

THE ASSESSMENT OF THE PUBLIC DEBT SUSTAINABILITY

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Abstract:

The subject of the article⁴² is justified by the international concerns following the rapid growth of the public debt, as an effect of the global economic and financial crisis. Based on the main concepts and definitions in the economic literature on debt sustainability, the author adopts her own opinion on the definition of debt sustainability. In the paper, there are analysed the factors influencing public debt and the risk of default, there are identified some limitations of the analysis of the public debt sustainability, there are presented the factors influencing public debt sustainability and the risk factors in ensuring the sustainability of the debt. Finally, some methods of ensuring debt sustainability are highlighted.

One of the most important conclusions is that there is no rule for determining a "safe" level of the public debt. Each country must define its maximum level of public debt based on its own macroeconomic and financial experience and of other countries, but taking into account its own characteristics.

Keywords: public debt, sustainability, negative effects, factors of influence, risks

JEL Classification: F34, G01, H63

Introduction

Since 2008, the effects of the global economic and financial crisis have begun to influence the world economy. Among these effects there is the rapid increase of public debt in advanced economies, mainly generated by an over-optimistic estimation of the fiscal situation before the crisis, by the reduction of public revenues and the increase of social expenses during the crisis, by the costs of restructuring the banking system, by the counter-cyclical fiscal policies.

In this context, the evolution of public debt and budget deficits has become a very important issue of economic policy in many countries. As a result, the sustainability of public debt has become one of the widely debated topics, in the context of the need to coordinate fiscal policies in the Eurozone countries, to raise awareness of the threats that exaggerated spending may have on future generations and the future challenges to public finances due to population aging.

Although there are several definitions of debt sustainability, it cannot be said that this concept is clear at present. In the economic literature, there are several methods for defining and evaluating debt sustainability, different in terms of time horizon and the variables chosen. Thus, debt sustainability can be viewed as a dynamic concept, on the short, medium and long term; debt and deficits can be measured in gross or net terms, including or not the liabilities of social security systems or other items.

The International Monetary Fund (IMF) defines *debt* as being the totality of the financial claims that requires the payment of interest and principal by the debtor to its creditor at a later date. *The debt financing profile* represents the characteristics of a country's debt, including currency composition, maturity of debt and the basis of creditors (composition, size and residence).

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Public debt represents the debt of the government (or of other entities, with the guarantee of the state) toward third parties, and it can be external public debt (toward foreign legal entities and physical persons, foreign companies and banks) and domestic public debt (loans in national currency or in foreign currency to national creditors) through the purchase of bonds issued by the government to cover the needs of the respective economy.

Public Debt Assessment

Debt sustainability is ensured if the government of a country does not resort to renegotiating, defaulting or restructuring its debt and / or will not make major adjustments to its policy. The debt is not sustainable when the debtor increases its debt faster than the growth of his ability to pay debt service, especially in the long term.

Long-term sustainability is a dynamic concept, which depends not only on the stock of debt and its associated service, but also on the growth rate of new loans, on the evolution of the fiscal situation and on the ability to repay the debt.

The destination of public debt, for consumption or for investment, is of utmost importance for the sustainability of the growth of public debt and for the transfer of fiscal burden to future generations.

Dinga E. (2018) defines *sustainability* as being a feature of a process (phenomenon, system) to maintain itself on the desirable trajectory, in a predetermined or acceptable range, for an indefinite period of time and on a global area of accessibility⁴³.

Sustainability has several characteristics that define it. Thus, sustainability is not judged in terms of yield, it does not matter the cost of ensuring sustainability; sustainability implies the existence of influences from outside the process / system; sustainability implies the element of proficiency⁴⁴; sustainability means solving the structural vulnerabilities that have arisen in the evolution of the process / system in question. (Dinga, 2018)

After analysing the economic literature, the author adopts her ***own opinion on the definition of debt sustainability***. Thus, *sustainability* is a property of *debt*, which implies that the evolution of the debt ensures the payment of the debt service in the medium, and possibly long term, without the need for significant changes in the economic policies, without generating shocks, tensions in the internal market, without causing major fluctuations of the macroeconomic variables of the national economy. Sustainability allows fluctuations of debt, being important to achieve the expected, positive, effect on the medium and long term.

From the definitions of debt sustainability in the literature, it emerges a *criterion for debt sustainability*, namely the borrowed capital must be used for investments having an yield at least equal to the interest rate paid on the contracted debt, or for economic reforms.

The purpose of pursuing debt sustainability is to ensure a sustainable economic development, sinuous, without constraints, shocks or tensions. In other words, *the purpose of ensuring debt sustainability* is to avoid the negative effects of debt default (the impossibility of the government to perform its duties; the significant increase in taxes, and even the implementation of expropriation measures; high inflation; the depreciation of the national currency; banking crises; the loss of private savings; the overloading of some segments of society; the undermining of public confidence in the government; domestic politic instability; the worsening of country's rating and of the political prestige at the international level).

Indebtedness indicators show liquidity and solvency issues. According to the IMF, the *liquidity* of a company shows the sufficiency of its liquid assets and of the available financing to cover or to roll up its outstanding liabilities.

⁴³ Not only a stationary process can be sustainable, but also one that increases or decreases.

⁴⁴ Proficiency is the quality of generating the expected (positive) effect.

Solvency shows that the current debt stock is fully covered by the present discounted value of all expected future primary balances⁴⁵. In other words, it can be said that the government meets the intertemporal budgetary constraint, or that the "no-Ponzi" condition is satisfied.

Generally, in order to describe the *solvency*, there are used in analysis indices of debt stock compared to the repayment capacity⁴⁶, and in order to describe *liquidity problems*, there are used debt service rates and indicators of gross financing needs.

Liquidity problems are sometimes difficult to distinguish from insolvency problems, as liquidity can lead to insolvency due to tensions in the exchange rate or to rise in interest rates.

In emerging and advanced countries, the problem of public indebtedness is rather related to the temporary lack of liquidity, due to insufficient revenue receipts and / or to urgent payments to creditors, while in low-income countries with high rates of public debt (% of GDP), the main problem seems to be solvency.

From a financial point of view, there are a number of indebtedness indicators that can be used to measure, in different ways, the cost of debt service and the ability of the country to ensure this service, and also the sustainability of debt can be evaluated (see table no. 1). In general, these indicators measure liquidity and solvency.

Table no. 1.

Indicators for Evaluating the Debt and the Debt Sustainability

Indicators	Calculation method	Explanations	Critical values of the indicators for debt sustainability framework (for HIPC ⁴⁷ countries)		
			Strong	Medium	Weak
For foreign debt					
Liquidity indicator	1. The ratio of external debt service (total external debt service / exports of goods and services)	1. It assesses the share of export receipts necessary to pay for external debt service	25%	20%	15%
	2. The ratio of the budgetary service (the total service of the external debt / the budget revenues generated domestically)	2. It measures the government's ability to finance the external debt service from domestic sources	35%	30%	25%
Solvency indicator	3. The present value of the external debt / exports of goods and services	3. It measures the present cost of external debt from the perspective of the ability to pay from exports	200%	150%	100%
	4. The present ⁴⁸ value of the external debt / budgetary revenues generated internally	4. It evaluates the present cost of external debt compared to the government's ability	300%	250%	200%

⁴⁵ The primary balance represents total interest-free income minus total interest-free expenses and net acquisition of non-financial assets. Also, the primary balance is equal to the net loans received / granted plus the net expenses with the interests minus the net income from the interests.

⁴⁶ If they have a stable or declining value, then the solvency condition is met.

⁴⁷ Heavily Indebted Poor Countries

⁴⁸ The present value of the payments for the external debt service is the discounted value of the payments planned according to the redemption plan. The rates determined on the basis of the present value have certain limits, the most important of which is that they are highly dependent on the discount rate chosen. Thus, a poorly chosen discount rate can determine results that lead to a wrong evaluation.

	5. The present value of the external debt / GDP	to finance foreign debt service from domestic sources 5. It evaluates the present cost of external debt compared to the national income.	50%	40%	30%
For internal/domestic debt					
Liquidity indicator	6. The total domestic debt service / domestic budgetary revenues	6. It measures the government's ability to finance domestic debt service from domestic sources			
Solvency indicator	7. The present value of the internal debt / budgetary revenues generated internally 8. The stock of nominal domestic debt /GDP	7. It evaluates the present cost of domestic debt compared to the government's ability to finance domestic debt service from internal sources 8. It measures the stock of domestic debt compared to the national income	Significantly more than 15-20%		
For total debt					
Liquidity indicator	9. The total debt service / domestic budgetary revenues	9. It measures the government's ability to finance domestic and foreign debt service from domestic sources			
Solvency indicator	10. The present value of the total debt / budgetary revenues generated internally	10. It assesses the present cost of internal and external debt compared to the government's ability to pay from internal sources			

Source : IMF

The factors influencing the public debt and the risk of default on the debt are:

- public expenditure on goods and services,
- tax revenues,
- the interest rate paid for the debt,
- the exchange rate of the national currency,
- the share of debt in foreign currency. The higher it is, the more the risk of default increases in case of depreciation of the national currency,
- the dynamics of public debt compared to the dynamics of GDP. The higher raise of the public debt compared to GDP has effects in the direction of increasing the risk of default.
- the dynamics of debt. If the debt increases rapidly, the risk of default is higher,
- the maturity of the debt. In the case of short-term debt, problems can arise for debt refinancing, but also due to fast disinvestment in the event of a shock, and thus increases the risk of default,
- the existence of liquid financial assets,

- the share of non-resident creditors in the total creditors. The higher their share, the greater the risk that they will sell their government bonds quickly in the event of a crisis,
- the presence of contingent liabilities, especially in the financial-banking system,
- the degree of openness and transparency of the government regarding public debt management. The availability of information on a country's public debt influences market expectations, and implicitly the behaviour of economic agents,
- market expectations, and implicitly the behaviour of economic agents, influence indirectly the level of public debt through the effect on the real interest rate,
- the financial standing and the reliability of the country (past events of debt default, high levels of inflation, banking crises, national currency stability),
- the political stability and the ability of politicians to make the decisions necessary to achieve fiscal consolidation, the predictability of a country's economic policy,
- the potential evolution of budget revenues, the availability of additional sources of budget revenues, the potential evolution of the budget revenues getting in rate,
- the level of development and liquidity of the financial market,
- the external demand for the sovereign debt of the respective country and for other financial instruments and the international role of its national currency. This factor expresses the degree of readiness of the financial markets to finance high levels of public debt of the respective economy,
- the situation on the international financial market, the changes in global liquidity, in investors' sentiment, their reaction to shocks.

As a result, it can be said that there is no rule for determining a "safe" level of public debt. Each country must define its maximum level of public debt based on its own macroeconomic and financial experience and of other countries, but taking into account its own characteristics. Given that the risk of default depends on many factors and sometimes on unforeseen circumstances (shocks, etc.), the maximum level of indebtedness must be determined at a low level, maintaining an adequate margin of safety.

The Assessment of the Public Debt Sustainability

The ratio between gross public debt and GDP represents a significant indicator of the economic and financial soundness of a country, and the decrease of this ratio can be determined by a small primary deficit and by an increase of the GDP higher than of the interest rate on the government securities., more precisely, it is necessary to aim always that the receipts exceed the expenses.

The ratio of gross or net public debt to GDP is an indicator through which debt burden is assessed qualitatively.

Also, the ratio between public debt and GDP, analysed in dynamics, is one of the most commonly used indicators for assessing the sustainability of public debt.

However, this indicator has some "shortcomings". Previous experience shows that the ratio of debt to GDP is not the only factor that defines the level of fiscal and financial risk of the country (public debt crises can occur at different levels of this indicator). Secondly, this indicator is strongly procyclical, thus decreasing in the years of boom and increasing during recession or during slowing down of economic growth. The procyclical character is determined by the way the indicator is built. Thus, during periods of boom, the fiscal balance improves, bringing about the decrease or the contraction of the increase of the public debt (the numerator). On the other hand, nominal GDP is growing faster (denominator). In addition, in the countries that borrow in foreign currency, the public debt expressed in national currency (the numerator) decreases as a result of the appreciation of the national currency. In times of crisis and recession, the trends presented above evolve in the opposite direction. In addition, some contingent public liabilities may arise, leading to an increase in nominal public debt (especially related to ensuring the stability of the financial-banking system).

Therefore, the ability of the public debt-to-GDP ratio to predict the risk of a debt crisis and to assess the financial and macroeconomic stability of an economy, and the sustainability of public debt is limited. (Dabrowski, 2014)

At the same time, the economic literature and our approaches identify *other limitations of the analysis of the public debt sustainability*.

One of the *limitations* refers to the fact that it is extremely difficult to assign explicit probabilities to the perspectives for debt crises outburst, especially in the context of a limited set of data or due to the impossibility to compare data between national economies, or between different economic sectors. Also, the conjectural or structural changes of the analysed economies make it difficult to analyse the sustainability of public debt.

Another limitation may be considered the preference of the analyses of the public debt sustainability for the indebtedness thresholds and less for the dynamics of the debt. It is estimated that many of the advanced economies (e.g. GIIPS countries) can ensure debt sustainability (calculated as % of GDP) also above the threshold of 100%, especially if there is a debt reduction plan and some reduction of the ratio between public debt and GDP occurs in time. This is less true for some emerging economies, which, although may have debt rates in GDP below the 60% threshold, they may be considered as unable to ensure the sustainability of the public debt and therefore they may pay higher interest rates.

According to the IMF (2013), even when the rates of public debt in GDP are low compared to the reference levels proposed by the profile institutions, in analysing the sustainability of the public debt, a series of vulnerabilities generated by the **factors influencing the public debt sustainability** must be taken into account:

- a volatile economic growth,
- designing fiscal adjustments in the near future,
- high requirements for external financing,
- large spreads on interest rates,
- the structure of the investor base (a high share of public debt held by non-residents),
- the currency structure of the debt (an important part of the debt in foreign currency),
- debt structure from the point of view of maturities (rapid growth of short-term public debt).

The factors influencing the sustainability of public debt determine the **risk factors in ensuring the sustainability of the debt**. They are brought about, first of all, by the market perception of the debtor state, but also by the debt structure from the point of view of maturity, which is measured by the debt payment profile and by the weight of the short-term debt. Also, it is important the currency structure of the debt, the degree of diversification of the investor base, as well as the availability of liquid assets and the creditors' base, especially the share of non-resident creditors. In addition, the assumptions based on which the forecasts for the macroeconomic variables are made must be realistic. Gross financing needs must also be assessed.

The lower is the share of short-term public debt service in the total public debt service and the more diversified is the investor base, the more sustainable is the debt. A lower share of short-term public debt means a smaller probability of liquidity crisis and lower costs with interest. The diversification of the investment base refers both to the types of investors and to their geographical distribution, and it shows the long-term confidence in the economic development of the respective country.

When assessing the debt sustainability, it must also be taken into account the specific risks of each country, and a wide set of tax liabilities should be monitored. The fiscal risks due to the imbalances of the private sector and to the contagion between countries must be assessed. Also, the economic and fiscal behaviour in response to shocks must be taken into account.

The debt sustainability assessment has also qualitative aspects. Thus, the sustainability of the debt depends also on the effects / consequences of the debt in the economy: efficiency, destinations (economic activities - consumption or production -, sectors of activity, development regions), on the

contribution to the economic development by financing some objectives / projects of national and / or regional interest, to remove regional and social discrepancies.

The Analysis of the Dynamics of Public Debt

A starting point for measuring the dynamics of public debt is the budget constraint, according to which the current expenses for goods and services plus the debt service must be equal to the current income from taxes plus the newly contracted debt. Also, the budget constraint is the starting point in the formal discussion on the requirements for ensuring debt sustainability. Thus, the change in the public debt (D), between two consecutive periods (years) t and t-1, is given by the following equality:

$$D_t - D_{t-1} = i_t D_{t-1} + S_t + a_t D_{t-1} - \Delta B_t, \text{ where,} \quad (1)$$

i - is the average nominal interest rate related to public debt, and it can be estimated as follows,

$$i_t = Db_t / D_{t-1}, \text{ where}$$

Db_t is the interest actually paid for the public debt;

D_t is the public debt contracted during the period t.

S - represents the primary deficit (without the interest paid);

a - is the effect of the revaluation on the existing debt (in Romania, it is entirely due to the depreciation of the effective exchange rate of the leu), and is equal to

$$\left(\frac{D_t}{D_{t-1}} \right) \left[1 - \left(\frac{CS_{t-1}}{CS_t} \right) \right], \text{ where } CS \text{ is the exchange rate of the currency of the external debt at the end of the year;}$$

ΔB - represents the direct financing of the budget from the Central Bank. This is not considered by the Ministry of Public Finance as an additional debt, and it cannot exceed a certain limit established by law.

An important determinant that appears in equation (1) is the primary fiscal deficit. A continuous increase of the primary fiscal surplus brings about the improvement of debt sustainability by: reducing the real interest rate (through the remission of the eviction effect); the income growth at a higher rate (by increasing the efficiency of resource allocation and reducing the interest rate); the growth of the demand for money (as a result of reducing inflationary expectations) (Garcia, 1998).

Therefore, the structure of fiscal adjustments can be a critical variable for achieving debt sustainability. To this purpose, it is necessary to draw a strategy for public spending.

If we divide equation (1) to nominal GDP (GDP_t) and perform some algebraic operations, we obtain the following relation:

$$d_t - d_{t-1} = (i_t + a_t - g_t) \left[\frac{d_{t-1}}{1 + g_t} \right] + s_t - b_t, \text{ where (2)}$$

d_t și d_{t-1} – are the public debt shares in GDP, in two consecutive years;

s - is the primary public sector deficit (budget deficit) as a share of GDP;

g - represents the annual change rate of nominal GDP between the two consecutive years taken into account;

b_t - is $\Delta B_t / PIB_t$

From equation (2), rearranging the terms, it results:

$$d_t = (1 + i_t + a_t) \left[\frac{d_{t-1}}{1 + g_t} \right] + s_t - b_t, \text{ (3)}$$

Equation (3) shows that the **share of debt in GDP increases if the government has a budget deficit and if the nominal interest rate exceeds the nominal GDP growth.**

We can approximate the nominal growth rate (g) as the sum of the change in the GDP deflator (p), and the real growth rate of GDP (q), rewriting equation (3), as follows (Pelinescu, Albu, 2000):

$$d_t = (1+i^*+p) \left[\frac{d_{t-1}}{1+p_t+q_t} \right] + s_t - b_t, \text{ where (4)}$$

i^* represents the average real effective interest rate of the public debt, and is equal to the average real interest rate (i-p), plus the revaluation effect, a.

In times of crises, the factors on which depends the evolution of public debt in GDP deteriorate (the budget deficit and the interest rate increase, the GDP growth rate decreases), so that public debt as a share of GDP will increase.

Market expectations, and implicitly the behaviour of economic agents, influence indirectly the level of public debt by raising the real interest rate.

Equation (4) shows that a high real growth rate of GDP compared to the real effective interest rate tends to diminish the debt ratio in GDP, while persistent net primary deficits tend to increase it.

The depreciation of the national currency leads to the increase of the public debt in national currency.

If in equation (4) we divide the public debt at the moment t-1 into the debt in national currency and the debt in foreign currency, and we note with $\mu = \frac{(1+i^*+p)}{(1+q+p)}$, we obtain:

$$d_t = \mu d_n + \mu r d_s + s_t - b_t, \text{ where (5)}$$

d_n is the debt in national currency

d_s is the debt in foreign currency

r is the exchange rate of the national currency.

By dividing equation (4) by d_{t-1} , it is obtained the *equation of debt dynamics*:

$$d_t/d_{t-1} = \frac{(1+i^*+p)}{(1+q+p)} + (s_t - b_t)/d_{t-1} \text{ (6)}$$

If we put the condition that the d_t/d_{t-1} ratio tends in dynamics to a low constant value (the condition for sustainability), it is obtained *the condition for the sustainability of the dynamics of public debt.*

After analysing equation (6), we highlight some *methods of ensuring debt sustainability.*

The first way to improve sustainability is to act on the term (s-b). Reducing budget deficits (s) is the most direct and economically sound method. This is, however, strictly limited by the general needs, especially of social order, of the functioning of the government and of the government's advance of institutional reforms. The action on parameter b, i.e. the use of the monetary lever, is dangerous, any increase in its value leading to the inflationary spiral.

If the term (s-b) represents the impact of monetary and budgetary policies, the report $\frac{(1+i^*+p)}{(1+q+p)}$

describes *the behaviour of the real economy.* The key variables that should be acted upon, in this case, are the interest rate (i^*), the dynamics of prices (p) and the rate of economic growth (q). In order to stimulate the sustainable growth of the public debt, the interest rate must not increase more than the rate of economic growth.

Conclusions

Long-term debt *sustainability* is a dynamic concept, which depends not only on the debt stock and its associated service, but also on the growth rate of new loans, on the evolution of the fiscal situation, on the debt profile, on the effects of debt in the economy, on the behaviour - response of the economic agents, on the financial flows that a country can absorb effectively, and on their yield, on the volume of foreign exchange reserves, etc.

The sustainability of public debt also depends on the specific risks of each country. The fiscal risks due to the imbalances of the private sector and to the contagion between countries must be assessed. The structure of fiscal adjustments can be a critical variable for achieving debt sustainability. For this purpose, it is necessary to draw up a strategy of public spending.

The author considers that *debt sustainability* implies that debt should evolve in a range that allows to ensure the payment of the debt service in the medium, and desirable long term, without requiring significant changes of the economic policies, without generating shocks, tensions in the domestic market, without leading to major fluctuations of some macroeconomic variables.

Debt is considered to be sustainable when a country can pay its commitments under the contracted debt without having to restructure its debt or without creating arrears.

The *purpose of pursuing debt sustainability* is to ensure a sustainable, sinuous economic development, without constraints, without shocks, without tensions. In other words, *the purpose of ensuring debt sustainability* is to avoid the negative effects of debt default.

From the condition for the sustainability of the public debt dynamics, we find a method of ensuring debt sustainability, i.e. diminishing the budget deficits. From the point of view of the real economy, in order to ensure the sustainable growth of the public debt, the interest rate must not increase more than the rate of economic growth.

There are also *risk elements in ensuring debt sustainability*. They are determined, first of all, by the market perception of the debtor state, but also by the structure of the debt in terms of currency composition and of maturities (it is important the share of the short term debt, and implicitly the weight of the short term public debt service in the total debt service). Also, there are important the availability of liquid assets, the degree of diversification of the creditor base, especially the share of non-resident creditors.

The research shows that there is no rule for determining a "safe" level of public debt for several reasons. Thus, there is no fiscal "safety" standard applicable to all economies. Every country must define its maximum level of public debt based on its own macroeconomic and financial experience and of other countries, but taking into account its own characteristics. In addition, in a globalized economy with irregular business cycles, it is difficult to determine at what stage of the cycle an economy is at a certain moment, which is essential for the assessment of fiscal indicators. The experience shows that the risk of default can substantiate at different levels of public debt, sometimes seemingly very low.

Given that the risk of default depends on many factors and sometimes on unforeseen circumstances (shocks, etc.), and due to the tensed situation on the international market, the "safe" level of public debt is lower at present than 10 years ago, and the maximum level of indebtedness must be determined at a level that will allow the country to cope with unpredictable situations.

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