancing of public

revenues and public expenditures (Barro and Grilli, 1994).

The normative approach can however, only exceptionally be confirmed by real data, and it can not explain either the appearance of high and permanent deficits in many countries in the time of peace, or difference in the levels of deficit in countries with similar economic circumstances.

Therefore, as an alternative to this neoclassical normative approach, there emerges a positive approach to the explanation of the appearance and trends of public debt. This approach abandons the presumption of the state as a benevolent social planner, and considers that politicians decide on source of financing on the basis of their own interest and specific limitations set up by institutional environment (Heinemann, 1992).

The members of the "public choice school" (Buchanan, Brannan, Tulock, and Niskanen) can be included among the advocates of the positive approach. They believe that excessive deficit tendencies may emerge from self-willed behavior of politicians and bureaucrats, whose aim is to secure re-election and keep their power and related benefits (Rolf, 1996). In order to explain the appearance of deficit and public debt, members of the public choice school presume the existence of a fiscal illusion and asymmetry of the Keynesian-type stabilization policies.

Models of the members of the so-called "new political economy" are also based on the positive approach. They stress the strategic importance of fiscal deficit. They presume that fiscal policy of the current government may determine the fiscal policy of its successor, so the current government is using it for their strategic goals. New political economy says that fiscal deficit and debt are aggregate results of a political conflict among various groups of citizens (present and future politicians) that has arisen as a result of a dispute about the structure of expenses (Alesina and Tabellini, 1990) or about overall expenditures (Persson and Svensson, 1989).

A similar group of models, which have adopted the positive approach in explaining public debt, claims that debt is a consequence of strategic conflicts among political parties and social groups exerting simultaneous pressure on political decisions. In line with that, Roubini and Sachs (1989a, 1989b) indicate that in modern democracies, public debt increases with the number of parties in a coalition government, i.e. with the number of various groups influencing the structure and size of the budget.

Grilli, Masciandaro and Tabellini (1990) prove that deficit is correlated with permanence of the government; long-lasting governments have lower deficits. This is in line with the findings of Roubini and Sachs, because

coalition governments usually rule for a shorter period of time.

The next group of models with the positive approach presumes that geographic affiliation of parliament members may cause excessive spending.[13]

The models presuming that budgetary institutions determine the size of the budget and the deficit also use the positive analysis. A large budget and fiscal deficit are a consequence of the lack of fiscal discipline, while tighter fiscal discipline is enabled by those budgetary institutions that provide strong prerogatives to a prime minister or finance minister, limit universalism[14], reciprocity[15] and parliamentary amendments and facilitate strict execution of the budget law (Alesina and Perotti, 1994).

Models based on the positive approach to deficit and public debt are empirically much more confirmed than the models based on the normative approach. In other words, the very fact that in modern democracies politicians behave like any other citizens, in some way pursuing their own benefit instead of social welfare, explains the recent appearance of relatively high deficits and public debt. The political attractiveness of debt suggested by the positive approach may, accordingly, take borrowing even across sustainable limits. This justifies the need for monitoring the dynamics of borrowing by revealing sustainable levels of public debt and by limiting growth of debt when it exceeds the sustainability limit.

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[13] *Weingeist, Shepsle and Johnson (Alesina and Perotti, 1994) have dealt with these models.*

[14] *Universalism is a feature of the budget that contains a little bit of everything for everybody.*

[15] *Reciprocity emerges when on enactment of the budget one representative makes an agreement with another one that, in exchange for the same benefit, he will not oppose his proposal.*

6
EVALUATION OF SUSTAINABILITY OF BORROWING POLICY IN THE REPUBLIC OF CROATIA

After the elaborate presentation of a number of possible methods of evaluation of sustainability of the current state borrowing policy, one can logically ask oneself which of these methods could be applied in order to establish whether the current dynamics of borrowing in the Republic of Croatia is sustainable in a long run. Due to a number of objective obstacles, the evaluation of debt sustainability in our case is more difficult. First, we still lack a reliable and complete database. Then, even if it existed, public debt time series would be too short to be used for analyzing future debt trends. Finally, since the last five years can be considered as not typical due to war and post-war reconstruction on the one hand and difficulties in obtaining foreign loans on the other, changes of debt in that period are not a result of the "normal" inclination of our country to borrowing. On top of all of this, it is difficult today to determine the nominal GDP long-term growth rate, as well as the long-term interest rate, which would be necessary to calculate the sustainable public debt level.

Still, certain conclusions about the sustainable public debt level could be made by studying the current state of public debt. First, the current share of debt in GDP can be compared with the Maastricht criterion. Further, (as suggested by expression (12)), net current value of the state can be evaluated with the application of various combinations of growth rates of GDP and interest rates.

Also, by assuming different GDP growth rates, interest rates, and shares of debt in GDP, values of future expenses for interest could be simulated and it could be assessed whether these expenditures are sustainable or not. The amount of primary surplus needed for long-term stabilization of the share of public debt in GDP can be calculated from current data, and this amount can be compared with the existing primary surplus. Finally, we can start calculating simple ratios (see part 2) and comparing them with indicators of the same kind calculated for various economies. These methods would definitely yield results indicating, fair to say, different conclusions about the sustainability of the current borrowing policy, but nevertheless provide a little clearer insight into what today looks quite difficult to perceive and a somewhat firmer basis for contemplation and discussion.

6.1 Debt indicators of the Republic of Croatia

A comparison of the basic debt indicators calculated for the Republic of Croatia (common in an economic analysis) with indicators of the same kind for a sample of countries, is the simplest way of analyzing Croatia's debt. Therefore, the following indicators have been calculated and laid out in Table 1 for a sample of 13 countries and the Republic of Croatia:

1. the share of interest on public debt in total revenues of consolidated central government (K/UP2),
2. the share of interest on public debt in total expenditures of consolidated central government (K/UI2),
3. the share of interest on public debt in GDP (K/BDP),
4. the share of deficit in total expenditures of consolidated central government (D/UI2),
5. the share of deficit in GDP (D/BDP),
6. the share of public debt in GDP ((B/BDP),
7. the share of internal public debt in GDP (Bd/BDP), and
8. the share of external public debt in GDP (Bf/BDP).

The sample contains the following 13 countries: Ireland, Malta, Cyprus, Turkey, Spain, Portugal, Greece, Austria, the Czech Republic, Poland, Bulgaria, Slovenia, and Slovakia. These countries have been selected for several reasons:

a) These countries are comparable with the Republic of Croatia because, like the Republic of Croatia, they belong to the group of middle-income European countries.

b) Ireland, Malta, Cyprus, and Turkey are countries with an average real growth rate of 3.5-6 percent in the period from 1993 to 1995. Accordingly, these are the economies which in the indicated period achieved the growth rates that are being forecast for Croatia for the following years.

c) Spain, Portugal, and Greece are the countries that have become members of the EU despite less developed economies, and are therefore comparable with the Republic of Croatia, which is also aspiring for EU membership.

d) Austria is interesting as a new member of the EU.

e) The Czech Republic, Poland, Bulgaria, Slovenia, and Slovakia are transition countries like Croatia. With the exception of

Bulgaria, these countries are among the more successful ones in the process of transition to market economy.

The years taken as a reference are 1994, as the last year for which data in the majority of the countries observed are available, and 1993, for the countries with no available data for 1994. For Slovakia and Croatia data have been taken for 1995 and 1996, respectively. These are considered as more relevant than 1994.

Data on consolidated central government have been taken into consideration. Data on a consolidated general government, which would be more appropriate for international comparisons were not available at the accessible data sources. Only the indicators for Slovenia were calculated by means of data for the overall public sector, since data in Slovenia are not prepared according to the methodology of Government Finance Statistics (GFS), among which the data on consolidated central government would also be found.

For the Republic of Croatia, the data on public debt refer to the entire public sector.

Among the indicators the most important are those on the share of deficit and debt in GDP. Table 1 indicates that the deficit/GDP ratio in the countries observed varies from (+)3.2 in Slovakia to 12.73 in Greece. Except for the Czech Republic and Slovakia as countries with a budget surplus, Croatia has, with 0.92 in 1995 and 0.46 in 1996, achieved the lowest deficit amounts.

Also, the share of public debt in GDP differs considerably from one country to another, acquiring values ranging from 18.71 percent in the Czech Republic to very high 103.78 of GDP in Greece and 147.82 percent in Bulgaria. The Croatian debt is somewhat higher than the one in low-debt Malta and Slovakia.

The above data may be roughly connected to the Maastricht criteria of 3 percent of GDP for deficit and 60 percent of GDP for debt, although this condition for deficit refers to the debt of a consolidated overall government and the condition for the debt refers to the total public sector debt. In both analyzed years, Croatia met both criteria, unlike e.g. Ireland, Portugal, Greece, Poland, and Bulgaria, which in the years indicated did not satisfy the limit of 60 percent of the share of debt in GDP, and unlike Turkey, Spain, Portugal, Greece, Austria, and Bulgaria, which realized a deficit higher than the one allowed for admission to the European Union. Consequently, out of the 14 countries indicated, apart from Croatia, the only countries that could qualify for admission to the EMU are Malta, Cyprus, the Czech Republic, Slovenia, and Greece. It should be mentioned here once again that the picture could be different if the data referred to a consolidated

general government, i.e. to the overall public sector.

Interestingly, all countries in the group of countries with a low growth rate have quite low values of both indicators - in other words, they meet at least one Maastricht criterion. The countries with the most unfavorable deficit ratios, i.e. deficit/GDP ratios, are the ones that already are members of the European Union, thus being less concerned about seeing the door of the EMU closed (Spain, Portugal, Greece, Austria), as well as Bulgaria as a country of a slower and less efficient transition process.

Croatia has a relatively low share of interest rates in government revenues and expenditures, i.e. in GDP. In comparison with Croatia, only Bulgaria has a lower proportion of interest in total revenues, expenditures, and GDP respectively. However, in Bulgaria, such low interest rates on public debt in 1994 may be considered merely as a non-typical phenomenon. The fact is that Bulgaria had a very high public debt of 1.47 of GDP in that year, which it did not repay at the time because of some unresolved relations with creditors - the Paris and London Clubs.

Since a large number of countries have started their fiscal reforms and restrictive debt policies after the proclamation of the Maastricht criteria, one can notice in all the monitored countries, as well as in Croatia, that the share of interest in GDP is bigger than the share of new debt (deficit) in GDP, meaning that the obligations stemming from the old debt are higher than new borrowing, which in the future will lead to a drop in the total public debt level (provided that there will be no turning point in the debt policy, i.e. stronger reliance on debt financing).

The data in Table 1 suggest that in the public debt structure of the developed countries there still prevails internal public debt, which is much more favorable for the external stability of a country. Among the "fast growing economies", Turkey alone owns more than one-half of the total debt to foreign countries. Unlike that, Croatia is among the transition countries which, due to a lack of their own savings, rely to a great extent on covering the deficit by foreign savings (the situation is similar in Poland and Bulgaria, whereas for Slovenia the data on total public debt are not available).

It follows from Table 1 that, in comparison with the 13 countries, Croatia does not have a distinct need for reducing the public debt because all debt indicators show that it is better off. The level of foreign debt may become the only source of problems, as it is currently 20.5 percent of GDP. This value is lower only than the one for Bulgaria, Poland, Turkey, and Greece.

Table 1

DEBT INDICATORS (CONSOLIDATED CEBTRAL GOVERNMENT)

	Ireland[a]	Malta[a]	Cyprus[b]	Turkey[b]	Spain[a]	Portugal[b]	Greece[a]	Croatia[d]
K/UP2	16.39	3.92	16.21	23.61	13.47	14.09	46.10	2.52
K/UI2	15.53	3.62	15.51	19.66	11.09	12.46	29.36	2.49
K/BDP	6.55	1.40	5.19	4.57	4.36	5.56	10.30	1.18
D/UI2	-5.28	-7.59	-4.33	-16.71	-17.69	-11.54	-36.31	-0.98
D/BDP	-2.23	-2.94	-1.45	-3.89	-6.95	-5.15	-12.73	-0.46
B/BDP	105.37	31.26	54.79	43.90	51.24	70.00	103.78	37.64
Bd/BDP	63.98	26.20	39.22	20.61	35.74	60.00	82.04	17.10
Bt/BDP	41.39	5.38	15.57	23.29	15.50	10.00	21.74	20.54

	Austria[b]	Czech Rep.[b]	Poland[b]	Bulgaria[b]	Slovenia[b]	Slovakia[c]	Croatia[c]
K/UP2	10.66	3.53	9.94	0.07	3.25	-	3.28
K/UI2	9.37	3.63	9.42	0.06	3.23	-	3.22
K/BDP	3.92	1.45	4.15	0.02	1.50	-	1.46
D/UI2	-12.07	2.21	-5.19	-10.43	0.50	-	-2.03
D/BDP	-5.05	0.88	-2.29	-4.06	-0.23	3.23	-0.92
B/BDP	54.64	18.71	69.53	147.82	-	26.00	27.73
Bd/BDP	43.10	12.07	23.62	45.83	-	19.00	16.94
Bt/BDP	11.53	6.65	45.91	101.99	9.29	7.00	10.79

Table 2

INDICATORS OF TAX BURDEN AND SIZE OF THE PUBLIC SECTOR

	Ireland[a]	Malta[a]	Cyprus[b]	Turkey[b]	Spain[a]	Portugal[b]	Greece[a]
PP1/BDP	30.04	27.15	17.95	15.15	16.47	23.00	18.73
PP2/BDP	35.04	27.15	25.97	15.16	28.78	32.39	18.73
PP3/BDP	35.90	-	25.97	15.16	31.71	33.50	18.73
RS	37.50	-	-	22.20	35.80	33.00	42.50
UI1/BDP	36.85	38.70	23.70	20.51	18.03	21.14	35.07
UI2/BDP	42.18	38.70	33.46	23.26	39.31	44.61	35.07
UI3/BDP	55.66	-	33.46	23.26	45.69	48.60	35.07
RS	40.40	-	-	-	42.60	42.46	52.70
Average growth rate of real GDP, 1993 – 1995	6.6	5.2	4.0	3.5	2.0	0.6	0.8

	Austria[b]	Czech Rep.[b]	Poland[b]	Bulgaria[b]	Slovenia[b]	Slovakia[c]	Croatia[c]	Croatia[d]
PP1/BDP	21.02	33.61	26.83	16.96	-	26.00	28.01	27.63
PP2/BDP	32.91	38.00	37.35	26.17	-	-	44.18	44.12
PP3/BDP	38.28	43.25	37.35	29.59	-	-	47.43	47.53
RS	42.80	47.30	-	-	-	-	-	-
UI1/BDP	22.84	34.35	21.70	24.91	24.00	33.00	30.32	30.51
UI2/BDP	41.84	39.86	44.05	38.96	-	48.00	46.67	47.33
UI3/BDP	52.28	50.66	44.05	47.00	46.00	-	51.34	54.04
RS	47.80	42.30	-	-	-	-	-	-
Average growth rate of real GDP, 1993 – 1995	1.7	2.2	5.4	1.0	3.2		-0.3	-

Data sources: Government Financial Statistics, IMF, 1997; International Financial Statistics Yearbook, IMF, 1996; World Economic Outlook, IMF, 1996; Ministry of Finance Monthly Statistical Reports; Bulletin of National Bank of Slovenia; OECD Economic Survey, various years; OECD Observer (data from Revenue Statistics of the OECD Countries).
Notes: a) 1993; b) 1994; c) 1995; d) 1996.

Table 2 shows the standard indicators of the tax burden and the size of government for selected countries, i.e. shares of tax revenues and total public expenditures calculated for three different scopes of government - central government (1), consolidated central government (2), and general government (3). Since it was not possible to collect data on consolidated general government because different data sources had to be used (Revenue statistics, Government Financial Statistics, OECD Economic Survey and data of national ministries of finance), the values for general government were obtained as approximate values, by adding up where it was possible the corresponding values for consolidated general government and local level of government. Since consolidation has not been conducted, it can be assumed that the obtained values overrate real amounts of indicators PP3/BDP and UI3/BDP.

For the Republic of Croatia, the values used were GDP in current prices amounting to HRK 94,624 million in 1995 and HRK 103,250 million in 1996. Since there are no data on tax revenues of extrabudgetary funds in the accounts of consolidated central government, it was assumed that all fund revenues were a result of social security contributions, which by definition are tax revenues. It was assumed that, in 1996, the achieved levels of tax revenues and total expenses on the local level in the Republic of Croatia were equal to the budget values.

It can be concluded from the calculated shares of tax revenues of central government in GDP that Croatia belongs to the countries whose citizens and businesses have a higher burden of paying taxes to the central government; still, that burden of 28 percent may be considered more or less normal. However, when payments to extrabudgetary funds (such as various social securit contributions) are added to this figure, the tax burden in the Republic of Croatia climbs up to 44.12 percent, which is a maximum level of this indicator in the countries observed.

Indicator of the tax burden on the general government level in the Republic of Croatia amounts to 47.53 percent, which also represents the highest value of this indicator. In terms of this criterion, only the Czech Republic comes close to Croatia with its 43.25 percent of the share of general government tax revenues in GDP. However, it should be noted here that data on the tax burden considerably differ from one source to another. Data with which the data of the same kind for the Republic of Croatia have been compared so far are the ones obtained from GFS. Data from Revenue Statistics for OECD countries (hereinafter: RS) are quite different (they are listed in the shadowed line with the mark RS in the first column). If RS data are taken as more relevant, then the tax burden in Croatia

is not so much different from the one in the observed countries.[16] In this case, the tax burden in Croatia is remains as the highest, but the Czech Republic, Austria, and Ireland are quite close in terms of the tax burden.

With respect to the size of the central government as an indicator (UI1/BDP), the Republic of Croatia again does not stand out among the observed countries, with its share of central government total expenditures in GDP at approximately 30 percent. When expenditures in extrabudgetary funds are taken into consideration, the Republic of Croatia, with the share of the expenditures of its consolidated central government climbing up to approximately 47 percent of GDP, again comes to the top, right after Slovakia. Taking into consideration the widest scope of government, i.e. consolidated central government enlarged by the expenditures of local government, it turns out again that Croatia has the biggest public sector among the analyzed countries, just a bit smaller than Ireland, which is a leading country when it comes to this indicator. The problem of relevance of data should be stressed here again, since RS data are also quite different in terms of this indicator. Still, whatever data are used for comparison purposes, it turns out that Croatia has a very big public sector and according to this criterion is on top among the countries considered here.

7
THE IMPLICATIONS OF THE OBTAINED RESULTS FOR THE FUTURE BORROWING POLICY OF THE REPUBLIC OF CROATIA

Data indicating that Croatia may be considered as a country with a high tax burden and a big public sector have significant implications on the public debt policy, as well as on macroeconomic policy in general. First, taxes and

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[16] *The difference between the data in the two used sources, which are regularly considered in literature as the most relevant ones, instigated the research for its causes during the project preparation. Co-operation has been established with the research staff of the International Monetary Fund, which helped to reach at least a partial explanation of the mismatch in those data. The basic cause of this mismatch is not, as it appears, the difference in the methodology of data preparation, but in the data scope. The GFS scope is generally narrower, because this statistics frequently exclude social security funds, i.e. the majority of extrabudgetary funds. Furthermore, in some countries lower government levels in GFS data are not included in the definition of consolidated general government. Different scopes of general government from one country to another make GFS an inappropriate data source for international comparisons. We have therefore been advised to rely, in comparisons to general government, on more complete data of Revenue Statistics.*

loans should be observed as alternative sources of financing public needs. If a country opts for financing public needs by taxes, borrowing requirements should be lower, and vice versa. The indicators mentioned may be used as a confirmation of this, as it can be seen that countries with a great difference between tax revenues and total expenditures usually have high public debt levels.

Croatia, being a country with a high tax burden, should be able to meet its public financing needs from collected tax revenues. Should it, however, be assessed that borrowing is a more favorable variety of financing, the tax burden should be decreased.

In addition, public debt should first of all be used for stabilization purposes, i.e. in periods of major crises, wars, and political strives, so as to enable the smallest possible drop in available income. In relatively peaceful times, with a growing GDP as an implicit tax base, it makes no sense to raise loans, no matter how favorable they are. Every loan needs to be repaid in future, so if the aim is to relieve the economy from tax payments in the future, then current borrowing is not in line with such an aim.

Furthermore, besides the sustainable level of public debt, the level of foreign debt is also important. More specifically, although the share of public debt in GDP in the Republic of Croatia is still bearable, the foreign component of the debt today may have become almost unbearable.

Finally, when debt is considered from the aspect of its dynamics, it can be noticed that nowadays the average interest rate on existing debt is approximately the same as the real GDP growth rate, or higher than that. This means that the debt burden in the future will be growing in real terms, and that, with a continuation of the current tendencies, the limit of public debt sustainability will be reached sooner or later.

In the end, it may be good to remember that the "unwritten limits of borrowing exist when the population considers a debt as evil" (Heinemann, 1994). In other words, voters should determine the final limit of borrowing in a democracy, not government institutions.

LIST OF SYMBOLS:

B = public debt

T = total public sector revenues

G = total public sector expenditures

D = total fiscal deficit

Y = output (GDP)

C = consumption

S = savings

I = investments

X = exports

U = import

M = monetary base

b = share of public debt in output

t = share of total public sector revenues in output

g = share of total public sector expenditures (without interest) in output

d = share of total fiscal deficit in output

p = share of primary deficit in output

s = share of primary surplus in output

n = real output growth rate

w = nominal output growth rate

r = average long-term real interest rate

i = nominal interest rate

k = tax rate required for debt servicing

α = a part of income saved by citizens as government bonds

β = a public debt growth rate

π = prices growth rate (inflation rate)

e = domestic currency real exchange rate

A = foreign exchange reserves

K = government net value

E = expected value

t = symbol for current period

j = symbol for last period

f = symbol for value expressed in foreign currency units

d = symbol for value expressed in domestic currency units

N = symbol for nominal values

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