Government debt dynamics in the EU after the pandemic: the role of the snowball effect

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Article**
JEL: E31, E58, E62, E65, H63
https://doi.org/10.3326/pse.50.3.1

* The author would like to thank Saša Ljepović, Ana Šabić and two anonymous referees for their very helpful comments and suggestions.
Views and opinions expressed in the paper are the author's own and do not necessarily reflect the policies or views of the Croatian National Bank.

** Received: April 10, 2026
Accepted: July 22, 2026

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Abstract

The COVID-19 pandemic and the subsequent economic recovery had a strong impact on government debt dynamics in the EU. This paper focuses on fiscal developments in the period 2021-2023, when the economic crisis triggered by the pandemic had already passed. In particular, it aims to determine whether the rapid reduction in government debt ratios in that period was driven by member states' primary surpluses or a favourable snowball effect – the positive difference between member states' nominal growth rates and the average interest rates on their debt. The analysis clearly reveals that the snowball effect was the key factor behind the favourable trend in debt ratios. The paper also discusses the challenges and adverse shocks that the EU faced in the post-pandemic period, which put pressure on national budgets and thus contributed to the persistence of primary deficits in that period.

Keywords: pandemic, inflation, fiscal policy, government debt

1 INTRODUCTION

Fiscal policy played a key role in supporting the EU economy during the COVID-19 pandemic. When the pandemic broke out in early 2020 and the national authorities responded by introducing mobility restrictions to contain infections, some parts of the economy were effectively shut down. For that reason, the mobility restrictions were complemented by large-scale fiscal support packages, aimed at protecting businesses and households against a dramatic fall in income. A strong fiscal intervention at the national and EU levels was justified given that the outbreak of COVID-19 was a purely exogenous shock that hit entire sectors indiscriminately. The fiscal packages adopted by member states' governments included wage subsidies and tax deferrals or exemptions, which were granted to all businesses that had suffered a major drop in revenues. These measures were a lifeline for many businesses and their employees – without them, corporate bankruptcies and the unemployment rate would certainly have spiked in 2020. Monetary policy played a decisive role too, as it managed to quickly restore stability to key financial markets, including euro area government debt markets.

The heavy fiscal costs of the pandemic coupled with the severe economic contraction caused a sharp increase in government debt levels. The debt ratio for the EU as a whole rose by 12 percentage points in 2020, reaching 90% of GDP. While all member states saw their debt ratios increase, the pace at which this happened was uneven across the EU – ranging from less than 5 percentage points in Bulgaria and Sweden, to more than 20 percentage points in Greece, Spain and Italy. This unfavourable trend was reversed already in the first half of 2021. The gradual easing of the pandemic enabled national authorities to lift the containment measures, which set the stage for a swift economic rebound. Inflation spiked in both the EU and globally, given that aggregate supply could not respond sufficiently fast to satisfy the rapidly growing demand supported by massive stimulus measures. The fiscal positions of member states improved markedly in such a context. The reduction in debt ratios was particularly fast in the case of highly indebted member states – in three cases, the debt ratio fell by more than 40 percentage points in less than three years.

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This paper explores the factors behind the rapid reduction in member states' debt ratios in the period 2021-2023. By applying the standard decomposition of annual changes in the debt ratio, it is determined whether the decline in debt ratios was driven by strong primary fiscal balances or a favourable snowball effect – the positive difference between nominal GDP growth rates and the effective interest rates on debt. The analysis clearly shows that the snowball effect made a much larger contribution than the primary balances – in only one case was the decline in the debt ratio driven mainly by the accumulation of primary surpluses. This finding is consistent with the fact that the most indebted member states experienced the fastest reduction in their debt ratios after the pandemic. In addition, the analysis reveals that elevated inflation – triggered by the swift post-pandemic economic recovery and Russia's war against Ukraine – had a key role in generating the favourable snowball effect.

This paper complements the vast literature on the fiscal implications of the COVID-19 pandemic by taking a closer look at fiscal developments in the EU in the post-pandemic period. Several studies have explored the ambitious fiscal and monetary policy measures implemented at the peak of the pandemic (e.g. Chang, 2021; Cottarelli, 2021; Bökemeier and Wolski, 2022; Benigno et al., 2022; Della Posta and Morroni, 2022; Heimberger, 2023). The overall policy response to the pandemic has been assessed as timely, forceful and highly effective. Cottarelli (2021) and Heimberger (2023) have noted that the policy response was much stronger compared to previous crisis episodes, especially the euro area sovereign debt crisis. The existing papers have documented the sharp deterioration in fiscal fundamentals during the pandemic, whereby large fiscal deficits and a severe drop in nominal GDP contributed jointly to the sharp rise in debt levels. However, there seem to be no previous papers that deal systematically with fiscal developments in the EU after the pandemic. This paper aims to fill this gap. The early post-pandemic period was peculiar from a policy perspective as it was marked by strong economic and geopolitical forces with opposite effects on public finances. In particular, while the swift post-pandemic rebound and high inflation helped reduce budget deficits and debt ratios, frequent external shocks put negative pressure on budget balances.

The paper also contributes to the relatively scarce literature on the role of the snowball effect in the EU's public finances. Checherita-Westphal and Domingues Semeano (2020) found that the interest rate-growth differential had been positive – thereby producing an unfavourable snowball effect – most of the time between the early 1980s and 2019. The exception was the latest part of the period when the interest rate-growth differential turned negative due to the ECB's expansionary monetary policy. Rawdanowicz et al. (2021) came to similar conclusions after observing government debt dynamics in OECD member countries, including several EU member states, in the period 1970-2020. In addition, Rawdanowicz et al. (2021) analysed several episodes of sharp reductions in debt ratios and found that the main driver of debt reductions were primary surpluses, rather than the (favourable) snowball effect. This paper complements these works by showing how the snowball effect gained strength in the post-pandemic period and became the key driver of the rapid reduction in debt ratios. In particular, it shows how a strong

post-pandemic economic rebound coupled with high inflation on the one hand, and a relatively long average maturity of member states' government debt on the other, created an environment where the interest rate-growth differential turned deeply negative. The most indebted countries such as Greece, Spain, Italy and Cyprus experienced the fastest reductions in their debt ratios as a result.

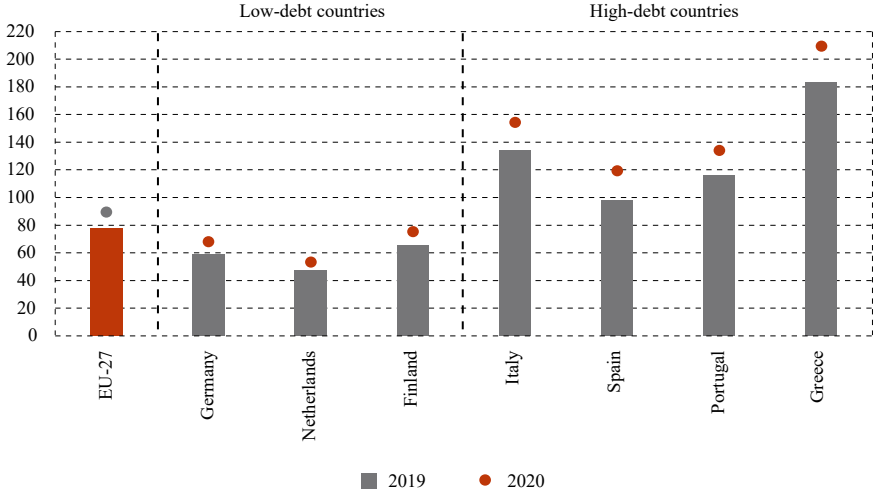
The rest of the paper is organized as follows. Chapter 2 provides a brief overview of the fiscal implications of the COVID-19 pandemic and the policy responses by individual member states and the EU collectively. Chapter 3 is the central part of the paper, which analyses the underlying drivers behind the rapid reduction in debt ratios after the pandemic, with a particular focus on the role of the snowball effect. Chapter 4 documents the fiscal policy challenges that member states encountered after the pandemic, which partly justify the persistence of primary deficits in that period. Chapter 5 presents the main conclusions of the paper.

2 THE FISCAL IMPACT OF THE PANDEMIC CRISIS IN THE EU

The COVID-19 pandemic was a perfect storm for public finances in the EU and around the world. Governments were prompted to significantly increase fiscal spending to cover pandemic-related costs at a time when fiscal revenues were falling sharply due to the lockdown-induced contraction in demand. The deterioration in fiscal indicators was further exacerbated by the steep fall in nominal GDP, which serves as the denominator when calculating the fiscal deficit and government debt ratios. Some EU member states were heavily indebted even before the outbreak of the pandemic. Market participants feared at the time that a further, pandemic-driven widening of budget deficits would make their government debt levels unsustainable, which was reflected in a sharp widening of sovereign bond yield spreads relative to Germany (Ortmans and Tripier, 2021).

FIGURE 1

Government debt of selected EU member states, 2019 and 2020 (percentage of GDP)



Source: Eurostat (2026a).

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As shown in figure 1, although government debt levels increased significantly during the pandemic across the EU, there were notable differences in debt dynamics between member states. Southern countries with initial government debt levels of 100% of GDP or higher – notably Greece, Spain, Italy and Portugal – were the ones that experienced the most rapid rise in debt in 2020. In contrast, northern countries with more moderate initial levels of debt, such as Germany, Finland and the Netherlands, saw a much milder deterioration in fiscal positions during the pandemic. The wide variation in the fiscal impact was not surprising considering the differences in the severity of economic decline across countries. There are several papers analysing the heterogeneity in the member states' growth performance during the pandemic (e.g. Muggenthaler, Schroth and Sun, 2021; Ari, Atsebi and Palacios, 2022). Most of them point to the stringency of disease prevention measures and the sectoral composition of the economy as the two most important factors explaining the differences. Specifically, the southern countries experienced a relatively stronger contraction of output because they faced a particularly serious health crisis, which in turn prompted very strict social distancing, both government-imposed and voluntary. Moreover, as the economic weight of contact-intensive services is higher in the tourism-oriented southern countries, the sudden drop in demand for such services had a stronger impact on overall output than elsewhere in the EU.

The enormous scale of the pandemic shock required a swift and coordinated EU response, given that the fiscal capacity of some member states to handle the crisis on their own was insufficient. The ECB once again played a key role in mitigating the panic. In order to prevent a self-fulfilling run on fiscally vulnerable member states and ensure a smooth transmission of its monetary policy, the ECB announced in mid-March 2020 a large-scale government bond buying scheme – the Pandemic Emergency Purchase Programme (PEPP). This not only helped dispel investors' fears about debt sustainability, but also allowed euro area governments to meet their large financing needs at a low cost throughout the pandemic. In particular, the massive purchases by the Eurosystem in the secondary market ensured a high level of liquidity for euro area government bonds, thereby boosting investor confidence and reducing yield spreads[1]. The central banks of some non-euro area member states, including Poland, Romania and Croatia, also successfully implemented bond purchases, despite having no previous experience with such programmes (Arslan, Drehmann and Hofmann, 2020; CNB, 2020).

Fiscal policy responses had an equally strong positive impact on investor confidence. This particularly concerns the adoption of the generous EU-wide recovery plan funded by common borrowing (Corradin, Grimm and Schwaab, 2021). The

[1] Initially, the Eurosystem's massive bond purchases had a positive impact on market liquidity, as other investors found it easier to sell bonds at a favourable price. However, as the purchases continued, an increasing share of total outstanding government bonds became immobilised on the Eurosystem's balance sheet, implying that fewer bonds were freely floating in the market (Carrera de Souza and Hudepohl, 2024). The scarcity of bonds created difficulties in repo markets where government bonds are the main source of collateral. The Eurosystem alleviated this problem to some extent by conducting securities lending transactions, whereby government bonds purchased under the programme were lent back to financial institutions, typically against cash collateral.

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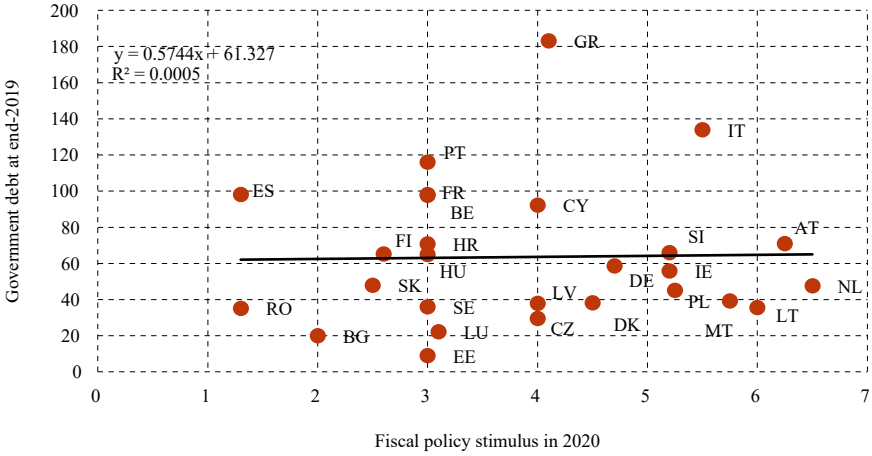
coordinated EU fiscal policy response started in March 2020 when the EU Council accepted the Commission's proposal for the activation of the general escape clause of the Stability and Growth Pact, allowing member states to temporarily deviate from fiscal rules. Then, in May 2020, the Council established the SURE facility, which helped finance member states' employment protection measures. Finally, in July 2020, the European Council established the NGEU instrument, with the Recovery and Resilience Facility at its core. The significance of the NGEU was twofold: it effectively transferred part of the fiscal costs of the pandemic from the strained national budgets to the EU level, and at the same time significantly enhanced the investment and growth potential of member states. Combined with a highly expansionary monetary policy, such a strong fiscal policy response enabled the EU economy to cope relatively well with the pandemic-induced crisis, without suffering lasting damage in terms of widespread corporate insolvencies, a loss of jobs and skills or a severe deterioration in banks' asset quality.

Despite the swift and ambitious EU response, member states' national budgets were heavily impacted by the crisis. The sharp widening of budget deficits during the pandemic was not only due to the operation of automatic stabilisers – falling tax revenues and rising unemployment benefits as economic activity declined. Discretionary fiscal easing measures played a major role too (European Commission, 2020). Specifically, shortly after the outbreak of the pandemic in March 2020, EU member states adopted ambitious fiscal stimulus packages to enable their economies to withstand a sharp contraction of activity triggered by the pandemic and the containment measures. In all member states, the stimulus packages included wage subsidies and tax and social security contributions deferrals for the affected companies. These two measures played a key role in supporting the liquidity of the corporate sector during the acute phase of the pandemic crisis, thus preventing mass bankruptcies and a surge in unemployment.

Interestingly, the size of the fiscal stimulus provided by individual member states during the pandemic crisis was not proportional to the fiscal space they had at that time. Specifically, the fiscal stimulus was large by historical standards in all member states, irrespective of their initial levels of government debt. As illustrated in figure 2, there was virtually no association between the member states' initial debt levels and the overall size of fiscal support measures adopted and implemented in the first year of the pandemic. For example, Italy and Greece adopted very large fiscal stimulus packages in early 2020, although their government debt ratios were the highest in the EU at the time, at above 130 and 180 percent of GDP, respectively. Supporting the economy with a massive counter-cyclical fiscal stimulus was justified in their case, as these two countries were about to suffer some of the worst output contractions in the EU. However, the strong fiscal expansion carried substantial risks as it implied that their already excessive government debt ratios would increase further significantly.

FIGURE 2

Fiscal policy stimulus and initial levels of government debt (percentage of GDP)*



*Note: *The fiscal policy stimulus refers to the estimated total size of pandemic-related support measures – including both revenue and expenditure side measures – adopted and implemented by national governments during 2020.*

Source: Eurostat (2026a), European Commission (2020).

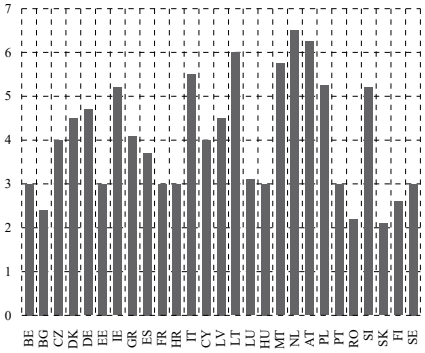
While during the pandemic crisis all EU member states relied heavily on fiscal policy measures to support their economies (figure 3a), fiscal policy had a more limited role during the previous major crisis – the global financial crisis of 2008-09 (figure 3b). In that particular episode, the overall size and even the direction of the fiscal response varied considerably across countries. In particular, only fiscally sound member states could afford to provide meaningful fiscal support to their economies. In contrast, countries that were considered fragile due to severe fiscal or external imbalances, or due to weaknesses in their banking systems, were not able to run a counter-cyclical fiscal policy. They even had to tighten fiscal policy in the midst of the recession to contain budget deficits and dispel investor concerns about the sustainability of their public finances. Despite fiscal consolidation efforts, many of them were eventually cut off from the financial markets and were forced to request emergency assistance from the IMF and the EU.[2]

[2] Between 2008 and 2013, eight EU member states requested financial assistance from the IMF and/or the EU. These were Latvia, Hungary, Romania, Greece, Ireland, Portugal, Spain and Cyprus.

FIGURE 3

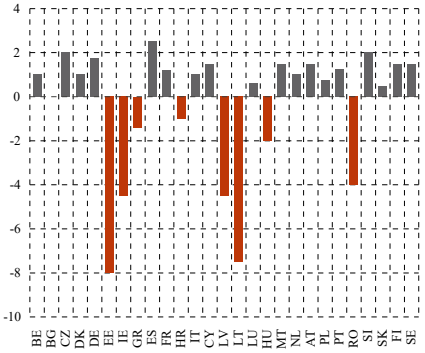
Fiscal policy stimulus by individual member states (percentage of GDP)*

a) Pandemic crisis (2020)



Source: European Commission (2020).

b) Global financial crisis (2009)



Source: European Commission (2009a) for Denmark and Italy, European Commission (2010) for Slovenia, IMF (2009a) for Greece, IMF (2009b) for Croatia, IMF (2009c) for Romania, and European Commission (2009b) for all other countries.

*Note: * The fiscal policy stimulus refers to the estimated total size of support measures – including both revenue and expenditure side measures – adopted and implemented by national governments during the respective year. If the amount of the fiscal stimulus is negative (red bar), it means that the country tightened fiscal policy during the crisis instead of providing fiscal stimulus.*

The reason why the fiscal policy response to the pandemic crisis was so strong and harmonised across the EU is related to the specific nature of that crisis. The COVID-19 pandemic was a global health emergency, which affected all member states irrespective of the state of their economies. In that regard, the pandemic crisis differed from an ordinary crisis which is typically driven by country-specific macroeconomic or financial vulnerabilities. Given that the pandemic crisis was essentially a liquidity crisis rather than a solvency crisis, there was a strong case for a coordinated EU policy response to cushion its impact. The decision by the ECB to launch the government bond purchase programme and the EU Council's decision to establish the NGEU were therefore justified. As mentioned above, these EU-wide policy interventions were crucial in reassuring investors and providing breathing space for the fiscally vulnerable member states, enabling them to carry out their own fiscal support packages. This largely explains why the relationship between the size of national fiscal support measures implemented in 2020 and initial levels of government debt was so weak (figure 2).

The case for a coordinated EU policy response is less clear if country-specific factors are at the root of the crisis. If individual member states are being penalised by financial markets for their excessive fiscal or financial imbalances, such a crisis should not be addressed by a common response such as a massive monetary expansion or EU-wide fiscal stimulus measures. Solvency issues of individual member states should be tackled primarily with tailor-made macroeconomic

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adjustment programmes. The turmoil that the EU experienced after the outbreak of the 2008-09 global financial crisis is a notable example of such a crisis. Given that there was no major EU-wide fiscal policy response, the capacity of the vulnerable member states to provide fiscal support to their economies was severely constrained (figure 3b).

In conclusion, the outbreak of the pandemic was a major adverse shock for the EU that triggered an unprecedented economic policy response. Fiscal policy played a key role, alongside monetary policy, in shielding the economy and the financial system from liquidity disruptions brought about by the pandemic and the containment measures. Some member states implemented fiscal support packages far exceeding their objective fiscal capacities. This was made possible by the decisive measures taken by the ECB and the EU Council, which boosted investor confidence and thereby provided breathing space to national governments.

3 DRIVERS OF THE REDUCTION IN DEBT RATIOS AFTER THE PANDEMIC

The pandemic crisis was severe, but short-lived, and the economic recovery that followed was swift and robust. The recovery started in the third quarter of 2020, as soon as the gradual easing of the pandemic allowed the authorities to start lifting the containment measures. Given the short duration of the crisis and the ambitious monetary and fiscal policy response, the pandemic did not inflict permanent damage on the EU economy and the financial system. Although the economy shrank by 13% in real terms in the first half of 2020, it exceeded its pre-crisis level already in the third quarter of 2021. Moreover, thanks to generous wage subsidies, the labour market was largely intact – the average unemployment rate rose by only 0.4 percentage points, from 6.8% in 2019 to 7.2% in 2020. By 2022, it had fallen to a historical low of 6.2%.

The EU's recovery from the pandemic crisis was unusually strong from a historical perspective, particularly when compared to the slow and fragile recovery following the global financial crisis of 2008-09 and the euro area debt crisis of 2011-13. It took the EU economy almost seven years, until late 2014, to reach the pre-crisis level of output[3]. As noted above, that crisis was much more harmful for the EU because it triggered an abrupt unwinding of macroeconomic and financial imbalances that individual member states had accumulated up to that point (Lane, 2012; Gros, 2012).

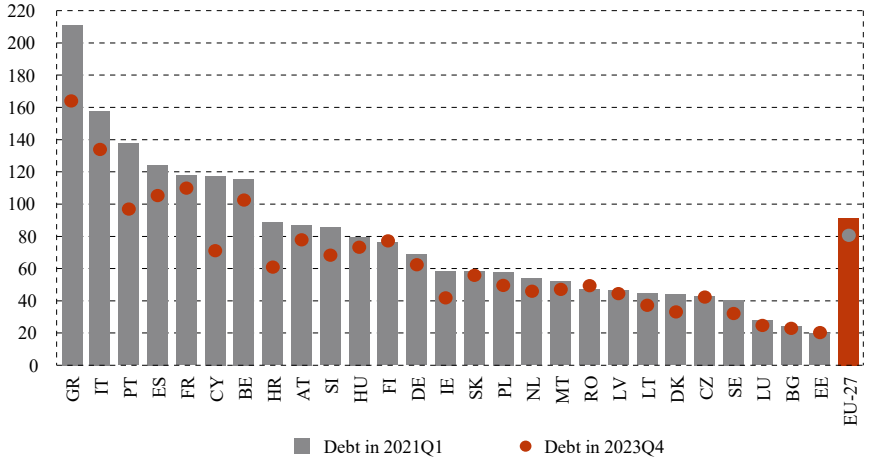
The robust recovery after the pandemic crisis enabled EU member states to repair their weakened fiscal positions relatively quickly. In particular, government debt ratios, which rose sharply in 2020 due to the recession and the high fiscal costs of the pandemic, started a steady decline the following year. The government debt ratio for the EU as a whole, after peaking at 91.5% of GDP in the first quarter of

[3] The highest pre-crisis level of quarterly real GDP was registered in the first quarter of 2008. This level of output was exceeded only in the fourth quarter of 2014, almost seven years later.

2021, declined steadily to 80.5% of GDP by the end of 2023. As shown in figure 4, almost all member states saw their government debt ratios improve in this period. Interestingly, the decline in the debt ratio was relatively more pronounced in countries with high initial levels of debt, namely Greece, Portugal, Cyprus, Italy and Spain. Indeed, as illustrated in figure 5, there was a strong statistical relationship between the level of government debt of member states in early 2021, and the cumulative decline in debt they experienced by the end of 2023.

FIGURE 4

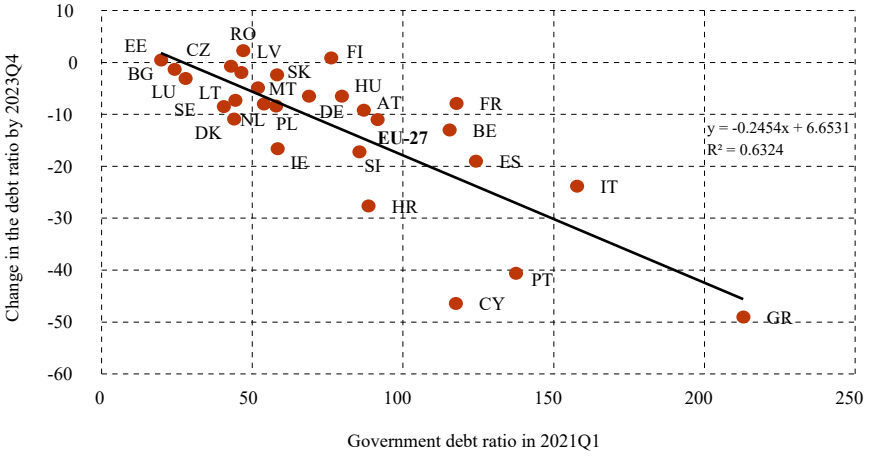
Government debt ratios: 2021Q1 vs. 2023Q4 (percentage of GDP)



Source: Eurostat (2026a).

FIGURE 5

Initial level of government debt and the cumulative decline in debt by 2023Q4 (percentage of GDP)



Source: Eurostat (2026a), author's calculations.

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The pace at which government debt ratios of high-debt member states declined after the pandemic was unusually strong. In less than three years, between March 2021 and December 2023, the debt ratios of Greece, Portugal and Cyprus fell by 40-50 percentage points, and those of Spain and Italy by around 20-25 percentage points of GDP (figure 5). In contrast, the reduction in debt ratios was much more gradual during the recovery after the sovereign debt crisis (European Commission, 2018). More specifically, the cumulative reduction in the debt ratios of Greece, Spain, Italy and Portugal in the three-year period 2015-2017 was only 3% on average, compared to 29% in the period 2021-2023 (Eurostat, 2026a). It is therefore worth considering what specific factors were at play after the pandemic that enabled EU member states to reduce their elevated debt ratios so rapidly.

To investigate this, we need to decompose the annual changes in the government debt-to-GDP ratios into its underlying drivers. What follows is a derivation of the debt accumulation equation that will serve this purpose. The starting point is the identity that relates nominal government debt in the current year with nominal government debt in the previous year augmented by interest paid, and the primary government balance in the current year:

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

where D_t is nominal government debt at the end of year t, D_{t-1} is nominal government debt at the end of year $t-1$, i_t is the average weighted interest rate on government debt in year t, and PB_t is the primary government balance in year t. There are other factors that can also influence annual debt dynamics, such as acquisitions or sales of financial assets, but we are going to disregard them for this purpose.

To express identity (1) in terms of GDP, both sides of the equation have to be divided by Y_t:

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

$$d_t = D_{t-1}(1+i_t)/Y_t - pb_t \tag{3}$$

where d_t is the government debt-to-GDP ratio in year t, and pb_t is the primary balance-to-GDP ratio in the same year. In order to have D_{t-1} also expressed in terms of GDP, we make use of the following identity:

$$Y_t = Y_{t-1}(1+g_t)(1+\pi_t) \tag{4}$$

where g_t is the real GDP growth rate, and π_t is the inflation rate.

After substituting Y_t with $Y_{t-1}(1+g_t)(1+\pi_t)$, we get:

$$d_t = D_{t-1}(1+i_t)/[Y_{t-1}(1+g_t)(1+\pi_t)] - pb_t \tag{5}$$

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Finally, since $D_{t-1}/Y_{t-1} = d_{t-1}$, we arrive at the final equation:

$$d_t = d_{t-1}(1+i_t)/[(1+g_t)(1+\pi_t)] - pb_t \quad (6)$$

The debt accumulation equation derived above reveals that there are essentially two possible drivers of annual changes in the government debt ratio. The first driver is the ratio between the nominal interest rate on debt (represented by $(1+i_t)$) and the nominal GDP growth rate (represented by $(1+g_t)(1+\pi_t)$), also known as the snowball effect. The second driver is the primary fiscal balance (pb_t). The impact of these two drivers on the debt ratio is straightforward: the higher the nominal GDP growth rate relative to the interest rate on government debt, and the higher the primary balance, the lower the government debt-to-GDP ratio will be. Conversely, the higher the interest rate on debt relative to the nominal GDP growth rate, and the lower the primary balance, the higher the government debt ratio will be.

3.1 THE SNOWBALL EFFECT

Figure 6 shows the decomposition of the cumulative change in government debt ratios in the period 2021-2023. This allows us to determine which of the two drivers – the snowball effect or the primary balance – played a more prominent role in the post-pandemic period. The figure clearly illustrates that the favourable snowball effect was the key driver of the fast reduction in debt ratios, especially in member states with elevated debt levels such as Greece, Cyprus, Portugal and Italy. Owing to the large positive difference between the nominal GDP growth rate and the average interest rate on their outstanding government debt, highly indebted countries were able to "grow out of their debt". More precisely, their government debt-to-GDP ratios declined simply because the denominator in the debt ratio – nominal GDP – expanded rapidly. The snowball effect had a favourable impact on the debt ratios of other member states as well, although this impact was generally weaker than in the case of highly indebted countries (figure 7). Among member states with a debt ratio below 90% of GDP, the snowball effect was particularly pronounced in the case of Croatia, given that it experienced the largest increase in nominal GDP in the entire EU.

The fact that highly indebted member states experienced a relatively stronger favourable snowball effect in the post-pandemic period than those with lower debt reflects the key feature of the snowball effect – it gains momentum as the debt ratio rises. Specifically, the difference between the nominal GDP growth rate and the interest rate on government debt produces larger absolute changes in the debt ratio when the initial debt ratio is high than when it is relatively low. In good times, when the growth-interest differential is positive, the (favourable) snowball effect enables highly indebted countries to reduce their debt ratios more rapidly. However, in bad times, when borrowing costs exceed the nominal GDP growth rate, the (unfavourable) snowball effect has an adverse impact on high-debt countries by further accelerating the rise in their debt ratios.

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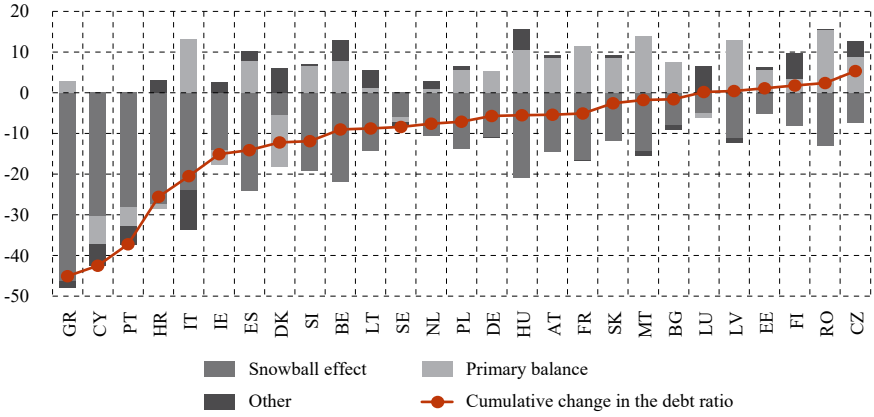
FIGURE 6

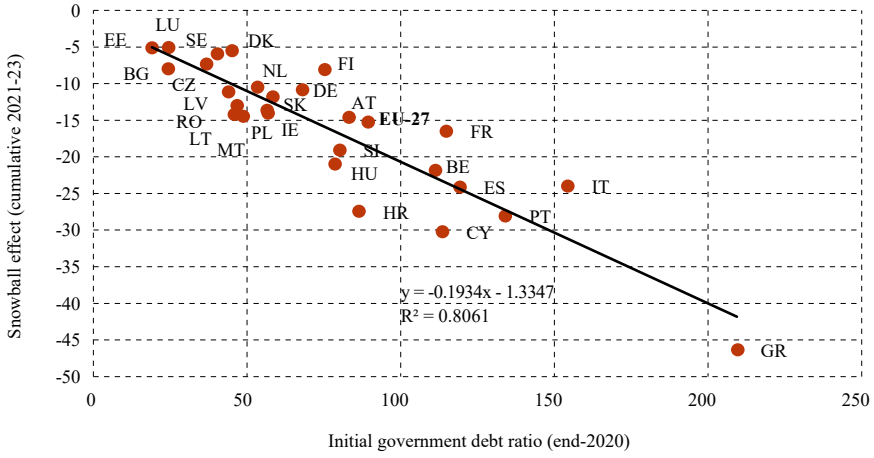
Decomposition of the cumulative change in government debt ratios in the period 2021-2023 (percentage points of GDP)



Source: Eurostat (2026a), author's calculations.

FIGURE 7

Initial levels of government debt and the favourable snowball effect in the period 2021-2023



Source: Eurostat (2026a), author's calculations.

As noted above, the period 2021-2023 was favourable for the public finances of EU member states, particularly for those that were heavily indebted. As an illustration, consider the case of Greece more closely. At the end of 2020, its government debt stood at 210% of GDP. The following year, Greece's nominal GDP expanded by about 10%, while the average interest rate on its debt remained low, at 1.3%. Due to the large positive growth-interest differential and the high initial level of debt, in 2021 alone the snowball effect produced a decline in the government debt ratio of 17 percentage points of GDP. If Greek debt at the end of 2020

had been 105% instead of 210% of GDP – the same growth-interest differential would have produced a snowball effect only half as large – 8.5 percentage points of GDP.

FIGURE 8

EU-27: Decomposition of the change in the government debt ratio (percentage points of GDP)

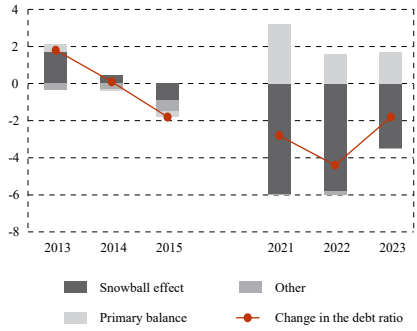
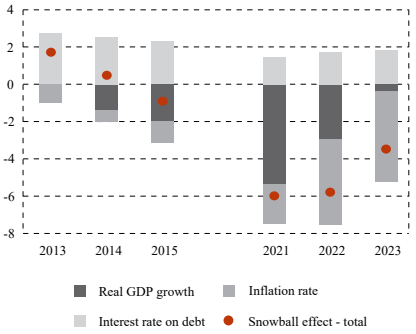


FIGURE 9

EU-27: Decomposition of the snowball effect (percentage points of GDP)



Source: Eurostat (2026a), author's calculations.

The snowball effect was not so supportive a decade earlier, when the EU was recovering from the sovereign debt crisis. Figure 8 compares the impact of the snowball effect on the debt ratio for the EU as a whole in the period 2013-2015 with its impact in the period 2021-2023. The difference between the two periods is evident. To illustrate what caused this large difference, figure 9 presents a decomposition of the snowball effect into its main drivers – real GDP growth, the inflation rate and the interest rate on debt. A couple of conclusions can be derived from these two figures.

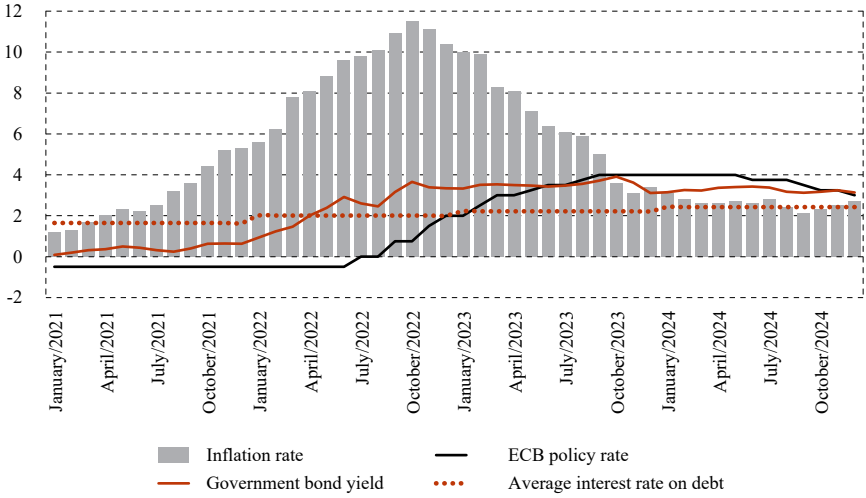
First, during the period 2013-2015, the combination of low growth and subdued inflation on the one side and moderate borrowing costs on the other created an unfavourable snowball effect, except in 2015 when it was mildly favourable. In such a setting, government debt ratios would have increased mechanically even if the primary fiscal balance had been zero. Therefore, accumulating primary surpluses was the only way national governments could bring down their debt ratios, but this was hard to achieve given the fragile economic conditions in that period. Second, in the period 2021-2023, the snowball effect had a favourable impact on debt ratios and this impact was very strong due to the robust post-pandemic economic growth, elevated inflation and relatively low borrowing costs. This enabled member states to achieve a significant reduction in their debt ratios despite running primary deficits.

Third, given that inflation supported the favourable snowball effect, particularly in 2022 and 2023, it is safe to say that a part of member states' government debt ratios was inflated away. Specifically, when inflation unexpectedly soared, this

was not followed by an equally sharp increase in member states' borrowing costs – government bond yields did rise, but much less than the inflation rate. There were two reasons for that. One reason was the stability of market participants' inflation expectations. Despite the sharp post-pandemic increase in the inflation rate, longer-term inflation expectations remained well anchored at the ECB's 2% target (ECB, 2024). Hence, while yields in government bond markets went up in 2022-2023 in response to the (expected) monetary policy tightening and higher uncertainty, they increased much less than the inflation rate (figure 10). The second reason was the relatively long average maturity of member states' government debt. Since only a fraction of the overall debt had to be refinanced in the high-inflation environment when yields in the bond market were higher, the pass-through of higher yields to the average cost of government debt was slow. In sum, as member states' average borrowing costs increased much less than the inflation rate, there is no doubt that high inflation contributed significantly to the favourable nominal growth-interest rate differential that brought down their debt ratios.

FIGURE 10

EU-27: Inflation rate, 10y bond yields and the ECB's policy rate (in percent)



Source: ECB (2026), Eurostat (2026b, 2026c, 2026d), author's calculations.

3.2 THE PRIMARY BALANCES

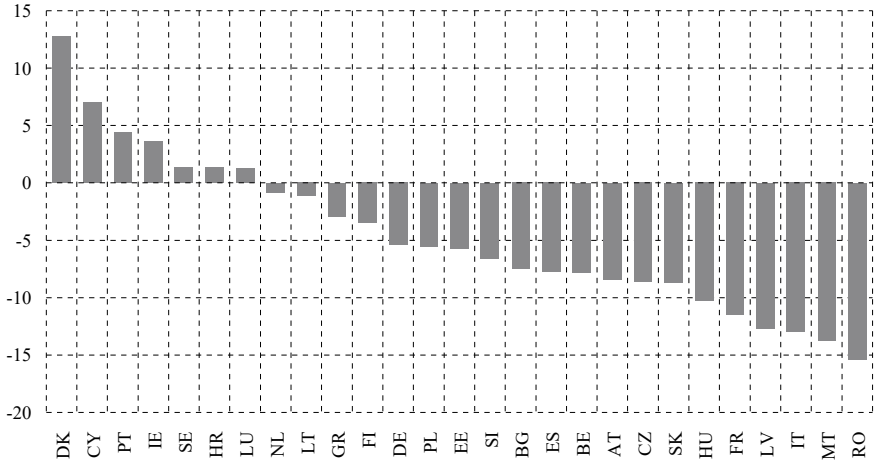
As explained above, the primary fiscal balance is the second driver determining the year-to-year changes in the government debt ratio. While the snowball effect put downward pressure on member states' debt ratios in the period 2021-2023, the primary balance in most cases had the opposite effect (figure 6). Specifically, only seven out of 27 member states recorded a positive primary balance, in cumulative terms, in the three-year period under review (figure 11). Denmark stood out in that regard with a particularly healthy fiscal balance. It was the only country where the decline in the debt-to-GDP ratio in the 2021-2023 period was driven mainly by primary surpluses, rather than the snowball effect. Among the countries which

recorded primary surpluses were also some highly indebted ones, namely Portugal and Cyprus.

In all other member states, the cumulative primary balance was negative, which means that it put upward pressure on the debt ratio. In several cases, the primary deficits were large enough to fully offset the favourable impact of the snowball effect, causing the government debt ratio to increase regardless of the positive growth-interest differential. Romania had the weakest fiscal performance among EU member states – its cumulative primary deficit in the period 2021-2023 amounted to more than 15% of GDP.

FIGURE 11

Primary fiscal balance, cumulative for 2021-2023 (percentage of GDP)



Source: Eurostat (2026a), author's calculations.

In sum, the analysis has shown that the rapid reduction in member states' government debt ratios after the pandemic was almost exclusively the result of the favourable snowball effect. Given that the vast majority of member states was accumulating primary deficits in this period, one could at first argue that fiscal policy did nothing to bring down government debt ratios. However, such a claim would not be entirely correct. Fiscal policy did help reduce debt ratios, but indirectly, by supporting domestic demand – and thus nominal GDP growth – during a challenging period marked by frequent adverse shocks. The next section touches upon these adverse shocks, as well as other challenges that partly explain the persistence of primary deficits in the post-pandemic period.

4 CHALLENGES FOR FISCAL POLICY IN THE POST-PANDEMIC PERIOD

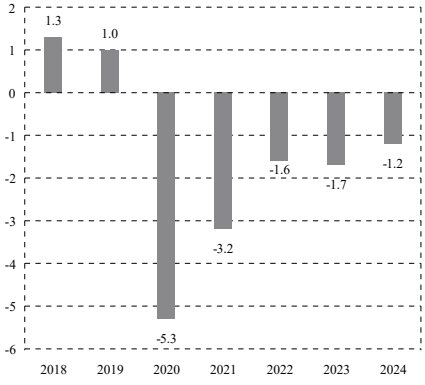
The fact that most member states ran primary deficits was a reflection of the delicate socio-economic and geopolitical environment that prevailed in the aftermath of the pandemic. At that time, there were three factors putting pressure on member states' national budgets. The first was the need to facilitate economic recovery after the

pandemic crisis. As mentioned earlier, the fiscal response to the pandemic was very ambitious, both the responses by individual member states and the collective response by the EU. The discretionary support measures introduced by member states in early 2020 remained sizeable throughout 2021, after which they were gradually phased out.

However, as soon as the pandemic-related fiscal spending slowed, the EU was confronted with another adverse shock – the sudden surge in inflation triggered by the energy price shock (European Commission, 2023a). This prompted member states to intervene with fiscal policy measures once again, this time to contain energy price increases and mitigate the adverse impact of inflation on households and businesses. Initially, the impact of inflation on the budget balances was positive, given that member states' fiscal revenues rose as soon as inflation soared, while it took some time for expenditures to catch up (European Commission, 2023b). Due to the gradual withdrawal of the pandemic-related measures and the positive initial impact of inflation on the budget, the primary balance for the EU as a whole improved in 2022 relative to the previous year (figure 12). However, in 2023, the primary balance deteriorated again slightly, as spending on pensions and public sector wages accelerated to compensate households for the loss of purchasing power caused by inflation. Figure 13 confirms that social benefits – which include pensions – and compensation of employees contributed significantly to the increase in government expenditures in 2023 and 2024. An analysis published by the ECB found that the high inflation episode had, in general, a negative impact on member states' budget balances, although it supported the reduction in the government debt ratio through the denominator effect (Bańkowski et al., 2023).

Figure 12

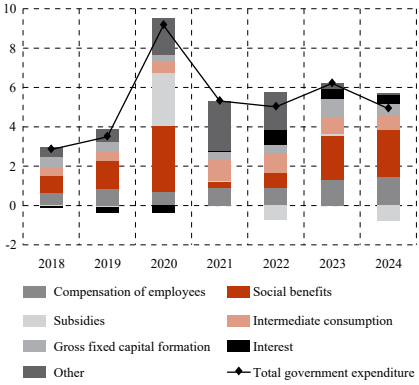
EU-27: Primary fiscal balance (percentage of GDP)



Source: Eurostat (2026a), author's calculations.

Figure 13

EU-27: Contributions to government expenditure growth (percentage points)



Source: Eurostat (2026b), author's calculations.

The sudden surge in inflation occurred in the context of a sharp increase in geopolitical risk, which in itself had budgetary implications. Specifically, Russia's unprovoked aggression against Ukraine in early 2022 highlighted two major sources of vulnerability for the EU – its excessive reliance on Russian energy supplies and

insufficient defence capabilities. The EU responded swiftly to enhance its energy security in such an environment. In May 2022, the European Commission proposed the RePowerEU plan – a strategic plan to reduce fossil fuel consumption, diversify away from Russia towards more reliable energy suppliers and expand its own capacities for renewable energy production (European Commission, 2022). Given that these efforts were aligned with the EU's green transition objective, funding for the RePowerEU Plan was secured under the existing Recovery and Resilience Facility, with additional support from EU cohesion policy funds (Schramm and Terranova, 2024). Hence, the steps to reduce dependence on Russian energy have had a limited impact on national budgets. More costly for member states' public finances have been efforts to enhance defence capabilities. Since the start of the war, most member states have markedly increased spending on defence, bringing total defence spending of the EU closer to the previous NATO target of 2% of GDP (figure 14). This trend has been particularly pronounced in countries in the geographical proximity to Russia and Ukraine, such as Poland and the Baltic States, where annual defence expenditures exceeded 3% of GDP by 2024 (figure 15). The EU is expected to continue raising spending on defence in the following decade, as member states make efforts to meet the new NATO target of 5% of GDP by 2035.[4]

FIGURE 14

EU-27: Total defence expenditure (EUR bn; percentage of GDP)

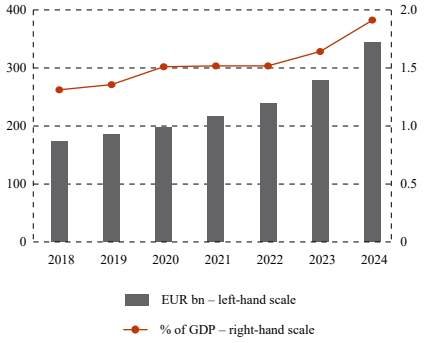
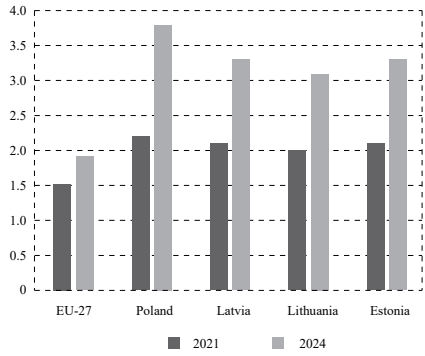


FIGURE 15

Total defence expenditure, EU-27 and selected countries (percentage of GDP)



Source: European Defence Agency (2026).

Taken together, these adverse factors put significant pressure on member states' public finances, given that a proactive use of fiscal policy was necessary to cushion the impact of the shocks. In such a delicate environment, it was objectively hard for member states to accumulate primary surpluses needed to bring down excessive debt ratios. Nevertheless, as explained earlier, member states managed to achieve a notable reduction in debt ratios thanks to resilient growth, high inflation and a relatively low average cost of borrowing.

[4] The new target was set at the NATO summit in Hague in June 2025. Member countries committed to raise core defence spending to at least 3.5% of GDP a year, as well as to allocate an additional 1.5% of GDP a year to defence-related activities, such as protecting critical infrastructure, improving civil preparedness and resilience and promoting innovation (NATO, 2025).

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5 CONCLUSION

The outbreak of the pandemic in early 2020 marked the beginning of a very turbulent period for the EU. Several external shocks hit the EU one after another, generating large swings in economic growth and inflation rates. The large swings in growth and inflation rates were clearly mirrored in member states' government debt ratios. The pandemic crisis caused government debt ratios to soar, due to high budgetary costs of the pandemic and a sharp contraction in nominal GDP. In contrast, when the health situation improved and a robust economic recovery followed, accompanied by rising inflation, the fiscal positions of member states improved markedly. In particular, government debt ratios declined substantially, especially the debt ratios of highly indebted countries such as Greece, Portugal and Italy.

The analysis presented in this paper shows that the rapid reduction in debt ratios after the pandemic was almost exclusively the result of the favourable snowball effect – the large positive difference between member states' nominal GDP growth rates and the average interest rates on their debt. More specifically, the strong post-pandemic economic recovery coupled with high inflation rates generated unusually high nominal growth rates, above 8% on average for the EU as a whole in the period 2021-2023. Meanwhile, average interest rates on member states' outstanding debt rose much less, due to the long average maturity of debt and the fact that market yields did not increase as much as the inflation rate, owing to stable longer-term inflation expectations. In such a context, the nominal growth-interest differentials widened significantly, causing the government debt-to-GDP ratios to fall at a record pace.

The primary fiscal balances did not contribute much to the reduction in debt ratios. Only seven member states achieved a cumulative primary surplus in the 2021-2023 period. The remaining 20 member states recorded primary deficits, which were in some cases so large that they fully offset the positive impact of the snowball effect. The persistence of primary deficits after the pandemic can, however, be partly justified by the need to mitigate the adverse impact of the cost-of-living crisis and to boost defence spending after Russia's unprovoked aggression against Ukraine. Although the primary fiscal balances were negative in most countries, it would not be entirely correct to claim that the reduction in debt ratios was purely a result of luck, and that it was unrelated to fiscal policy. In fact, fiscal policy did contribute to such favourable trends, but indirectly, by supporting domestic demand – and thus nominal GDP growth – during the period marked by frequent adverse shocks.

Disclosure statement

The author has no conflicts of interest to declare.

Declaration of generative AI and AI-assisted technologies in the writing process

No generative AI or AI-assisted tools were used in the preparation of this manuscript.

REFERENCES

1. Ari, A., Atsebi, J. M. B. and Palacios, M. D., 2022. Output Losses in Europe During COVID-19: What Role for Policies? *IMF Working Paper*, No. 22/130.
2. Arslan, Y., Drehmann, M. and Hofmann, B., 2020. Central Bank Bond Purchases in Emerging Market Economies. *BIS Bulletin*, No. 20.
3. Bańkowski, K. [et al.], 2023. The Effects of High Inflation on Public Finances in the Euro Area. *ECB Occassional Paper*, No. 332.
4. Benigno, P. [et al.], 2022. The European Monetary Policy Responses During the Pandemic Crisis. *Open Economies Review*, 33(4), pp. 657-675. https://doi.org/10.1007/s11079-022-09665-7
5. Bökemeier, B. and Wolski, M., 2022. This Time Is Different: Fiscal Response to the COVID-19 Pandemic Among EU Countries. *International Economics*, 172, pp. 217-226. https://doi.org/10.1016/j.inteco.2022.10.001
6. Carrera de Souza, T. and Hudepohl, T., 2024. Frictions in Scaling Up Central Bank Balance Sheet Policies: How Eurosystem Asset Purchases Impact the Repo Market. *Journal of Banking & Finance*, 158, 107037.
7. Chang, M., 2021. *Euro Area Fiscal Policies and Capacity in Post-Pandemic Times*. Paper prepared for the European Parliament Committee on Economic and Monetary Affairs. https://doi.org/10.2861/063465
8. Checherita-Westphal, C. and Domingues Semeano, J., 2020. Interest Rate-Growth Differentials on Government Debt: An Empirical Investigation for the Euro Area. *ECB Working Paper*, No. 2486.
9. CNB, 2020. *Macroeconomic Developments and Outlook*, No. 8. Zagreb: Croatian National Bank.
10. Corradin, S., Grimm, N. and Schwaab, B., 2021. Euro Area Sovereign Bond Risk Premia During the Covid-19 Pandemic. *ECB Working Paper*, No. 2561.
11. Cottarelli, C., 2021. *Euro Area Fiscal Policies and Capacity in Post-Pandemic Times*. Brussels: European Parliament.
12. Della Posta, P. and Morroni, M., 2022. The Credibility of Monetary Policy and the Fiscal Response to the Pandemic in the Eurozone. *Evolutionary and Institutional Economics Review*, 19, pp. 77-96. https://doi.org/10.1007/s40844-021-00226-0
13. ECB, 2024. *Annual Report 2023*. Frankfurt am Main: European Central Bank.
14. ECB, 2026. *Data Portal. ECB/Eurosystem policy and exchange rates*. Frankfurt am Main: European Central Bank.
15. European Commission, 2009a. *Public Finances in EMU 2009*. Brussels: European Commission.
16. European Commission, 2009b. *European Economic Forecast – Autumn 2009*. Brussels: European Commission.
17. European Commission, 2010. *European Economic Forecast – Spring 2010*. Brussels: European Commission.
18. European Commission, 2018. *Report on Public Finances in EMU 2017*. Brussels: European Commission.

19. European Commission, 2020. *European Economic Forecast – Autumn 2020*. Brussels: European Commission.
20. European Commission, 2022. REPowerEU: A plan to rapidly reduce dependence on Russian fossil fuels and fast forward the green transition. *Press release*, 18 May.
21. European Commission, 2023a. *Debt Sustainability Monitor 2022*. Brussels: European Commission.
22. European Commission, 2023b. *European Economic Forecast – Spring 2023*. Brussels: European Commission.
23. European Commission, 2024. *Report on Public Finances in EMU 2023*. Brussels: European Commission.
24. European Defence Agency, 2026. *EDA Defence Data*. Brussels: European Defence Agency.
25. Eurostat, 2026a. Government Finance Statistics (EDP and ESA 2010). *Government Deficit and Debt*. Brussels: Eurostat.
26. Eurostat, 2026b. Government finance statistics (EDP and ESA 2010). *Annual government finance statistics*. Brussels: Eurostat.
27. Eurostat, 2026c. Interest rates. *Maastricht criterion interest rates*. Brussels: Eurostat.
28. Eurostat, 2026d. Prices. *Harmonized index of consumer prices (HICP)*. Brussels: Eurostat.
29. Gros, D., 2012. Macroeconomic Imbalances in the Euro Area: Symptom or Cause of the Crisis. *CEPS Policy Brief*, No. 266.
30. Heimberger, P., 2023. This Time Truly Is Different: The Cyclical Behaviour of Fiscal Policy During the Covid-19 Crisis. *Journal of Macroeconomics*, 76, 103522. https://doi.org/10.1016/j.jmacro.2023.103522
31. IMF, 2009a. Greece: 2009 Article IV Consultation – Staff Report. *IMF Country Report*, No. 09/244.
32. IMF, 2009b. Republic of Croatia: 2009 Article IV Consultation – Staff Report. *IMF Country Report*, No. 09/185.
33. IMF, 2009c. Romania: Request for Stand-By Arrangement – Staff Report. *IMF Country Report*, No. 09/183.
34. Lane, P. R., 2012. The European Sovereign Debt Crisis. *Journal of Economic Perspectives*, 26(3), pp. 49-68.
35. Muggenthaler, P., Schroth, J. and Sun, Y., 2021. The Heterogeneous Economic Impact of the Pandemic Across Euro Area Countries. *ECB Economic Bulletin*, No. 5/2021.
36. NATO, 2025. *The Hague Summit Declaration*. Brussels: North Atlantic Treaty Organization.
37. Ortmans, A. and Tripier, F., 2021. COVID-induced Sovereign Risk in the Euro Area: When Did the ECB Stop the Spread? *European Economic Review*, 137, 103809. https://doi.org/10.1016/j.euroecorev.2021.103809

38. Rawdanowicz, L., Turban, S., Haas, J., Crowe, D. and Millot, V., 2021. Constraints and Demands on Public Finances: Considerations of Resilient Fiscal Policy. *OECD Economics Department Working Papers*, No. 1694.
39. Schramm, L. and Terranova, C., 2024. From NGEU to REPowerEU: Policy Steering and Budgetary Innovation in the EU. *Journal of European Integration*, 46(6), pp. 943-961. https://doi.org/10.1080/07036337.2024.2353791