FACTORS DRIVING THE PUBLIC DEBT DYNAMICS: THE CASE OF REPUBLIC OF MACEDONIA

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Abstract

The global financial and economic crisis has placed a significant strain on public finances in many economies. Since sound public finances are crucial for price and financial stability and for economic growth, concerns about rising debt commitments have led to a renewed interest in the analysis of debt sustainability in the last decade. This paper discusses the concept of fiscal sustainability and investigates the factors driving the public debt dynamics in the Republic of Macedonia over the period 2004-2021. Although the level of indebtedness is still moderate (below 50% of GDP), the public debt dynamics from 2008 is worrying (public debt has doubled in only 7 years). The starting point for assessing debt sustainability is the government budget constraint equation. This equation explains the evolution and accumulation of government debt by three main factors: the primary balance, the "snowball" effect, and the deficit-debt adjustment. The conventional debt sustainability analysis showed that the general government debt ratio over the period 2004-2017 increased moderately as a result of a significant increase in the primary deficit (by 16 p.p.), that was almost completely offset by the positive "snowball" effect. In addition, we found that in the pre-crisis period (2004-2008), the general government debt ratio declined significantly, mainly as a result of a positive "snowball" effect but also because of the primary surplus. Contrary to pre-crisis developments, the general government debt ratio increased significantly (by 19 p.p.) in the post-crisis period (2009-2017), due to the significant primary deficit increase, while the positive "snowball" effect was moderate.

Keywords: Public debt dynamics, Fiscal sustainability, Primary deficit, Debt-to-GDP ratio, Snowball effect

JEL classification: E60; E62; H60; H62

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Introduction

Public debt gained huge public attention in recent years, particularly during and after the Global crisis in 2008. The reason behind this is the enormous and continuously growing level of indebtedness of countries that cannot be compared with any other prior period. Debt-to-GDP ratios around the world have increased in recent years because governments took advantage of historically low interest rates and because of expansionary fiscal policy during the crises. According to IMF, the prolonged period of low interest rates had stimulated an increase in the debt level to world GDP to 225% in 2016, or 12 percentage points above the previous record level reached in 2009.

However, the concept of *fiscal sustainability* tells us that the debt to GDP ratio cannot keep on growing infinitely because that would require governments to continuously increase taxes and reduce government spending on public goods and services. In fact, fiscal sustainability is closely related to *public debt sustainability*. Both concepts refer to the government's solvency or its capacity to service its debt obligations in the long term (Cottarelli and Moghadan, 2011).

The main purpose of this paper is to analyze public debt sustainability in the Republic of Macedonia in the last two decades. Although the level of indebtedness in the Republic of Macedonia is still at a moderate level (below 50% of GDP), the public debt dynamics from 2008 is worrying. Namely, the public debt in R. Macedonia has doubled in only 7 years, from 23% of GDP in 2008 to 46% of GDP in 2015. Therefore, in our paper we have analyzed the factors driving the gross government debt dynamics in the Republic of Macedonia over the period 2003-2017. More particularly, we have investigated the primary budget balance, the GDP growth rates, the interest costs and inflation rates in order to determine whether each of these factors has contributed for the government debt to rise or to decline in the period analyzed.

The paper is organized as follows: (1) the first section presents a brief literature review regarding the concepts of fiscal sustainability and public debt sustainability; (2) the second section gives a short explanation of the factors that drive the public debt dynamics, as well the research methodology; (3) the third section gives an overview of the fiscal performance of the Republic of Macedonia in the last decade; (4) the fourth section presents the conventional dynamic analysis of the Macedonian public debt over the period analyzed; and (5) the last section makes some conclusions.

Fiscal and public debt sustainability – literature review

Fiscal sustainability is the ability of governments to maintain credible public finance over the long term. In contemporary economics literature, different definitions of the concept of fiscal sustainability can be found. According to IMF, there are academic, policy or pragmatic definitions of debt sustainability (Guzman and Heymann, 2015). In academic terms, fiscal or debt sustainability refers to the inter-temporal solvency (initial debt plus the discounted value of future streams of primary expenditure should be equal to the discounted value of future steams of income). According to this view,

debt is sustainable when the inter-temporal solvency condition is satisfied or when the expected present value of future primary balances covers the existing stock of debt. The economic policy definition of debt sustainability refers to a condition under which a country or its government doesn't need to default or renegotiate or restructure its debt in the future, or make implausibly large policy adjustments. The pragmatic definition considers public debt as sustainable if projected debt ratios are stable or decline, while also being sufficiently low as to avoid default. According to the definition of the European Central Bank, fiscal sustainability is defined as the capacity of the government to service its long term obligations. In other words, fiscal sustainability requires the state to be solvent, i.e. to be able to repay the debts that will be delivered in the future.

The concept of fiscal sustainability is related to fiscal policy (Burnside, 2004) or to the dynamics of public debt (Cruz-Rodriguex, 2014). In general, there are three concepts in defining fiscal sustainability in literature. The first concept links sustainability with solvency, that is, fiscal policy is sustainable if it leads to solvency (IMF, 2002; Croce and Juan-Ramón, 2003; Burnside, 2004). Solvency is defined as a situation in which future spending and future revenues satisfy the inter-temporal budget constraint[3]. Relatively older literature related to the sustainability of public finances can be found in the publications of Buiter (1985), Hamilton and Flavin (1986), Blanchard et al. (1990), etc. and it represents the second concept of defining fiscal sustainability. According to Buiter (1985), fiscal policy is sustainable if the net value of the government in terms of GDP is maintained at the present level. Hamilton and Flavin (1986) investigate fiscal sustainability and perform empirical testing of the inter-temporal budget constraint rule. A similar definition as Buiter is also given by Blanchard (1990), according to whom a sustainable fiscal policy is the policy that ensures that the debt-to-GDP ratio converges to its initial level. The problem of these definitions is the lack of theoretical support for converting the Debt/GDP ratio back to the initial level, i.e. why debt would not converge to any other level (Krejdl, 2006). Such a disadvantage is removed by giving a more general definition of fiscal sustainability, that is, fiscal policy is sustained if the present value of future primary[4] surpluses is equal to or higher than the current level of debt. Finally, the third concept includes both criteria - solvency and limitation of debt growth (Alvarado, 2004).

There are authors who distinguish between sustainability and solvency (Artis and Marcellino, 2000; IMF, 2002). According to them, the government is considered to be solvent if it is able to pay its debts with future primary surpluses in an unlimited time horizon. On the other hand, sustainability is defined as the ability of the government, within the existing policies, to reach a predetermined level of Debt/GDP over a certain period of time (Artis at al., 2000). Besides this, Balassone and Franco (2000) proposed different necessary conditions for sustainability from non-ever rising tax rate to an inter-temporal discounted budget constraint. The definition of fiscal sustainability based on government inter-temporal budget constraint (IBC) is most widely accepted.

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3 Inter-temporal budget constraint refers to the rule that the present value of all current and future tax revenues should be sufficient to cover the present value of all current and future government spending plus the initial level of government debt.

4 The primary balance is defined as the general budget balance reduced by interest payments.

Having in mind the above debate, fiscal sustainability, within the most general framework, can be defined as the ability of the government to service its debt obligations in the long run. This means that the government is solvent and liquid at the same time. Accordingly, a government that has debt, in the next period, should generate a primary surplus which is large enough to cover the costs of servicing the government's debt obligations (current and future). In other words, fiscal sustainability requires the government to be solvent - capable to repay its debt in a certain period of time in the future. Solvency is a medium to long-term concept and requires that the government's net present value budget constraint is fulfilled, stipulating that the net present value of the government's future primary balances must be at least as high as the net present value of the outstanding government debt.

Factors driving public debt dynamics – research methodology

There are several theoretical and empirical studies focusing on the determinants of public debt. Thus, Eichengreen and Portes (1986) found a negative correlation between public debt and economic growth. Sinha et al. (2011) showed that the economic growth rate is the most important determinant and it is negatively correlated with public debt. Hall and Sargent (2011) suggest that economic growth has reduced the Debt-GDP ratio in the United States. Simultaneously, they showed that in the period from 1946 to 1974, 23% of the debt reduction was due to inflation. Aizenman and Marion (2011) also found that inflation reduces the debt. In their study, the authors have shown that with an inflation of 6%, the Debt/GDP ratio will decrease by 20% in 4 years. Bittencourt (2015) emphasizes the importance of economic activity in reducing the public debt, showing that the increase in economic growth by 1% leads to the reduction of public debt by 0.7%.

The economic theory suggests that accumulation of gross debt is driven by three main factors: the primary balance, the "snowball" effect, and the deficit-debt adjustment (Martner and Tromben, 2004; Boussard et al., 2013; Heylen et al., 2013; Georgescu, 2014).

The primary balance is defined as the government fiscal balance net of interest payments (total revenue less expenditure excluding interest payments on debt). The "snowball" effect captures the impact of interest rate, real GDP growth and inflation rate on the Debt to GDP ratio (interest rate less growth less inflation). If interest rates are higher than the sum of inflation and growth (nominal growth), debt will grow even if the government has a primary surplus (positive "snowball" with negative effect). On the other hand, if interest rates are lower than the nominal growth, even a primary deficit can reduce the stock of debt (negative "snowball" with positive effect). Finally, the deficit-debt adjustment relates to those factors that affect the stock of debt but are not included in the primary balance (acquisition of shares in companies by the government, changes due to exchange rate differences, privatization proceeds, etc.). So, the starting point for the assessment of fiscal sustainability is the following government budget constraint (Escolano, 2010):

$$\frac{Dt}{Yt} - \frac{Dt-1}{Yt-1} = \frac{PDt}{Yt} + \left[\frac{Dt-1}{Yt-1} * \left(\frac{it-yt}{1+yt}\right)\right] + \frac{SFt}{Yt}$$

Where D is the total debt level, Y is nominal GDP, PD is the primary deficit, i is the average (nominal) interest paid on government debt, y is the nominal GDP growth rate and SF is the stock-flow adjustment.

If lower case letters represent ratios in terms of GDP:

$$\Delta b_t = \frac{i-g}{1+g} b_{t-1} - pb_t + sf_t$$

Where Δb_t is change in Debt/GDP ratio, i is the nominal (effective) interest rate, g is the nominal GDP growth rate, pb_t is the primary Balance-to-GDP ratio at time t, and sf_t is the deficit-debt adjustment to GDP ratio.

This dynamic debt accumulation equation shows the change in the government debt to GDP ratio in each period as the sum of the current primary balance, the "snowball" effect, which captures the joint impact of interest payments on the accumulated stock of debt and of real GDP growth and inflation on the debt ratio, and the deficit-debt adjustment). According to the equation, a stable or declining debt ratio ($\Delta bt \leq 0$) requires a sufficiently large primary surplus to be generated in each period if the nominal interest rate on outstanding debt is higher than the nominal growth rate of the economy and the deficit-debt adjustment is positive.

By solving the equation forward, it is possible to derive a condition for fiscal sustainability which can be expressed as:

$$b_0 \leq \sum_{i=1}^{\infty} \rho_i \, (\, pb_i \,)$$

assuming that the condition $\lim \rho_t \, b_t \leq 0$ holds (i.e. over an infinite horizon the stock of outstanding debt tends to zero or a positive asset position is built up). b_0 is the initial Debt-to-GDP ratio and $\rho_i = (1+g_i)/(1+i_i)\rho_{i-1}$ is the discount factor, which depends on the future values of the GDP growth rate and the interest rate.

Fiscal performance in the Republic of Macedonia over the last decade

In this section of the paper we will briefly analyze several macroeconomic and fiscal indicators of the Macedonian economy that are considered to be related to debt sustainability of the country. In this regard, we will examine the real growth rates, the inflation, the primary budget balance and interest costs.

The Republic of Macedonia is a country with long-lasting aspirations to become a member state of the European Union. Therefore, it has become a practice not only for politicians but also for scientific researchers, to compare the fiscal performances of the Macedonian economy with the EU convergence criteria (known as Maastricht criteria) on a regular basis. Regarding fiscal policy, the EU and EMU member states must fulfill two criteria: (1) the Deficit-to-GDP ratio must not exceed 3%, and (2) the Debt-to-GDP ratio must not exceed 60%.

The following diagram compares the Debt to GDP ratio in R. Macedonia to the average level of the EU member states, over the analyzed period from 2003 to 2017. As shown, in the period before the Crisis, the level of government debt in R. Macedonia has declining, due to some early repayments of its debt obligations. As a result, the government debt has dropped to 20.5% of GDP in 2008. On the other hand, after the Crisis followed the period in which the level of debt started to grow continuously, reaching 39.3% of GDP in 2017.

Figure 1. General government debt, % of GDP
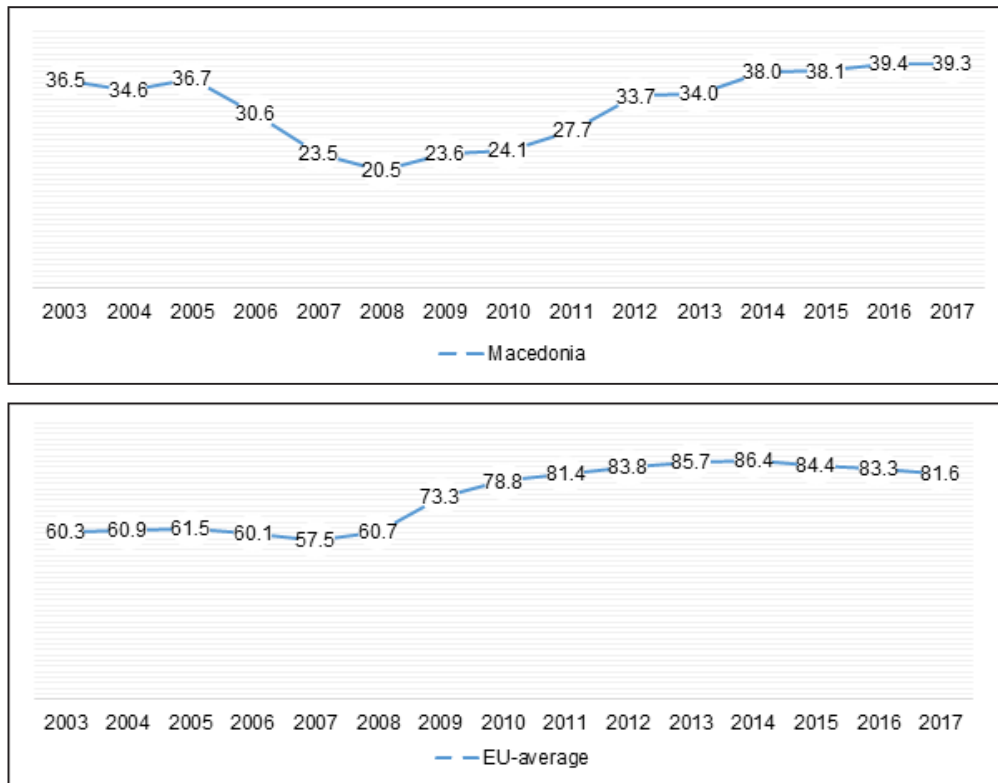
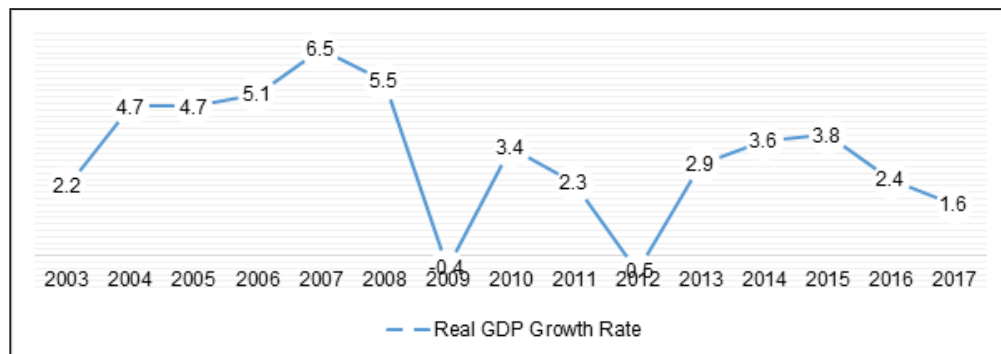Source: Ministry of Finance of R. Macedonia, EUROSTAT

Compared to the EU member states, despite its continuous growth, the government debt of R. Macedonia still remains at a relatively low level (the average debt level of EU member states amounted to 81.6% in 2017). However, in the lower income

countries, the threshold for negative economic implications of the debt is significantly lower than in the higher income countries (Reinhart and Rogoff, 2010). Therefore, although the level of government debt in R. Macedonia is not very high, what is worrying is the pace of the debt growth in the last decade. In fact, as mentioned previously, the Macedonian government debt has doubled in only 7 years (from 23% of GDP in 2008 to 46% of GDP in 2015).

The real growth rate is one of the main macroeconomic indicators that has the most direct and strongest effect on public debt sustainability of the country (Escolano, 2010). The positive growth rates of GDP, other things being equal, tend to decrease the Debt to GDP ratio and vice versa.

The following diagram presents the real growth rates of the Macedonian economy since 2004. As it can be seen, the Macedonian economy tended to grow more rapidly in the years before the Crisis (from 2006 to 2008 it reached its highest growth rates 5-6%). On the other hand, in the period after the Crisis the growth rates slowed down or became even negative in 2009 and 2012.

Figure 2. Real GDP growth rate

Source: State statistical office, National bank of the Republic of Macedonia, Ministry of Finance

The inflation rate also has strong influence on debt sustainability. Other things being equal, higher inflation rates tend to decrease the Debt-to-GDP ratio in real terms, and vice versa. The following diagram shows the inflation rate in R. Macedonia in the period from 2004 to 2021. The annual inflation averaged 1.74% in the period from 2004 to 2017, reaching its maximum rate of 5.8% in 2008 and a record low level of 0.3% in 2009.

The interest rate is the price of government borrowing and therefore has a significant effect on debt dynamics. Higher debt levels, other things being equal, are associated with higher interest costs. The following diagram presents the interest costs of the Macedonian government debt. As we can see, the interest costs follow a steady growth path over the entire period analyzed, reaching a record high level of 3.5% of
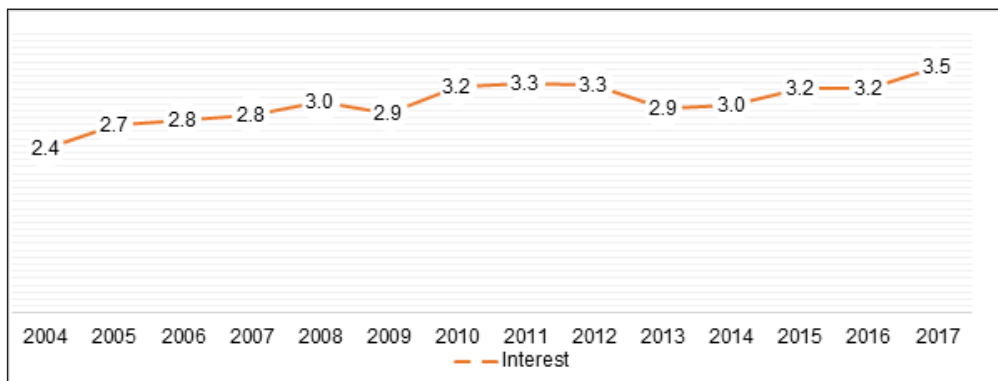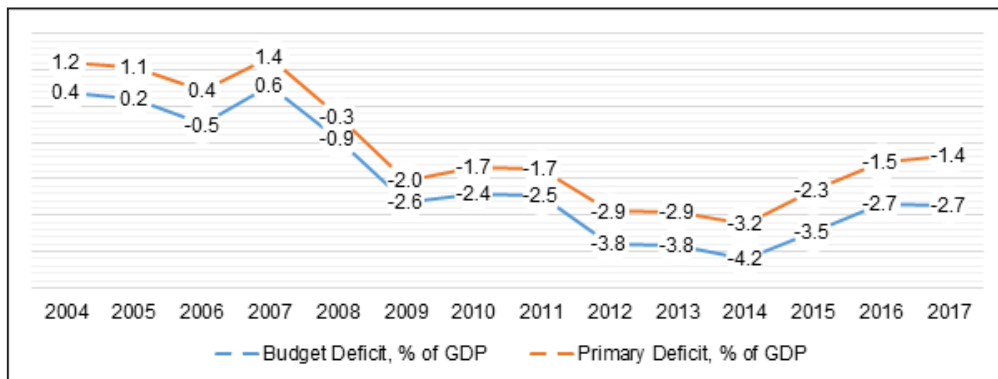
GDP in 2017. As a result, the difference between primary balance and total budget balance expanded over the analyzed period.

Figure 3. Inflation rate, annual
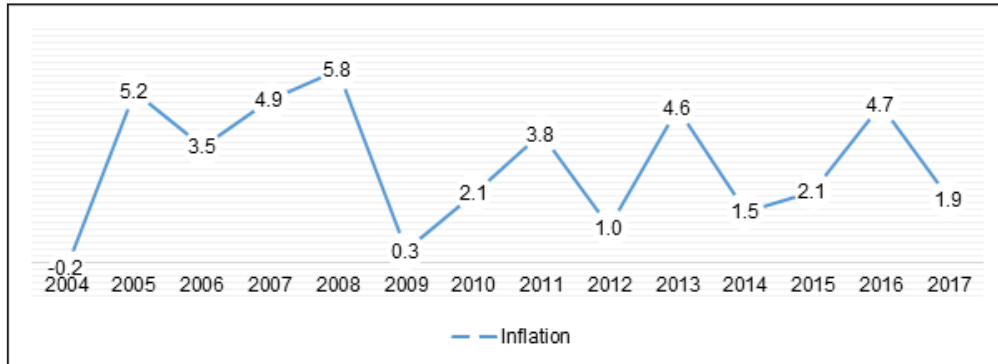
Source: State Statistical Office, National Bank of the Republic of Macedonia, Ministry of Finance

Figure 4. Budget balance and primary balance, % of GDP

Source: State Statistical Office, National Bank of the Republic of Macedonia, Ministry of Finance

The primary budget balance is perhaps the main driving factor of debt dynamics. Countries that have primary deficits, other things being equal, have higher borrowing needs that lead to higher debt levels in the future. In fact, the primary budget balance represents the government budget balance less interest payments associated with previous debt obligations. Therefore, the primary balance is more appropriate for analyzing the current course of the fiscal policy because it doesn't include the interest rate costs related to past debt obligations.

As it can be seen from the previous diagram, R. Macedonia had primary surpluses only in the period before the Crisis (the highest primary surplus was 1.4% of GDP in 2007). On the other hand, after 2008, the primary balance became continually negative and maintained its average level at around -2% of GDP (the biggest deficit of -3.2% was recorded in 2014). As a result, the total budget deficit exceeded the Maastricht criteria of -3% of GDP in 2012, 2013 and 2014. After 2014, there was a slight improvement in the primary balance and in 2017, it amounted to 1.4% of GDP. However, the total budget balance in the same year was -2.7% of GDP due to increased interest costs.

Conventional dynamic analysis of government debt in the Republic of Macedonia

In order to determine the government debt driving factors in the Republic of Macedonia, a conventional dynamic analysis of government debt sustainability is done based on the above methodological framework. For the purposes of our analysis, data on central government budget and general government debt from the Ministry of Finance, as well as data on GDP and inflation from NBRM and State Statistical Office were used for the period 2004-2017. We used projected data for these variables for the period 2018-2021 in accordance with the Fiscal Strategy of the Republic of Macedonia prepared and published by the Ministry of Finance.

The analysis used the concept of primary budget balance, calculated as the difference between the actual budget balance and the amount of interest payments on government debt. The data on government debt interest rate in a given year is calculated as the ratio of annual interest paid and government debt outstanding. GDP deflator is used as an indicator for inflation.

Table1. Change in debt ratio and factors of debt accumulation

Year	Change in debt ratio (1=2+3+7)	Primary Balance (2)	Snowball effect (3=4-5-6)	Interest (4)	Growth (5)	Inflation (6)	Deficit-debt adjustment (7)
2004	-1.9	1.2	-0.8	0.9	1.7	-0.1	0.1
2005	2.1	1.1	-2.5	0.9	1.6	1.8	5.6
2006	-6.1	0.4	-2.1	1.0	1.9	1.3	-3.5
2007	-7.1	1.4	-2.6	0.9	2.0	1.5	-3.1
2008	-2.9	-0.3	-1.9	0.7	1.3	1.4	-1.3
2009	3.0	-2.0	0.6	0.6	-0.1	0.1	0.4
2010	0.5	-1.7	-0.5	0.8	0.8	0.5	-0.7
2011	3.7	-1.7	-0.7	0.8	0.6	0.9	2.6
2012	5.9	-2.9	0.8	0.9	-0.1	0.3	2.3
2013	0.3	-2.9	-1.6	1.0	1.0	1.6	-1.1
2014	4.0	-3.2	-0.7	1.0	1.2	0.5	1.5
2015	0.0	-2.3	-1.0	1.2	1.4	0.8	-1.2
2016	1.3	-1.5	-1.5	1.2	0.9	1.8	1.3
2017	-0.1	-1.4	0.0	1.4	0.6	0.7	-1.5
2018*projection	1.8	-1.4	-1.3	1.4	1.3	1.5	1.7
2019*projection	2.5	-1.1	-0.8	1.5	1.4	0.9	2.3
2020*projection	0.2	-0.7	-1.0	1.7	1.7	0.9	0.5
2021*projection	-1.0	-0.2	-0.7	2.0	2.2	0.5	-0.5

Source: Own calculation based on data from the National Bank of the Republic of Macedonia, State Statistical Office, Ministry of Finance

The analysis shows that the general government debt ratio over the period 2004-2017 increased by 3 p.p., with a significant increase in the primary deficit (increase by 16 p.p.) that was almost completely offset by the positive "snowball" effect. The positive "snowball" effect is a result of higher nominal growth (GDP and inflation) than the interest rates. In order to determine the effect of the crisis, two sub-periods have been singled out and separately analyzed. In the pre-crisis period (2004-2008), the general government debt ratio declined by 16 p.p., mainly as a result of positive "snowball" effect but also because of the primary surplus realized in that period. Contrary to pre-crisis developments, the general government debt ratio increased significantly (by 19 p.p.) in the post-crisis period (2009-2017). This is entirely due to the significant primary deficit increase (by 20 p.p.), while the positive "snowball" effect was moderate (Figure 5).

Figure 5. The effect of debt accumulation factors on Macedonian government debt
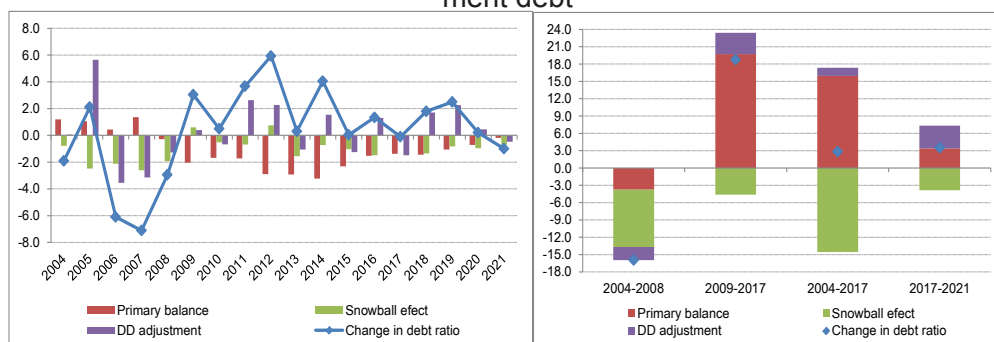
*For greater visibility, in the right-hand chart, the Primary balance data are presented with opposite signs.
Source: Own calculation based on data from the National Bank of the Republic of Macedonia, State Statistical Office and Ministry of Finance

Taking into account the projected values of budget items, GDP and inflation for 2018-2021, a moderate general government debt increase can be expected (by 3 p.p.) with a primary budget deficit and a positive "snowball" effect. The effect of the primary deficit is moderate due to the fiscal consolidation planned and gradual reduction of budget deficit by the Macedonian government. The positive "snowball" effect is mainly a result of the expected higher nominal GDP growth than the expected government debt interest rate in this period.

Figure 6. The "snowball" components' effect on Macedonian government debt
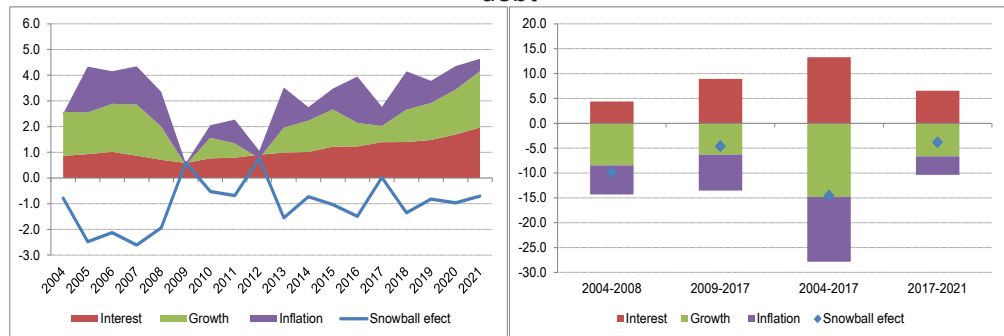
* For greater visibility, in the right-hand chart, growth and inflation data are presented with opposite signs.
Source: Own calculation based on data from the National Bank of the Republic of Macedonia, State Statistical Office and Ministry of Finance

Analyzing the individual components in the "snowball" structure in the period 2004-2017, the effect of interest rate was permanently increasing – from 30% in 2004 to 50% in 2017. However, in almost the entire period analyzed (with the exception of 2009 and 2012, where a negative real GDP rate and lower inflation rate were realized), the nominal growth rates (GDP and inflation) were higher than the interest rates. On average, in the period 2004-2017, the effect of real GDP growth in the "snowball" is the biggest (36%), while the effects of interest rate and inflation are identical (32%). In the pre-crisis period (2004-2008), the real GDP effect is higher (45%) compared to post-crisis period (28%). Contrary to the GDP component, the interest rate effect in the "snowball" is higher in the post-crisis period (40%) compared to the pre-crisis period (23%). The inflation component has the same effect in both periods (32%).

Analyzing the medium-term sustainability of the general government debt of the Republic of Macedonia (up to 2027), we found that in order to preserve the existing level of debt, it is necessary either (1) to achieve higher economic growth rates (real growth of 4-5% on a permanent basis) that allow a primary deficit of 1-2% on average, or (2) to reduce the primary deficit to zero if the rates of economic growth are moderate (2-3% on average). Such a scenario analysis is based on the assumption that the effect of deficit-debt adjustments is zero, the projected inflation rate is 2% and the expected government debt interest rate is 4,5% on average. Nominal interest is expected to rise as a result of rising interest rates in the global economy in the post-crisis period.

Conclusion

The global financial and economic crisis and concerns over countries' ability to finance their rising debt commitments have led to a renewed interest in the analysis of fiscal sustainability that is closely related to public debt sustainability. In the contemporary economic literature, different definitions of the concept of fiscal sustainability can be found. In general, fiscal sustainability is the ability of the government to service its debt obligations in the long run, meaning that government is solvent and liquid at the same time.

The level of indebtedness of Macedonia is still moderate (around 40% of GDP) but the general government debt dynamics in the last decade is worrying – it has doubled in only 8 years, from 20% of GDP in 2008 to 40% in 2016. Although lower than the European Union average ratio, a constantly increasing debt profile in the last decade may prove to be unsustainable. To assess factors driving the general government debt dynamics, a government budget constraint equation was used. The results show that in the period 2004-2017, the general government debt ratio increased moderately (by 3 p.p.) with a significant increase in the primary deficit (by 16 p.p.) that was almost completely offset by the positive "snowball" effect. In almost the entire period (with the exception of 2009 and 2012), the nominal growth rates (GDP and inflation) were higher than the interest rates, thus resulting in a positive "snowball" effect. The effect of real GDP growth in the "snowball" structure is the biggest. However, it should be noted that the effect of interest rate was permanently increasing during the period 2004-2017.

Taking into account the effects of the crisis, in the pre-crisis period (2004-2008), the general government debt ratio declined by 16 p.p., mainly as a result of the positive "snowball" effect, but also because of the primary surplus realized in that period. Contrary to the pre-crisis developments, the general government debt ratio increased significantly (by 19 p.p.) in the post-crisis period (2009-2017). This is entirely due to the significant primary deficit increase (by 20 p.p.), while the positive "snowball" effect was moderate. Within the "snowball" structure, the real GDP effect is higher in the pre-crisis period compared to the post-crisis period. This is contrary to the effect of interest rate, which is higher in the post-crisis period. In order to preserve the existing level of debt in the medium term, it is necessary either to achieve economic growth rates of at least 4-5% with a primary deficit of 1-2% or to reduce the primary deficit to zero.

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