WORKING PAPER

SUSTAINABILITY OF SERBIA'S PUBLIC DEBT: THEORETICAL FRAMEWORK AND ANALYSIS USING THE EUROPEAN COMMISSION'S DSA FRAMEWORK

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Sustainability of Serbia’s public debt: Theoretical framework and analysis using the European Commission’s DSA framework

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Abstract: The subject of the paper is the analysis of the sustainability of Serbia’s public debt in the period 2025–2035, using the DSA framework developed by the European Commission based on deterministic and stochastic public debt projections. Traditional deterministic projections rely on the creation of different scenarios based on macroeconomic projections and assumptions. An integral part of the European Commission’s DSA framework are stochastic projections of public debt, as a tool for graphically depicting the impact of uncertainty in macroeconomic conditions on public debt dynamics. Based on the results of the baseline projection scenario, and according to the European Commission’s definition of public debt sustainability, we can conclude that Serbia’s public debt will be on a sustainable path over the next ten years, primarily considering the downward trend in its share in GDP projected until 2035. Nominal GDP will grow faster than the nominal amount of debt, and mostly its real component, which leads to the encouraging conclusion that the earning capacity of the Serbian economy will grow faster than the borrowing that will be necessary to finance that growth. On the other hand, the projected growth in interest costs and the primary deficit will increasingly slow this decline by the end of the projection horizon, which represents a cautionary part of the conclusion.

Key words: public debt, sustainability, fiscal policy, European Commission, DSA
[JEL Code]: E60, E62

Non-technical summary

The paper presents an analysis of the sustainability of Serbia's public debt for the period 2025–2035, using the methodology developed by the European Commission. The European Commission's Debt Sustainability Analysis (DSA) framework defines public debt sustainability as a situation in which fiscal policy can be maintained unchanged over the forecast period (with no changes in public spending and/or taxation that would affect the primary fiscal balance), without causing a continuous increase in public debt expressed as a share of GDP. In this way, when considering public debt sustainability the European Commission strives to focus attention on ensuring that public debt expressed as a share of GDP declines over time, or at least stabilises.

The European Commission's DSA framework is very similar to the framework used by the IMF and is designed to be practical and operationally applicable, unlike other theoretical concepts that are difficult to implement in practice. The idea is to analyse the trajectory of public debt over the next ten years, using various assumptions and projections of movements in specific economic variables.

Deterministic projections rely on the creation of six different scenarios based on macroeconomic projections and assumptions. These projections and assumptions relate to real GDP growth, inflation, the exchange rate, the nominal interest rate (and thus the real interest rate), and the primary fiscal balance. These variables represent key factors in the equation of changes in public debt and its share in GDP over time.

Stochastic projections of public debt serve as a tool for graphically illustrating the impact of uncertainties in macroeconomic conditions and fiscal outcomes on the dynamics of public debt over a five-year period. Stochastic analysis measures the potential effects of positive/negative risks on the movement of public debt, where risks relate to movements in the primary balance, nominal GDP growth, developments in financial markets that translate into higher or lower costs of financing the government's public debt, as well as exchange rate movements.

According to the results of the baseline scenario projection and the definition of public debt sustainability used by the European Commission, we can conclude that Serbia's public debt will remain on a sustainable trajectory in the coming years, given the projected decline in the share of public debt in GDP by 2035. Nominal GDP will grow faster than nominal public debt, largely due to real GDP growth. This trend provides an encouraging conclusion that the earning capacity of Serbian economy will grow faster than the need for borrowing, which will be necessary to finance this growth.

However, the projected increase in interest costs and the projected primary deficit will soon slow the decline in the share of public debt in GDP and then lead to a slight increase by the end of the projection horizon, which represents a cautionary aspect of the conclusion.

Contents:

1 Introduction

The subject of this work is the analysis of the sustainability of Serbia's public debt during the period 2025–2035, using the Debt Sustainability Analysis (DSA) framework developed by the European Commission, which serves as the anchor for the EU's fiscal rules. This DSA framework is an integral part of the fiscal sustainability analysis for all EU member states, which the European Commission continuously conducts and publishes in its Fiscal Sustainability Report and the Debt Sustainability Monitor. The European Commission's DSA framework is based on deterministic and stochastic projections of public debt.

Traditional deterministic projections rely on the creation of various scenarios based on macroeconomic projections and assumptions. These projections and assumptions pertain to real GDP growth, inflation, the exchange rate, the nominal interest rate (and thus the real interest rate), and the primary fiscal balance. These variables represent key factors in the equation of public debt dynamics and its ratio to GDP over time.

A component of the European Commission's DSA framework is also stochastic projections of public debt, which serve as a tool for graphically illustrating the impact of uncertain macroeconomic conditions and fiscal outcomes on public debt dynamics over a five-year period. The stochastic analysis measures the potential effects of positive/negative risks on public debt movements, where risks relate to changes in the primary balance, nominal GDP growth, financial market developments that translate into higher or lower costs of financing public debt, as well as exchange rate movements.

The aim of this paper is to apply the aforementioned tests and projections to Serbia, following the approach used for EU member states as presented in the European Commission's reports mentioned above. By considering various scenarios of macroeconomic factors, fiscal policy, and the resulting public debt, and by conducting simulations, the goal is to create different public debt projections that will enable conclusions to be drawn about future uncertain outcomes and the potential sustainability of public debt over the next ten years.

The first part of the paper provides an overview of theoretical models and definitions of public debt sustainability by various authors who have researched the concept of debt sustainability, as well as definitions developed by international financial institutions such as the IMF and the European Commission. A special section provides the definition of public debt sustainability adopted by the European Commission, which forms the basis for the analysis and conclusions in this work.

The second part derives the basic equations of public debt dynamics on which the European Commission's DSA analysis is based. The aim of this section is to understand how and why public debt dynamics depend on the aforementioned variables, with a breakdown of the effects of all individual variables within the main equation of public debt dynamics.

The third part is a general analysis of the European Commission's DSA framework. It provides an overview of the deterministic scenarios conducted, as well as detailed explanations of the methodology used, namely the assumptions and projections on which each scenario is based, with graphical examples from the EU's Debt Sustainability Monitor published by the

European Commission in March 2024. Additionally, the methodology for creating stochastic projections of public debt is explained in more detail.

The fourth part of the paper presents the results obtained from the six deterministic scenario projections in terms of the analysis of all assumptions used, public debt projections for the period 2025–2035, as well as an analysis of the factors that will drive public debt movements during the specified period. Along with the six scenarios from the European Commission's framework, an additional scenario was constructed that includes simultaneous shocks to several variables, unlike the previously derived scenarios that represent stress tests where one variable is varied and the impact on public debt is measured.

The fifth part presents the results obtained from the stochastic projection for the period 2025–2029, along with an explanation of the methodology used.

2 Theoretical framework for the analysis of public debt sustainability

2.1 Overview of theoretical models and definitions of public debt sustainability

The concept of public debt sustainability in economic theory continues to spark debates in economic circles regarding its definition, quantification, and implications. In other words, translating public debt sustainability into operational concepts and indicators is not straightforward (Debrun et al., 2019). The aforementioned author highlighted at least three reasons why this is the case.

First, the very challenge of defining this concept potentially creates a conflict between economic theory and practice. Namely, economic theory broadly equates the concept of public debt sustainability with the notion of a state's solvency (the ability of a state to meet all its future financial obligations). This clearly articulated definition cannot always be translated into operational practicality, partly because sustainability itself is inherently a forward-looking concept, representing a judgment about the unknown.

Second, there is the problem of modelling uncertainty. The dynamics of public debt reflect a wide range of shocks that affect an economy. These range from unexpected changes in fiscal policy to economic and financial disruptions that can negatively impact public revenues, increase financing costs, or lead to the realisation of potential liabilities. From an operational perspective, analysts must incorporate a comprehensive view of relevant risks to public debt sustainability in their statistical models. This explains why stress tests and probability models occupy a prominent place in contemporary methods for analysing public debt sustainability.

Third, not all debts are the same. Issues such as currency structure (domestic currency debt versus foreign currency debt), maturity structure (long-term debt versus short-term debt), and debt ownership (debt owed to residents versus debt owed to non-residents) are highly significant because they directly influence exposure to adverse shocks. Additionally, the type of creditor (private investors, banks, investment funds, etc.), the type of debt (bonds, bank loans, loans at subsidised interest rates, etc.), and differences between debtor states (which vary by credit rating and thus the interest rates they pay on public debt) must also be considered when assessing debt sustainability.

When discussing the concept of public debt sustainability, the first question to address is which measure of public debt to adopt as the most appropriate. In this regard, there is a consensus among economists today that the share of public debt in GDP is the best measure of a country's debt level in the sense that, unlike public debt expressed in nominal terms, it far better reflects a state's ability to service its obligations.[1] Still, the debt ratio has at least three shortcomings that make it an inadequate measure of a country's fiscal position (Furman & Summers, 2020).

First, it ignores the fact that debt can be repaid over time. Specifically, debt represents a stock (an estimated amount at a specific point in time that does not need to be repaid immediately or in full), whereas GDP is a flow (measured over a discrete period).

Second, it ignores interest rates. In this context, with a lower interest rate, the same level of debt can be less costly compared to one with higher interest rates.

Third, it is a backward-looking concept. Public debt generally represents the sum of all budget deficits recorded by a state since its inception (with certain adjustments). As such, it does not reflect planned future fiscal policies, such as increased pension spending due to population ageing, rising costs of responding to potential shocks, and so on. It also does not account for a state's ability to address rising debt through future tax increases or reductions in public spending.

All of the above demonstrates how challenging it is to derive seemingly simple operational definitions of well-known economic concepts such as public debt sustainability. In other words, the question of public debt sustainability boils down to a simple yet deceptive question that demands a complex answer: When does a country's debt become so large that the country is no longer able to service it properly? (Wyplosz, 2011).

Thus, for instance, one definition of public debt sustainability around which there is broad consensus among economists today views public debt as sustainable when there is a high probability that the state will remain solvent in the future, i.e. able to meet its current and future financial obligations without changing fiscal policy, specifically without altering tax policy or public spending policies (IMF, 2013). Such definition of debt sustainability requires a precise definition of the concept of state solvency. According to the IMF, state solvency is achieved when future primary fiscal surpluses are sufficiently large to repay the debt, more precisely the principal of the debt. Even more precisely, solvency requires that the sum of the current level of public debt and the present value of all future expenditures does not exceed the present value of all future revenues (IMF, 2002).

However, this definition can also be seen as overly one-dimensional, as the analysis of the solvency of a state, enterprise, or individual essentially boils down to forecasting future budget balances over an unlimited time horizon, without clear operational implications. Addressing the question of debt sustainability through the concept of solvency, therefore, requires making

[1] Just as the information that a person has a housing loan of, for example, EUR 100,000 means nothing to you until you take into account how much that person earns, what the interest rate is, and what the repayment term is, exactly the same is true when you look at countries. It is therefore necessary to relate a country's level of debt to its "earning" capacity, that is, its ability to create added value, for which the generally accepted measure is gross domestic product.

judgments about events that have not yet occurred, covering a very long time horizon (measured in decades) and which are highly unpredictable (Wyplosz, 2011). Consequently, this specific approach to assessing public debt sustainability is overly focused on sufficient but not necessary conditions for determining public debt sustainability.

The aforementioned IMF definition of public debt sustainability can be compared to the broader concept of sustainability proposed by Arrow et al. (2004). Investigating the concept of sustainability in a completely different context (the sustainability of the exploitation and consumption of natural resources), Arrow et al. (2004) arrived at a definition that would read as follows in the context of public debt: debt sustainability requires that the so-called net worth of the government/country, defined as the present discounted value of future revenues minus current debt, does not exhibit a declining trend. Compared to the IMF’s definition, the key difference is that it does not require solvency. Solvency, as we have seen, is achieved if the difference between the net worth of expected fiscal balances and public debt is greater than or equal to zero. The definition by Arrow et al. (2004) does not exclude a scenario where the net worth is negative at the initial point but subsequently rises and enters non-negativity. For this reason, it inherently fulfils the definition of solvency. However, although theoretically clear, these concepts cannot be operationally implemented as such, as they require knowledge of debt dynamics over an unlimited time horizon.

We will now look at some alternative perspectives on the concept of public debt sustainability. For instance, Blanchard et al. (2021) argue that the concept of sustainability should be viewed more as a probability concept: since there is no absolute certainty regarding sustainability at any level of public debt-to-GDP ratio, the goal should not be absolute debt sustainability but rather debt sustainability with the highest probability. For example, even if the European Commission’s approach were to indicate fiscal unsustainability – i.e. a situation where no fiscal adjustments could ensure that public debt is brought onto a stable trajectory without negatively affecting the economy or causing public dissatisfaction – Blanchard et al. (2021) prefer to analyse the probability that the debt ratio of the observed country will “explode” based on its current set of fiscal policies. Moreover, in this approach, the debt ratio is not used as a strict measure or anchor for fiscal policy, although it predominantly defines public debt sustainability in their work (Blanchard et al., 2021).

Numerous approaches to analysing public debt sustainability focus on examining the past behaviour of governments. Such approaches are useful for drawing lessons for future behaviour and identifying various channels through which governments can achieve fiscal sustainability. However, their main practical drawback is that they are overly focused on past behaviour when analysing debt sustainability (Bouabdallah et al., 2017).

One example of such an approach is the so-called fiscal reaction function (Bohn, 1998, 2008), which shows that for public debt sustainability to be achieved, it is sufficient for a government to systematically respond to rising public debt through fiscal policy (i.e. by adjusting the primary balance). In empirical analyses, the fiscal reaction function essentially represents a regression of the primary balance on public debt. In the case of a linear relationship, the higher the slope coefficient of the function, the stronger the evidence of debt sustainability according to this approach.

Finally, in this section, we will mention approaches to public debt sustainability that are based on identifying specific numerical limits for the level of public debt and proposing that public debt be compared against these established thresholds to assess its sustainability. The main challenges faced by such approaches are the high levels of uncertainty in determining the set debt limits. This uncertainty stems from various sources, such as the choice of the historical period on which the analysis is based, the sample of countries used, or the model specifications, leading to significant dispersion in results across different models.

The first approach of this type that we will mention is the so-called steady-state debt ratio, developed by Blanchard et al. (1991). This refers to the debt-to-GDP ratio to which an economy should incline in the long run, with the implicit stabilisation of debt at that level. The IMF's definition of sustainability through solvency, as well as the IMF (2003) study mentioned earlier, essentially operationalises this approach.

Mendoza & Oviedo (2004) introduced the concept of the natural debt limit for developing countries, which represents the maximum debt ratio that a state could safely service. The authors incorporate short-term aspects (liquidity) into long-term sustainability models in an attempt to explain financial markets' concerns about the inability of states to meet their obligations during periods of high macroeconomic volatility or fiscal fatigue following a fiscal consolidation programme.

Two other approaches that also rely on setting limits for sustainable debt levels are the so-called fiscal space, formulated by Ghosh et al. (2013), and the fiscal limit, formulated by Bi & Leeper (2013). The shared goal of these approaches is to determine a "debt boundary" beyond which fiscal solvency is seriously called into question. The fiscal space approach seeks to identify the tipping point of public debt beyond which a state would no longer be able to service all its obligations. Similarly, the fiscal limit approach, developed within DSGE models (dynamic stochastic general equilibrium), aims to determine the maximum debt ratio that can be sustained without significant risk of default or higher inflation, where this debt ratio is not presented as a single point but as a probability distribution. The fiscal limit is also closely linked to a state's ability to increase public revenues (i.e. its position on the "Laffer curve").

2.2 Public debt sustainability according to the European Commission's DSA method

Finally, the European Commission's DSA framework defines public debt sustainability as a situation in which fiscal policy can remain unchanged over the forecast period (with no changes in public consumption and/or taxation, which would affect the primary fiscal balance), without causing continuous growth in public debt, expressed as a share of GDP (Heimberger, 2023). Global economic institutions such as the IMF and the European Central Bank use very similar definitions. In this way, the European Commission, when considering public debt sustainability, aims to focus on ensuring that public debt expressed as a share of GDP declines over time, or at least stabilises. Defined in terms of state solvency, public debt sustainability is achieved when the state is able to meet all its obligations through future primary fiscal surpluses. Put differently, solvency requires that the level of public debt must not exceed the present value of all future primary fiscal balances (European Commission, 2016). This concept of public debt refers to the total public debt at the general government level, which includes the financial obligations of the state in domestic and foreign currency, deposits, debt securities, and loans. It is also important to note that the focus on reducing the share of public debt in GDP is simultaneously crucial for reforms of fiscal rules in the EU as a response to the high indebtedness of most EU member states (European Commission, 2023).

On the other hand, the DSA framework also provides an inverse definition of this concept, aiming to show when public debt is considered unsustainable. This is the case when there is no politically or economically feasible fiscal path that can at least stabilise public debt over the medium-term horizon (in the baseline scenario or in a real shock scenario).

As already mentioned, the European Commission's DSA framework and its definitions of debt sustainability are very similar to the framework used by the IMF and are formulated to be practically and operationally applicable, unlike other theoretical concepts that are difficult to implement in practice. The IMF's definition of sustainability, which considers public debt sustainable when there is a high probability that the state will remain solvent in the future without changes to fiscal policy, fully aligns with the European Commission's concept: under this concept, the trajectory of public debt over the next ten years is analysed under the assumption that fiscal balances in those years will remain unchanged, while simultaneously projecting other variables in the model – interest rates, exchange rates, real GDP growth, and inflation. In this sense, this concept is operationally superior to the aforementioned theoretical concepts.

3 Basic equations of public debt dynamics

The European Commission's DSA framework is focused on the baseline scenario for projecting the ratio of public debt to GDP over the next ten years, based on macroeconomic assumptions. The first and most important assumption of the projection is that there will be no changes in fiscal policy, meaning that public expenditure will only be influenced by changes in costs related to population ageing. The baseline projection scenario is supplemented by alternative deterministic tests based on alternative assumptions about key macroeconomic and fiscal variables, and includes a stochastic analysis intended to capture uncertainty regarding macroeconomic movements.

We will begin by focusing on the basic equation of public debt dynamics, which represents the core of the DSA framework. Essentially, the amount of public debt at time *t* can be expressed as follows:[2]

$$D_t = (1 + i_t)D_{t-1} - PB_t + FT_t \quad (1)$$

where D_t is the level of public debt at time *t*, i_t is the nominal interest rate, PB_t is the primary fiscal balance (a negative value indicates a primary deficit, while a positive value

[2] Source: https://www.imf.org/external/region/tlm/rr/pdf/aug7.pdf

indicates a primary surplus), and FT_t denotes all other flows that increase the debt level.[3] In other words, the level of public debt this year is equal to the sum of last year's public debt level, total interest paid on that debt, the recorded primary deficit/surplus, and other flows that acted to increase/decrease the debt.

Since the DSA framework is not concerned with the absolute level of public debt but rather its share in GDP, the entire equation should be expressed relative to nominal GDP, which we will denote as $Y_t P_t$ (real GDP multiplied by the price level). For simplicity, we will assume that other net flows are zero, FT_t=0:

$$\frac{D_t}{Y_t P_t} = \frac{(1+i_t)D_{t-1}}{Y_t P_t} - \frac{PB_t}{Y_t P_t} \tag{2}$$

Nominal GDP in year t can now be expressed as a function of nominal GDP in the previous year t-1. Nominal GDP in year t will represent the nominal GDP in year t-1, increased by the real growth rate g_t and inflation π_t, i.e.:

$$\frac{D_t}{Y_t P_t} = \frac{(1+i_t)}{(1+g_{rt})(1+\pi_t)} \frac{D_{t-1}}{Y_{t-1} P_{t-1}} - \frac{PB_t}{Y_t P_t} \tag{3}$$

By introducing the real interest rate, expressed as $(1+r_t)=(1+i_t)/(1+\pi_t)$, we obtain:

$$\frac{D_t}{Y_t P_t} = \frac{(1+r_t)}{(1+g_{rt})} \frac{D_{t-1}}{Y_{t-1} P_{t-1}} - \frac{PB_t}{Y_t P_t}$$

(4)

If we express debt as a percentage of GDP (in lowercase), we get:

$$d_t = \frac{(1+r_t)}{(1+g_{rt})} d_{t-1} - pb_t \tag{5}$$

This equation represents the core of public debt sustainability analysis. The share of a country's public debt at time t is a function of debt at time t-1, the GDP growth rate in period t, the real interest rate at time t and the achieved primary balance in period t. If we wish to express the left side of the equation as a change in debt, we have:

$$d_t - d_{t-1} = \frac{(r_t - g_{rt})}{(1+g_{rt})} d_{t-1} - pb_t \tag{6}$$

In other words, the movement and sustainability of public debt in the future depend on the initial level of debt, the current and future real interest rate, the current and future GDP growth rate, as well as current and future primary budget balances. Now, let us assume that r_t, g_t and

[3] We will refer to these flows later in this paper as stock-flow adjustment (SFA). This factor explains the difference between changes in public debt and fiscal deficit/surplus. In other words, it explains changes in public debt that are not the result of changes in existing variables in the model. This could be, for example, additional liquidity accumulation, i.e. borrowing above the fiscal deficit level, materialisation of contingent liabilities, statistical deviations, etc. A more detailed analysis of the SFA is available at https://ec.europa.eu/eurostat/documents/1015035/16536421/SFA-PR-2023-Apr.pdf/ad4e15c0-a532-63d6-3f83-532d6429521b?t=1682009729585

pb_t will remain unchanged over time. Then, in equation (5), the quotient multiplying d_{t-1} can be expressed as:

$$\emptyset = \frac{1+r}{1+g} \tag{7}$$

Now, equation (7) is transformed into:

$$d_t = \emptyset d_{t-1} - pb_t \tag{8}$$

Based on this equation, we see that if the parameter $\emptyset$ is greater than 1 $(r > g)$, debt will be stable or unchanged only if the primary balance is in a sufficiently large surplus to offset the increase in debt due to the change in the parameter $\emptyset$. Economically, if interest expenditure grows faster than GDP, it is necessary to achieve a sufficiently high primary fiscal balance to offset this growth. Mathematically, for every level of the parameter $\emptyset$ greater than 1, there is a primary balance surplus pb_t that would be sufficient to keep debt unchanged in a given period.

The assumption that countries with high levels of public debt should achieve large primary surpluses in the case of $r > g$ to stabilise public debt has long been embedded in EU fiscal rules and has been the subject of discussion in professional and academic circles, while many economists and policymakers still think about public debt sustainability in this way (Blanchard et al., 2021).

For the purposes of deriving the debt dynamics equation relevant for debt sustainability analysis according to the European Commission's approach, equation (1) will be expressed in nominal terms, expanded to include the stock-flow adjustment factor ft_t:[4]

$$d_t = \frac{(1+i_t)}{(1+g_t)} d_{t-1} - pb_t - ft_t \tag{9}$$

The nominal interest rate i_t can be separated into the portion related to domestic currency debt and the portion related to foreign currency debt. For simplicity, we will assume that the interest rate on domestic debt and foreign currency debt does not differ, although in the analysis these two interest rates will be clearly separated. For the portion of interest on foreign currency debt, we will also account for exchange rate differences, transforming the entire equation into:[5]

$$d_t = \alpha^n \frac{(1+i_t)}{(1+g_t)} d_{t-1} + \alpha^f \frac{(1+i_t)}{(1+g_t)} \frac{e_t}{e_{t-1}} d_{t-1} - pb_t + ft_t \tag{10}$$

where α^n is the share of domestic currency debt in total debt, α^f is the share of foreign currency debt in total debt, and e_t is the nominal exchange rate (expressed as domestic

4 European Commission (2024).

5 European Commission (2024).

currency per unit of foreign currency – in case of domestic currency appreciation, e_t increases and vice versa).

To express the entire equation as debt dynamics, we subtract the debt share at time *t*-1 from both sides of the equation, obtaining:

$$\Delta d_t = \alpha^n \frac{(i_t - g_t)}{(1+g_t)} d_{t-1} + \alpha^f \frac{(i_t - g_t) + \varepsilon_t (1+i_t)}{(1+g_t)} d_{t-1} - pb_t + ft_t \tag{11}$$

where $\varepsilon_t = e_t / e_{t-1}$ is the rate of depreciation of the domestic currency. By decomposing the nominal GDP growth rate into its real and nominal components and rearranging the equation, we obtain:[6]

$$\Delta d_t = \frac{i_t}{(1+g_t)} d_{t-1} - \frac{gr_t}{(1+g_t)} d_{t-1} - \frac{\pi_t (1+gr_t)}{(1+g_t)} d_{t-1} + \alpha^f \varepsilon_t \frac{(1+i_t)}{(1+g_t)} d_{t-1} - pb_t + ft_t \tag{12}$$

where gr_t is the real GDP growth rate, and π_t is the inflation rate (expressed as the GDP deflator). This expression now allows us to identify all key drivers of the dynamics of the debt-to-GDP ratio. On the right side of the equation, all factors multiplying d_{t-1} are collectively referred to as the snowball effect. As can be seen from the equation, the snowball effect can be broken down into four components (European Commission, 2024):

(+) interest rate effect: $\frac{i_t}{(1+g_t)} d_{t-1}$

(-) real GDP growth effect: $-\frac{gr_t}{(1+g_t)} d_{t-1}$

(-) inflation effect: $-\frac{\pi_t (1+gr_t)}{(1+g_t)} d_{t-1}$

(+) exchange rate effect: $\alpha^f \varepsilon_t \frac{(1+i_t)}{(1+g_t)} d_{t-1}$

Thus, the interest rate effect and the exchange rate effect act to increase the debt-to-GDP ratio in the sense that higher interest rates and depreciation of the domestic currency raise the nominal level of public debt, and by extension its share in GDP. On the other hand, higher real economic growth and higher inflation reduce the debt-to-GDP ratio, as they together increase nominal GDP, the denominator in the debt ratio.

The remaining factors influencing debt dynamics over time are the primary balance (pb_t) and the stock-flow adjustment (ft_t). The effect of the primary balance can be further broken down into the structural balance before ageing costs, ageing costs, the cyclical component, and one-off and other temporary fiscal measures.

[6] European Commission (2024).

The debt equation used in the European Commission's framework is somewhat more complex than equation (12), as it assumes that foreign currency debt can be divided into euro-denominated debt and dollar-denominated debt. Following this, the expanded equation reads:[7]

$$d_t = \alpha^n \frac{(1+i_t)}{(1+g_t)} d_{t-1} + \alpha^{eur} \frac{(1+i_t)}{(1+g_t)} \frac{e_t}{e_{t-1}} d_{t-1} + \alpha^{usd} \frac{(1+i_t)}{(1+g_t)} \frac{\tilde{e}_{t-1}}{\tilde{e}_t} \frac{e_t}{e_{t-1}} d_{t-1} - pb_t + ft_t \qquad (13)$$

where α^{eur} is the share of euro-denominated debt in total debt, α^{usd} is the share of dollar-denominated debt, e_t is the nominal exchange rate of the domestic currency against the euro (expressed as domestic currency per unit of euro), and $\tilde{e}$ is the nominal exchange rate between the dollar and the euro (expressed as dollars per unit of euro).[8]

4 Deterministic and stochastic debt projections in the European Commission's DSA approach

4.1 Deterministic debt projections

The European Commission's Debt Sustainability Analysis (DSA) framework consists of traditional deterministic tests and stochastic projections, which are used simultaneously to draw conclusions about public debt sustainability.

Traditional deterministic projections rely on creating different scenarios based on macroeconomic projections and assumptions over the observation horizon (European Commission, 2016). These projections and assumptions relate to real GDP growth, inflation, nominal interest rate, primary fiscal balance, exchange rate, and the stock-flow adjustment. These variables are the key factors in the equation of public debt change over time, as discussed in detail in the previous chapter. In addition to the baseline scenario, alternative scenarios are projected, designed to capture different possible movements in input variables in the future, such as potential macro-fiscal shocks. The goal is to have a set of different public debt projections that will allow conclusions to be drawn about future uncertain outcomes, i.e. realisations.

In practice, the European Commission conducts deterministic debt projections over a 10-year horizon. This achieves a compromise between the need to produce projections that do not relate to too long a time horizon (the longer the horizon, the greater the uncertainty) on the one hand, and on the other ensuring that the observation horizon is not too short (in which case it would not be possible to include the impact of population ageing on public debt movements through those categories of public expenditure affected by this phenomenon).

The baseline projection scenario used in deterministic tests is defined as a scenario in which there are no changes in fiscal policy. The scenario relies on the Commission's macroeconomic and fiscal projections for the first year, after which it is assumed that fiscal

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[7] European Commission (2024).

[8] This specification also allows for the impact of exchange rate movements and euro area countries where the share of debt in dollars can be significant (European Commission, 2024).

policy will remain unchanged until the end of the projection horizon, meaning that from year T+1 (in our case, from 2025), an unchanged structural primary balance is implied.[9] This is further adjusted for the cyclical component of the fiscal balance, which is calculated using standard elasticity parameters for revenue and expenditure relative to the output gap, specific to each country, as well as for ageing costs, which in the baseline scenario are included through specific categories of public expenditure subject to them – faster growth in pension, health, and social protection expenditure relative to nominal GDP. The final category within the overall structural primary balance – one-off and temporary fiscal measures – is assumed to be zero from year T+1.

Within the baseline scenario, the real GDP growth projection for the current year is taken from the Commission's latest projection report, which in this specific case is the Autumn 2023 Forecast, after which projections are derived based on the estimate of potential growth, i.e. the projected output gap. For the inflation projection (measured by the GDP deflator), it is assumed that from the currently projected rate for the current year, it will linearly converge to market inflation expectations for the period T+10. For the exchange rate projection, the Commission's projections are used for year T+1, after which it is assumed that there will be no changes. For the stock-flow adjustment, it is assumed to be zero from year T+1, meaning that there will be no borrowing beyond the level of the projected fiscal deficit, or the materialisation of potential liabilities.

The baseline projection scenario is accompanied by so-called historical scenarios. These assume a gradual return (4-year adjustment) to the historical average movements of individual input variables (15-year average). In the case of adjusting the primary fiscal balance, it is taken into account that fiscal expansion/contraction simultaneously affects GDP growth/decline, with a fiscal multiplier of 0.75 used. This means that a reduction in the deficit of 1 pp of GDP reduces the GDP growth rate in the same year by 0.75 pp, and vice versa in the case of fiscal expansion (Carnot & De Castro, 2015).

In the specific historical SPB scenario (historical SPB scenario) conducted in the Commission's latest report, only the structural primary balance is projected to linearly return to the 15-year average over four years, while other input variables (GDP growth, inflation, interest rate, and exchange rate) are projected to remain constant after the first year of the projection until the end of the projection horizon. A combined historical scenario can be created in which all input variables are projected to return to the 15-year average. This way we gain insight into the differences in public debt dynamics between scenarios where all variables are kept constant and scenarios where they return to the multi-year average.

In addition to the specific historical SPB scenario, a so-called lower SPB scenario is also conducted. Unlike the historical SPB scenario, which implies a strict return to the historical average of the structural primary balance, the lower SPB scenario implies a lesser degree of fiscal consolidation. Specifically, as in the baseline scenario, the structural primary balance is kept constant after the first year of the projection, but at a lower level. More precisely, in the latest spring report, the European Commission presented this scenario by assuming that for

[9] Fiscal policy in this context is defined by the structural primary balance (SPB). In the baseline scenario, it is assumed that after the first year of the projection it will remain unchanged at the level of the last forecast value.

countries where it had assumed a more restrictive fiscal policy in the previous autumn projections, i.e. a smaller primary deficit, in this scenario it assumed that only 50% of that tightening would be implemented. For countries where the autumn forecasts projected a worsening fiscal deficit in the baseline scenario, a further 50% larger deficit was assumed in this scenario.

Following the two historical scenarios, three shock tests are conducted in the Commission's DSA framework, which examine how shocks to macro-financial variables affect the public debt dynamics compared to the baseline scenario. In other words, the aim of shock tests within the DSA framework is to cover a broad spectrum of shocks in public debt projections which might affect movements in public debt in future. Beside the two that we will explain in more detail below, a third test is conducted for countries outside of the euro area, implying exchange rate shocks.

The first scenario constructed within the European Commission's DSA framework is the adverse "$\mathrm{r-g}$" scenario. It covers the risks associated with a reversal or reduction in the current difference between the nominal GDP growth rate (g) and the nominal interest rate (r). The motive for constructing such a scenario within the DSA framework was that in previous Fiscal Sustainability Reports, in the baseline projection scenarios, the $r-g$ difference was assumed to increase over time (that interest rates grow faster than GDP growth rates), yet still to remain below the historical level, which did not sufficiently capture the risk of its growth (European Commission, 2023). To do this in a more credible way, starting from the first year of the projection (T+1) the $r-g$ difference was assumed to permanently increase by 0.5 to 0.6 pp compared to the difference in the baseline scenario, and remain so until the end of the projection horizon.

The next scenario constructed within this framework takes into account financial shocks and is known as the financial stress scenario. This scenario aims to capture the risks associated with temporary turmoil in financial markets, manifested in fluctuations in market interest rates. According to this scenario, in the first year of the projection, it is assumed that market interest rates will post a one-off increase by 1 pp before the end of the projection period, with an additional risk premium added for countries with high levels of indebtedness.[10] In the Commission's reports up to 2021, the so-called enhanced sensitivity tests for financial shocks were also conducted, simulating the impact of a temporary extreme deterioration in debt financing conditions in the market.

Shocks to short-term and long-term interest rates on newly issued debt are automatically transferred into changes in the weighted average interest rate on public debt. The magnitude of the change in the interest rate on public debt will depend primarily on the structure of public debt, in terms of the share of fixed-rate and variable-rate debt, as well as short-term and long-term debt in the total debt. Given that rising interest rates affect newly issued and refinanced debt, countries with shorter average debt maturities (i.e. countries with a higher share of short-

[10] The risk premium under this approach is equal to 0.06 multiplied by the level of debt exceeding 90% of GDP. For our analysis this will not be relevant as Serbia's debt does not exceed that level, but for details on the risk premium see Pamies et al. (2021).

term debt) are more exposed to interest rate shocks than countries with longer average debt maturities.

Finally, stress tests related to exchange rate changes are conducted. Exchange rate shocks affect the dynamics of public debt in non-euro area countries, particularly the ones with a significant share of foreign currency debt. More precisely, this stress test assumes that in the first year of the projection, the exchange rate of the domestic currency will depreciate/appreciate by a percentage equal to the maximum recorded in the previous ten years, after which the assumptions from the baseline scenario are applied until the end of the projection period, meaning no further changes in the exchange rate are expected. In addition to all the aforementioned tests, special tests can be conducted in cases where specific risks exist for certain countries, requiring a tailored approach.

4.2 Stochastic debt projections

Stochastic projections of public debt are an integral part of the European Commission's DSA framework and a tool for graphically illustrating the impact of macroeconomic uncertainty on public debt dynamics. Stochastic analysis measures the potential effects of positive/negative risks on public debt movements, where risks, as explained in the previous section, relate to movements in the primary balance, real GDP growth, inflation, the exchange rate, and the weighted average interest rate on public debt.

The key equation for deriving stochastic projections of public debt is the reformulated equation (12) from the previous chapter:[11]

$$d_t = d_{t-1} + \frac{i_t}{(1+g_t)} d_{t-1} - \frac{gr_t}{(1+g_t)} d_{t-1} - \frac{\pi_t(1+gr_t)}{(1+g_t)} d_{t-1} + \alpha^f \varepsilon_t \frac{(1+i_t)}{(1+g_t)} d_{t-1} - pb_t + f_t \quad (14)$$

In the derivation of stochastic shocks, five variables from the previous equation are included: real GDP growth (gr_t), weighted average interest rate (i_t), primary balance (pb_t), the dinar-euro exchange rate (ε_t) and the inflation rate (π_t), while other variables such as stock-flow adjustments are taken from the baseline projection scenario and are not subject to stochastic shocks (European Commission, 2024).

For each of these five variables, 12,000 shocks are generated using Monte Carlo simulations, based on the assumption of a joint normal distribution of these variables. The simulations are conducted over a five-year period. Stochastic shocks are given as the product of uncorrelated Z-statistics (12,000 random simulations for each variable with a normal distribution) and the Cholesky decomposition matrix *(D)*, which is given as:

$$D = \begin{pmatrix} D_{11} & \cdots & D_{15} \\ \vdots & \ddots & \vdots \\ D_{51} & \cdots & D_{55} \end{pmatrix} \quad (15)$$

[11] A detailed description of methodologies of stochastic public debt projections according to the European Commission's framework is presented in European Commission (2024), Annex A4, p. 139.

In the Cholesky decomposition matrix, the elements are calculated according to the equations:

$$D_{jj} = \sqrt{A_{jj} - \sum_{k=1}^{j-1} D_{jk}^2} \tag{16}$$

$$D_{ij} = \frac{A_{ij} - \sum_{k=1}^{j-1} D_{ik} D_{jk}}{D_{jj}} \tag{17}$$

In equations (15) and (16), A_{ij} is the correlation coefficient between variable *i* and variable *j*. The correlation coefficients between the variables are given in the form of a correlation matrix (A):

$$A = \begin{pmatrix} A_{11} & \cdots & A_{15} \\ \vdots & \ddots & \vdots \\ A_{51} & \cdots & A_{55} \end{pmatrix} \tag{18}$$

Stochastic debt projections are given as the sum of the baseline projection scenario and the individual stochastic shocks obtained, which can be represented as follows (European Commission, 2024):

$$g_{rt} = \overline{g_{rt}} + \theta_t^g \tag{19}$$

$$i_t = \overline{\iota_t} + \theta_t^i$$

$$pb_t = \overline{pb_t} + \theta_t^{pb}$$

$$\varepsilon_t = \overline{\varepsilon_t} + \theta_t^{\varepsilon}$$

$$\pi_t = \overline{\pi_t} + \theta_t^{\pi}$$

where in equations g_{rt}, i_t, pb_t, ε_t and π_t respectively denote the stochastic projections of real GDP growth, the interest rate, the primary balance, the dinar-euro exchange rate, and the inflation rate in year *t*. These are given as the sum of the deterministic projection from the baseline scenario and the calculated stochastic shock in year *t*. In other words, if the shock in year *t* were equal to zero, the value of the stochastic projection for that variable would be the same as in the baseline projection scenario (European Commission, 2024).

Stochastic debt projections are represented as a probability distribution of debt trajectories, associated with a wide range of different macroeconomic conditions. Different sets of macroeconomic conditions are obtained by applying random shocks, while the intensity and interrelation of the shocks are based on the historical behaviour of the mentioned variables, with the additional assumption that they follow a joint normal probability distribution. Moreover, the methodology allows for the generation of a number of simulations of different macroeconomic conditions, significantly more than what is feasible in the shock tests of deterministic debt projections. In other words, stochastic debt projections essentially represent a significantly enhanced sensitivity analysis around the baseline scenario (European Commission, 2016).

As the central scenario for stochastic debt projections, the baseline scenario of the deterministic projection is used, in which it is assumed that there will be no changes in fiscal policy during the observation period, with stochastic projections conducted over a five-year horizon. In this way, each individual debt trajectory in the distribution is assigned a certain probability of realisation, which represents one of the key differences compared to deterministic projections. For example, it is possible to assign a certain probability of realisation to each level of the debt ratio at the end of the observation horizon, whether it is higher or lower than the level of debt in the initial projected year. Finally, the results obtained by this method are summarised in two key metrics. The first is the probability that the debt ratio at the end of the projection period will be higher than the initial level, and the second is the difference between the 10^{th} and 90^{th} percentiles of the debt probability distribution, which graphically measures the width of the distribution and essentially illustrates the estimated degree of uncertainty surrounding the baseline projection scenario.

5 Analysis of public debt sustainability in Serbia – Deterministic tests

This chapter presents the assumptions and results of the analysis of public debt sustainability in Serbia using the European Commission's DSA framework in the form of deterministic projections of public debt for the period 2025–2035. Six deterministic tests were conducted: the baseline scenario, the historical SPB scenario, the lower SPB scenario, the adverse "r–g" scenario, the financial stress scenario, and the exchange rate shock scenario. Within the baseline scenario, the assumptions and projections of all input variables in the model are presented in detail, while for the other scenarios, only the modified assumptions of the model are discussed.

5.1 Baseline scenario

As already mentioned, the baseline scenario for public debt projections under the European Commission's framework is defined as a scenario in which there will be no changes in fiscal policy throughout the projection period. More precisely, this is a scenario in which the structural primary fiscal balance, i.e. the primary fiscal balance excluding one-off fiscal revenues and government expenditures and the impact of the economic cycle, is assumed to remain constant over the projected period. In the case of Serbia, the baseline scenario for public debt projections was conducted for the period 2025–2035, i.e. from 2025 as the first year of the projection (T+1).

The input assumptions and results of the baseline scenario are given in Table 2. The weighted average interest rate on Serbia's public debt was calculated as the weighted average of the dinar-, euro- and dollar-denominated debt, with interest rates on all securities issued in the domestic and international markets included in the calculation (an overview of eurobonds issued in the international market is given in Table 1, and their coupon rate after hedging was used in the calculation), interest rates on loans from commercial banks and loans from foreign governments.[12] For the projection of the weighted average interest rate, the maturities of previously issued securities were taken into account, and it was assumed that they would be refinanced at projected market interest rates. Additionally, it was assumed that fiscal deficits in this period would be covered by borrowing in the international market through securities, as has most often been the case so far.

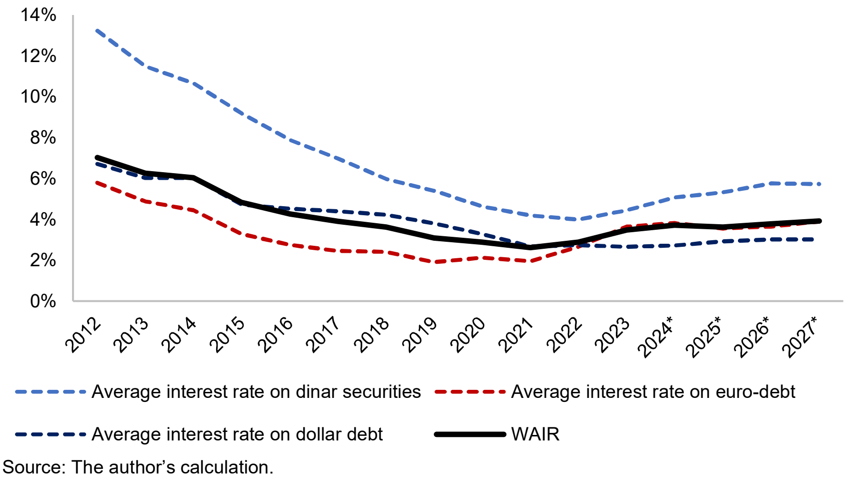
Table 1 **Issued eurobonds (stock at end-2024)**

Eurobond	Issue volume (in EUR)	Issuance year	Maturity year	Coupon rate (for EUR)
Serbia 2027	2,000,000,000	2020	2027	3.125%
Serbia 2028	693,866,223	2023	2028	6M EURIBOR + 2.908%
Serbia 2028	1,000,000,000	2021	2028	1.000%
Serbia 2029	1,550,000,000	2019	2029	1.500%
Serbia 2030	1,016,432,323	2020	2030	1.066%
Serbia 2033	924,727,205	2023	2033	6M EURIBOR + 3.073%
Serbia 2033	1,000,000,000	2021	2033	1.650%
Serbia 2036	750,000,000	2021	2036	2.050%
Serbia 2034	1,381,724,392	2024	2034	4.754%

Source: Public Debt Administration.

According to the calculations, the weighted average interest rate will slightly decrease in 2025 due to the projected decline in market interest rates, primarily EURIBOR. In the period 2026–2035, a further increase in the weighted average interest rate is projected, as previously issued eurobonds with effective rates of 1–3% will mature and need to be refinanced at inevitably higher interest rates, which significantly influenced the movement of the average interest rate on total public debt in the previous period.

Chart 1 **Average interest rates on the debt in dinars, euros and dollars, and weighted average interest rate on total public debt (WAIR), 2012–2027**



Source: The author's calculation.

[12] For the sake of simplicity, as in the European Commission's DSA framework, it is assumed that public debt is composed of the debt in dinars, dollars and euros. At end-September 2024, the share of debt in these currencies in the total debt measured around 93%.

The projection of the nominal exchange rate of the dinar against the euro and the dollar for 2025 at 1.03 USD/EUR was taken from the February *Inflation Report* of the National Bank of Serbia, and it was assumed that the exchange rate would remain unchanged until the end of the projection horizon.

The real GDP growth rate for the period 2025–2027 was projected at 4.5%, in line with the projections of the National Bank of Serbia. From 2028 to 2034, a real growth rate of 4% was used, equal to the potential GDP growth projection of the Ministry of Finance and the National Bank of Serbia, i.e. it was assumed that the output gap would be closed, in line with the methodology.

Regarding the inflation projection, i.e. the GDP deflator, for the period 2025–2027, the results of the January Inflation Expectations Survey of the financial sector were used, in line with the methodology, while after 2027, it was assumed that inflation would remain stable at 3%, which is the National Bank of Serbia's central midpoint and is in line with the inflation expectations of the financial sector from the Inflation Expectations Survey.

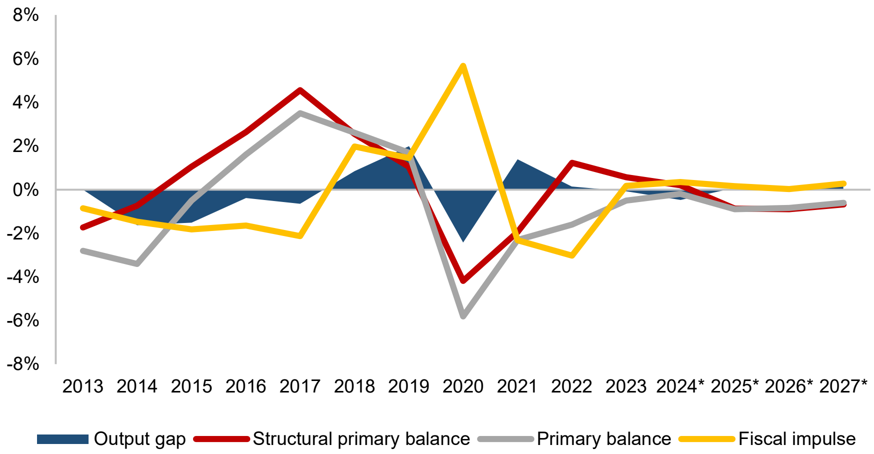
Table 2 **Baseline scenario of Serbia's public debt projection, 2022–2035**

Baseline scenario	2023.	2024.	2025.*	2026.*	2027.*	2028.*	2029.*	2030.*	2031.*	2032.*	2033.*	2034.*	2035.*
Assumptions													
Nominal weighted average interest rate (in %)	3.5	3.7	3.6	3.8	3.9	4.1	4.3	4.5	4.7	4.8	4.9	5.0	5.0
Nom. RSD/EUR exchange rate (in RSD)	117.3	117.2	117.2	117.2	117.2	117.2	117.2	117.2	117.2	117.2	117.2	117.2	117.2
Nom. RSD/USD exchange rate (in RSD)	105.9	112.4	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0
Inflation – GDP deflator (in %)	13.8	4.9	3.9	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Real GDP growth rate (in %)	3.8	3.9	4.5	4.5	5.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Nominal GDP growth index	1.18	1.09	1.09	1.08	1.08	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
1. Primary balance (1.1. + 1.2. + 1.3)	-0.5	-0.2	-0.5	-0.5	-0.6	-0.7	-0.7	-0.7	-0.8	-0.8	-0.9	-0.9	-1.0
1.1. Structural primary balance (1.1.1. + 1.1.2)	0.6	0.2	-0.5	-0.6	-0.6	-0.7	-0.7	-0.7	-0.8	-0.8	-0.9	-0.9	-1.0
1.1.1. Structural primary balance, before ageing costs (*SPB*)	0.6	0.2	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
1.1.2. Ageing costs	-	-	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.5
1.2. Cyclical component	0.0	-0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.3. Effect of one-off income and expenditure	-1.0	-0.2	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2. Snowball effect (2.1. + 2.2. + 2.3. + 2.4)	-6.8	-2.0	-2.1	-1.9	-1.8	-1.3	-1.2	-1.1	-1.1	-1.0	-1.0	-0.9	-0.9
2.1. Nominal interest rate costs effect	1.6	1.7	1.6	1.6	1.7	1.8	1.8	1.9	2.0	2.0	2.1	2.2	2.2
2.2. Real GDP growth effect	-1.7	-1.7	-2.0	-2.0	-2.2	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7
2.3. Inflation effect (GDP deflator)	-6.4	-2.2	-1.8	-1.6	-1.4	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.4
2.4. Exchange rate effect	-0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3. Primary balance effect	0.5	0.2	0.5	0.5	0.6	0.7	0.7	0.7	0.8	0.8	0.9	0.9	1.0
4. Stock-flow adjustment	1.8	1.0	1.1	0.9	0.7	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Public debt, in % of GDP	**48.4**	**47.6**	**47.1**	**46.6**	**46.0**	**45.9**	**45.7**	**45.6**	**45.7**	**45.8**	**46.1**	**46.4**	**46.7**
Change in public debt, in pp of GDP (2.+ 3.+ 4)	-4.5	-0.8	-0.5	-0.5	-0.6	-0.1	-0.2	-0.1	0.0	0.1	0.2	0.3	0.4

Source: Author's calculation.

As envisaged by the European Commission's framework, the total primary fiscal balance is represented as the sum of the structural primary fiscal balance adjusted for ageing costs, the cyclical component, and one-off temporary fiscal measures. The assessment of the structural primary balance up to 2025 was carried out by estimating potential GDP and the output gap (using the Hodrick-Prescott filter), where the output gap transitions from negative to slightly positive territory until 2027, after which it is projected to close. Subsequently, one-off revenues and expenditures were identified and excluded to estimate the cyclically adjusted primary fiscal balance, and then the structural primary balance.[13] After 2025, the structural primary balance is assumed to remain unchanged until the end of the projection horizon. This way, the key assumption of the baseline projection scenario was respected – that fiscal policy, represented by the structural primary balance, would remain unchanged throughout the projected horizon.

Chart 2 **Estimated structural primary balance, output gap and fiscal impulse, 2013–2027**



Source: The author's calculation.

As for the costs of population ageing, they are represented by the growth of expenditure for old-age pensions, where it was assumed that the amount of the average old-age pension would grow in line with nominal GDP growth, while growth in the number of old-age pension beneficiaries was based on the ten-year average for the period 2015–2024 (growth of 0.6% on average annually).

Finally, the stock-flow adjustment for 2024 was projected as a five-year historical average, as net flows were mostly positive during this period (1.1 pp of GDP on average). For the period 2026–2029, a linear convergence to the ten-year average was projected, while from 2029 it is assumed to remain unchanged until the end of the projection horizon.[14]

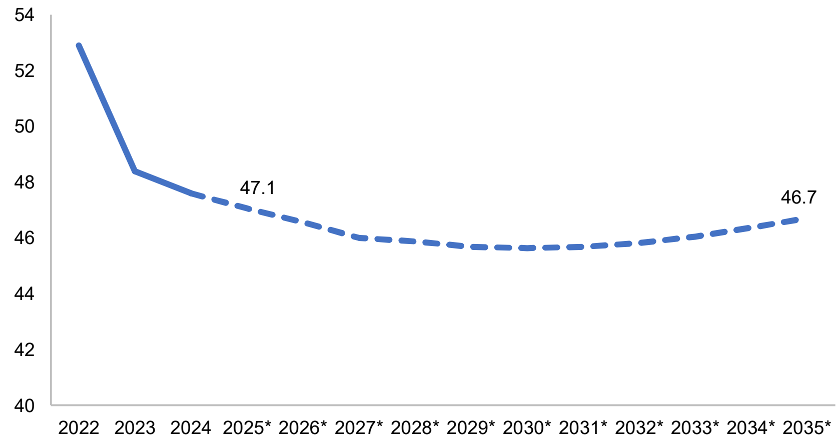
According to the baseline scenario, the share of general government debt in GDP will decline from 47.6% in 2024 to 45.7% in 2031, after which it will gradually increase to 46.7% by the end of 2035. In fact, the debt ratio will continue the decline that began in 2017 and lasted uninterrupted until 2024, except for 2020 (due to fiscal support packages for corporates and households). The main factor behind the decline in the debt-to-GDP ratio in the observed period will be the growth of nominal GDP, i.e. the combined effect of inflation and real GDP growth, which has been a factor in previous years as well. Within the effect of nominal GDP,

[13] For the coefficient of elasticity of the fiscal balance in relation to the output gap, the latest available estimate of the European Commission for comparable countries in Central, Eastern and Southeastern Europe for the period 2014–2018 was used, averaging 0.42. For more details, see Mourre et al. (2019).

[14] The European Commission projects this category for most EU Member States at zero, as there are few countries where these flows exceed 0.5% of GDP. For some countries, such as Luxembourg, Finland and Greece, stock flow adjustments are specifically projected, as these are countries that have historically recorded significantly positive (Finland and Luxembourg) or significantly negative (Greece) net flows.

the effect of real GDP growth is expected to be greater than the effect of inflation. After 2028, the effect of nominal GDP will stabilise and amount to around 3 pp of GDP annually.

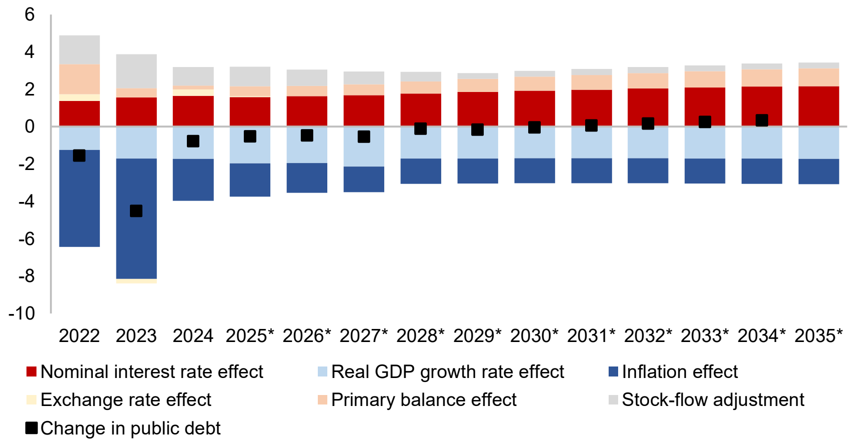
Chart 3 **Baseline scenario of Serbia's public debt projection, 2022–2035**



Source: The author's calculation.

On the other hand, the effect of interest costs (interest rates) and the primary balance will act in the opposite direction, with a slightly increasing trend. The negative impact of the primary balance will show a slightly increasing trend due to ageing costs, which will be reflected in a slightly faster growth of old-age pension expenditure compared to nominal GDP, with these costs projected to reach 7.3% of GDP by the end of the projection horizon. The effect of interest costs will also increase slightly, in line with the projected rise in effective interest rates, which, as already explained, will be influenced by the refinancing of debt from maturing securities and loans taken out during the period of low interest rates. With the exchange rate effect being neutral from 2026, the overall snowball effect during the projection period will act to reduce the debt-to-GDP ratio, while the primary balance effect will slow this decline.

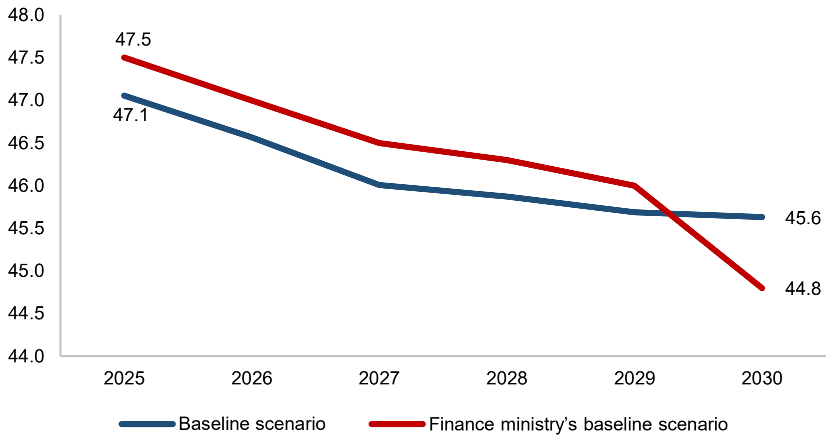
Chart 4 **Decomposition of the change in the share of debt by factor, 2022–2035** (in pp of GDP)



Source: The author's calculation.

The results obtained in the baseline projection scenario can be compared with the projections of the Ministry of Finance from the revised Fiscal Strategy for 2025. According to the Ministry of Finance’s projections, the share of general government debt in GDP will be on a declining trajectory until 2030 (projection period 2025–2030), with the decline accelerating significantly after 2029, leading to a debt-to-GDP ratio of 44.8% by the end of 2030, which is 0.8 pp lower than the result in the baseline projection scenario obtained in this study. On the other hand, the trajectories of debt movement differ, as in the projections in the Fiscal Strategy, the debt ratio declines year after year (on average by 0.5 pp). The difference in trajectories mainly stems from the difference in projections of the structural primary fiscal deficit. In the baseline projection scenario of the Ministry, a constant fiscal policy during the projection period was not assumed, but rather a gradual transition from fiscal expansion to fiscal contraction, which represents the key difference compared to the European Commission’s methodology. In addition to the baseline scenario, the Ministry of Finance projects public debt movements in two alternative scenarios – a fiscal shock scenario and a scenario of slower economic growth after 2027, which are not comparable to the alternative scenarios created under the European Commission’s methodology.[15]

Chart 5 **Baseline scenario of public debt projection and baseline scenario from the revised Fiscal Strategy for 2025** (in % of GDP)

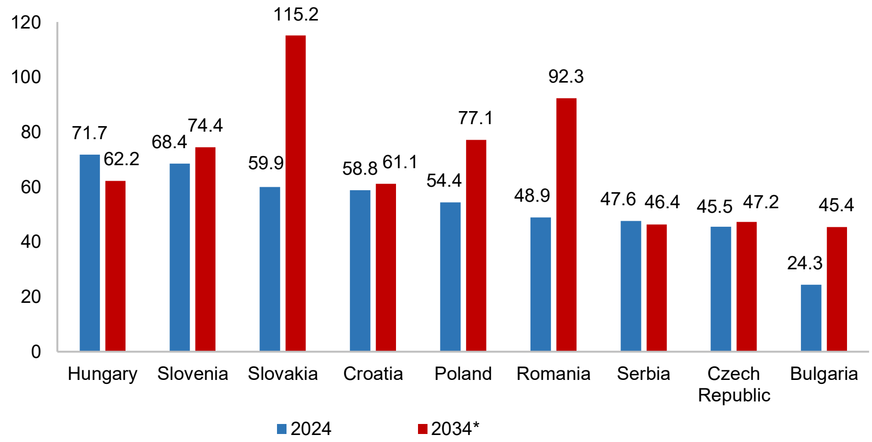


Source: Ministry of Finance – Fiscal Strategy for 2025 and the author’s calculation.

Compared to public debt projections of comparable countries in Central, Eastern, and Southeastern Europe, Serbia’s public debt in the baseline scenario is expected to be at the lowest level after Bulgaria, for which a debt level twice as high as Serbia’s is estimated in the first year of the projection. Moreover, the European Commission projects a decline in the debt-to-GDP ratio by 2034 only for Hungary in the baseline scenario, while for all other comparable countries, the ratio is projected to go up.

[15] The “slow growth after 2027” scenario implies an average real GDP growth of around 1% in the observed period, with the same level of fiscal deficit compared to the baseline scenario. The “fiscal shock after 2027” scenario implies the realisation of an extraordinary event (natural, health, economic, etc. extraordinary circumstances) with a dual impact on both the fiscal and real sectors (Ministry of Finance, 2024).

Chart 6 **Public debt of Serbia and CESEE countries in the baseline scenario projection, 2024–2034** (in % of GDP)



Source: European Commission (2024) and the author's calculation.

5.2 Historical SPB scenario

In the historical SPB scenario, the key assumption is that after a gradual four-year adjustment, the structural primary balance will return to its 15-year average, which in the case of Serbia was calculated for the period 2010–2024. During 2010–2024, the structural primary deficit averaged -0.2% of GDP, which is 0.3 pp lower than the projection for 2025, representing the difference for which the primary balance needs to be linearly adjusted during 2026–2029. After 2029, the primary deficit is projected to remain unchanged until the end of the projection horizon.

Table 3 **Key assumptions of the historical SPB scenario, 2023–2035** (in % of GDP)

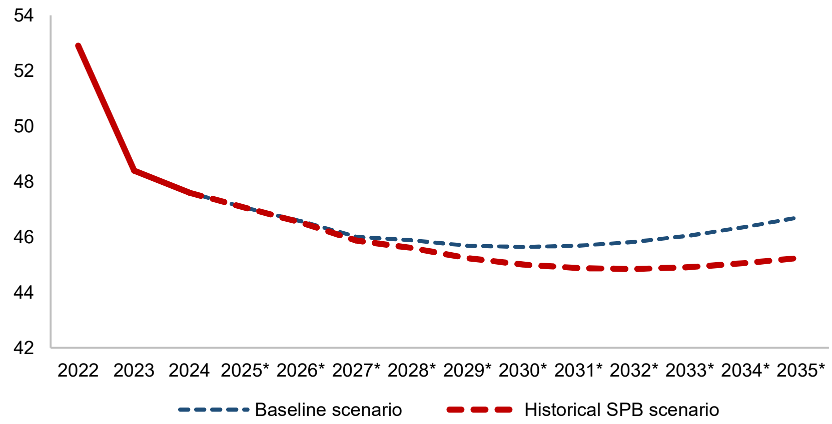
Historical *SPB* scenario	2023	2024	2025*	2026*	2027*	2028*	2029*	2030*	2031*	2032*	2033*	2034*	2035*
Primary balance (in % of GDP)	-0.5	-0.2	-0.5	-0.5	-0.4	-0.5	-0.4	-0.5	-0.5	-0.6	-0.6	-0.6	-0.7
Structural primary balance, before ageing costs (*SPB*)	0.6	0.2	-0.5	-0.4	-0.4	-0.3	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
Real GDP growth rate (in %)	3.8	3.9	4.5	4.4	4.9	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
Public debt, in % of GDP	**48.4**	**47.6**	**47.1**	**46.5**	**45.9**	**45.6**	**45.2**	**45.0**	**44.9**	**44.8**	**44.9**	**45.1**	**45.2**

Source: The author's calculation.

Simultaneously with the adjustment of the structural primary balance, the real GDP growth rate is also adjusted using a fiscal multiplier of 0.75. As explained in the previous section, the assumption is that an increase in the structural primary balance (fiscal consolidation) of 1 pp leads to a reduction in real GDP growth by 0.75 pp, and vice versa. In the case of Serbia, the structural fiscal balance was improved by a total of 0.3 pp during 2026–2029, resulting in slower real GDP growth compared to the baseline scenario.

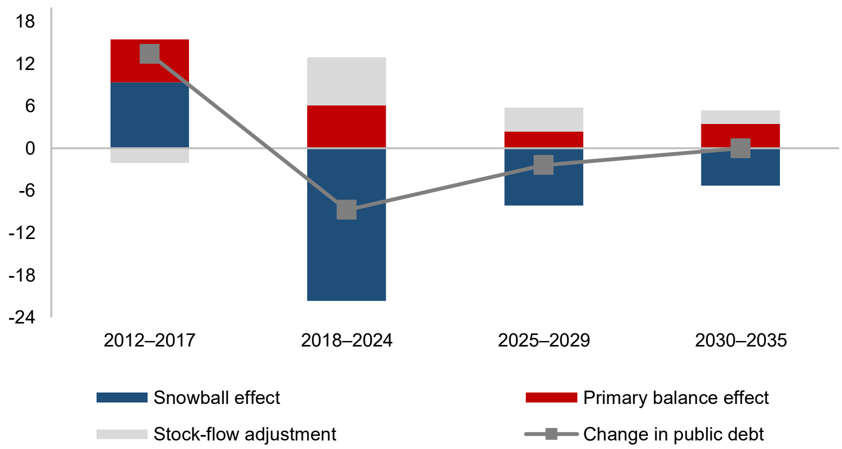
According to the historical SPB scenario, the share of general government debt in GDP will reach 45.2% by the end of 2035, which is 1.5 pp lower than the projection in the baseline scenario, as the historical structural primary deficit of 0.2% of GDP projected for 2029–2035 is significantly different from the projection in the baseline scenario (structural deficit of 0.5% of GDP), representing a factor for the faster decline in the debt ratio compared to the baseline projection. From 2033, the adverse effect of the primary fiscal deficit and stock-flow adjustments will catch up and slightly exceed the favourable snowball effect, leading to a higher debt-to-GDP ratio by the end of 2035 compared to 2033.

Chart 7 **Historical SPB and baseline scenario, 2022–2035** (in % of GDP)



Source: The author's calculation.

Chart 8 **Decomposition of change in public debt in the historical SPB scenario, 2012–2017, 2018–2024, 2025–2029 and 2030–2035** (in pp of GDP)

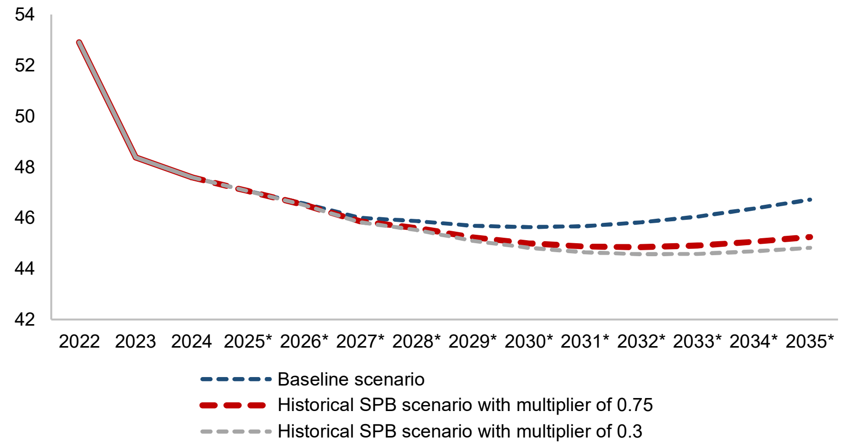


Source: The author's calculation.

The mentioned fiscal multiplier of 0.75 was calculated at the EU level and is used by the European Commission in public debt projections for all member states. However, in reality, fiscal multipliers vary significantly from country to country, depending on numerous factors such as the size of the country, its fiscal position, import propensity, consumption propensity, etc. In this regard, Spilimbergo et al. (2009) estimated fiscal multipliers depending on various factors, primarily the size of the country, and found that the multiplier for large countries ranges from 1 to 1.5, for medium-sized countries from 0.5 to 1, while for small, open economies (such as Serbia), the multiplier ranges from 0.3 to 0.5. Similar results were obtained by Ilzetzki et al. (2011), where the cumulative multiplier for developed countries was around 0.8, while for developing countries, it was lower at around 0.5.

To assess the impact of the fiscal multiplier on public debt movements, i.e. how the debt trajectory changes depending on the size of the fiscal multiplier, below we present the results of the historical SPB scenario using a multiplier of 0.3, which is more appropriate for an economy like Serbia's. As expected, in the scenario with a multiplier of 0.3, public debt at the end of the projection horizon is lower compared to the scenario with a multiplier of 0.75, as the impact of restrictive fiscal policy on slowing GDP growth is smaller, and thus the impact on reducing the debt ratio is greater.

Chart 9 **Historical SPB scenario using the fiscal multiplier of 0.75 and of 0.3, 2022–2035** (in % of GDP)



Source: The author's calculation.

5.3 Lower SPB scenario

The lower SPB scenario projects a 50% poorer structural primary balance for 2025 (the first year of the projection) than the baseline scenario. In other words, if the baseline scenario projects a smaller structural primary deficit for 2025 than in 2023 (or a larger surplus), this scenario projects only 50% of that improvement. The opposite is true in the case of a worsening deficit or a decreasing surplus – an additional 50% greater deterioration is expected. After 2025, as in the baseline scenario, the structural primary deficit remains constant until the end of the projection horizon and is adjusted only for the costs of population aging.

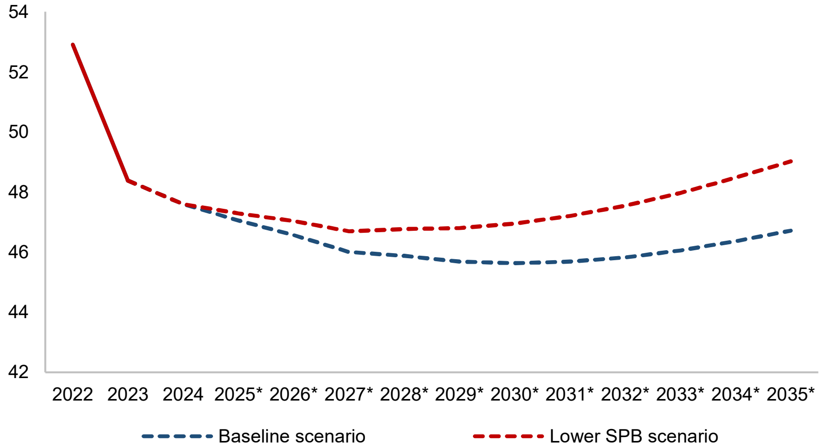
Table 4 **Key assumptions of the lower SPB scenario, 2023–2035** (in % of GDP)

Lower *SPB* scenario	2023	2024	2025*	2026*	2027*	2028*	2029*	2030*	2031*	2032*	2033*	2034*	2035*
Primary balance (in % of GDP)	-0.5	-0.2	-0.9	-0.9	-0.9	-1.0	-1.1	-1.1	-1.1	-1.2	-1.2	-1.3	-1.3
Structural primary balance, before ageing costs (SPB)	0.6	0.2	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9
Real GDP growth rate (in %)	3.8	3.9	4.8	4.8	5.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Public debt, in % of GDP	**48.4**	**47.6**	**47.3**	**47.0**	**46.7**	**46.8**	**46.8**	**47.0**	**47.2**	**47.5**	**48.0**	**48.5**	**49.0**

Source: The author's calculation.

In Serbia's case, it was assumed that in 2025 there would be a significant deterioration in the structural primary deficit and that in 2025 it would amount to -0.9% of GDP, remaining at that level until the end of 2035. The results obtained indicate that in this scenario, Serbia's public debt would also be on an upward trajectory already as of 2028. At end-2035, the projected debt-to-GDP ratio is 49%, 2.3 pp higher than in the baseline scenario, as, due to the significantly larger projected structural deficit, the snowball and primary balance effects would tend to equalise more quickly than in the baseline scenario.

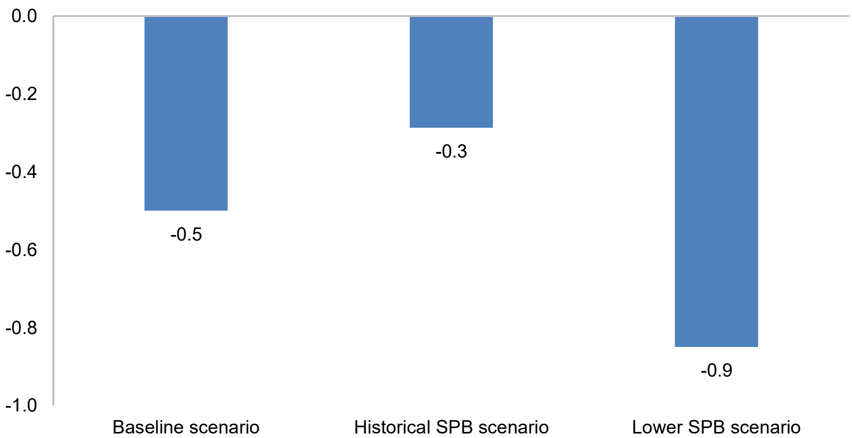
Chart 10 **Lower SPB and baseline scenarios, 2022–2035** (in % of GDP)



Source: The author's calculation.

In the first three deterministic tests, the differences in the projections of Serbia's public debt until 2035, although present, do not change the conclusion that public debt will remain below the level of 50% of GDP until the end of the projection horizon. Namely, in the first three scenarios, the variable that was subject to variation was the structural primary balance, where in the first scenario it was assumed to remain at the projected level for 2025, in the historical SPB scenario a four-year return to the 15-year average, while in the lower SPB scenario a deterioration in 2025 by 50% compared to the projection in the baseline scenario and then a retention at that level was assumed. However, as shown in Chart 11, the aforementioned projections of the structural primary balance do not differ by more than 0.4 pp, which is why the paths of public debt do not differ to the extent that the conclusion on debt sustainability would vary significantly from scenario to scenario.

Chart 11 **Structural primary deficit in three projection scenarios, average for the period 2025–2035** (in % of GDP)



Source: The author's calculation.

5.4 The adverse "r–g" scenario

The aim of the adverse "r–g" scenario is to include potential risks for a reversal or narrowing of the current gap between the GDP growth rate and the interest rate. For almost all CESEE countries, this scenario is constructed with a slight but permanent increase in the average weighted nominal interest rate (by 0.1 pp), as well as a decrease in the real GDP growth rate by an average of 0.5 pp per year compared to the projections from the baseline scenario, and the scenario is implemented in the same way for Serbia's public debt. In other words, the scenario assumes that the difference between the interest rate and GDP growth will permanently worsen by 0.6 pp compared to the baseline scenario, which will inevitably make the share of public debt in GDP higher than in the baseline scenario.

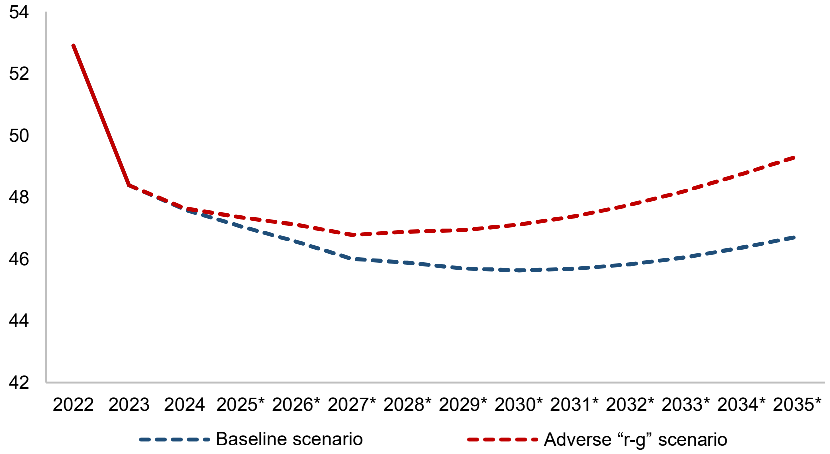
Table 5 **Key assumptions of the adverse "r–g" scenario, 2023–2035** (in % of GDP)

Adverse "*r-g*" scenario	2023	2024	2025*	2026*	2027*	2028*	2029*	2030*	2031*	2032*	2033*	2034*	2035*
Nominal weighted average interest rate (in %)	3.5	3.8	3.7	3.9	4.0	4.2	4.4	4.6	4.7	4.9	5.0	5.1	5.1
Real GDP growth rate (in %)	3.8	3.9	4.0	4.0	4.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Public debt, in % of GDP	**48.4**	**47.6**	**47.4**	**47.1**	**46.8**	**46.9**	**46.9**	**47.1**	**47.4**	**47.7**	**48.2**	**48.7**	**49.3**

Source: The author's calculation.

In the case of Serbia, public debt in this scenario maintains a slightly decreasing trajectory to 46.9% of GDP by 2029, while remaining almost unchanged in the following six years. On the one hand, the effects of interest costs grow faster per year compared to the baseline scenario, while on the other hand, the effect of nominal GDP slows down faster compared to the baseline scenario. Unlike other stress tests, such as exchange rate shocks that are one-off or temporary in nature, this stress test aims to test public debt for shocks of a longer-term nature. At end-2035, public debt in this scenario is 2.6 pp higher than in the baseline scenario.

Chart 12 **Adverse "r–g" and baseline scenarios, 2022–2035** (in % of GDP)



Source: The author's calculation.

5.5. Financial shock scenario

The financial shock scenario implies a temporary shock to the financial market in the first year of the projection, manifested in a temporary increase in all market interest rates by 1 pp in the first year of the projection (T1+1). In the case of Serbia, market interest rates are represented by EURIBOR and BELIBOR and their growth directly affects the increase in interest costs on current debt with a variable interest rate, newly issued debt (debt to cover the fiscal deficit) and refinanced debt.

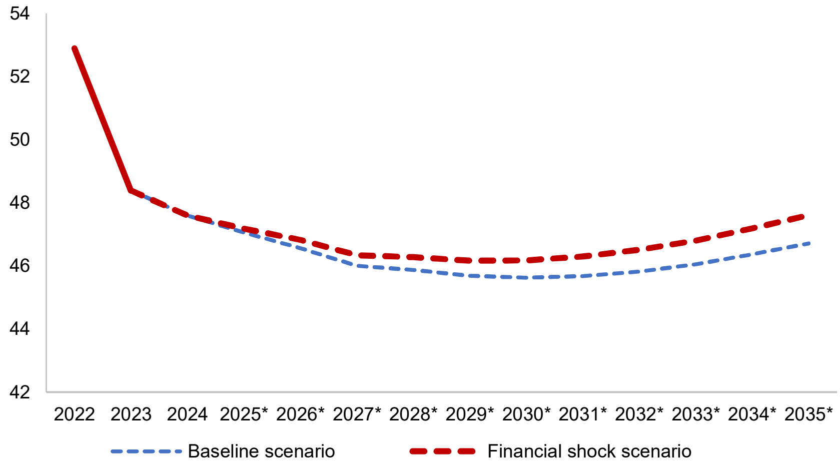
Table 6 **Key assumptions of the financial shock scenario, 2023–2035** (in % of GDP)

Financial shock scenario	2023	2024	2025*	2026*	2027*	2028*	2029*	2030*	2031*	2032*	2033*	2034*	2035*
Nominal weighted average interest rate (*WAIR*, in %)	3.5	3.7	3.9	4.1	4.1	4.3	4.5	4.7	4.8	5.0	5.1	5.2	5.2
Public debt, in % of GDP	**48.4**	**47.6**	**47.2**	**46.8**	**46.3**	**46.3**	**46.2**	**46.2**	**46.3**	**46.5**	**46.8**	**47.2**	**47.6**

Source: The author's calculation.

The increase in market interest rates in this scenario directly affects the level of the average weighted interest rate, to the greatest extent in the first year of the projection. The assumed 1 pp increase in EURIBOR compared to the baseline scenario projection raises the interest rate on variable-rate debt, whose share in total government sector debt at end-September 2024 was around 27%, assuming it would not change. This resulted in the average weighted interest rate at end-2025 being 0.2 pp higher than in 2024, and 0.3 pp higher than in the baseline projection for 2025.

Chart 13 **Financial shock and baseline scenarios, 2022–2035** (in % of GDP)



Source: The author's calculation.

Based on the results obtained, we can conclude that the financial shock assumed in this scenario would affect the level of debt-to-GDP ratio throughout the projection horizon, with the debt ratio of 47.6% at end-2035, which is 0.9 pp higher than the projection in the baseline scenario. Therefore, public debt would maintain a similar trajectory in this scenario too, but the decline until 2031 would be milder and growth from 2031 would be faster than in the baseline scenario.

It is important to emphasize once again that the structure of the government sector's public debt is dominated by debt with a fixed interest rate (over 70%), which has largely protected the state from short-term interest rate risk, i.e. the risk of an increase in interest rates during debt repayment which leads to an increase in the amount of debt. In addition, countries' sensitivity to interest rate shocks depends to a lesser extent on the maturity of their debt since shorter debt maturity implies a faster transmission of market shocks to the interest rate on public debt.

5.6. Exchange rate shock scenario

The final stress test according to the European Commission methodology is the public debt test for exchange rate shocks and is conducted for EU member states outside the euro area. The scenario involves the application of an exchange rate shock equivalent to the largest change in the exchange rate of the domestic currency in the previous 10 years and is applied in the first year of the projection, after which the assumptions of constant exchange rate from the baseline scenario are assumed. When it comes to Serbia's public debt, exchange rate shocks of the dinar against the euro and the dinar against the dollar were applied simultaneously so as to more reliably apply shocks to the foreign exchange market and to more clearly demonstrate the effects of these shocks on public debt movements.

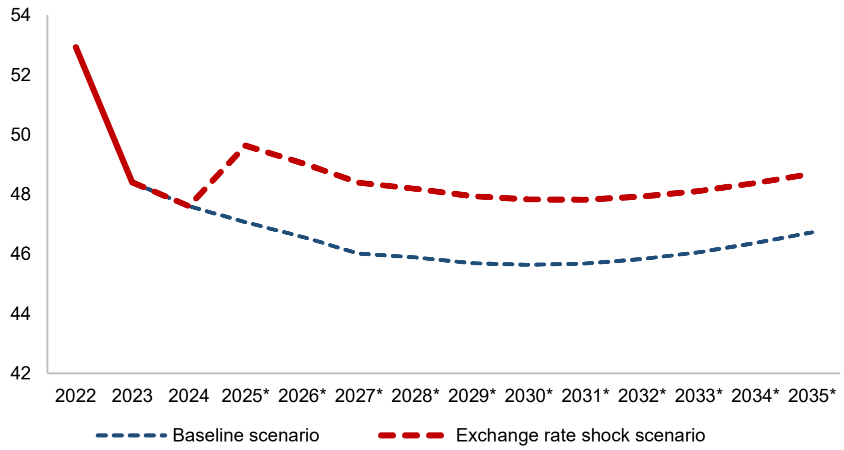
Table 7 **Key assumptions of the exchange rate shock scenario, 2023–2035**

Exchange rate shock scenario	2023	2024	2025*	2026*	2027*	2028*	2029*	2030*	2031*	2032*	2033*	2034*	2035*
Change in RSD/EUR exchange rate	0.1	0.1	-5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Change in RSD/USD exchange rate	3.9	-6.2	-19.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Public debt, in % of GDP	**48.4**	**47.6**	**49.6**	**49.0**	**48.4**	**48.2**	**47.9**	**47.8**	**47.8**	**47.9**	**48.1**	**48.4**	**48.7**

Source: The author's calculation.

The results obtained show that simultaneous shocks in the foreign exchange market in the form of depreciation of the exchange rate against the euro and the dollar would significantly affect the level of public debt throughout the observed projection period, despite the assumption of one-off shocks in the first year of the projection. According to this scenario, the share of public debt in GDP at the end of 2035 would amount to 48.7% of GDP, measuring 2 pp more than projected in the baseline scenario. A 5.5% exchange rate shock would have a one-time impact on public debt growth in the year in which the shock occurred, so the debt ratio would increase to 49.6% at the end of 2025, which would represent an increase of 2 pp compared to the balance at end-2024.

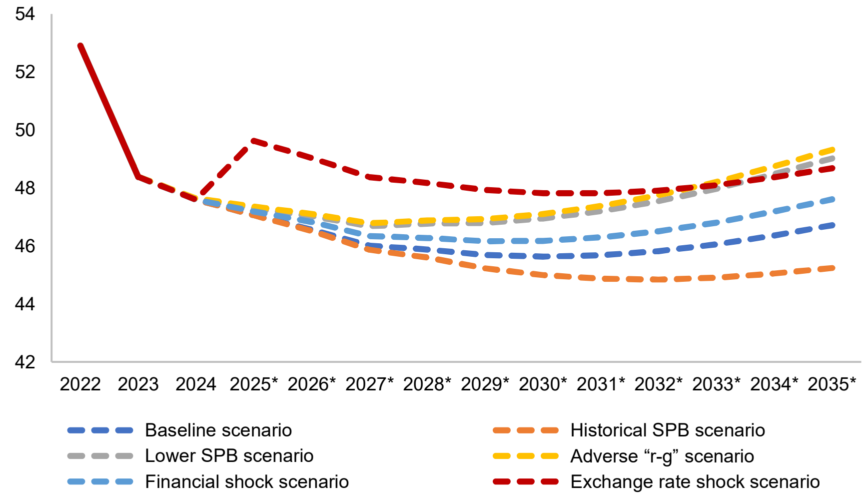
Chart 14 **Public debt in the exchange rate shock and baseline scenarios, 2022–2035** (in % of GDP)



Source: The author's calculation.

In the six implemented scenarios of public debt movement, the most favourable path of public debt is recorded in the historical SPB scenario, while in the adverse "r–g" scenario, public debt is at its highest level at end-2035, as a result of the projected chronic lower economic growth and higher interest rates until 2035.

Chart 15 **Public debt in six deterministic projection scenarios, 2023–2035** (in % of GDP)



Source: The author's calculation.

6 Sustainability analysis of Serbia's public debt – stochastic tests

As explained above, the purpose of stochastic debt projections is to "capture" the overall uncertainty of debt movements over the projection period around the baseline scenario. Unlike deterministic tests, the outcome of stochastic projections is not a single debt path, but a wide range of possible outcomes due to a wide range of shocks. Stochastic projections aim to show how various shocks in terms of movements in the primary balance, interest rates, real growth, inflation and exchange rates may affect the movement of public debt in the future.

Monte Carlo simulations were used to apply the aforementioned shocks, with 12,000 simulations conducted based on the assumption of a joint normal distribution of input variables, and according to the variance-covariance matrix previously calculated for historical data on the aforementioned input variables: primary fiscal balance, nominal interest rate, real GDP growth, inflation, as well as the nominal exchange rate of the dinar against the euro. The equation of public debt dynamics according to which the simulations were performed is given in Chapter 4 (Equation 14). The simulations were conducted over a five-year time period. Although the assumption of a joint normal distribution of the input variables may not perfectly match the empirical distribution observed in the data, it was strategically chosen for two reasons. First, it simplifies the computational processes in the simulations themselves, making the analysis easier to understand. Second, it reduces the likelihood of extreme shocks occurring in the simulations, which could potentially significantly distort projections and lead to less reliable scenarios and thus conclusions (European Commission, 2024).

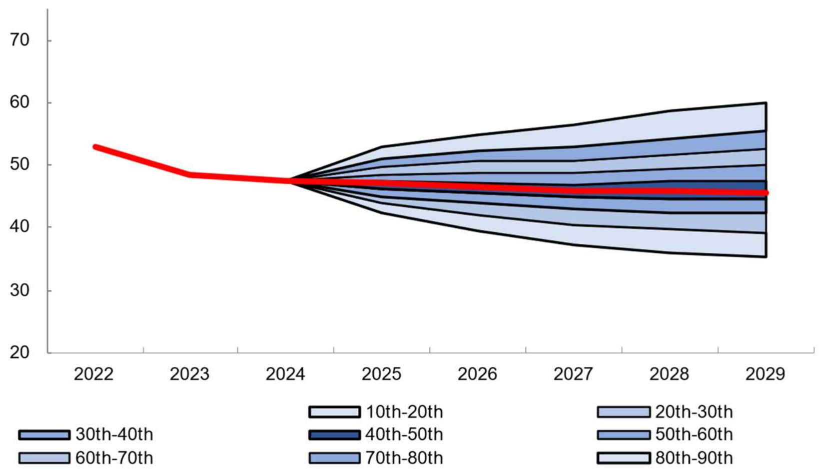
The results of the stochastic projections are presented in a fan chart around a line representing the baseline scenario. The range covers 80% of all simulated debt paths in the period 2025–2029, with the lower and upper bounds representing the 10^{th} and 90^{th} percentiles of the distribution, respectively. In other words, if future shocks follow the same pattern as in the past, there is an 80% probability that the debt in the next five years will indeed be within the constructed range. The diagram excludes the debt paths derived from the 20% most extreme shocks, or so-called tail events. Different shades within the range represent different parts of the overall distribution.

Table 8 **Var-Covar matrix of input variables of public debt for the period 2012–2024***

Var-Covar matrix (Sigma)						
	g	**i**	**pb**	**e**	**p**	**Number**
g	7.34	-2.47	3.97	0.10	1.13	24
i	-2.47	2.03	-1.24	-0.61	-0.27	24
pb	3.97	-1.24	7.89	2.68	-2.38	24
e	0.10	-0.61	2.68	6.99	-4.75	24
p	1.13	-0.27	-2.38	-4.75	13.99	24

*Variables: g – real GDP growth rate, i – nominal growth rate, pb – primary balance, e – dinar-to-euro exchange rate, p – inflation rate.
Source: The author's calculation.

Chart 16 **Stochastic projections of Serbia's public debt, 2025–2029**

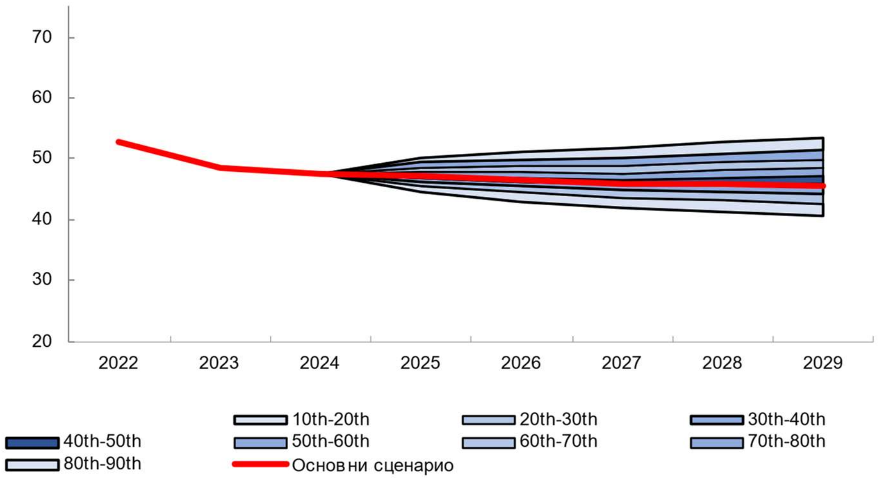


Source: The author's calculation.

The results of the stochastic tests indicate significant uncertainty about the path of Serbia's public debt over the next five years. For 2029, projections indicate that Serbia's debt will be in the range of 35.4% to 55.4% of GDP with an 80% probability, which represents a range of as much as 20 pp. The average debt value at the end of 2029 is estimated at 47.5% of GDP, i.e. there is exactly an equal probability that the debt ratio will be below or above that level at end-2029. In the baseline scenario, the projected debt level at the end of 2029 is 45.7% of GDP, and if this is compared with the mean value of stochastic projections, we see that there is a slightly higher probability that the debt will be above the level in the baseline scenario (the probability that the debt will be higher than 45.7% at end-2028 is around 56%).

By excluding/including shocks to individual variables in the model, we see that shocks on the primary fiscal balance side contribute the most to the uncertainty of stochastic projections of public debt in the case of Serbia. In the event that the possibility of shocks to the primary fiscal balance is excluded, at end-2029, the level of public debt is projected to range from 40.4% to 51.4% of GDP with a probability of 80%, i.e. a range of about 10 pp, or half the range compared to the scenario with primary balance shocks included. The smallest variance is observed in the case of excluding exchange rate shocks, as a result of the relatively stable dinar exchange rate in the previous ten years, and bearing in mind that potential shocks are simulated based on historical values. For the same reason, primary balance shocks have the greatest impact on stochastic projections – in some years before 2024, extremely high primary deficits were recorded, and stochastic shocks are constructed based on historical trends.

Chart 17 **Stochastic projections of debt excluding primary balance shocks, 2025–2029**



Source: The author's calculation.

7 Conclusion

Based on the results of the baseline projection scenario, and according to the European Commission's definition of public debt sustainability, we can conclude that Serbia's public debt will be on a sustainable path in the next ten years, primarily considering the downward trend in its share in GDP projected until 2035. Although debt will inevitably grow in absolute terms, nominal GDP will grow faster, and mostly its real component, which leads to the encouraging conclusion that the earning capacity of the Serbian economy will grow faster than the borrowing that will be necessary to finance that growth.

However, it is evident that the snowball effect on public debt reduction will be lower year by year, as the effect of interest costs increases with the rise in interest rates and by the end of the projection horizon gradually catches up with the effect of nominal GDP, which will be the main factor behind the decline in debt ratios throughout the projection horizon. As already explained, in the coming years, debts taken out during a period of record low interest rates on the domestic and especially on the international financial market will mature, and it will be necessary to refinance them at a higher interest rate than at that time. This will be particularly pronounced in the period from 2027 to 2034, when nine eurobonds issued so far with a total nominal value of EUR 10.3 bn will mature (Table 1 in Chapter 5). The rise in interest rates compared to the period before 2022 will also affect debt in euro loans, as about two-thirds of that debt has a variable interest rate that is directly affected by financial market conditions. Part of the debt in euro-denominated securities issued on the domestic market before the monetary tightening cycle of leading central banks will also be affected, as will new securities that will be issued to finance projected fiscal deficits – new refinancing will mean higher financing costs.

At the same time, the unfavourable effect of the primary balance, i.e. the primary deficit, will be greater as a consequence of the aforementioned growing costs of population aging, which will put pressure on public finances, because higher expenditures for social transfers, primarily pensions, which represent the costs of aging, will act in the direction of worsening the primary fiscal balance, which will need to be financed by borrowing. This will result in a smaller decline in public debt from year to year, with the snowball effect and primary balance gradually catching up. With the assumed constant fiscal policy, i.e. a structural primary deficit of 0.5% of GDP, achieving stability and/or a decline in public debt in GDP will require more dynamic economic growth to prevent the negative effects of ageing costs. The historical scenario also contains the same conclusion about the sustainability of Serbia’s public debt, but the fiscal policy is somewhat more restrictive, which ultimately means a less unfavourable effect of the primary deficit on public debt, but also slower real GDP growth, which will mitigate this effect.

The remaining four deterministic scenarios imply less favourable financial, fiscal and macroeconomic assumptions compared to the baseline scenario, which is reflected in the obtained projection results. In all four scenarios, a slower decline in the share of public debt in GDP is projected, with the slowest decline projected until 2034 in the lower SPB scenario, as a consequence of a permanently higher structural deficit compared to other stress tests where shocks are of a more temporary nature. The projections show that Serbia’s public debt would be somewhat resilient to potential shocks of a temporary nature, as its trajectory from the baseline scenario would not be significantly jeopardised. A much greater challenge would be posed by more permanent shocks that would affect economic activity as a whole and negatively impact real GDP growth, because GDP growth with the presence of inflation is the main factor in the decline of the debt-to-GDP ratio.

Of the input variables in the equation of public debt dynamics, the state directly influences the primary fiscal deficit (excluding ageing costs) and indirectly influences other variables, primarily economic growth, therefore these are the main channels through which the state can keep public debt and its share in GDP under control. In this sense, the sustainability of Serbia’s public debt in the coming years will predominantly depend on the state’s ability to create economic growth, on the one hand, and on the other, on its fiscal discipline and stability of public finances – the key task of the state will be to implement fiscal deficits that will stimulate economic growth but not jeopardise fiscal stability.

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