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Discussion Paper Series

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Monetary and fiscal policy interactions: risks to price stability in times of high government debt

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Discussion papers

Discussion papers are research-based papers on policy relevant topics, offering a broader and more balanced perspective. While being partly based on original research, they place the analysis in the wider context of the literature on the topic. They also consider explicitly the policy perspective, with a view to develop a number of key policy messages. Their format offers the advantage that alternative analyses and perspectives can be combined, including theoretical and empirical work. The selection and distribution of discussion papers are subject to the approval of the Director General of the Directorate General Research.

Abstract

The change in macroeconomic conditions since the ECB's strategy review in 2021 towards an environment characterised by above-target inflation, high interest rates, and renewed concerns about elevated government debt has been a vocal reminder of the intricate interdependencies between monetary and fiscal policies. Against this background, our paper reviews the literature on how central banks' ability to maintain price stability is shaped by their interactions with fiscal policy and the state of the economy. According to standard models, a policy framework aimed at price stability requires suitable commitments from both monetary and fiscal authorities. When public debt burdens become too high, price stability may be at risk. The paper also draws lessons on how to mitigate such risks.

Non-technical summary

Since the 2021 ECB strategy review and after a long period of low inflation and low policy rates, inflation in the euro area – along with other advanced economies – picked up rapidly. Central banks around the world responded to the persistent surge in inflation with a series of large policy rate increases and started to phase out their asset purchase programmes. The rise in interest rates has partly reversed the secular decline from previous decades. Euro area economies also faced two large contractionary shocks, the Covid-19 pandemic and, shortly thereafter, the energy shock triggered by Russia's invasion of Ukraine, which exacerbated the rise in inflation. Fiscal authorities in the euro area and other advanced economies responded with a series of fiscal support measures that contributed to further increases in public debt-to-GDP ratios.

The prospect of higher interest rates for longer, coupled with the fiscal cost of the support measures, in turn, led to renewed concerns about the elevated government debt. In light of these events, fiscal authorities have been under pressure to gradually lower debt ratios to more sustainable levels. On the other hand, there are heightened demands on fiscal policy, such as those related to ageing, health care, climate change and transition to a green economy, defence, et cetera. These demands are likely to make fiscal tightening complicated from a political point of view and could raise concerns about fiscal fatigue and fiscal limits. Some expect that the currently very high public debt levels in some advanced economies are not going to decline significantly for the foreseeable future, despite posing economic, financial and political problems. At the same time, a revised fiscal framework, having at its core a debt sustainability analysis has recently been approved in the European Union. While entailing consolidation requirements for most countries, including the highly indebted euro area economies, its actual implementation and effectiveness remains to be tested.

In the euro area, the tightening of the common monetary policy in the presence of large heterogeneity in national fiscal positions has initially posed challenges to monetary policy. This led the ECB Governing Council to announce in July 2022 the Transmission Protection Instrument (TPI). Under the TPI, the Eurosystem can make secondary market purchases of securities issued in jurisdictions experiencing a deterioration in financing conditions not warranted by country-specific fundamentals, provided that said jurisdictions satisfy the eligibility criteria. Upon announcement of the TPI, the Governing Council also announced that the flexible reinvestment policy under the Pandemic Emergency Purchase Programme, initiated in March 2020, would continue, being a first line of defence to counter risks to the transmission mechanism related to the pandemic.

Against this background, our paper reviews the theoretical and empirical literature on the complex interlinkages between monetary and fiscal policy in a monetary union, with a focus on the potential risks to price stability in times of high government debt. In a monetary union, price stability requires suitable commitments from the common central bank and from all national fiscal authorities. Sustainable public finances are a key element of the fiscal policy commitment. A sustainability-oriented fiscal policy eventually raises primary balances when monetary policy tightens, and vice versa, thereby providing the fiscal backing for monetary policy. In the euro area, elevated public debt ratios in a subset of member countries coupled with the prospect of heightened demands on public expenditures and a persistently higher interest rate-growth rate differential could lead to an environment where some national fiscal authorities find themselves unable or unwilling to generate sufficiently large primary balances, which, in turn, may pose a threat to price stability. Fiscal risks to price stability are, however, not necessarily orthogonal to monetary policy, for central banks' policies affect fiscal policymakers' incentives to abide by their commitments. The changed environment since 2021 suggests that central banks may want to pay particular attention to potential unintended side effects on fiscal policymakers' incentives when weighing the benefits and potential costs of their monetary policy measures.

1. Introduction

Since the 2021 ECB strategy review and after a long period of low inflation and low policy rates, inflation in the euro area – along with other advanced economies – picked up rapidly. Central banks around the world responded to the persistent surge in inflation with a series of large policy rate increases and started to phase out their asset purchase programmes. The rise in interest rates has partly reversed the secular decline from previous decades (Schnabel, 2024a). Euro area economies also faced two large contractionary shocks, the Covid-19 pandemic and, shortly thereafter, the energy shock triggered by Russia's invasion of Ukraine, which exacerbated the rise in inflation. Fiscal authorities in the euro area and other advanced economies responded with a series of fiscal support measures that contributed to further increases in public debt-to-GDP ratios.

The prospect of higher interest rates for longer, coupled with the fiscal cost of the support measures, in turn, led to renewed concerns about the elevated government debt. In light of these events, fiscal authorities have been under pressure to gradually lower debt ratios to more sustainable levels (Adrian, Gaspar and Gourinchas, 2024). On the other hand, there are heightened demands on fiscal policy, such as those related to ageing, health care, climate change and transition to a green economy, defence, etc. (Draghi, 2024). These demands are likely to make fiscal tightening complicated from a political point of view and could raise concerns about fiscal fatigue and fiscal limits. Some expect that the currently very high public debt levels in some advanced economies are not going to decline significantly for the foreseeable future, despite posing economic, financial and political problems (Arslanalp and Eichengreen, 2023). At the same time, a revised fiscal framework, having at its core a debt sustainability analysis has recently been approved in the European Union (see Haratounian et al. 2024 for a review). While entailing consolidation requirements for most countries, including the highly indebted euro area economies, its actual implementation and effectiveness remains to be tested.

In the euro area, the tightening of the common monetary policy in the presence of large heterogeneity in national fiscal positions has initially posed challenges to monetary policy. This led the ECB Governing Council to announce in July 2022 the Transmission Protection Instrument (TPI).[1] Under the TPI, the Eurosystem can make secondary market purchases of securities issued in jurisdictions experiencing a deterioration in financing conditions not warranted by country-specific fundamentals, provided that said jurisdictions satisfy the eligibility criteria. Upon announcement of the TPI, the Governing Council also announced that the flexible reinvestment policy under the Pandemic Emergency Purchase Programme (PEPP), initiated in March 2020, would continue, being a first line of defence to counter risks to the transmission mechanism related to the pandemic.

Against this background, our paper reviews the theoretical and empirical literature on the complex interlinkages between monetary and fiscal policy in a monetary union, with a focus on the potential risks to price stability in times of high government debt. The paper is complementary to Corsetti et al. (2019) and ECB (2021b), the latter representing staff input to the 2021 strategy review, which focus on monetary-fiscal policy interactions in low-inflation environments. Our paper is also related to Bonam et al. (2024) who review a broader range of challenges for monetary and fiscal policy interactions in the post-pandemic era. In contrast to our paper, Bonam et al. focus more on the role of fiscal policy in temporarily mitigating adverse economic effects from supply shocks, as well as on the role of government investment for inflation. The remainder of the paper is organised as follows. Section 2 presents empirical facts relevant for the interactions between monetary and fiscal policy in the euro area. Section 3 lays out a benign benchmark regime for monetary-fiscal policy interactions in a monetary union with multiple national fiscal authorities that is conducive to price stability. Section 4 considers risks to price stability in times of high government debt that may arise when policymakers deviate from the benchmark regime. Section 5 discusses some lessons for monetary and fiscal policymakers aimed at containing these risks. Four boxes provide additional details on various aspects relevant for monetary-fiscal policy interactions in times of high government debt and high inflation.
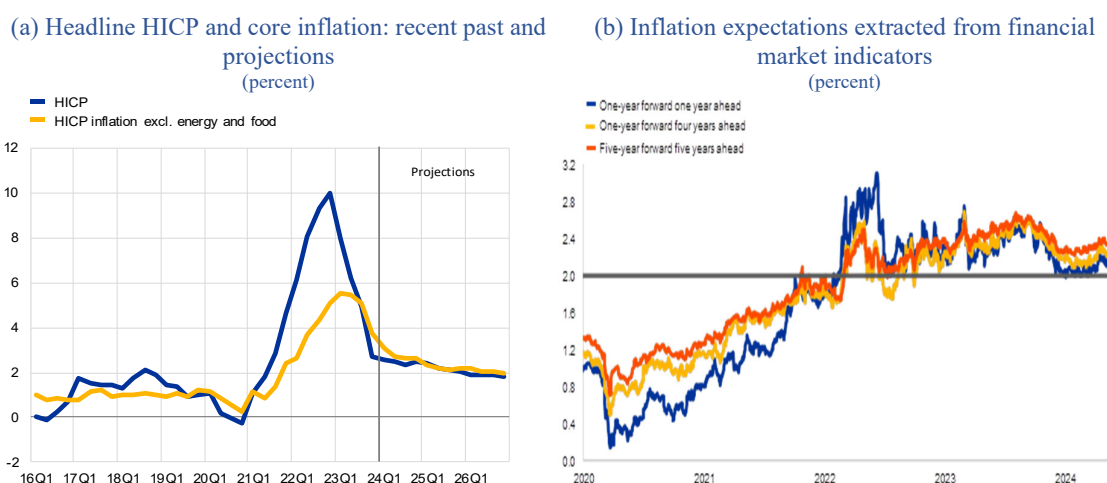
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[1] For more details, see ECB press release "The Transmission Protection Instrument", of 21 July 2022.

2. Setting the stage: Some empirical facts for the euro area[2]

2.1. Euro area has recently experienced very high inflation

The macroeconomic environment has changed significantly since the 2021 ECB strategy review, which included a discussion on the topic of monetary-fiscal policy interactions. The euro area, like other advanced economies, faced a rapid and sharp rise in inflation. After being below the ECB's target for almost a decade, euro area inflation rose at a pace last seen in the 1970s and early 1980s, exacerbated by the energy shock triggered by Russia's invasion of Ukraine in February 2022. Headline year-on-year inflation, as measured by the Harmonised Index of Consumer Prices (HICP), rose from 1.9% in June 2021 to a peak of 10.6% in October 2022, before starting to drop to 2.6% in May 2024. While inflation is projected to gradually decline towards the ECB's target (Chart 1a), core inflation proved more persistent than initially expected. Excluding energy and food, core inflation peaked only in March 2023 at 5.7% and declined more slowly to 2.9% in May 2024. As external energy shock pressures have largely dissipated, albeit with remaining uncertainties, domestic demand, and in particular wage growth, became the dominant factor driving inflation developments since the first half of 2023. Inflation expectations, as captured by financial market indicators, overshot in the first half of 2022 (particularly the shorter-term ones), then stabilised and followed a volatile, but slightly increasing path up to August 2023. More recently, they started declining towards the ECB's 2% target, remaining somewhat above it in the first part of 2024 (Chart 1b).

Chart 1: Euro area inflation
Unprecedented increase in 2022

(a) Headline HICP and core inflation: recent past and projections
(percent)

(b) Inflation expectations extracted from financial market indicators
(percent)

Source: Panel a) June 2024 Eurosystem staff macroeconomic projections (cut-off date for technical assumptions 15 May 2024). Panel b) Bloomberg and ECB calculations.
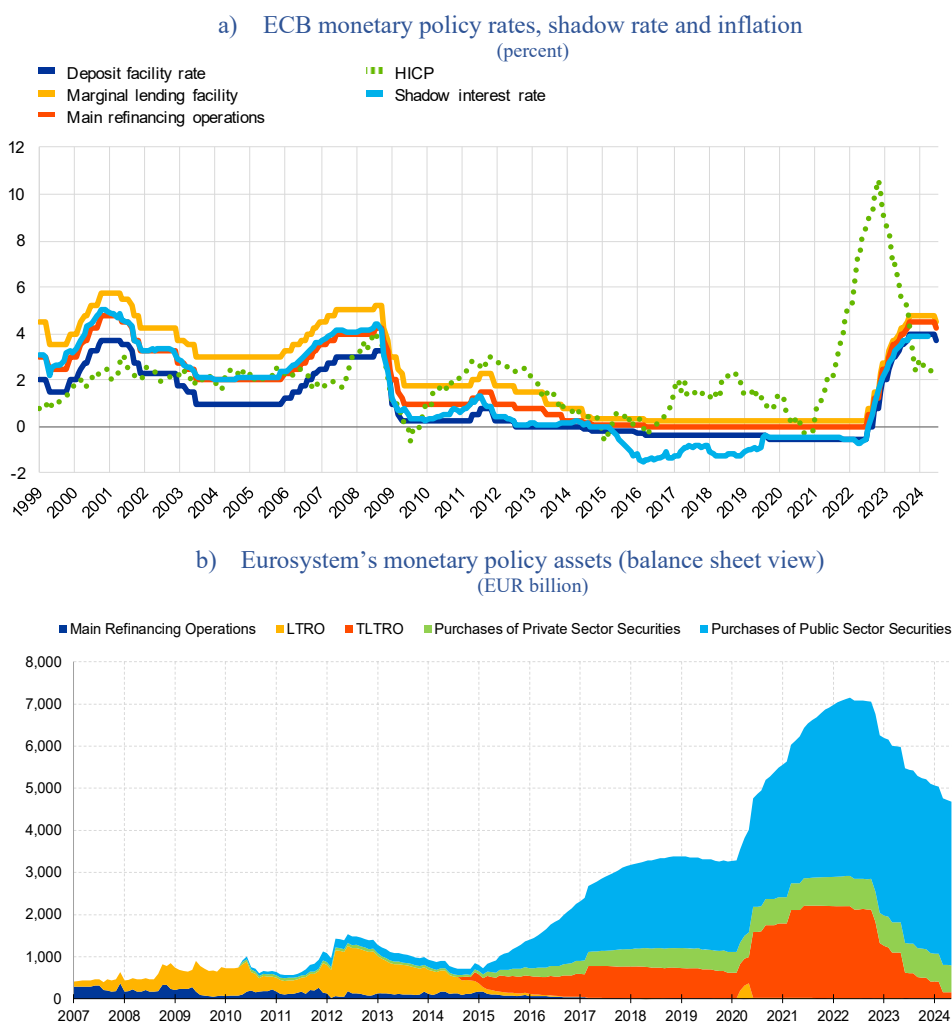Notes: Panel b) cut-off date is 31 May 2024.

2.2. Monetary and fiscal policies have reacted

On the monetary policy side, the ECB, along with other central banks in the advanced economies, responded to the strong rise in inflation by embarking on a sustained tightening cycle, mainly employing the conventional policy toolkit. The key policy rates were first raised in July 2022 and have been increased steadily until September 2023, when a pause was signaled. For instance, the deposit facility rate (DFR) was increased from -0.5% to 0.0 in July 2022 and then gradually to 4.0% in September 2023, an all-time high. This level was maintained until June 2024 when a 0.25

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[2] The cut-off date for data used in this section is end-May 2024.

percentage point cut was implemented in all policy rates (Chart 2a). The use of the unconventional monetary policy toolkit has remained of secondary importance in the tightening cycle so far. After many years of substantial balance sheet expansion, mainly through purchases of public sector securities, the ECB began quantitative tightening on March 1, 2023, when it stopped fully reinvesting maturing securities under the Asset Purchase Program (APP). The balance sheet had already started to shrink in the fall of 2022, as banks began to repay their outstanding TLTRO loans, which account for most of the quantitative tightening so far. The Pandemic Emergency Purchase Program (PEPP) - the second wave of the Eurosystem's balance sheet expansion launched in March 2020 in response to the pandemic, with an overall envelope of €750 billion, extended twice by December 2020 to €1,850 billion - is to start being reduced later, in the second half of 2024.[3] So far, the Eurosystem's public sector securities portfolio has declined gradually and slightly from a peak of €4,237 billion at the end of June 2022 to €3,883 billion at the end of May 2024 (Chart 2b).

Chart 2: Monetary policy response

Unprecedented rate hike and start of balance sheet reduction

a) ECB monetary policy rates, shadow rate and inflation
(percent)

b) Eurosystem's monetary policy assets (balance sheet view)
(EUR billion)


Source: ECB calculations.
Notes: Panel a) - Last observation May 2024 for the HICP inflation rate, June 2024 for the monetary policy interest rates and March 2024 for the shadow rate (estimates based on Lemke and Vladu, 2017). Panel b) latest observation 31 May 2024.

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[3] In December 2023, the ECB announced its intention to continue reinvesting, in full, the principal payments from maturing securities purchased under the PEPP during the first half of 2024. Over the second half of the year, it intends to reduce the PEPP portfolio by €7.5 billion per month on average. The Governing Council intends to discontinue reinvestments under the PEPP at the end of 2024. See ECB press release as of 15 December 2023.

On the fiscal side, euro area governments responded to the energy shock and the resulting high inflation with a set of mainly "unconventional" stimulus measures, aimed at containing the rise in energy prices and protecting households' purchasing power. Prior to Russia's invasion of Ukraine, energy support in the euro area was relatively limited and confined to a few countries. Following the surge in energy prices, fiscal support measures were adopted at a large scale in many countries, bringing the (gross) size of this stimulus to about 1.7% of GDP at the euro area aggregate level in 2022 (Chart 3). The measures mainly took the form of reductions in indirect taxes and increases in subsidies, mostly on energy products, as well as transfers to households. Many were extended into 2023 and new ones adopted, so that the fiscal support, albeit declining in size, is estimated to have remained large in 2023 (at 1.3 percent of GDP). A sizeable part of the support, especially from 2023 onwards, consists of subsidies related to price cap measures adopted in some of the largest euro area countries. Around 70% of the measures in terms of budgetary impact is set to be withdrawn in 2024. Given the profile and composition of measures, fiscal policy is expected to contribute in the shorter run (2022-23) to reducing inflation pressures. Hence, the "unconventional" nature of many of these measures: albeit a fiscal stimulus, being mostly in the form of temporary reductions in indirect taxes and increases in subsidies, it can contribute to reducing inflation, while increasing real output, over the period of its application. However, as these measures are withdrawn and the positive wealth effect of the overall fiscal stimulus may still persist, a reversal of the impact (higher inflation) is expected, especially in 2024. Compared with a no-fiscal policy change scenario, such measures are generally assessed to mitigate the effects of the energy shock and smoothen the inflation profile, with lower inflationary pressures in the short run and higher afterwards.[4]

Chart 3: Fiscal policy response

Large temporary stimulus over 2022-23 in response to the energy crisis and high inflation
(percent of GDP)
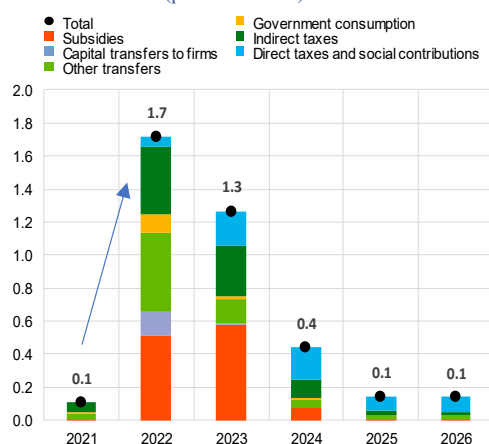
Source: June 2024 Eurosystem staff's macroeconomic projections

2.3. Large heterogeneity in fiscal positions, with very high public debt levels in some countries

The monetary tightening has taken place against a large degree of fiscal heterogeneity across the euro area countries, with very high debt levels in several of them. In 2022, public debt ratios ranged from about 20% to 170% of GDP (Chart 4a). Budget balances ranged from deficits close to 8% to surpluses of over 2% of GDP (Chart 4b). Debt and deficit ratios spiked in 2020 in all euro area countries following the large shock during the pandemic crisis and the substantial fiscal support provided in response. They generally declined in 2021-23 as the pandemic shock faded and high inflation helped in the short term especially to erode the real value of the debt stock. The projections indicate, however, only a broad debt stabilisation of the public debt at the euro area aggregate level

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[4] For the estimation of the effects of these measures on inflation in the context of the Eurosystem staff macroeconomic projections, see Bankowski et al. (2023a) and subsequent ECB projection articles.

and a continued increase in several countries, especially the large euro area economies that entered the crises with a high debt burden (Chart 4). The heterogeneity of fiscal positions, especially in terms of debt levels, remains substantial in the euro area and tends to increase during crises. This poses challenges for the conduct of the single monetary policy.

Chart 4: Fiscal positions across euro area countries

Large heterogeneity and persistent high debt (and deficit) ratio in some countries despite some recent improvements

a) Public debt ratios
(percent of GDP)

b) Budget balance ratios
(percent of GDP)
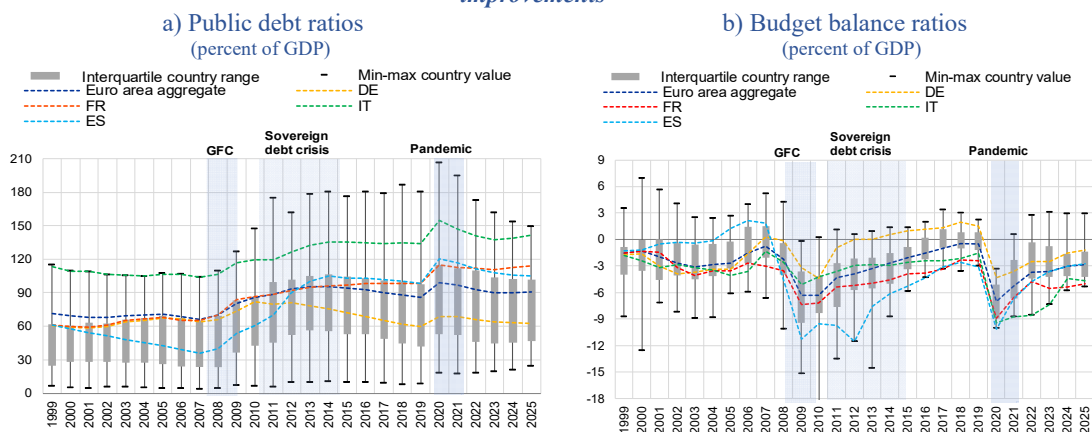
Source: ECB calculations, Ameco and European Commission Spring 2024 forecast.

2.4. Monetary policy tightening has implied a reversal of the declining trend in interest payments and r-g, reducing fiscal space

After a long period of decline, the interest payments on government debt as a share of GDP have started to increase following the steep monetary tightening. This increase will be gradual as the higher interest rates feed through the maturity structure of government debt when old debt is rolled over. Yet, the increase is projected to be rather substantial for higher debt countries and in the absence of more convincing efforts for fiscal consolidation (Chart 5a). For the new deficit financing and the inflation linked bonds (the latter being relatively limited in the euro area to a few countries[5]), the pass-through of higher inflation and higher marginal interest rates to interest payments is immediate within the year. In addition to interest payments, monetary policy has a bearing on the maturity of government debt influenced through the QE operations. Purchases of longer dated government securities on the secondary market was associated with an extension of maturity of nominal government securities. For the euro area (weighted) average debt, the residual maturity of total government debt stood at 8.6 years (8.1 years for securities) at end-2022, on an increasing trend compared to end-2014, just before the start of the large balance sheet expansion by the Eurosystem (7.2 and 6.4 years, respectively).[6] At the same time, from a consolidated balance sheet perspective, the QEs entailed a shortening of maturities, as longer-dated government liabilities have been transformed into shorter-dated bank deposits at the Eurosystem (see also Section 3).

The increase in interest rates, together with the slowdown in real growth, has led to a steep increase in the interest-rate differentials on government debt from the lows of 2019-21. Interest rate growth-differential is an important factor driving debt dynamics and impacting debt sustainability. While some economists (e.g., Blanchard 2019, 2021) viewed it until recently to be persistently negative

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[5] As indicated by the data on sovereign securities, the share of inflation-indexed bonds in the total stock of government-issued securities in the euro area was around 6% in 2022 (5% of GDP), The amount reflects the issuance of this type of security by only some Member States, most of which are large economies, such as Italy (close to 11% of all securities), France (8%), Spain (6%) and Germany (close to 4%). For more details, see Bankowski et al. (2023b).

[6] In terms of residual maturity, there is some country heterogeneity, but differences are not very large. The only extreme outlier is Greece (with a residual maturity of total government debt of 17.5 years at end-2022) thanks to the preferential loans received under the financial programme. The large euro area countries have residual maturities between 7 and 8 years.

and allowing public debt to decline even in the presence of (moderate) primary deficits, the variable has started to increase as of mid-2022. Interest rate-growth differentials exhibit a large heterogeneity across euro area countries, even across the more matured economies, less prone to negative differentials (Chart 5b). In particular, high debt economies tend to face higher interest rate-growth differentials. This holds on average over longer periods and it is usually exacerbated in crisis times.[7] With the monetary policy tightening and growth slowing, the interest rate-growth differential is moving faster to positive territory in the high debt economies.

Chart 5: Interest payments and interest rate-growth differentials on government debt

Reversal in declining trends

High debt economies tend to face higher interest rate-growth differentials, esp. in crisis times
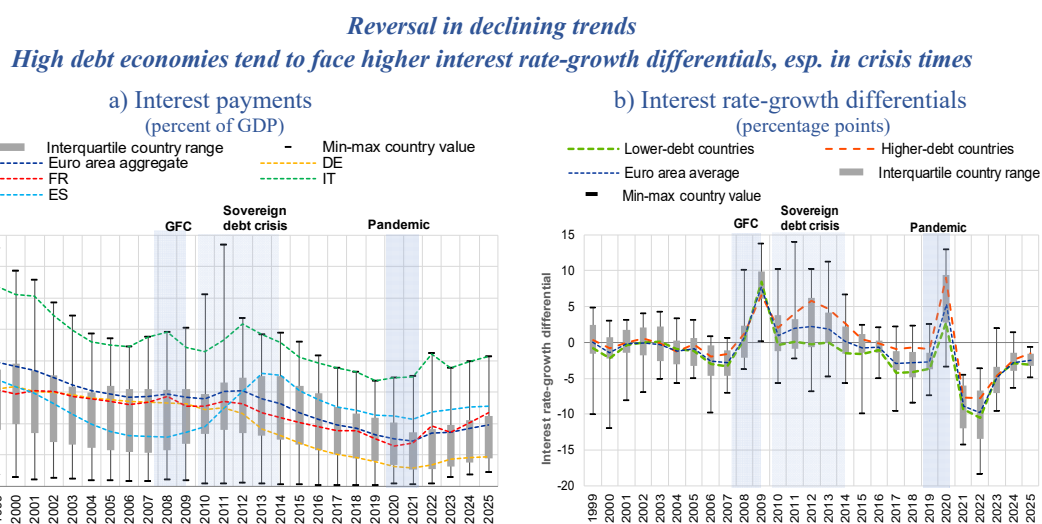
Source: ECB calculations, Ameco and EC Spring 2024 forecast for Chart 5a) and June 2024 Eurosystem staff macroeconomic projections for Chart 5b).

Notes: In Chart 5b), the interest rate-growth differential is calculated as the difference between the nominal implicit interest rate (interest payments in year t divided by the stock of government debt at t-1) and the nominal growth rate of the economy. The higher (lower) debt country grouping is defined as countries with the public debt ratio higher (lower) than 90% of GDP in 2019.

2.5. The inflation shock and expectations of monetary policy tightening was initially accompanied by an increase in sovereign spreads

The inflation shock and start of tightening in the common monetary policy, in the presence of substantial fiscal heterogeneity at country level, led initially to an increase in sovereign spreads, potentially posing risks to monetary policy transmission. Following the large inflation shock in early 2022 and the expected monetary policy tightening, sovereign yield spreads, measured as the difference between the benchmark (10-year) bond yield of a euro area government and the corresponding yield on German debt, started to widen (Chart 6). This widening was particularly large for the highest debt countries, comparable for some with peaks during the pandemic crisis, when PEPP was approved and activated (Chart 6b). Such developments prompted the ECB Governing Council to announce on 21 July 2022 the Transmission Protection Instrument (TPI). While not used so far, TPI can be activated to counter unwarranted, disorderly market dynamics that pose a serious threat to the transmission of monetary policy across the euro area. Subject to fulfilling established criteria – including a debt sustainability analysis – the Eurosystem can make secondary market purchases (unrestricted ex-ante) of securities issued in jurisdictions experiencing a deterioration in financing conditions not warranted by country-specific fundamentals. At the same time, upon announcement of the TPI, the Governing Council also announced that the flexible reinvestment policy under PEPP would continue and be the first line of defence to counter risks to the transmission mechanism related to the pandemic.

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[7] See also empirical evidence in this respect in Checherita-Westphal and Domingues-Semeano (2020), Escolano et al. (2017), Turner and Spinelli (2011).
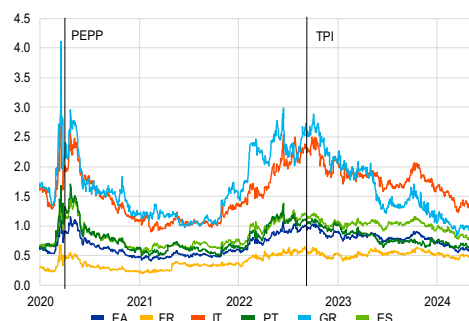
Chart 6: 10-year sovereign bond yields and spreads

As sovereign yields started increasing so did the spreads, especially for the highest debt countries

a) Sovereign yields over the euro area period
(percent)
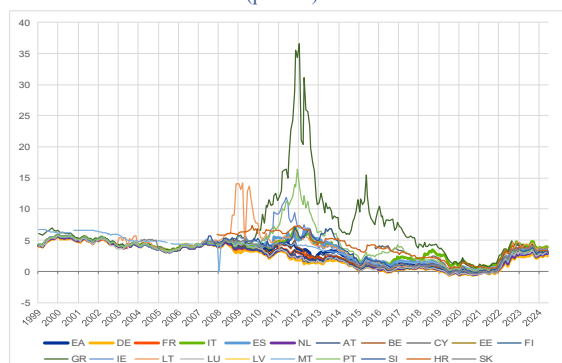
b) Recent developments in sovereign spreads to Germany for selected countries (percentage points)

Source: Bloomberg, Reuters and ECB calculations.
Notes: Panel a) last observation (monthly data) May 2024, Panel b) last observation (daily data) 31 May 2024.

3. Monetary and fiscal policy requirements for price stability

Monetary and fiscal policy are intricately linked. Monetary policy has fiscal effects, and fiscal policy has monetary consequences. An increase in central banks' policy rates, for instance, raises governments' debt servicing costs, and, if there is no adjustment in other government expenditures or revenues, leads to an increase in government debt. A fiscal transfer to households increases their wealth, stimulates consumption demand, and puts upward pressure on inflation. In case of the euro area, these interactions are particularly complex as one monetary authority – the European Central Bank – interacts with 20 national fiscal authorities.

Such linkages can be complicated when government debt is high. First, a high debt burden makes the economy more vulnerable to macroeconomic shocks. Second, and related to the above, the literature suggests that high debt burdens can ultimately impede long-term growth.[8] The empirical literature tends to conclude that high public debt can adversely affect the macroeconomic resilience and longer-term growth of an economy through various channels.[9] These can include: sovereign spreads (confidence effects) and sovereign yields, financial intermediation (bank credit),[10] future crowding-out of private investment, lower scope for counter-cyclical fiscal policy, including through a reduced capacity to finance future public investment. High public debt can also reduce the short-term output effectiveness of a fiscal stimulus (see Box B for a review). Moreover, household surveys provide some evidence that high(er) public debt can be associated with higher inflation and with larger inflationary effects of a fiscal stimulus (see review and empirical analysis in Box B). Finally, the quality of a country's institutional framework is also likely to affect the relationship between debt and growth, with particularly low growth performance in situations of high debt coupled with poor institutions and conversely, a cushioned impact of high debt in situations of very strong institutions.[11]

The *level* is not the only relevant dimension for debt-related vulnerabilities. Other characteristics like the maturity structure, the financing method and the resulting composition of public debt can also

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[8] This is particularly the case when debt is contracted to finance unproductive expenses or beyond optimal (growth-maximising) levels of public capital stock (Checherita-Westphal et al., 2014). For a recent review of the links between public debt and growth, see Bentour (2021); for empirical analyses applied to euro area, see Checherita and Rother (2012) and Baum et al. (2012).

[9] For a review of the empirical literature, as well as macroeconomic simulations across three large-scale DSGE models applied to euro area (countries) pointing to risks associated with high public debt, see Burriel et al. (2020).

[10] See De Bonis and Stacchini (2013) for the impact on bank credit and Jorda et al. (2016) for the effects in the aftermath of crises. The latter paper explores a historical database on public- and private-sector debt build-ups for advanced countries for the period 1870–2011 and finds that although high public debt build-ups are not correlated with a greater likelihood of financial crisis, a high level of public debt does tend to exacerbate the negative effects of post-crisis financial sector deleveraging.

[11] See for instance, Masuch et al. (2016).

have sizable economic effects.[12] A greater share of short-term debt may make a government more vulnerable during a crisis, because of the need to roll over increased amounts of debt. Moreover, in case a debt crisis mixes elements of illiquidity and insolvency, like the euro area sovereign crisis, the government would be vulnerable to bad news, whose real impact would be amplified by creditors' unwillingness to roll over their claims.

A well-designed policy framework aimed at price stability requires both a suitable monetary policy commitment and an adequate fiscal policy commitment. One possible configuration, which has often served as a blueprint for the design of monetary and fiscal policy frameworks over the past three decades, including for Europe's Economic and Monetary Union, ascribes to the common central bank the primary objective of maintaining price stability and to fiscal authorities the responsibility for maintaining fiscal sustainability. The central bank commits to adjust its monetary policy instruments to stabilise inflation at the inflation target. The fiscal authorities, in turn, commit to adjust real primary surpluses to maintain fiscal sustainability regardless of the paths of monetary policy instruments and inflation. Formally, each fiscal authority ensures that the real value of its liabilities equals the expected present value of future real primary surpluses plus remittances from the central bank (taking the latter as given). The debt and deficit limits enshrined in the Maastricht Treaty and Stability and Growth Pact can be interpreted as fiscal rules aimed at ensuring appropriate fiscal policy behaviour in a monetary union without a fiscal union. In the literature, this type of policy configuration is often referred to as "monetary dominance" (e.g., Schnabel, 2020), or "active" monetary policy and "passive" fiscal policy (Leeper, 1991).[13] Monetary dominance, while acknowledging monetary-fiscal interlinkages, describes a policy framework that postulates a clear separation between the goals of monetary and fiscal policies.[14]

In normal times, passive fiscal policy *also* provides the required "backing" for price stability, i.e. fiscal policy is set in a way that is consistent with the central bank's policy aimed at price stability.[15] Public liabilities, i.e. those of the fiscal authorities and those of the central bank (in the case of the euro area the ECB and the National Central Banks of the Member States), are backed by the stream of future real primary surpluses and real seigniorage revenues.[16] In a monetary union with multiple national fiscal authorities it is the sum of (national) real primary surpluses that matters for backing.[17] When public liabilities are nominal, insufficient backing can create inflationary pressures (or sovereign default risk), whereas too much fiscal backing can create deflationary pressures. That is because taxes and transfers affect households' disposable income and wealth, and, thereby, spending. Consider, again, a temporary increase in the policy rates by the central bank with the aim to depress demand for consumption, and lower inflation. For this to be an equilibrium outcome, the present value of real primary surpluses must increase sufficiently to offset the positive wealth effect resulting from higher interest payments to bond holders. In other words, for the monetary tightening to be disinflationary, fiscal policy must tighten as well, at least eventually.[18] Thus, while monetary dominance postulates separate goals for monetary and fiscal policies, in so doing it serves to (implicitly) coordinate the two policies.

The required fiscal adjustments under monetary dominance can be sizeable, and depend, inter alia, on the government debt-to-GDP ratio. Most macroeconomic models used for monetary policy analysis assume monetary dominance.[19] Box A provides an assessment of the fiscal consequences of

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[12] See, for example, Hatchondo and Martínez (2013). For review of various such indicators that matter in sovereign debt sustainability analysis (DSA) and, in general, for an overview of the Eurosystem's DSA framework, see Bouabdallah et al. (2017).

[13] Part of the literature, instead, uses the term "Ricardian" fiscal policy rather than passive fiscal policy (Woodford, 2003).

[14] The separation was also reflected in the initial operational framework of the ECB with a small balance sheet and the use of main refinancing operations to steer interest rates.

[15] See, e.g., Woodford (2001).

[16] This condition is often referred to as the (consolidated) government "intertemporal budget constraint".

[17] See Woodford (1998), Bergin (2000), and Maćkowiak and Schmidt (2023).

[18] Since it is the expected present value of primary surpluses rather than the current surplus that matters for backing, the fiscal adjustment does not have to occur instantaneously, so long as the private sector expects the adjustment to take place eventually. Indeed, from a normative perspective when taxes are distortionary it is often desirable to "smooth" the fiscal adjustment over time (Barro, 1979).

[19] To the best of our knowledge, this is the baseline fiscal policy assumption in most dynamic general equilibrium models used for forecasting and policy analysis. See, for instance, the description of the New Area-Wide Model's fiscal block in Christoffel et al. (2008).

a transitory monetary policy shock based on a textbook New Keynesian model with active monetary policy and passive fiscal policy. A common approach to model active monetary policy is to specify a feedback rule for policy rates that responds more than one-for-one to inflation. A common approach to model passive fiscal policy is to specify a feedback rule for the real primary surplus, or a tax instrument, that responds to variations in the real value of government debt by more than one times the long-run neutral real interest rate. Under the baseline parameterisation, a transitory 100 basis points increase in the policy rate (annualised) requires a cumulative increase in the real primary surplus of 2.6 percent of GDP. The higher the government debt-to-GDP ratio and the shorter the maturity structure of government debt, the larger the required fiscal adjustment. In a monetary union, *all* national fiscal authorities must raise their primary surpluses, and those with a higher debt ratio, ceteris paribus, must tighten their fiscal stance by more than those with a lower debt ratio, for fiscal policy at the level of the union to be passive.

Temporary episodes characterised by the real rate of return on government bonds being smaller than the real growth rate do not resolve the need for sustainable fiscal policies.[20] When the economy grows at a rate that exceeds the rate of return on government bonds, the government-debt-to-GDP ratio may decline even in the absence of primary surpluses. Small deficits can then be consistent with fiscal sustainability for as long as the benign financing conditions exist. Interest rates are, however, not invariant to fiscal policy. Higher public debts and deficits typically raise the rate of return investors require to hold government bonds and, thereby, endogenously increase the level of budget balances needed to ensure consistency with stable or declining debt ratios.[21] In practice, the future evolution of the interest-rate growth-rate differential is uncertain. While some economists have argued that real interest rates, after their recent increase, are likely to return to their record-low pre-pandemic levels over the medium term, others have argued that new trends point to a persistent increase in real interest rates.[22] Finally, even when the interest-rate growth-rate differential is negative, large increases in public debt can be costly. Using an overlapping generations model with two assets (public debt and private productive capital) and *no* risk of default, Cao et al. (2024) show that a permanent rise in the public debt ratio (from 60% to 120% of GDP) leads to a significant reduction in the capital stock (of about 15%) and in the steady-state GDP (by about 8%).

When fiscal instruments are distortionary, high government debt-to-GDP ratios increase the exposure of the macroeconomy to the detrimental effects of fiscal adjustments. Under monetary dominance, fiscal policy must adjust not only in response to changes in monetary policy, but in response to any economic disturbance that affects the real value of government debt. In practice, most fiscal instruments are distortionary from an economic point of view. For instance, an increase in the labour income tax rate aimed at increasing fiscal revenues may have detrimental effects on labour supply. Since the amount of the required fiscal adjustment is typically an increasing function of the government debt-to-GDP ratio, this consideration provides a normative rationale for moderate levels of government indebtedness (Adam, 2011).[23] Of course, other considerations (e.g. demand for and supply of safe assets) may call for government debt not to be too low. The optimal level of government indebtedness balances these considerations.

The empirical evidence for passive fiscal policy behavior is mixed. Following Bohn (1998), one strand of the literature estimates single equation fiscal feedback rules to assess fiscal policy behavior. Using this approach, Mauro et al. (2015) find that in most, but not all, advanced countries in their sample the primary surplus response to government debt is consistent with passive fiscal policy prior to the Global Financial Crisis (GFC). Similar evidence is found, on average, across euro area countries, with

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[20] See, for instance, Blanchard (2021) and Cochrane (2021).

[21] Reis (2022) argues that after a debt-financed fiscal expansion, if government debt features a convenience yield and the convenience yield declines in response to the rise in government debt, a more rapid fiscal consolidation than in the absence of a convenience yield may be desirable.

[22] See, for instance, Obstfeld (2023) and Reis (2023). Blanchard (2023) writes "Across advanced economies, the celebrated (r - g), i.e., the difference between the interest rate and the growth rate, appears to have durably changed sign or, at a minimum, to have gone from a substantially negative number to a number closer to zero."

[23] Burriel et al. (2020), who assess the macroeconomic implications of high public debt in a global DSGE setup designed for the euro area, also find a larger impairment for the long-run output when the most distortionary type of taxation (in particular labour income) is used to finance the additional public debt burden in the future.

a stronger reaction if the sample period includes the GFC and the sovereign debt crisis (see Checherita-Westphal and Zdarek, 2017). Some papers find, however, evidence of fiscal fatigue above a certain debt level (Ghosh et al., 2013). Bolhuis et al. (2024) present evidence that advanced economies' primary surpluses have become unresponsive to debt, in particular after the pandemic. A potential concern with analyses based on single-equation estimates may be that they can be prone to simultaneity bias (Woodford, 2001; Leeper and Li, 2017). Based on a Structural-VAR analysis of the euro area, Reichlin et al. (2023) find that an expansionary conventional monetary policy shock results in a decline in the cumulative real primary surplus, consistent with passive fiscal policy behaviour.[24] Another strand of the literature, which has primarily focused on the U.S. economy, relies on estimated dynamic stochastic general equilibrium models to assess fiscal (and monetary) policy behaviour (Bianchi 2012; Bianchi and Ilut 2017; Chen et al., 2022). Estimating the evolution of monetary-fiscal policy configurations in France and Italy, Bouabdallah et al. (2023) find evidence for changing monetary-fiscal policy regimes over time in both countries. Their model estimations suggest that fiscally-dominant regimes prevailed in both countries prior to the early 1990s, and monetary-dominant regimes thereafter.

In tail events, passive fiscal policy may fail to provide the backing for price stability. The passive-fiscal, active-monetary policy configuration does not necessarily rule out inflationary spirals and low-inflation traps (Benhabib et al., 2001; Woodford, 2001, 2003). Consider an inflationary spiral, i.e. a period when inflation and policy rates keep rising, accompanied by expectations of even higher inflation. When inflation expectations keep rising, an increase in policy rates may fail to increase real interest rates and depress consumption demand. In this case, passive fiscal policy supports the inflationary spiral for the accelerating price level erodes the real value of government debt, leading to lower primary surpluses, and, thus, higher household disposable income and wealth. Households then seek to raise consumption, which exacerbates the inflationary pressures.

Maintaining price stability in tail events may require fiscal policy to become sufficiently tight, or sufficiently loose, in the respective tail events, regardless of the debt-to-GDP ratio. An inflationary spiral may be prevented when fiscal policy raises the real primary surplus, even if the debt-to-GDP ratio is falling. A higher primary surplus lowers households' disposable income and, thereby, depresses spending, which is disinflationary. Likewise, a low-inflation trap may be prevented when fiscal policy lowers the real primary surplus even if the debt-to-GDP ratio is rising. The lower primary surplus raises households' disposable income, and, thereby, stimulates spending, which is inflationary. In a monetary union, the sum of national primary surpluses must adjust accordingly. Bai and Leeper (2017) review several fiscal rules and conclude that these rules primarily focus on debt reduction/stabilisation and pay little attention, if any, to fiscal backing of monetary policy.[25] Maćkowiak and Schmidt (2023) propose a policy framework for a monetary union aimed at ensuring fiscal backing in tail events. In their proposal national fiscal authorities set the national primary surplus according to a conventional passive feedback rule so as to maintain stable public finances at the national level, and a common fiscal authority ensures that when the threat of a tail event emerges, fiscal policy at the level of the union is sufficiently tight, or sufficiently loose, to prevent the respective tail event. More recently, some papers in the literature have argued that under some conditions the central bank itself may be able to provide the required backing without a need for fiscal policy to deviate from passive behavior (e.g. Benigno 2020).[26]

Economic theory also suggests that "financial independence" is key for the central bank to be able to maintain its inflation target under all circumstances. Central banks' balance sheets nowadays are exposed to non-trivial interest-rate mismatch risks resulting from, on the one hand, large-scale asset purchases, and, on the other hand, the issuance of interest-paying reserves. If the (market) value of a central bank's assets falls, it may suffer a loss. In order for a central bank to be able to maintain price stability, fiscal authorities should be committed to provide "fiscal support" (Bassetto and

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[24] Reichlin et al. do not find a significant response of cumulative primary surpluses in response to unconventional monetary policy shocks related to central bank asset purchases.

[25] Indeed, Yared (2019) cites political economy considerations (e.g. present bias) and associated time inconsistency problems as the primary reason for why governments have adopted fiscal rules that limit deficits or spending.

[26] These conditions are, inter alia, a well-capitalised central bank, a lean central bank balance sheet with the asset side consisting primarily of safe short-term government bonds, and a remittance policy that is fully under the control of the central bank.

Messer 2013; Del Negro and Sims 2015) to the central bank when necessary. A central bank needs a capital injection, when, in the absence of a fiscal transfer to the central bank, the expected present value of central bank remittances to the fiscal authorities (net of fiscal transfers to the central bank) is larger than the expected present value of seigniorage revenues plus the central bank's net equity. If the central bank, in this extreme case, fails to receive fiscal support, it may be forced to implement a policy that is inconsistent with its inflation target.[27] While this form of "intertemporal" central bank insolvency appears to be a very unlikely event for central banks in advanced economies, an explicit commitment guaranteeing fiscal support could provide additional credibility to a central bank's price stability objective.[28] A commitment to fiscal support might be particularly beneficial in a monetary union with multiple national authorities, for, according to Sims (2012), "[a] fragmented collection of fiscal authorities has less incentive than a unified fiscal authority to recognise the actions required of it and respond appropriately." In principle, transparent rules could be designed to ensure the provision of sufficient fiscal support. For instance, Hall and Reis (2015) show that a remittance rule which calls for the central bank to rebate its net income (based on marking to market) to the fiscal authorities if positive, or to receive a transfer of equal amount from fiscal authorities if negative ensures fiscal support.[29] Reichlin et al. (2021) propose a configuration with callable capital whereby the European System of Central Banks would have the right to demand a capital injection in the event of large losses arising from its monetary policy operations.[30]

These considerations suggest that fiscal policy should play an important role in monetary policy analysis, central bank projections and communication. Leeper (2023) provides several suggestions. For instance, he advocates providing assessments of the economic impact of monetary policy conditional on alternative assumptions regarding fiscal policy. Using these alternative scenario projections in central bank communication could help to foster an implicit coordination of monetary and fiscal policies. Reichlin et al. (2021) propose a "board for joint fiscal-monetary oversight" to facilitate informal coordination of monetary and fiscal policies in the euro area.

Box A: Fiscal requirements for price stability: A model-based assessment

by S. Schmidt

This box provides a model-based assessment of the fiscal adjustments that are implicitly assumed (but rarely reported) under the standard active-monetary, passive-fiscal policy regime discussed in Section 3. For illustrative purposes, we use the textbook New Keynesian model of Galí (2015) augmented with a fiscal block. In the model, aggregate private sector behaviour is summarised by a New Keynesian Phillips curve and a consumption Euler equation, and monetary policy is governed by an interest-rate feedback rule. The parameterisation of these equations follows Galí (2015). We assume that the fiscal authority issues nominal government bonds and sets the real primary surplus according to a standard passive feedback rule that responds to variations in the lagged real value of government debt. To focus on the wealth effect of fiscal policy, taxes and transfers are assumed to be lump sum. The steady-state government debt-to-annual-GDP ratio is set to 91 percent, consistent with euro area data for the first quarter of 2023. The average duration of government bonds is set to 20 quarters.

Chart 6 shows impulse responses of the policy rate and inflation to a transitory monetary policy shock that raises the policy rate on impact by 100 basis points (annualised). The monetary policy tightening leads to a temporary decline in inflation by one annualised percentage point. The associated fiscal adjustment is substantial. Under the baseline parameterisation, fiscal policy must raise the primary

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[27] Specifically, the central bank may be inclined to increase the present value of seigniorage, and doing so may require a policy rate path that is inconsistent with price stability.

[28] See also section 5 in Corsetti et al. (2019), and chapter 3 in the CEPR report on the 2021 ECB Strategy Review by Reichlin et al. (2021).

[29] Perhaps similar in spirit, the Bank of England's Asset Purchase Facility is fully indemnified for losses by the UK Treasury. The Sveriges Riksbank Act provides a positive target level for the Riksbank's equity, and requires the Riksbank to ask for a capital injection when its equity falls below a positive threshold value.

[30] Reichlin et al. (2021) also discuss challenges related to risk sharing resulting from central bank asset purchases in a monetary union.

surplus by a cumulative amount of 2.6 percent of steady-state output. The required fiscal adjustment is larger if we consider a higher government debt-to-GDP ratio, for a higher debt ratio implies a larger change in debt servicing costs associated with a given change in interest rates. For instance, if the steady-state government debt ratio equals 120 percent (rather than 91 percent), the cumulative adjustment in the primary surplus amounts to 3.5 percent of steady-state GDP. The required fiscal adjustment also depends on the maturity structure of government debt. The shorter the duration of government bonds, the larger the required fiscal adjustment. Bond prices fall temporarily in response to a temporary increase in interest rates, thereby initially alleviating the adverse fiscal consequences, and this benefit is stronger for long-term bonds than for short-term bonds. For instance, if the average duration of government bonds equals 10 quarters (rather than 20 quarters), the primary surplus rises by a cumulative amount of 2.8 percent of GDP (compare to 2.6 percent of GDP in the baseline).

Chart 6: Impulse responses to a monetary policy shock
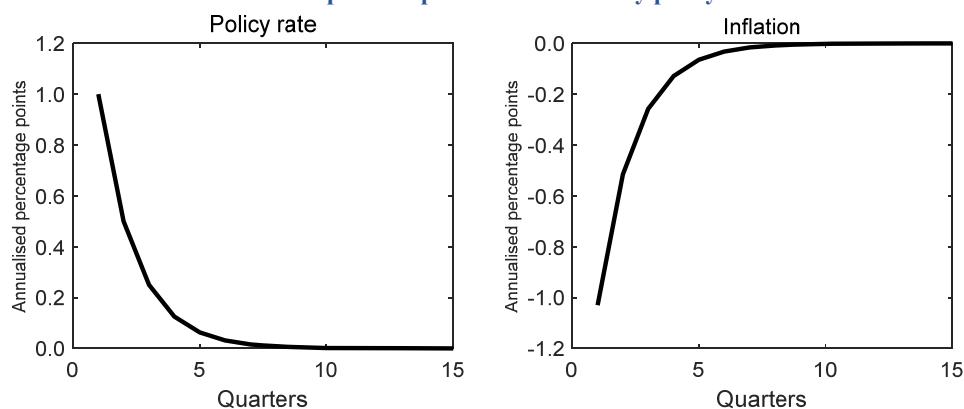
Notes: Based on New Keynesian model of Galí (2015) augmented with a fiscal block.

Box B: The discretionary fiscal policy effects on inflation: an empirical analysis accounting for non-linearities

by C. Checherita-Westphal and T. Pesso

This Box (drawing from Checherita-Westphal and Pesso, 2024) reviews the empirical literature on the discretionary fiscal policy effects on inflation and provides for an analysis that disentangles such effects according to regimes of high vs. low public debt, while also accounting for the monetary policy stance and the cycle.

The empirical literature on the impact of discretionary fiscal policy (shocks) on inflation is still unsettled. First, this strand of the literature is much more scarce compared to the one focusing on the "typical" (real output) fiscal multipliers. Second, the results are less conclusive in terms of the significance and sign of the effect. Where results are reported, several studies suggest either a *no statistically significant* or even a *negative* reaction of inflation in response to an expansionary fiscal shock, usually in the form of higher government spending (Perotti (2005), Mountford and Uhlig (2009), Nakamura and Steinsson (2014), Jørgensen and Ravn (2022)). Other studies report positive responses of inflation (Caldara and Kamps (2008), Ben Zeev and Pappa (2017), Ferrara et. al (2021)).

The *monetary policy stance,* including any endogenous response to the fiscal shock, is likely to be a major factor shaping the ultimate reaction of inflation after the fiscal policy intervention. The literature on the *output* fiscal multiplier is rich in this respect, showing that the multiplier can go from negative to

large positive values depending on the degree of monetary policy accommodation.[31] However, the effect on inflation is rarely shown in the papers that compute state-dependent "output" fiscal multipliers.

Another important state dependency for the fiscal multiplier, which is the focus of our Box, is the state of public finances, usually captured by the *level of public debt*. In terms of the *output* multiplier, this strand of the empirical literature is also relatively rich. It generally finds lower multipliers (fiscal policy is, ceteris paribus, less effective for real output stabilization) in regimes of high public debt (weak public finances).[32] The underlying channels here could be stronger Ricardian effects, higher credit risk (spreads) feeding into higher sovereign yields and higher uncertainty.[33] As regards the response of *inflation* to an expansionary fiscal policy shock in regimes of high debt, two forces can be at play. On the one hand, the traditional Keynesian aggregate demand channel would imply higher inflationary pressures, assuming no monetary policy reaction, though possibly less strong in the high vs. low debt regimes given the weaker effectiveness of fiscal policy. On the other hand, in regimes of high debt, a further stimulus may trigger higher inflation through: (i) wealth effects as predicted by the fiscal theory of the price level, (ii) a possibly higher degree of monetary policy accommodation, as posit by the fiscal dominance literature, or (iii) people's beliefs as suggested in recent survey studies.[34] According to Ferrara et. al (2021), the negative reaction of inflation after a positive government spending shock found in some studies arises because the recursive identification strategy used usually fails to capture the changing nature of government spending in the US, which shifted from alternating tax- and debt-financing to be steadily debt-financed since the end of the 1990s. This hints to debt as a potential source of non-linearities.

Overall, the very few studies that report the reaction of inflation to a fiscal shock depending on the level of public debt tend to find somewhat *higher inflation in regimes of high debt,* especially at longer horizons (not on impact).[35] A recent IMF working paper (Cevik and Miryugin, 2023), which is the closest in scope to our analysis, focuses specifically on the topic of fiscal policy shocks and inflation, including state-dependency in a large sample of 139 developed and developing countries over the period 1970-2021. Their main conclusions are that inflation increases in response to an expansionary fiscal policy. This impact is dependent on the fiscal space (larger at higher levels of public debt), type of monetary policy and exchange rate regimes (lower in countries with inflation targeting and more flexible exchange

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[31] See Cloyne, Jorda and Taylor (2023), which use the short-term interest rates for monetary policy changes and attempt to estimate the "endogenous" reaction of monetary policy to the fiscal shock, subsequently calculating how the output fiscal multipliers changes according to this reaction. Hack, Istrefi and Meier (2023) find a large variation in the government spending output multiplier (war spending in the US) according to the "systematic" reaction of monetary policy, identified based on the historical composition of hawks and doves in the FOMC. For similar results, see also the large literature on the output fiscal multiplier at the ZLB and Coenen et al. (2012) for results with large scale macroeconomic model simulations.

[32] See, inter-alia, Ilzetzki et al. (2013), Corsetti et al. (2012), Nickel and Tudyka (2014), Huidrom et al. (2020) for samples of (mainly) advanced OECD economies. Fotiou (2022) concludes that when debt is high, fiscal consolidation based on expenditure (vs. taxes) are much less costly in terms of output and can stabilise debt. On the other hand, Eminidou et al. (2023) find that the result of lower multipliers in regimes of high debt holds only when one exploits the time variation in debt, while the opposite is true for the cross-country variation, which is more important in the euro area. These contrasting results are explained by the possibility of more severe private sector credit constraints in the high public debt economies, which (paradoxically) could be relieved by more fiscal stimulus. This explanation is, however, not supported by the findings of another paper (Pinardon-Touati, 2023), which uses micro and macro (French administrative) data over 2006-2018 and finds that when local government spending is financed through debt, this crowds out private loans, which in turn reduces the output multiplier.

[33] As documented empirically in Huidrom et al. (2020).

[34] Andrade et al. (2024) find in a randomised controlled trial with German households that expectations of higher future public debt go hand in hand with an increase in inflation expectations for the euro area as a whole, in particular if survey participants expect that some euro area member countries might face fiscal stress in the medium term. Grigoli and Sandri (2023) find in randomised controlled trials in the US, UK and Brazil that households interpret high public debt as bad news for the economic outlook, leading to both higher inflation and unemployment expectations. Confidence in the central bank is also found to considerably reduce the sensitivity of inflation expectations to public debt. For the US, Coibion et al. (2021) find that information about the current debt or deficit levels has little impact on inflation expectations, but news about future (higher) debt leads households to anticipate higher inflation in the short and long run.

[35] Among the papers that focus on output multipliers, but report also on inflation impacts, Corsetti et al. (2012) check for state-dependency in regimes of weak public finances (debt larger than 100% of GDP or deficit larger than 6%) for a sample of 17 advanced economies over 1975-2008. They report that inflation and the interest rate follow similar patterns as in a scenario with sound public finances, but their responses are more pronounced: after a positive government spending shock, the initial decline in inflation and the subsequent peak are larger, while the monetary stance (short-term interest rate) is looser throughout. However, the results are weakly, if at all, statistically significant. Eminidou et al. (2023) find higher inflation and inflation expectations after a positive government spending shock (statistically significant only at longer horizons of 8 quarters and when accounting for cross-country variation) in euro area countries with high debt.

rates), and the position in the business cycle (larger inflation if the economy is in a recessionary state before the shock occurs, which could also be explained by a more accommodative monetary policy). Compared to this study, our analysis accounts better for discretionary fiscal policy (endogeneity issues), state-dependency for advanced economies (euro area) and simultaneity of various states.[36]

We study the dynamic impact of discretionary fiscal policy on inflation in a sample of mature euro area economies (the first 12 members of the euro area, EA-12) over the period 1999-2022, with robustness checks across a wider sample of advanced economies.

For fiscal policy shocks, we use in the baseline model a proxy for total discretionary fiscal policy measures (henceforth DM) from the Eurosystem, based on a narrative, measure-by-measure approach on the revenue side and benchmarking the growth rate of three relevant expenditure categories (government consumption, investment and discretionary transfers) to nominal potential growth. This measure covers both stimulus and consolidation episodes, on an annual basis, but it does not distinguish the endogenous (in response to the cycle) from the exogenous ones (independent from the cycle, hence pure fiscal shocks). While the discretionary fiscal policy is in practice largely endogenous and remains important from a monetary policy perspective, for purposes of identification in this exercise, we go further and purge this measure from past and expected contemporaneous output developments[37] (henceforth DM "purged"). Finally, in a third identification alternative, for robustness checks, we use the exogenous consolidation (only) episodes from Guajardo et. al (2014) and Alesina et. al (2019), for a sample of 16 OECD countries over the period 1978-2014.

We first analyse empirically the dynamic impact of fiscal policy, dependent on the level of debt, using the local projection method (Jorda, 2005), while controlling for the state of the economy and the monetary policy stance. To start with, we estimate the linear impact of inflation without debt, as given in equation 1 for each horizon h=0,..,4:

$$\frac{cpi_{i,t+h} - cpi_{i,t-1}}{cpi_{i,t-1}} \cdot 100 = \mu^h + \alpha^h(L)x_{i,t} + \beta^h g_{i,t} + \delta_t + a_i + \varepsilon_{it} \quad (eq.\,1)$$

where the dependent variable is the cumulative headline or core inflation at horizon t+h (after the fiscal shock occurring in t), t refers to the time period (years) and i refers to the country; a_i is a country fixed effect; δ_t is a time fixed effect, $g_{i,t}$ is the government (fiscal) policy shock, $x_{i,t}$ is a set of controls comprising two lags of inflation, the output gap and the (common) euro area shadow interest rate.[38]

Further, to account for potential nonlinearities in the level of debt using state-dependent local projections (Ramey and Zubairy, 2018), we define the states of *high* (*low/lower*) debt according to the debt-to-GDP ratio (d_{t-1}) [39] being above (below or equal to) 90%. We then interact our fiscal policy shock and controls with the resulting dummy variable and estimate equation 2 below for each horizon h=0,..,4:

$$\frac{cpi_{i,t+h} - cpi_{i,t-1}}{cpi_{i,t-1}} \cdot 100 = 1[d_{t-1} > 90]\big(\mu^h_{high} + \alpha^h_{high}(L)x_{i,t} + \beta^h_{high} g_{i,t}\big) +$$

$$1[d_{t-1} \leq 90]\big(\mu^h_{low} + \alpha^h_{low}(L)x_{i,t} + \beta^h_{low} g_{i,t}\big) + \delta_t + a_i + \varepsilon_{it} \quad (eq.\,2)$$

---

[36] These conclusions are drawn in most part based on a highly endogenous measure of fiscal policy, that is, the change in the headline budget balance or primary balance, with some robustness checks using alternative measures. Moreover, while the overall inflation response is found to be larger in the sub-sample of developing economies compared to the developed ones, most of the state-dependency results (one state only as shown in our step 1 below) are presented only for the whole sample.

[37] Broadly following the method in Corsetti at al. (2012) and regressing the DM variable for individual countries on the first two lags of real GDP growth and the lagged value of the OECD composite leading indicator, which proxies for the government pre-budget expectations with respect to next-year growth.

[38] This follows the specifications in Jorda and Taylor (2016) and Cloyne et al. (2023) to explain variation in real output. The shadow (short-term nominal) interest rate for the euro area (Wu and Xia, 2020) is used as a proxy for the monetary policy stance. Output gap estimates up to 2022 are taken from the Eurosystem's June 2023 macroeconomic projection database.

[39] Acknowledging the endogeneity of the debt-to-GDP ratio to fiscal shocks, we also note its relative persistence and slow adjustment to the shock, especially when the latter is rather moderate as in our sample. Hence, the maximum shock in our data being only around four times the standard deviation mitigates the concerns raised in Gonçalves et al. (2023), where values around ten were considered problematic. Moreover, while the average debt ratio increases over our sample period, the results broadly hold for a debt threshold of 70% of GDP (about the median of the sample, entailing a more stable grouping of countries). Finally, we go beyond exogenous debt thresholds in step 2 of our analysis (see below).
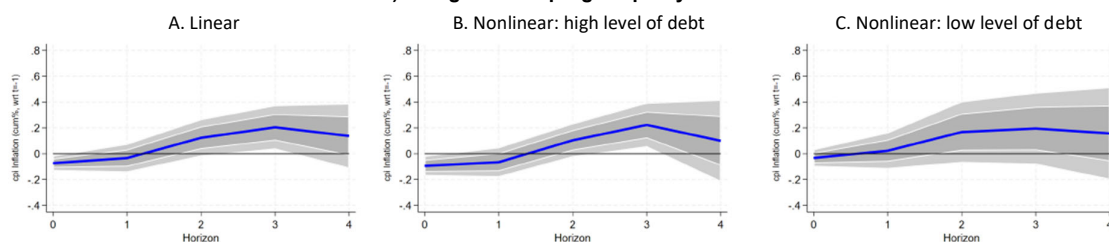
Figure 1 illustrates the results in terms of headline inflation for the linear and non-linear specifications, with the initial DM measure for the fiscal shock (panel a) and the purged DM (panel b).

Figure 1: Impact of 1% of GDP fiscal stimulus on headline (cumulative) inflation

a)   Using the discretionary fiscal policy measures (DM) proxy for fiscal shocks

A. Linear	B. Nonlinear: high level of debt	C. Nonlinear: low level of debt
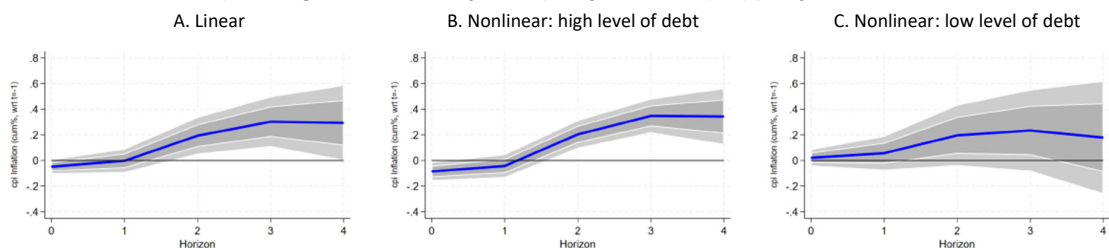
b) Using the DM "purged" proxy for fiscal shocks

A. Linear	B. Nonlinear: high level of debt	C. Nonlinear: low level of debt

Notes: Impulse responses estimated according to eq. 1 and 2 and shown in cumulative terms at each horizon after the fiscal shock in year t-1. Shaded areas are 68% (dark) and 90% (light) confidence intervals. Panel of 12 euro area countries over 1999-2022.

The results indicate that inflation (both headline shown above and core) tends to rise following an expansionary fiscal policy shock, particularly when the economy carries a high debt burden before the shock. Specifically, five years after a +1% of GDP fiscal stimulus, economies with high starting levels of debt witness an additional +0.4 pp cumulative headline inflation. The most significant (both statistically and economically) impact tends to manifest between the third and fourth years after the shock (h=2, 3), with relatively muted effects in the short term. For the low debt countries, the effect is weaker and mostly not statistically significant. The conclusions broadly hold (albeit weaker statistically) for the purged measure of the fiscal shock (panel b) (similar results are obtained with the 3rd identification strategy for the panel of OECD countries).

In a second step, we go further in testing the robustness of the non-linear effects in debt. While previous studies commonly explore a single state dependency at a time, our approach involves a joint analysis of various potential state dependences.[40] To this end, we use the local projections method with the Kitagawa-Blinder-Oaxaca (KBO) decomposition (eq 3) as proposed in Cloyne, Jorda, Taylor (2023). This allows to assess any changes in the inflation effects of a fiscal stimulus shock according to the level of public debt (in this specification, as a continuous variable) when accounting *simultaneously* for the indirect effects of the fiscal shock interaction with the euro area-wide monetary policy stance[41] (proxied by the shadow interest rate, x_r) and the state of the economy (output gap, x_{OG}). As discussed in Cloyne et al. (2023), by adding the various interaction terms, this specification allows to better control for neglected estimation biases, as policy interventions can modify how other variables influence the (inflation) outcomes.

$$\frac{cpi_{i,t+h} - cpi_{i,t-1}}{cpi_{i,t-1}} \cdot 100 = \mu^h x_{i,t} + \beta^h g_{i,t} + \delta_t + a_i + \beta^h_{debt} g_{i,t}(x^{debt}_{i,t} - \bar{x}^{debt}) +$$
$$\beta^h_r g_{i,t}(x^r_{i,t} - \bar{x}^r) + \beta^h_{OG} g_{i,t}(x^{OG}_{i,t} - \bar{x}^{OG}) + \varepsilon_{it} \quad (eq.3)$$

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[40] As mentioned in Cloyne, et al. (2023), this is a type of "selection-on-observable" strategy.
[41] For the monetary policy stance, the interaction can depend on the type of fiscal shock (incidence of higher interest rates at times of fiscal stimulus and lower interest rates at times of consolidations), which we account for with 2 separate interaction terms for $x^r_{i,t}$. Note that in this exercise we do not capture the *endogenous reaction* of the monetary policy to the fiscal shock.

The finding of non-linear effects of a fiscal shock on inflation according to the level of debt holds also in this specification (Table 1). The effects are somewhat stronger (both statistically and economically) for core inflation. The indirect effects in debt are also statistically significant. According to the KBO specification, a 1% of GDP fiscal stimulus in a country with government debt at around 70% of GDP (sample mean) brings about 0.2 pp higher cumulative core inflation after 5 years, but 0.3-0.4 pp more when debt is higher by 1 standard deviation (about 35 pp of GDP). As shown in Table 1, when considering instead the interaction with the monetary policy stance, the impact of a 1% of GDP fiscal stimulus (indicated as +DM) on core inflation is by 0.9 pp lower (with DM purged) when short-term rates are 1 standard deviation (about 3.75 pp) above the mean. Conversely, in the case of a fiscal consolidation of 1% of GDP (indicated as -DM), core inflation decreases by 0.8 pp (with DM purged) in a scenario where short-term interest rates are 1 st.dev. higher than the mean.

Table 1: Non-linear effects of 1% of GDP fiscal stimulus on headline and core inflation with the KBO decomposition

		Debt	Interest rate +DM	Interest rate -DM
HICP Infl.	DM	0.22**	0.19*	-0.39*
		(0.13)	(0.27)	(0.39)
	DM purged	0.21*	-0.32*	-0.57*
		(0.14)	(0.40)	(0.37)
Core Infl.	DM	0.36***	-0.04	-0.57**
		(0.11)	(0.21)	(0.28)
	DM purged	0.28***	-0.87***	-0.77**
		(0.13)	(0.34)	(0.40)

Notes: The table shows nonlinear effects (coefficients of the interaction terms in debt and shadow interest rate) for the fiscal shocks identified as DM or DM purged at horizon h=4. Standard errors in parenthesis. Significance level *68%, **90%, ***95%.

To conclude, this Box finds evidence of higher inflationary effects of a fiscal stimulus in regimes of high(er) government debt and lower effects in times of high(er) interest rates.

4. Risks to price stability

"What a government spends the public pay for. There is no such thing as an uncovered deficit."[42] In the previous section, we described a monetary-fiscal policy configuration where, at least in normal times, government spending is financed by a stream of current and future tax revenues. At very high debt levels, it can, however, become more difficult for fiscal authorities to abide by this benchmark configuration, both, for economic reasons – e.g. fiscal limits – and for political economy reasons. How does the public pay for the government's expenditures in this case? One possibility is sovereign default. If the government decided to default, bondholders would bear the cost in the form of lower net worth. Another possibility is debt monetisation. If the central bank stood ready to buy the government debt that the private sector refuses to roll over, the deficit would be financed by an inflation tax. The latter monetary-fiscal configuration is often referred to as fiscal dominance.

When a government defaults on its nominal debt, the nominal value of its obligations declines. Suppose that the present value of primary surpluses is unaffected by the government's decision to default. Then, for the intertemporal budget constraint of the government to be satisfied, the price level must fall. This happens because households, who see the value of their bond portfolio lowered by the government defaulting on its obligations will reduce their consumption plans, leading to dis-inflationary pressures.

The overall effect of sovereign default on inflation is ambiguous. That is because, in reality, it is hard to maintain that the expected present value of primary surpluses remains unaffected by default. The expected present value of surpluses might change due to a variety of reasons. The macro literature has identified two types of costs associated with sovereign default (e.g. Arellano, 2008). First, a defaulting country often loses access to financial markets after default, at least for some periods. Second, default can trigger reputation losses, sanctions, and resource misallocations, that can result in productivity losses. Lower productivity, in turn, can generate inflationary pressures (Arellano et al., 2023).

In a recession, fiscal authorities may face a trade-off between fiscal stimulus aimed at stabilising economic activity and fiscal austerity aimed at containing default risk. Absent the risk of sovereign

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[42] Keynes (1923), chapter 2.

default, a fiscal stimulus may be the optimal response to a recession (Bianchi, Ottonello and Presno, 2023). When there is no large crowding out of private consumption following a fiscal stimulus, say because of the presence of hand-to-mouth households and some nominal rigidities, then fiscal multipliers are high and there are welfare gains from conducting countercyclical fiscal policies. However, when there is the risk that the government might default on its debt obligations, a trade-off arises between fiscal stimulus and austerity.[43] In this situation, issuing more debt to finance fiscal stimulus raises sovereign spreads.[44] If the increase in sovereign spreads is big enough, the stimulative effects of a fiscal expansion may be overturned, and fiscal austerity might become preferable to fiscal stimulus.

The trade-off between stimulus and austerity worsens the higher a country's debt burden. The level of government debt may significantly affect how a government should respond to a recession. If the level of debt is low, it is optimal for the government to stimulate the economy as the Keynesian forces prevail on sovereign default considerations. If, on the other hand, the level of debt is high, it may be optimal for the government to cut spending to reduce default risk and avoid a costly default (Bianchi, Ottonello and Presno, 2023).

The mere possibility of default may trigger *belief-driven* increases in sovereign yields, which are unrelated to countries' fundamentals. Even if governments were eventually able to raise taxes and/or cut spending to repay their debts, bond holders may not believe it. This, in turn, may trigger a spike in sovereign yields. The mere expectation of default might become self-fulling.[45] Intuitively, there is a feedback effect between interest rates and the debt burden.[46] When interest rates increase, the debt burden rises as countries face higher debt service expenditures. A higher debt burden may eventually drive countries into insolvency, thus justifying the initial rise in interest rates. This may happen abruptly, as in a rollover crisis, or build up over time, as in a slow-moving debt crisis.[47] Member countries of a monetary union may be more prone to self-fulfilling rollover crises than countries with monetary independence and a flexible exchange-rate regime (Bianchi and Mondragon, 2022).

Central banks can help ruling out *self-fulfilling* sovereign debt crises by conducting balance sheet policies.[48] Key to a successful prevention of this type of crises is the ability of central banks to issue nominal liabilities (reserves) which are convertible into currency at par. These liabilities bear an interest rate that is lower (possibly zero) than the one borne by sovereign bonds, which are subject to default risk. When purchasing sovereign bonds by issuing reserves, central banks are effectively swapping higher interest-rate bearing liabilities with lower interest-rate bearing liabilities. When doing so to a sufficiently large scale, they reduce the overall cost of debt service to such an extent that sovereign default might no longer be the most convenient strategy for the government, which then decides to honour its debt.

A central bank can also help a fiscal authority to avoid *fundamental-driven* debt crises at the cost of giving up on its price stability goal. In this case, monetary dominance gives way to fiscal dominance. The literature has studied different models of fiscal dominance. The classic model goes back to Sargent and Wallace (1981). Consider the consolidated intertemporal budget constraint of an economy with its own currency and suppose that there is a sudden fall in the primary surplus (perhaps due to a recession) that – unlike under the benchmark active money, passive fiscal regime – is not offset by a corresponding increase in the expected present value of future surpluses. Then, in the classic model, the central bank is forced to issue additional non-interest bearing reserves used to buy

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[43] Bianchi, Ottonello and Presno (2023) consider a small open economy framework with a fixed exchange rate. As they point out, one can think of such a country as a member of a monetary union.

[44] See the seminal work of Giavazzi and Pagano (1990). More recent examples can be found in Mendoza and Yue (2009); Corsetti et al. (2013); Bocola (2016).

[45] There is an extensive literature on self-fulfilling public debt crises, starting with the seminal work of Calvo (1988). Self-fulfilling debt/rollover crises in monetary unions are considered in, e.g., Corsetti and Dedola (2016), and Bianchi and Mondragon (2022).

[46] This has been firstly formalized in a two-period model by Calvo (1988) and then extended to a dynamic setting with long-term bonds by Lorenzoni and Werning (2018).

[47] See Cole and Kehoe (2000) for a workhorse model of rollover crises and Lorenoni and Werning (2018) for a model of slow-moving debt crises.

[48] See Section 4 of Corsetti et al. (2019) and Corsetti and Dedola (2016) for a discussion on how central bank balance sheet policies can act as a backstop to self-fulfilling creditor runs.

government bonds. The increase in central bank reserves has to be sufficiently large that the rise in seigniorage revenues – which the central bank remits to the fiscal authority – compensates for the decline in the present value of primary surpluses. In this case, the government remains solvent, and default is avoided. However, for the private sector to be willing to hold a larger amount of reserves the nominal interest rate must fall, potentially below the level consistent with price stability. The central bank, thus, may be forced to tolerate higher inflation.[49] A central bank in a monetary union might be more shielded from this type of fiscal dominance than a central bank in an economy with its own currency, for it is likely more difficult for the fiscal authority of an individual member country to force the common central bank to monetise its debt.

More recently developed models of fiscal dominance suggest that the price level itself, rather than seigniorage revenues, may adjust to ensure that the real value of nominal government obligations equals the present value of surpluses and seigniorage revenues. These models are often associated with the "fiscal theory of the price level" (FTPL).[50] Consider, again, a sudden fall in the expected present value of primary surpluses in an economy with its own currency. To emphasise the difference with the classic model of fiscal dominance, we abstract from seigniorage revenues.[51] Suppose, the central bank stands ready to buy government bonds in order to stabilise government bond prices at the levels prevailing prior to the fiscal shock. If the central bank's promise is credible, the private sector is willing to buy government bonds at these prices (and the central bank may not have to buy a large amount, if any, of the bonds). The drop in the present value of primary surpluses raises households' disposable income. Households, thus, would like to consume more. The increase in aggregate demand leads to an increase in the price level. In equilibrium, the price level increases by the amount necessary to balance the real value of total government obligations and the expected present value of primary surpluses.[52] With long-term government bonds, the inflation rate increases persistently. When prices are sticky, output may increase as well. Barro and Bianchi (2023) aim to assess how much of the inflation surge between 2020 and 2022 in a set of OECD countries can be accounted for by (seemingly) unbacked fiscal expansions in the spirit of the FTPL. According to their empirical analysis, the highly expansionary fiscal policy stance in many OECD countries has been a key driver of inflation during this episode.

In a monetary union, it may be sufficient for a single member country to deviate from the benchmark policy regime for fiscal dominance to arise. Consider a monetary union with multiple national fiscal authorities, and recall that in this case it is the sum of national real primary surpluses that matters for fiscal backing. Suppose that all national fiscal authorities but one pursue passive fiscal policies consistent with the benchmark policy regime described in Section 3 – that is, they adjust primary surpluses such that their national intertemporal budget constraint is satisfied for any path of the price level. The deviating national fiscal authority, instead, does not adjust its primary surplus in response to changes in the real value of national government debt. Then, in standard models of the FTPL, the price level of the monetary union adjusts so that in equilibrium the intertemporal budget constraint of this individual member country is satisfied. To provide an example, suppose the fiscal authority of said member country lowers the present value of its primary surpluses. In equilibrium, the union price level goes up. As a result of the rise in the price level, the real value of government debt in all member countries declines, and, hence, the national fiscal authorities of the other member countries will, consistent with passive fiscal policy behaviour, lower the present value of their primary surpluses accordingly. This model property, that the union price level may be determined by the behavior of a single member country even if said country accounts only for a small share of union GDP, has received some skepticism. Indeed, in FTPL models that deviate from the standard model in terms of how

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[49] Barthélemy, Mengus and Plantin (2024) using a model of dynamic strategic interactions between fiscal and monetary authorities that pursue distinct objectives analyse under which circumstances the fiscal authority has an incentive to enforce fiscal dominance.

[50] See Cochrane (2023) for a textbook treatment. To be clear, in models of the FTPL monetary and fiscal policy together can achieve price stability. Here, we focus on the case where fiscal policy behavior puts price stability at risk.

[51] In advanced economies, non-interest-bearing money accounts only for a small part of total government liabilities.

[52] Note that in FTPL models at least part of government debt has to be nominal, whereas in the classic model of fiscal dominance it is immaterial whether government debt is issued in nominal or real terms.

expectations are formed, the relative size of the country deviating from passive fiscal policy can matter for the effect of its fiscal behavior on the union-wide price level.[53]

Under fiscal dominance, policy rate increases may further amplify rather than contain inflationary pressures. If the central bank raises the policy rate in response to the rise in inflation after an unbacked fiscal expansion, bond prices fall, inducing a negative wealth effect on households. Hence, all else equal, the price level will initially increase by less than if the central bank had kept the policy rate constant. However, when the policy rate increase is persistent, the Fisher effect, a common feature of standard macroeconomic models, will eventually dominate, and a higher policy rate will go hand in hand with higher inflation. When prices are sticky, the policy rate increase will also lead to higher real interest rates. Higher real rates dampen economic activity and reduce the tax base, thus further reducing the present value of future surpluses. In the absence of fiscal adjustments, the policy rate increase may then lead to even more inflation.[54] Hence, the effect of monetary policy actions, in general, depends on how fiscal policy reacts, and may, under fiscal dominance, fail to have the intended effect.[55]

The mere private sector perception of fiscal dominance risk can complicate the central bank's task to achieve price stability.[56] Suppose the private sector attaches a positive probability to the possibility that the policy regime may shift from monetary dominance to fiscal dominance. That is, households are uncertain whether future primary surpluses will be sufficiently high to back current government debt. This is a plausible scenario, given the high uncertainty associated with (discounted) future surpluses. Then, the (perceived) risk of a future shift to fiscal dominance raises inflation expectations. The more likely the future occurrence of fiscal dominance according to private sector beliefs, and the larger the surge in inflation expected under fiscal dominance, the stronger the increase in inflation expectations. In standard macroeconomic models, higher expected inflation puts upward pressure on current inflation. Under monetary dominance, the central bank will raise the policy rate to lower the output gap and mitigate inflationary pressures. However, for standard parameterisations of monetary policy rules, the monetary policy tightening will not fully offset these pressures. Moreover, if the central bank raised its policy rate more aggressively so as to better stabilise inflation, this attempt could backfire. Suppose that the probability of a shift to a regime of fiscal dominance is increasing in the government debt ratio. Then, the more aggressively the central bank tightens the policy rate, the larger, ceteris paribus, the increase in debt servicing costs, and, thus, the upward pressure on the debt ratio. In equilibrium, the associated increase in fiscal dominance risk may raise, rather than lower, the inflation rate compared to the case where the central bank raises its policy rate more moderately. See Box C, which summarises a recent study of monetary-fiscal policy interactions in a model with endogenous policy regime shifts.

Box C: Fiscal dominance risk and inflation stabilisation

by S. Schmidt

This box explains how fiscal dominance risk can make it more complicated for the central bank to stabilise inflation. The discussion is based on Schmidt (2023). Consider a fiscal authority that is limited in its willingness or ability to raise primary surpluses. Specifically, the fiscal authority sets the real primary budget surplus according to a feedback rule with an upper limit. When the real value of government debt is not too high, a moderate surplus is sufficient to maintain fiscal stability. An increase in the real value of government debt leads to an increase in the primary surplus and vice versa. The central bank, in this environment, focuses on its price stability goal and sets the policy rate according to a conventional Taylor rule. That is the orthodox policy regime. When, instead, the real value of government debt is high, moderate surpluses are no longer sufficient to maintain fiscal stability, and the

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[53] Specifically, standard models of the FTPL assume rational expectations. See Maćkowiak and Schmidt (2023), Online Appendix F for a backward-looking FTPL model of a monetary union.

[54] Bianchi and Melosi (2022) refer to this phenomenon as "fiscal stagflation".

[55] See also Sims (2023).

[56] See, for instance, Davig and Leeper (2006) and Schmidt (2023).

surplus limit binds. An increase in government debt no longer leads to an increase in primary surpluses – the economy is in a fiscally-dominant regime. If the central bank sticked to the conventional Taylor rule, fiscal stability could be at risk, for an increase in policy rates, which raises debt servicing costs, would feed into a higher debt burden with no adjustment in surpluses. Such fiscal instability ultimately erodes price stability. As Sargent (1982) notes, under fiscal dominance "the fiscal authorities select a path or policy for government expenditures and explicit taxes implying growth rates of government indebtedness to which the monetary authority must adjust." Suppose, then, that the central bank adjusts by deviating from the conventional Taylor rule and keeping the policy rate below some upper bound.

Schmidt (2023) analyses the macroeconomic consequences of this monetary-fiscal policy configuration in a New Keynesian rational-expectations model with sticky prices. In the model, the economy endogenously shifts from the orthodox regime to the fiscally-dominant regime. The adjustment in the monetary policy rule when the economy is in the fiscally-dominant regime helps to preserve fiscal stability. At the same time, the central bank generically fails to achieve its price stability goal. Inflation is systematically higher than it would be if fiscal policy always ensured government debt sustainability and the central bank was solely concerned with inflation stabilisation. In the model, this inflation bias increases with the real value of government debt.

Consider an economic environment akin to the one many economies faced in 2021/2022: Inflation and policy rates have been low for a long time, and government-debt-to-GDP ratios are high. Then, the economy is hit by a large and persistent inflationary shock. The central bank, in line with a conventional Taylor rule, raises the policy rate more than one-for-one with inflation. As a result, debt servicing costs increase and the real value of government debt rises. The fiscal authority initially responds to the rise in the debt level by raising its primary surplus, but at some point the surplus limit becomes binding. The economy has entered the fiscally-dominant regime. In the fiscally-dominant regime, the central bank's interest rate response is asymmetric. It always lowers the policy rate aggressively in response to disinflationary shocks but, because of the conditional interest rate upper bound, it does not necessary raise the policy rate by much, if at all, in response to inflationary shocks. Thereby, monetary policy helps to preserve fiscal stability. At the same time, the inflation response to shocks also becomes asymmetric. Inflation increases more in response to inflationary shocks than it declines in response to disinflationary shocks of the same magnitude.

Agents internalise the asymmetric inflation profile. The mere possibility of a future shift from the orthodox to the fiscally-dominant regime moves inflation expectations upwards. Higher inflation expectations, in turn, put upward pressure on actual inflation. The central bank, abiding by the Taylor rule, raises the policy rate to counteract the inflationary pressures. Yet, for standard parameterisations of the monetary policy rule the central bank does not fully offset these inflationary pressures. The upshot is the inflation bias. The higher the real value of government debt, the higher is, ceteris paribus, the probability of a future shift to the fiscally-dominant regime. Hence, the inflation bias is an increasing function of the debt level.

What, if anything, can the central bank do to preserve price stability or at least mitigate the inflation bias without putting fiscal stability at risk? The central bank can reduce the probability of a shift to the fiscally-dominant regime by refraining from raising the policy rate too aggressively in response to inflation, though still sufficiently aggressively that real interest rates go up – consistent with its commitment to price stability. A more moderate interest rate increase in response to inflationary shocks mitigates the fiscal consequences of the monetary tightening. Lower fiscal dominance risk, in turn, helps to anchor agents' inflation expectations at the central bank's target. The inflation bias contracts and may even disappear. Inflation volatility may decline as well. While a more moderate response to inflation, ceteris paribus, increases inflation volatility, reducing fiscal dominance risk lowers inflation volatility.

These results come with some caveats. First, in the model, agents have perfect knowledge of the central bank's reaction function. In practice, the private sector may misinterpret a moderate response to inflation as an implicit renouncement of the price stability goal. Second, in the model, the fiscal authority's reaction function is invariant to the central bank's reaction function. In practice, the fiscal authority could be tempted to exploit, and, thereby, undo the central bank's attenuation of fiscal dominance risk.

Box D: How to separate short-run macroeconomic stabilisation from the goal of long-run fiscal sustainability?

by A. Rogantini Picco

According to Bianchi, Melosi and Rogantini Picco (2023), the euro area policy framework may have exposed its member states to the opposite risks of deflation and high inflation as it did not separate the need for short-run macroeconomic stabilisation from the issue of long-run fiscal sustainability. This Box summarises a proposal for institutional reform by Bianchi et al. aimed at addressing these risks.

Following a large contractionary shock, strict fiscal rules may prevent coordination between the monetary and fiscal authorities to avoid the lower bound on nominal interest rates. Both low- and high-debt countries experience contractions in real activity, albeit it is also worthwhile emphasising the evidence pointing to much larger contractions in highly indebted (fiscally weak) countries (see Sections 2 and 3). Suspending the fiscal rules, on the other hand, allows for fiscal interventions, but also exposes the monetary union to the risk of high inflation and fiscal stagflation whenever a country refuses to return to strict fiscal rules once the contractionary shock is reabsorbed.

To illustrate these points, Bianchi et al. build a two-agent New Keynesian model of a monetary union with a high-debt country and a low-debt country to evaluate three post-pandemic scenarios for the euro area. In the first scenario, similarly to pre-pandemic arrangements, the national governments of the euro area agree on a set of fiscal rules requiring large national debts to be stabilised through distortionary fiscal adjustments. In the second scenario, they study the possibility that a high-debt country refuses to return to the common fiscal rules in the aftermath of a large contractionary shock. In the third scenario, they introduce a novel policy framework in which a centralised fiscal authority is responsible for implementing stabilisation policies in the euro area. This centralised Treasury issues Eurobonds that during regular times are backed by taxes collected among the country members. Under this new monetary and fiscal arrangement, national governments remain fiscally responsible to stabilise their own debt as in the past. However, this last scenario allows for coordination between the monetary and fiscal authorities on how to stabilise the increase in the volume of Eurobonds issued in the face of a large contractionary shock.

They calibrate the model to two euro area member countries with substantially different debt-to-GDP ratios: Italy and Germany. They then evaluate the ability of the three policy arrangements to stabilise the monetary union economy and at the same time avoid the risk of high inflation and fiscal stagflation. For this purpose, they consider a demand-driven recession that can push the euro area against the interest-rate lower bound.

In the first model-based scenario, *Fiscal Discipline*, the national fiscal imbalances accumulated following the large contractionary shock are expected to be entirely corrected by higher distortionary taxes and lower expenditures. The recession is particularly deep for the high-debt country, but the low-debt country also suffers a severe contraction in real activity. This result emerges for two reasons. First, the two economies are characterised by a large degree of interdependence due to their strong trade links. Second, the low interest rate environment turns out to critically limit the central bank's ability to alleviate the adverse effects of the recessionary shock and of the large fiscal adjustments implemented in the high-debt country.

In the second scenario, the fiscal rules are temporarily suspended to provide fiscal stimulus during the recession. However, once the shock is reabsorbed, the high-debt country refuses to implement the necessary fiscal adjustments. In the model, this situation leads to a *Conflict* with the common monetary authority. If the central bank is expected to lose this conflict, perhaps because a default of the high-debt country would be a threat to the survival of the whole currency union, the monetary union experiences an increase in inflation. The increase in inflation can be very large if agents are concerned that a significant portion of the pre-existing debt will be stabilised via inflation. If the central bank responds to

the inflationary pressure by tightening monetary policy before the institutional conflict is resolved, the monetary union can enter a vicious circle of stagflation and debt accumulation. If the private sector expects the central bank to eventually accommodate the rise in inflation needed to stabilise the fiscal imbalance of the defiant country, inflationary pressure in the monetary union intensifies because of the larger debt-to-GDP ratio in the high-debt country. In the model, the resulting spiral of monetary tightening, followed by a deeper recession and higher inflation causes serious harm to both the high- and low-debt countries. The low-debt country ends up being affected by the higher inflation rate needed to stabilise the fiscal imbalance of the high-debt country. This scenario can usher in a prolonged period of heightened macroeconomic volatility if the monetary union enters a regime of fiscal dominance.

The third scenario considers a *New Fiscal Framework,* under which a centralised Treasury can issue Eurobonds. Eurobonds are exclusively used to finance stabilisation policies, while individual countries remain responsible for their long-term spending programmes. During regular times, the common budget is backed by future primary surpluses to be raised symmetrically across member countries. However, when an exceptionally large area-wide recession occurs, the resulting increase in Eurobonds will be addressed by a coordinated monetary and fiscal policy mix. In this coordinated scenario, the monetary authority stands ready to tolerate the moderate increase in inflation needed to stabilise the amount of Eurobonds issued in response to the large recession. This moderate reflation of the economy prevents the monetary union from entering the lower bound and a deflationary state, restoring monetary policy as an important stabilisation tool.

The increase in the Eurobonds debt-to-GDP ratio is not a discretionary choice of national governments. Rather, the common central bank and national fiscal authorities agree on a fiscal rule to establish the policy response to large area-wide recessionary shocks. Moreover, the existence of a common budget devoted to stabilisation policies implies that country-specific fiscal imbalances resulting from past and future decisions of the national governments will be covered by the taxpayers in the respective member countries.

In the New Fiscal Framework scenario, the centralised Treasury's spending works as an automatic stabiliser by moderately increasing inflation at the onset of a recession. In the model, these effects on inflation are particularly helpful in mitigating the severity of a recession because they allow the monetary union to avoid or shorten the duration of the lower bound. In the meantime, the national fiscal authorities remain responsible to stabilise their own debt. This preserves long-run macroeconomic stability. In the model simulations, when monetary policy is not constrained, a high debt country experiences a slower recovery than a low-debt country, because it needs to implement a larger fiscal adjustment. The spillover effects for the low debt country are relatively modest, because the central bank is able to neutralise the headwinds due to the large fiscal adjustments. Thus, when monetary policy is unlikely to become constrained, the low debt country has no interest in moving away from fiscal discipline. However, in a low-interest-rate environment, recessions are more severe in both countries because monetary policy is constrained by the lower bound. In this case, the moderate increase in inflation resulting from monetary-fiscal coordination at the union level mitigates the recession both in the high- debt country and in the low-debt country.

5. Protecting price stability – fiscal policymakers' incentives and monetary policy trade-offs

Central banks' policies influence fiscal policymakers' incentives. For instance, a central bank that is credibly committed to neither monetise public debt nor support government bond prices leaves economies with a shortfall in primary surpluses with the stark choice between fiscal consolidation and sovereign default. Faced with this choice, a fiscal policymaker may find it optimal to raise primary surpluses rather than risking default (Bianchi et al., 2023).[57] Alternatively, the fiscal policymaker might

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[57] In some circumstances, a (partial) sovereign default may be unavoidable. An orderly public debt restructuring mechanism should thus be an important element of the institutional setting. In the case of the euro area, an orderly restructuring of national

be more reluctant to consolidate if she expects the central bank to step in and conduct secondary market purchases of public sector securities. Fiscal risks to price stability thus depend on expectations about monetary policy.[58]

At the same time, a central bank that credibly rules out *any* government bond purchases may find it difficult to prevent, and may make economies prone to, disorderly market dynamics and self-fulfilling creditor runs on public debt. In principle, the institutional setting of a monetary union could feature a common fiscal backstop for member countries whose fiscal policies are conducive to national public debt sustainability. In the absence of a fiscal backstop, however, the susceptibility of government bond prices to self-fulfilling market dynamics will depend not only on national public debt ratios but also on market participants' expectations about monetary policy. According to Schnabel (2024b), the euro area was confronted with the risk of multiple equilibria in bond markets during the 2012 sovereign debt crisis and during the Covid-19 pandemic. Thus, in 2012, the ECB announced the Outright Monetary Transactions programme to contain these risks. During the pandemic, the ECB relied on flexibility in the allocation of asset purchases under the PEPP, as well as the Transmission Protection Instrument, as discussed in Section 2.

The common central bank of a monetary union will thus occasionally face a trade-off between market stabilisation considerations and potential negative side effects on fiscal policymakers' incentives for ex-ante fiscal prudence (moral hazard).[59] The ECB, in its 2020-2021 Strategy Review, acknowledges that monetary policy measures, in particular when they involve the use of instruments other than standard policy rates, may have unintended side effects on the real economy and on the financial system (ECB, 2021a). The discussion in this paper emphasises the possibility of unintended side effects on fiscal policy.

To account for these potential negative side effects, the ECB's monetary policy decision making process entails a systematic proportionality assessment of its policy measures. The proportionality assessment analyses both the benefits and the possible side effects of monetary policy measures. The outcome of the assessment "may affect both the intensity with which these measures are employed and their design, which can be calibrated to limit side effects [...]" (ECB, 2021a). To contain possible negative side effects on fiscal policy, the conditionality attached to the use of policy measures that involve secondary market purchases of public sector securities, and the credible commitment to revert them in case conditions are no longer met are likely to be key. A particular challenge arises in the context of policies that are aimed at preventing "disorderly market dynamics", for, in practice, it is difficult to tell apart fundamental and non-fundamental movements in prices.

Various proposals aim at reforming the institutional setting of EMU with a view to unburden the ECB and provide fiscal policymakers with incentives that are conducive to public debt sustainability and price stability.[60] A thorough assessment of these proposals is beyond the scope of this paper. In the literature, a fully-fledged fiscal union complementing monetary union is often characterised as a first best institutional setting (e.g. Farhi and Werning, 2017). Several contributions propose the creation of a central fiscal capacity as an intermediate solution (e.g. Corsetti et al. 2019; Bianchi et al. 2023; Draghi 2023; Beetsma et al. 2024).[61] While not free of political economy constraints and trade-offs in terms of incentives for prudent fiscal policy, a well-designed central capacity could help to facilitate an appropriate aggregate fiscal stance for the euro area, in particular in the face of large shocks. It could also provide support to member countries whose fiscal policy is ex-ante consistent with the objective of debt sustainability so as to contain the risk of self-fulfilling creditor runs on national public debt.

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public debt by a member country should take place without prejudice to the country's membership in the euro and the European Union. See also Corsetti et al. (2019).

[58] Article 123 of the Treaty on the Functioning of the European Union, which prohibits monetary financing in the form of ECB or NCB purchases of public debt instruments on the primary market, provides an explicit institutional safeguard against fiscal dominance risk in the European Union.

[59] A similar trade-off may occasionally arise between, on the one hand, financial stability considerations and, on the other hand, private and public sector incentives (Brunnermeier, 2023).

[60] See Haroutunian et al. (2024) for an overview and discussion of the recent reform of the EU's fiscal framework.

[61] See Box D for a summary of the Bianchi et al. (2023) proposal.

On the shorter to medium-run, the fiscal priorities in the euro area remain the reduction of high debt burdens and cross-country debt heterogeneity, supported by a more growth-friendly composition of fiscal consolidation. To achieve this, as pointed out in Haroutunian et al. (2024), who discuss the recent reform of the EU's fiscal framework, a credible implementation of the new rules would be crucial. The more successful the new fiscal framework would prove in reducing fiscal vulnerabilities and incentivising growth-enhancing reforms and investment, the higher the trust among Member States in taking further steps towards deeper fiscal integration in the euro area. As this paper has emphasised the risks associated with high government debt for price stability, pushing forward with fiscal prudency under the new rules would also effectively support ECB's monetary policy in achieving its main objective.

6. Conclusion

An independent central bank alone may not be able to ensure price stability. In a monetary union, price stability requires suitable commitments from the common central bank and from *all* national fiscal authorities. Sustainable public finances are a key element of the fiscal policy commitment. A sustainability-oriented fiscal policy eventually raises primary balances when monetary policy tightens, and vice versa, thereby providing the fiscal backing for monetary policy. In the euro area, elevated public debt ratios in a subset of member countries coupled with the prospect of heightened demands on public expenditures and a persistently higher interest rate-growth rate differential could lead to an environment where some national fiscal authorities find themselves unable or unwilling to generate sufficiently large primary balances, which, in turn, may pose a threat to price stability. Fiscal risks to price stability are, however, not necessarily orthogonal to monetary policy, for central banks' policies affect fiscal policymakers' incentives to abide by their commitments. The changed environment since 2021 suggests that central banks may want to pay particular attention to potential unintended side effects on fiscal policymakers' incentives when weighing the benefits and potential costs of their monetary policy measures.

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