# Fiscal rules and debt in the 21st century: a brief overview

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Since the turn of the millennium, it has become increasingly common to attempt to improve public finances through the implementation of fiscal rules. These rules vary significantly across economies in terms of the fiscal variables they regulate, the target levels they prescribe, and their enforcement and monitoring mechanisms. However, evidence remains mixed on whether fiscal rules actually lead to better fiscal outcomes. Public debt levels have increased in most advanced economies despite the widespread introduction of fiscal rules, partly due to various crises, the relationship between interest rates and economic growth, changing demographics and political economy elements. Cross-country differences in these factors have also caused public debt levels to increasingly drift apart. In economies where the increase has been particularly sharp, concerns have even been raised regarding fiscal sustainability. Unfortunately, fiscal sustainability is difficult to evaluate because of uncertainty regarding future budgetary behaviour, interest rates and economic growth.

## 1 Introduction

Recent years have seen a growing amount of attention on the connection between monetary and fiscal policy, and the potential need for a greater coordination between the two.[1] At the same time, changing demographics and the need for greater public investment in defence, infrastructure and the green transition appear to be moving fiscal policy in many advanced economies in a more expansionary direction. Some economies have recently chosen to relax their fiscal rules in order to finance such investments.[2] This move towards more expansionary fiscal policy is occurring in an environment where public debt levels in many economies are already historically high, which raises concerns about fiscal sustainability in the more extreme cases.

With increasing focus on monetary-fiscal policy coordination, a shift toward more expansionary fiscal policy, and concerns about fiscal sustainability, fiscal developments are likely to play a greater role in monetary policy analysis going forward. To contribute to a better understanding of these developments, this article

* We thank Anders Vredin, Hanna Armelius, Iida Häkkinen Skans, Magnus Jonsson, Mårten Löf, Peter Sheikh Kvarfordt, Pär Stockhammar, Stefan Laséen and Ulf Söderström for valuable comments.

[1] See, for instance, Leeper (2018), de Brouwer et al. (2023), Sims (2016), Barro and Bianchi (2023), Blanchard (2021), Cochrane (2022) and Ascari et al. (2025).

[2] Specifically, Germany (see Shukla, 2025) and the European Union (European Commission, 2025).

aims to provide a brief overview of a few major fiscal policy themes over the past three decades. Specifically, we focus on fiscal rules, public debt developments, and fiscal sustainability, drawing on insights from previous literature and illustrating our points using data on the United States, Germany, France, Sweden, and the aggregate of the European Union (EU).

Section 2 provides an overview of fiscal rules, which have become an increasingly common tool in attempting to improve public finances since the 1990s. Between 1990 and 2021, the number of countries implementing at least one rule grew from just seven to more than a hundred. However, their design varies significantly across economies in terms of the fiscal variables they regulate, the target levels they set, and the mechanisms for enforcement and monitoring. Despite their widespread adoption, the effect of rules on fiscal outcomes remains debated. While several studies have concluded that there is a positive relationship between fiscal rules and improved fiscal performance, establishing a causal link has been challenging. Studies that account for causality concerns often find significantly weaker effects.

Section 3 focuses on public debt developments in recent decades. Despite the widespread introduction of fiscal rules, public debt has actually increased in most advanced economies in the 21st century. The increase is partly attributable to a few factors, such as the fiscal impact of the Global Financial Crisis and the Covid-19 pandemic, unfavourable dynamics between interest rates and economic growth, and a growing pressure on public finances from aging populations. These factors have not affected economies symmetrically, which can help to explain why public debt levels have also increasingly drifted apart. Beyond these factors, the literature on the deficit bias also offers political economy explanations connected to certain trends from the past few decades, including increased political polarization and greater electoral uncertainty.

Section 4 concerns fiscal sustainability, which the particularly sharp public debt increases in certain advanced economies have raised concerns about. Fiscal sustainability can broadly be defined as the government having a high probability of being solvent, meaning that it is able to meet its current and future financial obligations without having to resort to undesirable or unfeasible policies. Unfortunately, evaluating this probability is difficult, because it is dependent on future budget behaviour, interest rates and economic growth, all of which are naturally uncertain. One common approach in the literature is to estimate fiscal reaction functions, which model a country's historic budgetary behaviour, and use the results as an indicator of future behaviour. We estimate such a function for each of our example economies and find that since the introduction of fiscal rules, Sweden and Germany have systematically countered debt increases by eventually running primary budget surpluses, while France and the U.S. have not. However, other recent evaluations, which instead make forward-looking assessments partly based on qualitative factors, have deemed that the sustainability risks in all of our example economies are overall low, at least in the short term.

# 2 Fiscal rules

Since the start of the 1990s, it has become increasingly common to attempt to improve public finances through the implementation of *fiscal rules*. A (numerical) fiscal rule is a long-lasting numerical constraint on a budget aggregate (such as debt or expenditures) which is meant to discipline the spending behaviour of policymakers.[3] Theoretically, such rules will produce better fiscal outcomes since policymakers may be subject to a "deficit bias', which is a common explanation for the rise in public debt in the late 20th century and onwards (see for instance Calmfors, 2010).

Between 1990 and 2021, close to one hundred countries adopted at least one fiscal rule (Davoodi et al. 2022). But while these countries all had the same objective, they generally chose very different policy designs. In broad terms, fiscal rules can be categorized according to the variable they regulate: expenditures, revenues, budget balance or debt. Most countries apply some combination of these and sometimes have more than one rule for the same variable. This is often the case when countries are covered by both a national and a supranational framework, as in all European Union member states. But even when countries have similar types of rules, they can still differ in other respects, whether in technical ones such as target levels, or procedural ones such as legal status, monitoring, and enforcement mechanisms.

The variation in fiscal frameworks is illustrated in Table 1, which summarizes the fiscal rules in Sweden, the EU, the United States, Germany, and France. First, there is a clear difference between the U.S. and the European countries with regards to the number of rules that they have adopted. While the U.S. only has a single, national expenditure rule, the European countries are covered by both their own national frameworks and the EU framework.[4] This means that they have at least three rules in place (two EU rules and one national), and Sweden has as many as five. But there are also differences in policy design between the national frameworks of the European countries. For instance, Sweden is alone in having implemented its own debt anchor at a level different from the EU limit. Additionally, each country's budget balance rule differs from the others', either in terms of prescribed target level, time horizon, or variable specification (total or structural budget balance).

[3] In addition to numerical fiscal rules, there are 'procedural' rules which establish good practices for the budget process. However, we disregard these rules since they typically do not aim to produce certain fiscal outcomes (see for example Davoodi et al. 2022). Throughout this article, 'fiscal rules' refers to numerical rules.

[4] However, there are several U.S. fiscal rules imposed at the state level. Some states have enforced strict budget balance requirements that prohibit carrying deficits into the next fiscal year, while others allow for more flexibility, including escape clauses and lenient enforcement. For more information, see Leiner-Killinger and Nerlich (2019).

**Table 1. Overview of numerical fiscal policy rules at the general or central level of government in selected economies[5]**

| | Rule type | Description | Legal status | Enforcement procedure | Monitoring | First adopted and latest revision |
|---|---|---|---|---|---|---|
| Sweden | Expenditure | Parliament sets an upper limit for central government nominal expenditures three years in advance. The limit is set after a proposition from the government, which may also suggest changes to the limit after it has been accepted. | Statutory | No | Yes | 1997 |
| | Budget balance | A surplus target for the budget balance of the general government, amounting to 0.33 percent on average over the course of a business cycle.[6] | Statutory | No | Yes | 1997, 2019 |
| | Debt | An anchor for the Maastricht debt at 35 per cent of GDP in the medium term, with a tolerance interval of plus/minus 5 per cent. | Statutory | No | Yes | 2019 |
| European Union[7] | Budget balance | A limit for the general government deficit at 3 per cent of GDP. | International treaty | Yes | Yes | 1992, 2024 |
| | Debt | A limit for the Maastricht debt at 60 per cent of GDP. | International treaty | Yes | Yes | 1992, 2024 |

[5] For more details on the Swedish and European frameworks, see Calmfors (2023) and the European Parliament (2025), respectively.

[6] A parliamentary oversight of the rule recently suggested changing the target level from 0.33 per cent of GDP to balance, starting on January 1st 2027 (SOU 2024:76).

[7] The EU fiscal framework also requires member states to present a 'net expenditure path', which is meant to outline the medium-term development of government expenditures. However, we do not include the net expenditure path in the table because its explicit purpose is to ensure compliance with the debt rule and the budget balance rule. In that sense, the net expenditure path can be considered as more of an operational indicator rather than a numerical rule in its own right. For more information, see European Parliament (2025).

**Table 1. Overview of numerical fiscal policy rules at the general or central level of government in selected economies[5]**

| | | | | | | |
|---|---|---|---|---|---|---|
| United States[8] | Expenditure | Nominal limits on discretionary federal spending, not including spending for emergencies. | Statutory | Yes | Yes | 1990-2002, 2011-2023 |
| Germany | Expenditure | Central government expenditures should not grow, on average, faster than its revenues. | Political commitment | No | No | 1982, 2008 |
| | Budget balance | The structural deficit of the federal government must not exceed 0.35 per cent of GDP. Defence spending above 1 per cent of GDP is exempt. | Constitutional | Yes | No | 2009, 2025 |
| France | Budget balance | The budget balance of the general government (total or structural) must meet a medium-term objective. | Statutory | Yes | Yes | 2012, 2021 |
| | Expenditure | General government expenditures must meet a medium-term objective. | Statutory | No | Yes | 1998, 2021 |

Note. Table 1 only includes numerical fiscal rules. For instance, the U.S. "Pay-as-you-go' rule has been excluded since it does not set numerical limits. The table also only includes rules which apply to the central or general government.

Sources: IMF Fiscal Rules Dataset 1985-2021 (2022), Government Offices of Sweden (2025), European Parliament (2025), Fiscal Responsibility Act (2023), Vie Publique (2021), Haut Conseil des Finances Publiques (2025), Programme de stabilité 2024-2027 (2024), Congressional Research Service (2022) and Bundesrat (2025).

Beyond the number of rules and their design, the frameworks in these countries also differ in terms of legal status, enforcement and monitoring. Therefore, having more rules or stricter target levels does not necessarily imply that fiscal policy is more heavily regulated. For instance, while most national fiscal rules in the European countries are legally established and monitored, few of them are enforceable by any formal procedure. In that sense, their common EU rules are stricter, in that member states may be sanctioned if they persistently fail to take effective action to return to the specified target levels when they are not met. Such sanctions may include a fine of up to 0.05 per cent of the previous year's GDP to be paid every six months

[8] The United States also has a federal debt limit. However, the limit does not restrain the spending and revenue decisions of Congress. It simply sets a limit for the amount that the Treasury is allowed to borrow to meet already existing legal obligations, such as interest payments. Congress has always raised the debt limit when necessary (Congressional Research Service, 2025; U.S. Department of the Treasury, 2025a).

(European Parliament, 2025). But this approach is arguably still less strict than the enforcement of the U.S. expenditure rule, which is known as "sequestration' – automatic, across-the-board spending cuts when expenditure limits are surpassed. However, these limits have frequently been raised through subsequent legislation to allow for more spending.[9]

Most relevant, of course, is whether the fiscal rules have been an effective tool for controlling public debt levels and budget balances and if some rules are preferable to others. In the case of the above-mentioned economies, fiscal variables have developed very differently since the introduction of fiscal rules, and the respective frameworks have generally been judged accordingly. In Sweden and Germany, where debt levels have decreased since the introduction of national rules, reviews by independent agencies have often deemed them effective. For instance, recent Article IV consultations by the IMF have recognized Sweden's fiscal framework as effective in maintaining sustainable public finances (IMF, 2024a), and stated that the German budget balance rule has served as an anchor for solid public finances (IMF, 2023a). Conversely, in the U.S. and most EU member states, debt levels have increased and the frameworks have been criticized. Critique of the U.S. framework has often focused on the coverage being too narrow and the target levels insufficient (IMF, 2012 and 2024b), while critique of the EU framework has instead focused on lack of implementation in part due to weak enforcement procedures (Arnold et al. 2022).[10]

Looking beyond the economies mentioned above, the academic literature on fiscal rules in general provides broad empirical evidence that rules tend to coincide with better fiscal performance. For instance, Debrun et al. (2008) and Badinger and Reuter (2017) provide panel estimates that show that fiscal rules are associated with more positive budget balances. The latter study also suggests that the relationship is stronger when rules are more "stringent' with regards to factors such as legal status, enforcement and monitoring. Other studies have also suggested that the type of rule matters. Budget balance rules and expenditure rules are typically shown to be most associated with sound performance, for instance in panel estimates by Nerlich and Reuter (2013), Fall et al. (2015) and Bergman et al. (2016). It has been argued that these types of rules are more effective than debt or revenue rules because they are more operational, meaning that they are more useful tools in the budgeting process (Brändle and Elsener, 2024). Finally, some studies have also suggested that the institutional setting matters. For instance, von Hagen (2006) provides empirical evidence that fiscal rules have had a greater impact on fiscal performance in economies with a strong finance minister role, long multi-annual fiscal programs, and explicit mentioning of fiscal targets in political coalition agreements.

However, while fiscal rules and fiscal performance are related, the relationship is not necessarily a causal one. It is often stressed in the literature that fiscal rules could simply be more likely to be introduced in countries where fiscal sustainability is already an important political issue. In other words, fiscal rules and fiscal discipline

[9] For a complete list of revisions of expenditure limits during 2011-2019, see Congressional Research Service (2022).

[10] For the U.S., see also U.S. Department of the Treasury (2025b) and U.S. Government Accountability Office (2024).

could both be caused by fiscally concerned electorates, rather than the former causing the latter. In addition, it is possible that the causality is reversed. Policymakers could be more likely to introduce or tighten rules when fiscal outcomes are already sound or improving and they expect to achieve the targets, such as in times of economic upturn (Brändle and Elsener, 2024; Calmfors, 2023). In a meta-study of 30 papers on fiscal rules and fiscal performance, Heinemann et al. (2018) find that the relationship between the two becomes significantly weaker the more sophisticated methods that are used to handle such potential endogeneity. A similar result is also reached in Caselli and Reynaud (2020), where the authors find that fiscal rules are associated with smaller deficits, but that the relationship disappears when endogeneity is addressed. However, the relationship continues to hold for rules that are more stringent.[11]

# 3 Debt developments

Global public debt has increased significantly in the 21st century, despite the widespread introduction of fiscal rules (see Figure 1). The increase has been particularly large in advanced economies, where the aggregate level has risen from 70 to 110 per cent of GDP (IMF, 2025a).[12] But public debt-to-GDP ratios have also developed very differently across these countries and now show a greater dispersion than at the start of the century.[13] In some countries (such as the United States and France), the public debt ratio has approximately doubled over the past three decades, while others (such as Germany) have seen more moderate increases of only a few percentage points. There are also a few notable examples (such as Sweden) where the public debt ratio has instead fallen.[14]

[11] For an overview of other recent studies that attempt to handle the endogeneity problem, see Calmfors (2023).

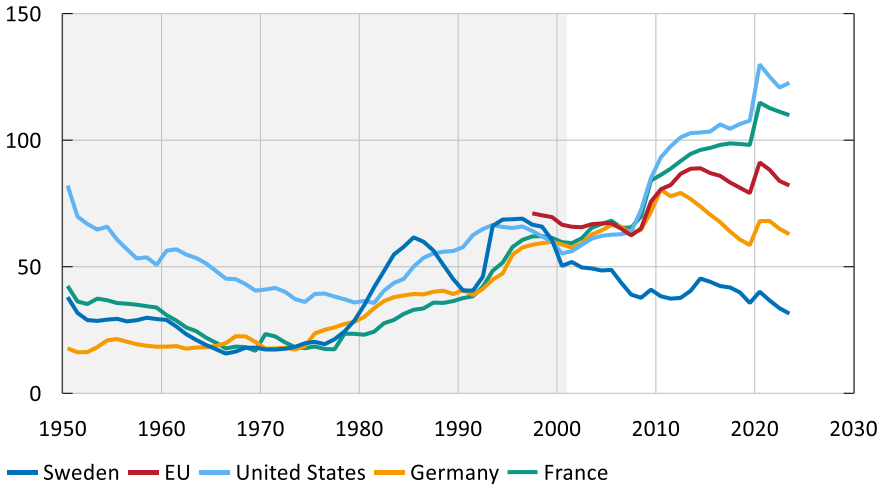
[12] In IMF (2025) the group 'advanced economies' includes Andorra, Australia, Austria, Belgium, Canada, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Macao, Malta, the Netherlands, New Zealand, Norway, Portugal, Puerto Rico, San Marino, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Taiwan, United Kingdom and the United States.

[13] Between 2000 and 2024, the difference between the highest and lowest public debt-to-GDP ratios amongst advanced economies has increased from 131 to 227, and the variance has more than doubled (IMF, 2025a).

[14] The other advanced economies that have experienced a fall in the public debt ratio are Belgium, Denmark, Iceland, Israel, Malta, Puerto Rico, the Netherlands and Switzerland (IMF, 2025a).

**Figure 1. Public sector debt**

Per cent of GDP




Note. Nominal (face) value of total outstanding public sector debt (central government, local governments, and social security funds) at the end of the period and consolidated between the government subsectors. The EU refers to the aggregate of all member states (EU27).

Source: AMECO.

The rise in public debt ratios in advanced economies is partly a consequence of fiscal responses to various crises and recessions, most importantly the Global Financial Crisis and the Covid-19 pandemic. The large adverse effects that these two crises had on economic activity put pressure on government finances through *automatic stabilisers*, such as reduced tax revenues and increased spending on unemployment benefits. In addition, many governments engaged in substantial fiscal stimulus through discretionary measures to support growth and mitigate crisis-specific consequences, such as financial market unrest during the Global Financial Crisis and pressures on the public health system during the pandemic.[15] In many economies, the resulting primary deficits, in combination with reduced output, led to the largest single-year increases in debt ratios since the Second World War (see Figure 1). However, unlike after the Global Financial Crisis, public debt ratios partially fell back again after the initial year of the pandemic. This quick reversion was partly caused by a strong global economic recovery, and partly by the large global shock to inflation (IMF, 2023b). Unexpected increases in inflation reduce the public debt ratio because output increases in nominal terms (inflating GDP in the ratio's denominator), while the outstanding stock of debt (assumed at a fixed nominal value) is unaffected. In addition, public finances tend to improve with inflation shocks because the nominal

[15] However, discretionary fiscal stimulus was in many cases greater during the pandemic than during the Global Financial Crisis (IMF, 2020; Heimberger, 2023). For country-specific details on fiscal responses during the pandemic, see IMF (2021). For an overview of fiscal responses to the Global Financial Crisis in G20 countries, see IMF (2010). Effects on debt-to-GDP ratios in euro area countries from financial sector support during the Global Financial Crisis are reported in Semeano and Ferdinandusse (2018).

tax base instantly grows (for instance through value-added taxes when prices rise), while expenditures are usually fixed under budgetary caps.[16]

The impact of the crises on public debt ratios are illustrated for each of our example economies in Figure 2, which shows contributions to changes in their public debt ratios from a few major components: the primary balance, interest payments, GDP growth, and the stock-flow adjustment.[17] With the exception of Sweden (where public debt increased sharply in 2014 due to an unusually large stock-flow contribution[18]), the crises constitute the most severe periods of debt increase in all economies. During the initial year of each crisis, the debt ratio increase in each economy was primarily caused by a deterioration of the primary balance (reflecting automatic stabilizers and discretionary fiscal stimulus) and negative economic growth. After the initial year of the pandemic, the public debt ratios fell again, primarily as a result of large downward contributions from increased GDP growth (boosted by inflation).

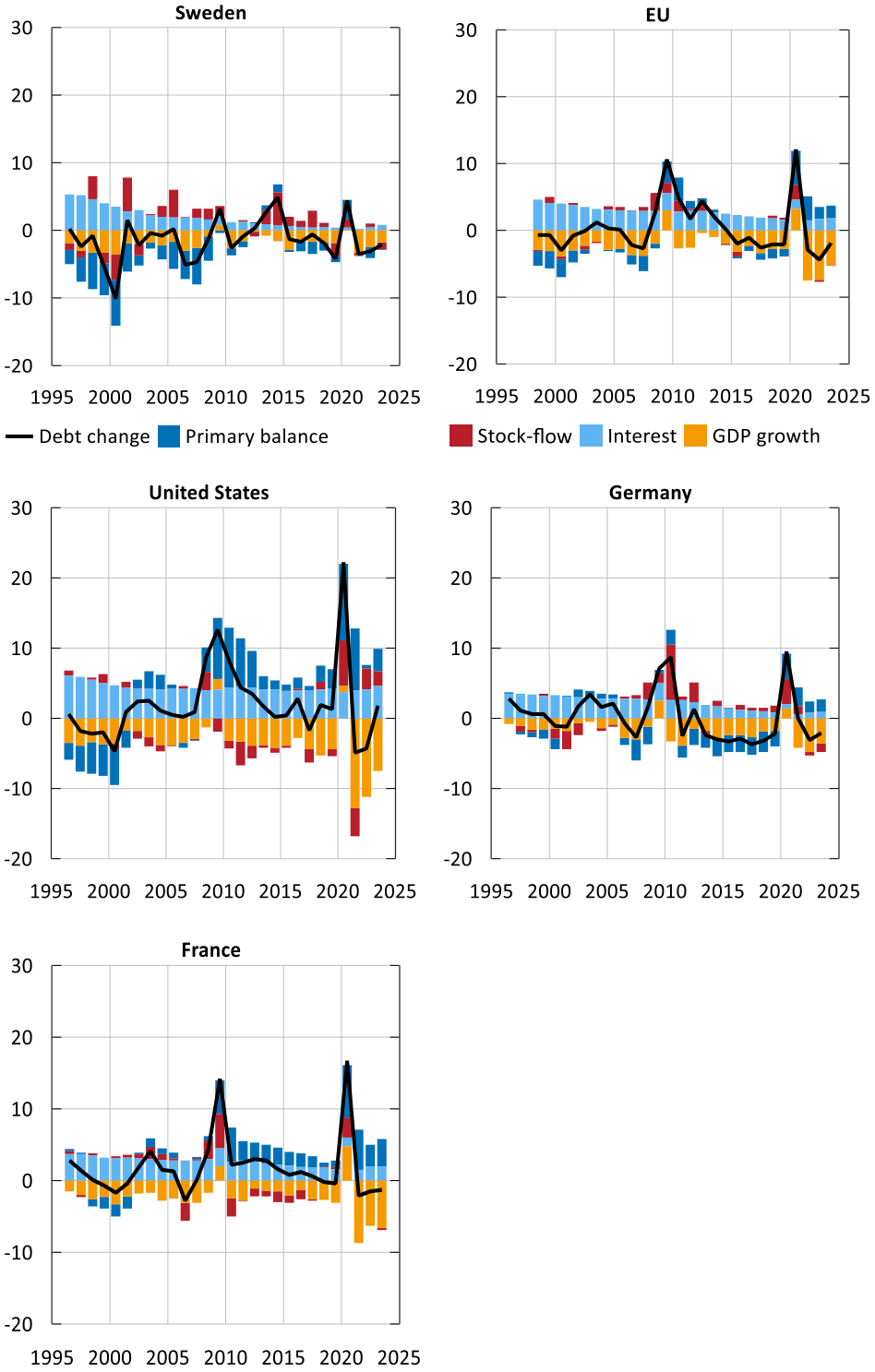
[16] Note that the effects of inflation on public finances discussed here only apply to *unexpected* increases. Increased inflation expectations are associated with a smaller increase in nominal GDP and faster increases in primary spending and interest expenditures (IMF, 2023b).

[17] The stock-flow adjustment is the difference between the change in (nominal) government debt and the nominal budget balance for a given year. Such differences may arise for several reasons. For instance, government debt issued in foreign currency can appreciate and depreciate due to exchange rate fluctuations, which are not reflected in the budget balance. For more details, see Eurostat (2019).

[18] This increase was in part caused by asset managing authorities holding 70 billion SEK in repurchasing agreements which did not mature until 2015 (Swedish National Fiscal Management Authority, 2019), as well as a significant exchange rate depreciation (IMF, 2015).

**Figure 2. Change in public debt and contributions from different factors**

Percent and percentage points




Note. Debt change refers to annual changes in the public debt-to-GDP ratio. Stock-flow component data is a result of own calculations (see footnote 17). Contributions are calculated as the change in debt that would have occurred if only one of the components experienced its annual change.

Sources: AMECO and own calculations.

While Figure 2 illustrates that debt was generally driven by the same factors in all economies during the crises, it also shows that the size of the increases vary widely. The same is also true of the debt decreases after the acute phase of the pandemic. Since the cross-country differences are partly attributable to primary balances, it is possible that they can be explained by a variation in the effectiveness of the economies' fiscal rules, or perhaps in their handling of rules during crises. For instance, Sweden remained in compliance with the EU budget balance rule during the Global Financial Crisis while Germany and France did not. Furthermore, Germany, unlike Sweden, suspended its national rules during the pandemic and also ran a larger primary deficit at the time. With regards to the effectiveness of rules, it can also be mentioned that the primary deficits that the U.S. ran during both crises (which were significantly greater than those of the other economies) were not in breach of national rules, but would have been under, for instance, the EU rules. In fact, U.S. fiscal policy was not even subject to a rule during the initial year of the Global Financial Crisis (see Table 1).

However, differences in fiscal responses to crises are not solely determined by ambitions regarding fiscal discipline, but also by factors such as economic conditions and national needs. As illustrated in Figure 2, debt increases during the crises partly varied because some economies were more adversely affected than others. For instance, (nominal) Swedish output was largely unchanged between 2019 and 2020, compared to a fall of almost four per cent in the EU aggregate. More adverse effects on growth cause larger increases in the debt ratio both directly (through the denominator), but also indirectly through automatic stabilisers and the need for additional fiscal support. Furthermore, crisis-specific consequences varied across countries, implying varying needs for discretionary fiscal support. For instance, countries had to devote different amounts of resources to stabilizing their financial markets during the Global Financial Crisis (Semeano and Ferdinandusse, 2018), and greater fiscal support was needed during the pandemic in countries with more pandemic incidents and an older population (Elgin et al. 2020; Chen et al. 2021). Finally, during the pandemic, some countries also chose to provide more of their fiscal support through measures that did not directly affect the debt ratio, such as loans or loan guarantees (Hudson et al. 2021).

Looking beyond the crises, other periods of debt increase have for the most part also coincided with periods of economic downturn. This is illustrated in Figure 3, which plots the primary balance, the GDP gap, and the periods of debt increase for each of our example economies.[19] With a few exceptions, each economy's debt ratio has only increased when its GDP gap has been strictly negative, in balance, or strictly negative in the following year.[20] The figure also shows that this is partly due to the primary balance, which exhibits a rather strong correlation with the GDP gap in each

[19] The GDP gap is the difference between actual GDP and potential GDP, which is an estimate of the output that would theoretically have been produced if the available production factors in the economy (capital and labour) were fully utilized. The GDP gap is a commonly used measure of the business cycle, indicating an economic boom when the gap is positive and a slump when it is negative. However, it is also an uncertain measure since potential GDP cannot be observed but has to be estimated.

[20] We define 'balance' as +/- 0.5 per cent of potential GDP. The exceptions are Germany in 1998, France in 2001, 2004 and 2005, and the U.S. in 2005 and 2018.

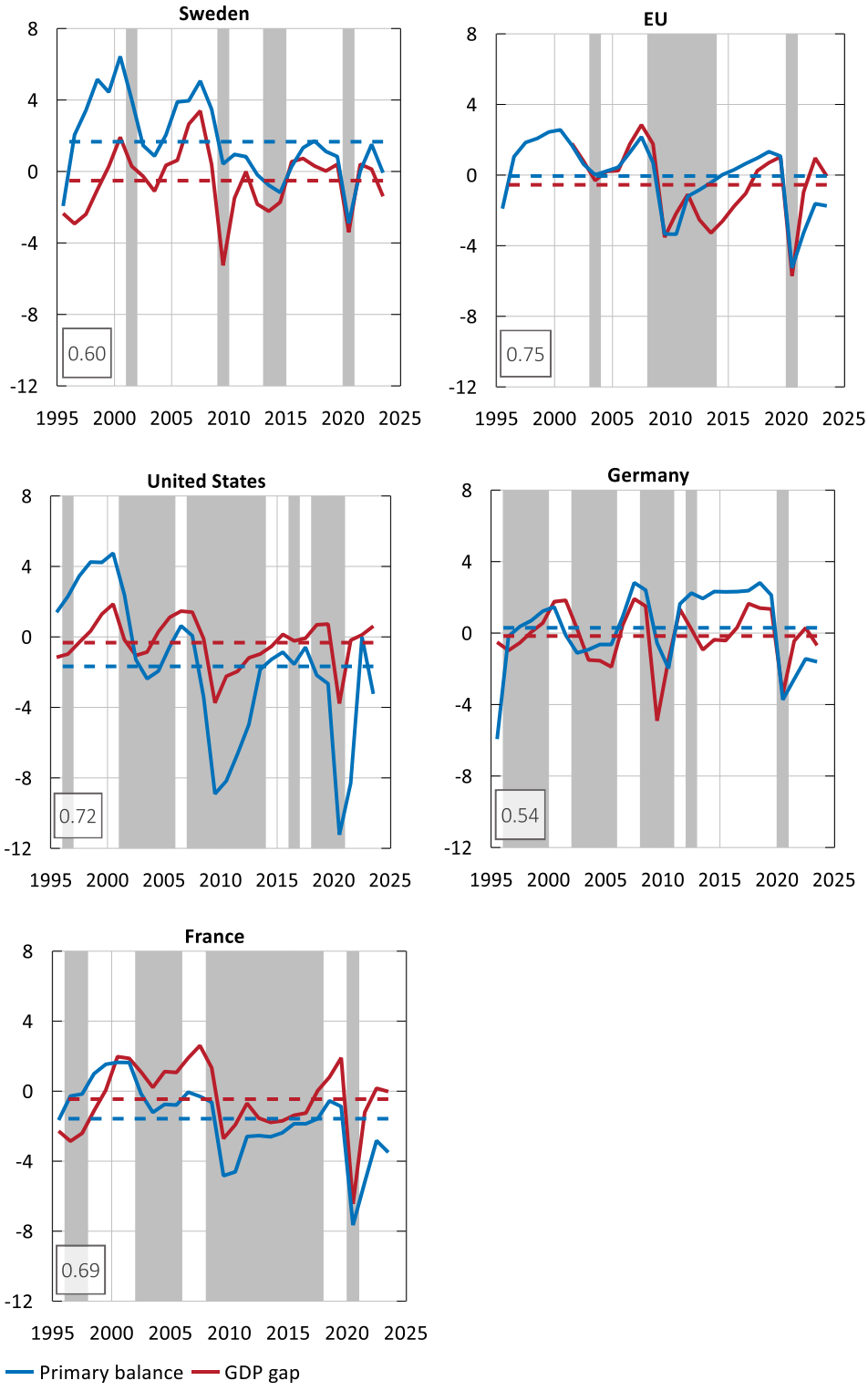
economy. Once again, this pattern is partly a natural consequence of automatic stabilizers. However, the correlation is somewhat weaker for Germany, which appears to be a result of the period in between the Global Financial Crisis and the pandemic, where the country produced consistent primary surpluses regardless of the business cycle. Interestingly, this change in behaviour coincides well with the introduction of their national budget balance rule. On the other hand, a similar medium-term rule was introduced in France three years later (see Table 1), and yet France continued to produce primary deficits in the period between the two crises.

While Figure 3 shows that the primary balance of each of our example economies tends to fluctuate with the business cycle, it also shows that business cycles have been remarkably similar among all economies, and yet that there is a strong difference in the average primary balance. For instance, Swedish primary balances have generally been in surplus, while U.S. and French balances have generally been in deficit. Once again, a possible explanation for the differences is a variation in the efficiency of rules and in attitudes towards them. There are also a few practical explanations. In the case of the U.S., the large deficits at the start of the century can partly be attributed to the war in Iraq (IMF, 2003). There is also the matter of changing demographics. The *old-age dependency ratio*, which is the population share of the elderly relative to the working age population, has increased significantly in advanced economies over the past decades (up from 22.5 to 35 per cent in the OECD countries since the start of the century, see OECD (2025)). The evolution has placed an increasing burden on public welfare systems in most economies, but particularly in those with relatively generous systems, such as France (IMF, 2019).[21] Yared (2019) shows that changes in debt ratios and changes in old age dependency ratios over the past several decades are correlated.

Looking beyond primary balances, the relationship between economic growth and the interest paid on public debt has also been an important cause of debt increases during economic downturns. Figure 2 illustrates that for most of our example economies, the largest upward contribution to changes in the debt ratio in non-crisis times has often come from interest payments. In most instances, these contributions are cancelled out by larger or equally large downside contributions from economic growth. However, when the growth rate falls in an economic downturn, the differential deteriorates and causes upward pressure on the debt ratio. In a few instances, the differential has even been large enough to cause a debt increase even in the absence of a primary deficit, such as in the U.S. in 2001 and in the EU aggregate in 2003. Since a debt increase in turn contributes to further increases in interest payments (further deteriorating the differential), the relationship between economic growth and interest payments is associated with a "snowball effect'. The effect also works in the opposite direction. For instance, Figure 2 illustrates that interest payments decreased in Sweden at the start of the period, making it easier to accomplish debt reductions, which contributes to further reductions in interest payments, et cetera.

[21] This is expected to be a great long-term challenges for fiscal policy in Europe, see Moshammer (2024).

**Figure 3. General government primary balances and the business cycle (GDP gap)**
Per cent of GDP (primary balance) and potential GDP (GDP gap)




Note. Grey areas indicate periods of debt increases larger than 0.5 per cent of GDP. Dashed lines indicate the mean of each variable for the period 1995-2023. The number in the lower left corner refers to the correlation between the GDP gap and primary balance.

Sources: AMECO and own calculations.

We can compare contributions to public debt increases from the various components in Table 2, which reports cumulative contributions over the period 1995-2023 for each of our example economies. In the U.S. and France, primary balance contributions have clearly exceeded contributions from the stock-flow component and the differential between interest payments and growth. In France, around 30 per cent of these primary balance contributions are attributable to the years 2009-2010 and 2020, and the share is above 50 per cent in the U.S. In the other economies, the greatest contributions are from the stock-flow component. In Germany, a large share of these contributions can be attributed to financial market support which did not affect the primary balance during the Global Financial Crisis. In Sweden, the contributions are of a more technical nature (see footnote 18).

**Table 2. Contributions to the public debt between 1995 and 2023**
Percentage points

| | Primary balance | Stock-flow | GDP growth | Interest | Total change |
|---|---|---|---|---|---|
| Sweden | – 53.1 | 20.0 | – 54.6 | 50.4 | -37.3 |
| EU | 1.5 | 9.4 | – 69.9 | 70.0 | 11.0 |
| United States | 49.1 | – 3.7 | – 109.5 | 121.3 | 57.4 |
| Germany | −15.3 | 14.4 | – 52.5 | 61.5 | 8.1 |
| France | 44.2 | 3.7 | – 67.0 | 71.2 | 52.1 |

Note. Discrepancies due to rounding errors have been evenly distributed among the components. EU data is only between 1997 and 2023.

Sources: AMECO and own calculations.

Beyond more practical reasons for why debt ratios have increased, such as crises, recessions, unfavourable interest-growth dynamics or increased pressure from changing demographics, the literature on the deficit bias also offers some political economy explanations.[22] Common examples include *fiscal illusion*, that voters and policymakers overvalue the benefits of current spending relative to the cost of future taxation. There is also the *common pool* problem, under which competing interest groups lobby governments to direct resources to their cause without internalizing the cost.[23] However, these issues are always present and offer no insight as to why public debt has increased more in recent decades or in certain economies.

Yared (2019) argues that the increase in public debt in advanced economies over the past several decades can partially be explained by three political economy factors. The first is that populations are becoming increasingly older. Older voters are assumed to have weaker preferences for fiscal responsibility (which is also supported by survey data, see Parker, 2012) since future generations will bear the tax burden. The second factor is that political polarization has increased, which is supported by the fact that an increasing share of the vote has been going to far-left and far-right parties across

[22] See, for instance, Nordhaus (1975), Rogoff and Sibert (1988) and Rogoff (1990) for early literature on how fiscal policy is influenced by political factors, such as elections, government ideology and macroeconomic conditions.

[23] See Calmfors (2023) and Brändle and Elsener (2024) for overviews of more common examples.

advanced economies.[24] Theoretically, increased polarization leads to debt accumulation through a variation of the *tragedy of the commons*, where policymakers overspend because they cannot effectively coordinate and realize that all parties will share the burden of the future debt (see Velasco, 2000). That greater polarization is associated with larger deficits has also been shown empirically (see Crivelli et al. 2016). The final factor is rising electoral uncertainty, meaning that the margin of victory in political elections has been steadily declining in advanced economies. Theoretically, greater electoral uncertainty leads to a present bias for policymakers, who realize that they may not remain in power and therefore choose to increase spending now while they may still benefit and have the power to influence the fiscal choices of their successor (see for instance Alesina and Tabellini, 1990; Persson and Svensson, 1989). That political turnover is connected to debt accumulation is also supported by some empirical work (for example Alt and Lassen, 2006).

# 4 Fiscal sustainability

The sharp rise in public debt ratios in certain advanced economies in recent decades has led to increased concern about *fiscal sustainability.* Fiscal sustainability (or "debt sustainability') can broadly be defined as the government having a high probability of being solvent, meaning that it is able to meet its current and future financial obligations without having to resort to undesirable or unfeasible policies (Debrun et al. 2019). Unfortunately, evaluating this probability is difficult. To see why, we can start by considering the government's budget constraint:

$$G_t + r_t D_{t-1} = T_t + (D_t - D_{t-1}),$$

where $G_t$ is the government's primary expenditures, $r_t$ is the interest on government bonds, $T_t$ is tax revenues, and $D_t$ and $D_{t-1}$ are the stock of public debt in the current and previous period, respectively. Simply put, the constraint states that the government's total expenditures in any given time period must equal the sum of its tax revenues and its debt issuance. Rearranging, the constraint becomes an expression for government debt:

$$D_t = (1 + r_t)D_{t-1} - PB_t,$$

where $PB_t = T_t - G_t$ is the primary balance. The expression states that public debt in the current period is equal to the public debt in the previous period, plus interest payments and minus the primary balance. Dividing by GDP, we get an expression for the debt ratio:

$$d_t = \left(\frac{1 + r_t}{1 + g_t}\right) d_{t-1} - pb_t,$$

where $d$ is the debt ratio, $pb$ is the primary-balance-to-GDP ratio, and $g$ is the GDP growth rate. The expression states that the debt ratio is decided by the primary balance and the relationship between interest payments and economic growth, as

[24] See Figure 4 in Yared (2019), which is based on data from Funke et al. (2016).

discussed in section 3.[25] If the interest rate on government bonds is greater than the economic growth rate, then the debt ratio will grow automatically if it is not offset by a larger or equally large primary surplus. Therefore, in order for the government to be able to meet its obligations (that is, pay off the debt), the current debt level cannot be greater than the present value of all future primary balances. In other words, evaluating whether the government has a high probability of being solvent is difficult because solvency is dependent on future primary balances, interest rates, and economic growth, all of which are naturally uncertain.

Because of the inherent difficulty, there is no consensus on how to best evaluate fiscal sustainability, and many different approaches have been suggested. One common approach in the literature is to focus on historic budgetary behaviour by estimating *fiscal reaction functions*, which model government primary balances as a function of public debt developments and macroeconomic conditions. The approach was first suggested in a seminal study by Bohn (1998), which showed that a sufficient condition for government policy to satisfy the intertemporal budget constraint (in a general equilibrium model) is a positive response of the primary balance to rising debt, when controlling for temporary variations in other determinants such as output. While earlier accounts had also typically focused on historic budgetary behaviour, they often studied *unconditional* developments in public debt and the primary balance. However, Bohn argued that these can be misleading indicators of sustainability in a stochastic environment. For instance, a rising public debt level could be a natural consequence of economic crisis, war or an adverse growth shock, and is not indicative of unsustainable fiscal policy as long as the government eventually moves toward primary surpluses. A positive *conditional* response of the primary balance to public debt shows that the government has tended to do so in the past and can therefore serve as an indicator of future behaviour.

Based on this reasoning, Bohn defined a fiscal reaction function where the primary balance is determined by the debt ratio, the business cycle and temporary government expenditures, and estimated the function using ordinary least squares. Subsequent research has typically altered the model specification and estimation technique somewhat. For instance, *error-correction models* have been used to address the issue that public debt ratios and primary balances are often not stationary time series, but tend to be cointegrated. In addition, model specifications now often incorporate additional determinants of the primary balance, such as inflation and interest rates on government bonds. As discussed in section 3, inflation has a direct impact on the primary balance since it increases government revenue instantly but typically increases expenditures with a lag. Interest rates, on the other hand, are thought to have an indirect impact by affecting the government's incentive to reduce public debt. Higher interest rates are associated with greater interest payments, which the government may wish to reduce by lowering public debt through improved primary balances (see for example Mauro et al. 2015).

Below, we provide estimates of a fiscal reaction function for each of our example economies. The methodology is from Berti et al. (2016) and was previously an

[25] With the exception of the more technical 'stock-flow adjustment'.

integrated part of the European Commission's framework for evaluating fiscal sustainability. It is an error-correction model, which deals with stationarity issues and allows us to estimate a long-run, systematic relationship between the public debt and the primary balance in each economy, capturing whether the government eventually counters a debt increase by running primary surpluses. The original paper provided estimates for several European countries, including Sweden, Germany and France, over the period 1950-2013. Here, we include more recent data and estimate the function for the United States as well. We also exclude an interaction term that was used in the original model to investigate whether the long-term relationship between public debt and the primary balance in each economy had changed since the Global Financial Crisis. Instead, we estimate the model for two different time periods (1950-1990 and 1990-2023) to see whether the relationship has changed since the economies began introducing fiscal rules (see Table 1).

The model is specified as:

$$\Delta PB_t = \beta_1 + \beta_2 \cdot (PB_{t-1} - \beta_3 \cdot Debt_{t-2}) + \beta_4 \cdot \Delta Debt_{t-1} + \beta_5 \cdot \Delta Debt_{t-2} + \beta_6 \cdot GG_t + \beta_7 \cdot YG_t + \beta_8 \cdot \Delta reff_t + \beta_9 \cdot \Delta infl_t + \varepsilon_t$$

As discussed, we are primarily interested in the long-run, systematic relationship between the primary-balance-to-GDP ratio ($PB_{t-1}$) and the debt ratio ($Debt_{t-2}$). The issue is that these series are often found to be non-stationary, meaning that we could obtain spurious results by directly estimating their relationship using standard techniques. However, if the series are *cointegrated*, then there exists a linear combination between the two (here: $PB_{t-1} - \beta_3 \cdot Debt_{t-2}$) that is stationary. In that case, we can estimate annual changes in the primary-balance-to-GDP-ratio ($\Delta PB_t$, also made stationary by the transformation) as a function of the linear combination and from there derive the long-term relationship ($\beta_3$). The coefficient $\beta_2$ measures how responsive the primary balance is to deviations from this relationship. Similar to Berti et al. (2016), we find (using standard stationarity tests, see Table A1 in Appendix A) that the debt ratio in each economy is non-stationary, but that the primary balance-to-GDP ratio is stationary in half the cases and ambiguously non-stationary in the other half. However, standard cointegration tests (see Table A5 in Appendix A) suggest that the series are cointegrated in each economy.

The error-correction model also accounts for short-term dynamics that cause deviations from the long-term relationship. Annual changes in the primary-balance-to-GDP ratio is in part explained by annual changes in the debt ratio ($\Delta Debt_{t-1}$ and $\Delta Debt_{t-2}$), but also by variations in the additional determinants discussed above. $GG_t$ represents the expenditure gap, and is defined as the difference between current and trend primary government expenditures. The gap is meant to capture temporary and unexpected expenditures, such as military spending in the event of war. $YG_t$ represents the GDP gap, and is meant to capture business cycle fluctuations. As discussed in section 3, the business cycle is intimately connected with the primary balance, in part due to automatic stabilizers. As mentioned above, a measure of the business cycle and temporary government expenditures were also included in Bohn's (1998) original fiscal reaction function, and both have remained common control variables since then. $\Delta reff_t$ represents annual changes in the real implicit interest

rate (interest payments on government debt in relation to the debt ratio) and $\Delta infl_t$ represents annual changes in the inflation rate. All these variables are found to be stationary (see tables A2-A4 in Appendix A). Further details on how the variables have been constructed, as well as plots of each time series, can be found in Appendix B.

**Table 3. Estimated fiscal reaction functions**

| | | DE | FR | SE | US |
|---|---|---|---|---|---|
| (A) | Intercept | 0.207 | 1.814** | -1.243** | -2.312*** |
| 1950-1990 | | (0.536) | (0.714) | (0.508) | (0.584) |
| | $\Delta Debt_{t-1}$ | -0.068* | 0.100 | -0.332** | -0.134** |
| | | (0.047) | (0.147) | (0.142) | (0.060) |
| | $\Delta Debt_{t-2}$ | 0.139*** | 0.151*** | 0.412*** | 0.016 |
| | | (0.047) | (0.053) | (0.103) | (0.044) |
| | $PB_{t-1}$ | -0.301* | -0.689*** | -0.185 | -0.924*** |
| | | (0.148) | (0.139) | (0.144) | (0.167) |
| | $Debt_{t-2}$ | 0.000 | -0.055** | 0.038*** | 0.061*** |
| | | (0.019) | (0.026) | (0.013) | (0.013) |
| | $GG_t$ | 0.085 | -0.213*** | -0.292 | -0.001 |
| | | (0.165) | (0.055) | (0.180) | (0.153) |
| | $YG_t$ | -0.448 | 0.362** | 0.069 | 0.131 |
| | | (0.537) | (0.177) | (0.105) | (0.091) |
| | $\Delta infl_t$ | -0.048** | 0.038 | -0.045 | 0.201*** |
| | | (0.017) | (0.029) | (0.034) | (0.052) |
| | $\Delta reff_t$ | -0.083 | 0.062 | -0.131 | -0.490 |
| | | (0.176) | (0.291) | (0.116) | (0.500) |
| | Adjusted R2 | 0.079 | 0.517 | 0.393 | 0.616 |
| (B) | Intercept | -2.591** | -0.595 | -4.267*** | -1.507 |
| 1990-2023 | | (0.082) | (0.916) | (1.387) | (1.893) |
| | $\Delta Debt_{t-1}$ | 0.163* | 0.154 | 0.043 | 0.254 |
| | | (0.082) | (0.120) | (0.066) | (0.156) |
| | $\Delta Debt_{t-2}$ | -0.054 | 0.146** | -0.089 | 0.266** |
| | | (0.047) | (0.060) | (0.095) | (0.126) |
| | $PB_{t-1}$ | -0.503* | -0.159 | -0.698*** | -0.202 |
| | | (0.245) | (0.274) | (0.228) | (0.264) |
| | $Debt_{t-2}$ | 0.043** | -0.006 | 0.118*** | 0.007 |
| | | (0.016) | (0.014) | (0.033) | (0.023) |
| | $GG_t$ | -1.140*** | -0.910*** | 0.030 | -1.341*** |
| | | (0.080) | (0.245) | (0.133) | (0.295) |
| | $YG_t$ | 0.055 | 0.153 | 0.597*** | -0.199 |
| | | (0.108) | (0.164) | (0.194) | (0.340) |
| | $\Delta infl_t$ | 0.076 | 0.270* | 0.126 | 0.406** |
| | | (0.156) | (0.152) | (0.099) | (0.170) |
| | $\Delta reff_t$ | -0.195 | -0.442 | 0.550* | -0.384 |
| | | (0.704) | (0.492) | (0.277) | (0.668) |
| | Adjusted R2 | 0.834 | 0.705 | 0.748 | 0.615 |

*** p<0.01, ** p<0.05, * p<0.1. All estimates are OLS with annual data. Robust standard errors in parentheses (Newey-West, lag window of size 3).

Long-term debt coefficient ($\beta_3$)

| | DE | FR | SE | US |
|---|---|---|---|---|
| 1950-1990 | 0.000 | -0.080* | 0.205 | 0.066* |
| 1990-2023 | 0.085* | -0.038 | 0.269* | 0.035 |

Coefficients have been derived as minus the ratio between the estimated coefficient on lagged debt and the estimated error-correction term. "*' Indicates that both these coefficients are statistically significant.

Table 3 presents the results for each country. Panel A reports the estimates for the earlier time period (1950-1990) and Panel B for the later period (1990-2023). Estimates of the long-term relationship between the debt ratio and the primary balance ratio ($\beta_3$) are reported for each country in each period at the bottom of table. These estimates suggest that in the earlier period, the U.S. (with a significantly positive $\beta_3$ of 0.066) was the only country that systematically responded to debt accumulation by eventually running primary surpluses. Bohn (1998) provides a similar result for U.S. fiscal policy in the 20th century. Conversely, the estimates for Sweden and Germany over the same period are insignificant, suggesting a lack of a systematic response, and the French estimate is even significantly negative. Berti et al. (2016) reach a similar result for France over the period 1950-2013. However, since it seems unlikely that any government would actively pursue a policy of running primary deficits in response to debt accumulation, the negative coefficient should probably be interpreted as an absence of long-term debt management rather than as active policy.

In the later period, during which fiscal rules are introduced, the estimates of the long-term relationships are significantly different. During this period, the $\beta_3$-estimates suggest that both Sweden and Germany systematically responded to debt accumulation by eventually running primary surpluses. The size of the coefficients (0.269 in Sweden and 0.085 in Germany) also suggest that these responses were relatively forceful compared to the U.S. ones in the earlier period, especially in Sweden. At the same time, the U.S. estimate is substantially smaller in the later period than in the earlier one and is statistically insignificant, suggesting a lack of a systematic response. The French coefficient remains negative, but is also smaller and insignificant. A comparison between the two time periods would therefore suggest that Swedish and German (and to some degree French) fiscal policy has increasingly moved toward debt management, while U.S. policy has moved in the opposite direction. Since these changes coincide with the introduction of rules, it is possible that these provide an explanation. In that case, the Swedish and German rules would also appear more effective than the U.S. and French ones. However, as discussed in Section 2, there are reasons to be cautious in assuming causality between rules and outcomes, even when more explicitly modelling a relationship between the two.

The apparent move towards increased debt management in Sweden and Germany is to some degree also evident in the evolution of the short-term dynamics between their debt ratios and primary balances. In the earlier period, both German and Swedish fiscal policy exhibit a somewhat erratic response to debt developments in the first two years after they have occurred (see the $\Delta Debt_{t-1}$ and $\Delta Debt_{t-2}$ rows). The estimates suggest that in both countries, the primary balance tends to deteriorate in the first year after a debt increase, only to more forcefully improve in the year after that. No such pattern is recorded in the later period. Instead, the German primary balance tends to improve immediately after a debt increase, while the Swedish balance shows no short-term response at all. However, the lack of a Swedish short-term response also illustrates that short-term dynamics are a lesser concern in terms of debt management. The primary concern is that the government *eventually* counters a debt increase with primary surpluses, which is what the long-term coefficient is meant to capture. The fact that Swedish policy in the later period shows

no short-term response but a significantly positive long-term response illustrates that such countering does not have to occur immediately.[26]

Looking at the other short-term determinants of the primary balance, it would appear that the expenditure gap ($GG_t$) has become a more important factor in most economies. In the earlier period, it only enters significantly in the case of France, while in the later period, it enters significantly and with large coefficients for all countries except Sweden. This is most likely illustrative of the fiscal responses to the various crises in the 21st century, as discussed in section 3. At the same time, the output gap ($YG_t$) appears a less important determinant, entering significantly and positively (indicating a countercyclical tendency) in the later period only for Sweden, and in the earlier period only for France.[27] This is somewhat surprising, considering the strong correlation between GDP gaps and primary balances in the later period, as illustrated in Figure 3. However, it is possible that the expenditure gap is capturing some of the effect of the output gap (or vice versa in the case of Sweden) since these series are also strongly correlated.[28] Furthermore, changes in the inflation rate ($\Delta infl_t$) appear to have the expected positive effect on the primary balance in the U.S. and France in the later period, and in the U.S. in the earlier period. Somewhat surprisingly, however, the variable enters negatively in the earlier period for Germany.[29] Finally, changes in the implicit interest rate ($\Delta reff_t$) have the expected positive effect in Sweden in the later period, but remain insignificant in all other instances.

To summarize, Swedish and German primary balance ratios over the past three decades exhibit a positive conditional response to debt increases, and thus satisfy the Bohn condition for sustainability. French and U.S. primary balance ratios do not. However, it is worth mentioning at this point that there are a few practical weaknesses with this approach to evaluating sustainability. First, a positive conditional response is a *sufficient* condition for sustainability, not a necessary one. In other words, the assessment allows for characterizing Swedish and German fiscal policy as sustainable over the period considered, but does not allow for characterizing French and U.S. policy as unsustainable (see Bohn, 1998). Second, since the assessment is based on historical behaviour, any inference regarding sustainability going forward relies on the assumption that the recorded behaviour will not change. As illustrated by our estimates for the U.S., where fiscal policy systematically responded to debt increases in the earlier period but not the later one, it is possible

[26] As mentioned, $\beta_2$ measures how responsive the primary balance is to deviations from its long-run relationship with debt, that is, how fast the relationship is restored after some short-term disturbance from another determinant. These estimates are in the range [-1, 0] (-1 being the fastest response), and are reported in the $PB_{t-1}$-rows. In the later period, Sweden exhibits a faster reversion than Germany. In the earlier period, the U.S. reversion appears to have been remarkably fast.

[27] That Swedish fiscal policy would have been countercyclical during this period is in line with previous evaluations, for example by Lyhagen and Shahnazarian (2023) who find that fiscal policy in Sweden has been countercyclical between 2000 and 2022, and with Calmfors et al. (2022) who also find that this is entirely due to automatic stabilizers rather than active fiscal policy.

[28] In the later period, the correlation is -0.62 in the U.S., -0.77 in France, -0.59 in Germany and -0.53 in Sweden.

[29] Berti et al. (2016) also obtain negative inflation coefficients for some countries. A possible explanation would be that expenditures are indexed by inflation, or that tax bases are somehow lagged. We are unaware of any such characteristics in German fiscal policy in the late 20th century.

that such behavioural changes can occur. Finally, the method does not acknowledge that there is a limit to the size of primary surpluses, and therefore some limit for the debt level beyond which the government cannot *credibly* commit to servicing it with surpluses. Credibility is an important part of sustainability, because a loss of credibility may result in *sovereign stress*, whereby interest rates rise sharply and further reduce the government's ability to meet its financial obligations.

Other approaches to analysing sustainability attempt to deal with these issues by making forward-looking assessments which weigh in credibility concerns. Such approaches often include making baseline projections of debt trajectories based on announced policies and forecasts for debt determinants, assessing risks to the baseline, and combining the results with assessments of qualitative factors which affect credibility, such as the country's quality of institutions. Table 4 summarizes some overall assessments, identified risks and mitigating factors from recent such evaluations by the IMF and the European Commission for each of our example economies. The conclusion is generally that sustainability and sovereign stress risks are low overall (at least in the short-term), and these assessments partly build on factors such as the countries' strong access to financing, institutional strength, and the composition of their debt.[30] However, it is worth remembering that projections are naturally uncertain, and that credibility factors are difficult to quantify and measure.

[30] Similar factors are often used in other assessments of fiscal sustainability as well, see for example Edelberg et al. (2025) and Congressional Budget Office (2025). Although the latter evaluation considers that the debt is sustainable based on these factors, it also emphasizes that a large and growing debt can have other negative consequences, such as reduced private investment and slower output growth, due to higher interest rates.

**Table 4. Debt sustainability evaluations by the IMF and the European Commission as of May 2025**

| | IMF Debt Sustainability Analysis | EC Debt Sustainability Monitor |
|---|---|---|
| Sweden | **Risks:** -<br><br>**Mitigating factors:** Low debt level, historical debt performance, robust fiscal framework.<br><br>**Assessment:** Overall low risk of sovereign stress and explicitly states that debt is sustainable. | **Risks:** High share of short-term debt, contingent liability risks stemming from elevated private debt.<br><br>**Mitigating factors:** Financial market perceptions, favourable growth and interest rate developments, unchanged aging-related expenditures, stable financing sources.<br><br>**Assessment:** Low risk overall. |
| France | **Risks:** High debt level, debt dynamics sensitive to future paths of interest rate and growth, long-term spending pressures due to demographic changes and green transition.<br><br>**Mitigating factors:** Planned consolidation measures, large institutional investor base, deep and liquid debt market.<br><br>**Assessment:** Overall low risk of sovereign stress. | **Risks:** Projected debt increase, unfavourable developments in interest rates and growth, liability risks from private sector.<br><br>**Mitigating factors:** Financial market perceptions, stable financing sources, lengthening of debt maturity in recent years.<br><br>**Assessment:** Low risk in short-term, high in medium-term, medium in long-term. |
| Germany | **Risks:** Aging-related expenditures on pensions and health care.<br><br>**Mitigating factors:** Strong institutions, stable investor base, relatively long average debt maturity, predominantly euro-denominated debt.<br><br>**Assessment:** Overall low risk of sovereign stress and explicitly states that debt is sustainable. | **Risks:** Projected debt increase, aging-related expenditures, high share of short-term debt.<br><br>**Mitigating factors:** Financial market perceptions, favourable growth and interest rate developments, stable financing sources, lengthening of debt maturity in recent years.<br><br>**Assessment:** Low risk in short-term, medium in medium- and long-term. |
| United States | **Risks:** Debt expected to rise for several years, aging-related spending pressures on health and social security.<br><br>**Mitigating factors:** Strong institutions, depth of investor pool, role of the US dollar in the international system.<br><br>**Assessment:** Overall low risk of sovereign stress and explicitly states that debt is sustainable. | - |

Note. Overview of risks, mitigating factors and assessments made in the IMF's and the European Commission's most recent debt sustainability evaluations. For more information, see the actual reports.

Sources: IMF (2024b, 2024c, 2024d, 2025b), European Commission (2024).

# 5 Concluding comments

Recent years have seen an increased attention to the relationship between monetary and fiscal policy, and the potential need for stronger coordination between the two. At the same time, recent developments are pointing towards more expansionary fiscal policy in the years to come, with announcements of substantial increases in government spending and relaxation of fiscal rules. These factors make it likely that fiscal developments will play a larger role in monetary policy analysis going forward. To better understand and analyse the potential consequences of these developments, this article has provided an overview of fiscal rules, the evolution of public debt levels in recent decades, and fiscal sustainability, with a particular focus on a few selected economies.

Since the turn of the millennium, there has been a widespread adoption of fiscal rules which are designed to improve public finances. Yet, public debt levels have continued to rise in most advanced economies and the causal effects of rules remain debated. It is possible that the type of rule and its design matter for fiscal discipline, but it is also possible that fiscal rules and fiscal discipline are simply codetermined by fiscally concerned electorates. The lack of clarity regarding the effects of rules makes it more difficult to predict the consequences of relaxing them.

Recent announcements of increased government spending on matters such as defence and infrastructure are likely to cause further increases in public debt. But economies also continue to struggle with the factors that have caused debt accumulation in previous decades. While crises, recessions and political economy dynamics are difficult to predict, aging populations and interest burdens will continue to put pressure on public finances. The fact that global interest rates have risen in recent years compounds the problem, which once again highlights the connection between fiscal and monetary policy.

Rising public debt levels continue to pose a risk to fiscal sustainability. However, sustainability remains difficult to evaluate. Our estimates of a fiscal reaction function provide evidence that Swedish and German fiscal policy has increasingly moved towards debt management since the introduction of fiscal rules, while French and U.S. fiscal policy has not. While such estimates may serve as a useful indicator of future behaviour, there is no guarantee that they will. They also do not provide any guidance on at which point the debt level is no longer sustainable. Such assessments must be based on credibility, which is difficult to measure.

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# Appendix A – Stationarity and cointegration tests

**Table A1. ADF test for unit root in the public debt and the primary balance, sample period 1950-2023**

| | $PB_{t-1}$ | | $Debt_{t-2}$ | | Conclusion |
|---|---|---|---|---|---|
| | H0: Random walk, no restrictions | | H0: Random walk, no restrictions | | |
| | ADF test | Phillips-Perron test | ADF test | Phillips-Perron test | |
| Sweden | -4.247*** (2 lagged difference) | -3.153* | -2.169 (1 lagged difference) | -2.034 | • $PB_{t-1}$ is I(0) by the ADF test, but weak significance by the Phillips-Perron test.<br>• $Debt_{t-2}$ is I(1). |
| Germany | -4.669*** (0 lagged difference) | -4.652*** | -3.415 ** (1 lagged difference) | -3.008 | • $PB_{t-1}$ is I(0).<br>• $Debt_{t-2}$ is I(0) by the ADF test but not the Phillips-Perron test. |
| France | -2.988 (2 lagged difference) | -4.217*** | -2.580 (0 lagged difference) | -2.582 | • $PB_{t-1}$ is I(1) by the ADF test, but not the Phillips-Perron test.<br>• $Debt_{t-2}$ is I(1). |
| United States | -4.795*** (1 lagged difference) | -3.893** | -2.084 (0 lagged difference) | -2.062 | • $PB_{t-1}$ is I(0).<br>• $Debt_{t-2}$ is I(1). |

Note. ***p<0.01, **p<0.05, *p<0.1. Lag length for the ADF test has been selected using the AIC.

**Table A2. ADF test for unit root in first-differenced public debt and primary balance, sample period 1950-2023**

| | $\Delta \mathrm{PB}_t$ | | $\Delta Debt_{t-1}$ | | Conclusion |
|---|---|---|---|---|---|
| | H0: Random walk, no restrictions | | H0: Random walk, no restrictions | | |
| | ADF test | Phillips-Perron test | ADF test | Phillips-Perron test | |
| Sweden | -5.860*** (0 lagged difference) | -5.829*** | -4.983*** (0 lagged difference) | -5.010*** | • $\Delta \mathrm{PB}_t$ is I(0). • $\Delta Debt_{t-1}$ is I(0). |
| Germany | -8.345*** (1 lagged difference) | -10.960*** | -6.207 *** (0 lagged difference) | -6.160*** | • $\Delta \mathrm{PB}_t$ is I(0). • $\Delta Debt_{t-1}$ is I(0). |
| France | -9.443*** (1 lagged difference) | -10.345*** | -8.005*** (0 lagged difference) | -8.002*** | • $\Delta \mathrm{PB}_t$ is I(0). • $\Delta Debt_{t-1}$ is I(0). |
| United States | -5.941*** (3 lagged difference) | -8.118*** | -7.594*** (0 lagged difference) | -7.570*** | • $\Delta \mathrm{PB}_t$ is I(0). • $\Delta Debt_{t-1}$ is I(0). |

Note. ***p<0.01, **p<0.05, *p<0.1. Lag length for the ADF test has been selected using the AIC.

**Table A3. ADF test for unit root in the expenditure gap and GDP gap, sample period 1950-2023**

| | $\mathrm{GG}_t$ | | $YG_t$ | | Conclusion |
|---|---|---|---|---|---|
| | H0: Random walk, no restrictions | | H0: Random walk, no restrictions | | |
| | ADF test | Phillips-Perron test | ADF test | Phillips-Perron test | |
| Sweden | -6.179*** (3 lagged difference) | -6.513*** | -4.702*** (3 lagged difference) | -5.069*** | • $\mathrm{GG}_t$ is I(0). • $YG_t$ is I(0). |
| Germany | -7.807*** (2 lagged difference) | -8.709*** | -5.974 *** (3 lagged difference) | -6.667*** | • $\mathrm{GG}_t$ is I(0). • $YG_t$ is I(0). |
| France | -6.132*** (3 lagged difference) | -8.675*** | -5.014*** (0 lagged difference) | -4.999*** | • $\mathrm{GG}_t$ is I(0). • $YG_t$ is I(0). |
| United States | -6.737*** (3 lagged difference) | -6.223*** | -5.696*** (2 lagged difference) | -5.506*** | • $\mathrm{GG}_t$ is I(0). • $YG_t$ is I(0). |

Note. ***p<0.01, **p<0.05, *p<0.1. Lag length for the ADF test has been selected using the AIC.

**Table A4. ADF test for unit root in inflation rate and implicit interest rate, sample period 1950-2023**

| | $\Delta infl_t$ | | $\Delta reff_t$ | | Conclusion |
|---|---|---|---|---|---|
| | H0: Random walk, no restrictions | | H0: Random walk, no restrictions | | |
| | ADF test | Phillips-Perron test | ADF test | Phillips-Perron test | |
| Sweden | -6.819*** (3 lagged difference) | -11.897*** | -7.688*** (0 lagged difference) | -7.703*** | • $infl_t$ is I(0).<br>• $reff_t$ is I(0). |
| Germany | -6.924*** (3 lagged difference) | -26.658*** | -5.811*** (3 lagged difference) | -10.643*** | • $infl_t$ is I(0).<br>• $reff_t$ is I(0). |
| France | -6.635*** (2 lagged difference) | -12.002*** | -5.619*** (3 lagged difference) | -8.041*** | • $infl_t$ is I(0).<br>• $reff_t$ is I(0). |
| United States | -6.697*** (3 lagged difference) | -8.465*** | -5.583*** (0 lagged difference) | -5.563*** | • $infl_t$ is I(0).<br>• $reff_t$ is I(0). |

Note. ***p<0.01, **p<0.05, *p<0.1. Lag length for the ADF test has been selected using the AIC.

**Table A5. Tests for cointegration between $PB_{t-1}$ and $Debt_{t-2}$, sample period 1952-2022**

| | Engle-Granger test | | Johansen test | Conclusion |
|---|---|---|---|---|
| | Using ADF | Using Phillips-Perron | | |
| Sweden | -4.203*** (2 lagged difference) | -3.176* | Rank 1, trace statistic 3.6027 | Cointegrated. |
| Germany | -4.651*** (0 lagged difference) | -4.634*** | Rank 1, trace statistic 0.0938 | Cointegrated. |
| France | -4.786*** (1 lagged difference) | -4.881*** | Rank 1, trace statistic 2.2063 | Cointegrated. |
| United States | -4.373*** (1 lagged difference) | -3.601** | Rank 1, trace statistic 0.0341 | Cointegrated. |

Note. ***p<0.01, **p<0.05, *p<0.1. Lag length for the ADF test has been selected using the AIC.

# Appendix B – Data

Table B1 below presents the data sources and transformations for each variable used in our fiscal reaction function. These closely follow those in Berti et al. (2016), on which much of our methodology is based.

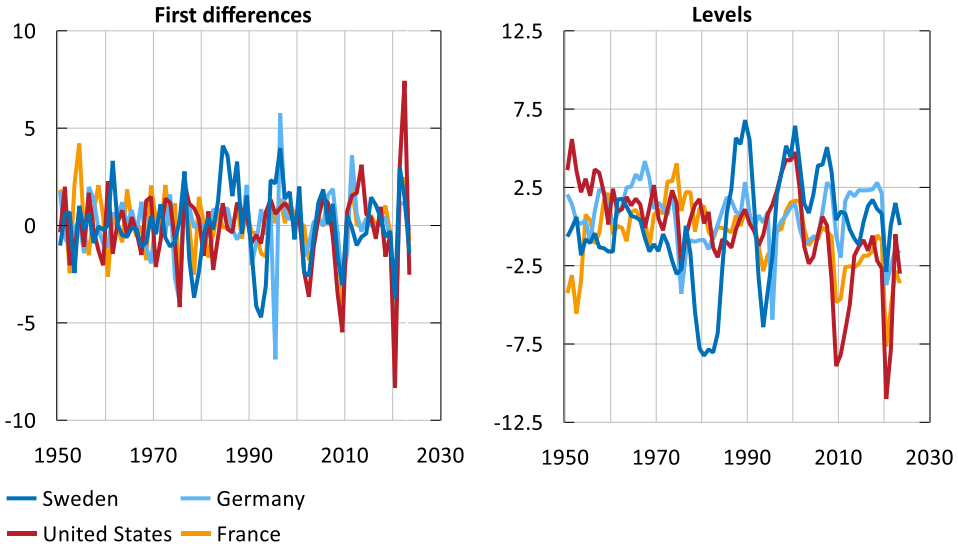
The Public Finances in Modern History (PFMH) dataset refers to the 2024 version. The choice between the 2024 and 2025 version has no implications for most variables, as most revisions concern recent years, and we do not use any PFMH data beyond 2001. The exception is the U.S. primary expenditure and primary balance series. In the 2024 version of the PFMH dataset, there is a significant jump in both government primary expenditures and revenues between 1959 and 1960 due to a change in data sources. However, because expenditures and revenues were collected consistently within each year, there is no break in the primary balance series. In contrast, the 2025 version of the PFMH dataset, significantly revises U.S. government expenditures for 1929–2000 to ensure data consistency with Federal Reserve Economic Data (FRED). This removed the jump in government primary expenditures but not in revenues, resulting in a break in the primary balance series. Since the primary balance is a key variable in our analysis, and because consistency with FRED is less of a concern for our purposes, we have chosen to use the 2024 version of the PFMH dataset.

**Table B1. Data sources and transformations**

| | Source | Transformation |
|---|---|---|
| Primary balance (% of GDP) | IMF's Public Finances in Modern History (PFMH) and AMECO | For each country, the AMECO series has been extended backward from 1995 using annual changes in the PFMH series. |
| Public debt (% of GDP) | PFMH and AMECO | For each country, the AMECO series has been extended backward from 1995 using annual changes in the PFMH series. |
| Expenditure gap ($GG$) | PFMH and AMECO | First, a government expenditures series for each country is created by extending the AMECO series backward from 1995 using annual changes in the PFMH series. Second, we estimate a trend in the linked series using a Hodrick-Prescott filter. The final series is obtained by subtracting the trend from the actual series. |
| Output gap ($YG$) | AMECO and the 2023 Maddison Project Database | For each country, the output gap series is obtained by extending the AMECO measure of the output gap backward using annual changes in our own measure of the output gap. Our own measure is derived as follows: First, historical GDP data for each country is sourced from the Maddison Project Database. Second, we estimate a trend in the series using a Hodrick-Prescott filter. Third, the trend is subtracted from the actual series. Finally, the AMECO measure and our own measure are linked at the closest point between the two series within five years of the start of the AMECO series. |
| Inflation rate | AMECO and Reinhart and Rogoff (2010) dataset (available at: https://carmenreinhart.com/data/) | For each country, the AMECO series has been extended backward from 2001 using the Reinhart and Rogoff series. The inflation rate is expressed in first differences to ensure stationarity. |
| Implicit interest rate | AMECO, PFMH and the IMF's Global Debt Database | For each country, the implicit interest rate series is obtained by extending the AMECO series back from 1996 using annual changes in our own measure. Our own measure is derived as follows: First, we obtain historical data on public debt as percentage of GDP, as well as interest paid on public debt as percentage of GDP, from the PFMH database. We also obtain GDP data at current prices from the Global Debt Database and construct a GDP value for the year 1949 using the real GDP growth rate from the PFMH database. Second, we multiply the debt and interest paid series by the GDP series. Finally, we calculate the implicit interest rate series by dividing each interest paid value by the debt value from the previous year. The implicit interest rate is expressed in first differences to ensure stationarity. |

**Figure B1. Primary balance expressed in first differences and levels**

Per cent of GDP

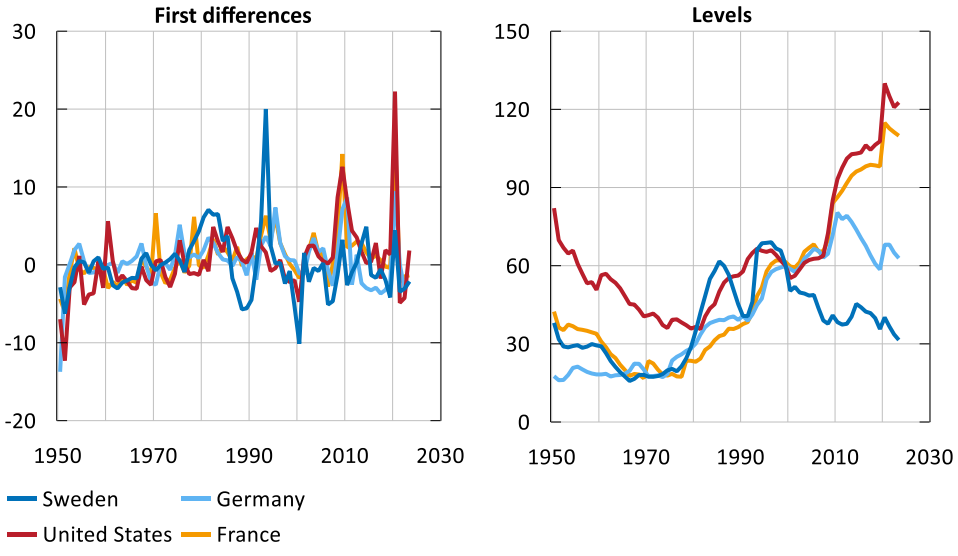



Note. See Table B1 for details on transformations.

Sources: AMECO, IMF and own calculations.

**Figure B2. Public debt expressed in first differences and levels**

Per cent of GDP

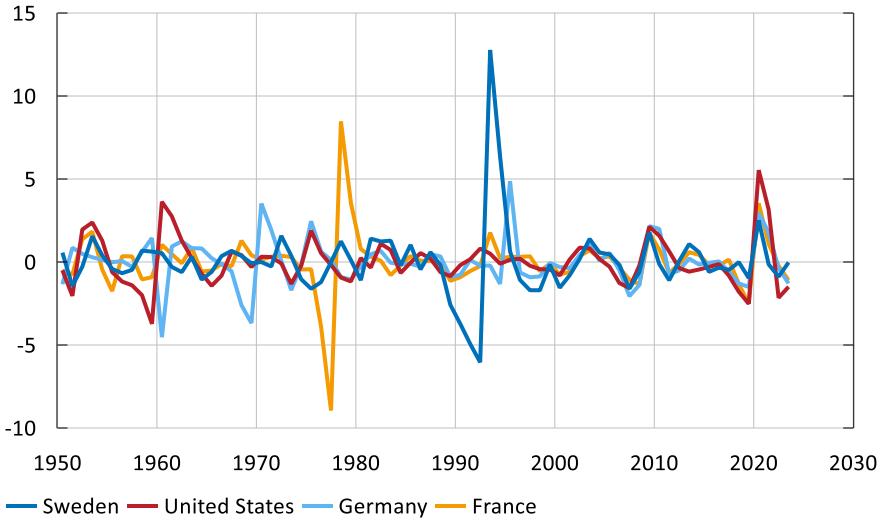



Note. See Table B1 for details on transformations.

Sources: AMECO, IMF and own calculations.

**Figure B3. Expenditure gap**

Per cent of GDP

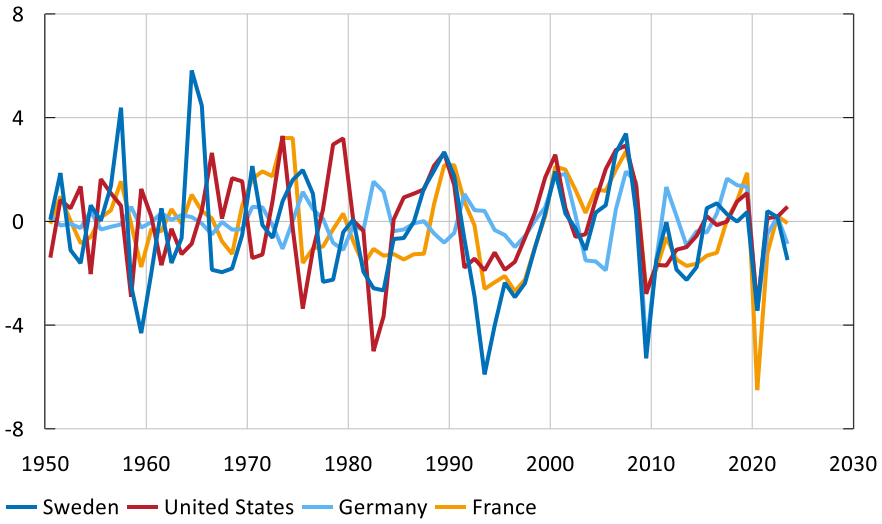



Note. See Table B1 for details on transformations.

Sources: AMECO, IMF and own calculations.

**Figure B4. Output gap**

Per cent of GDP

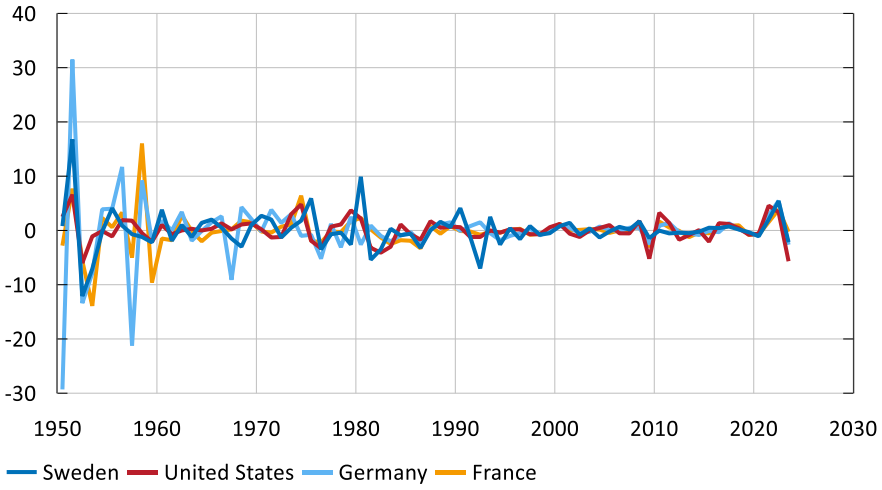



Note. See Table B1 for details on transformations.

Sources: AMECO, the 2023 Maddison Project database and own calculations.

**Figure B5. Inflation rate**

Annual percentage change, first difference

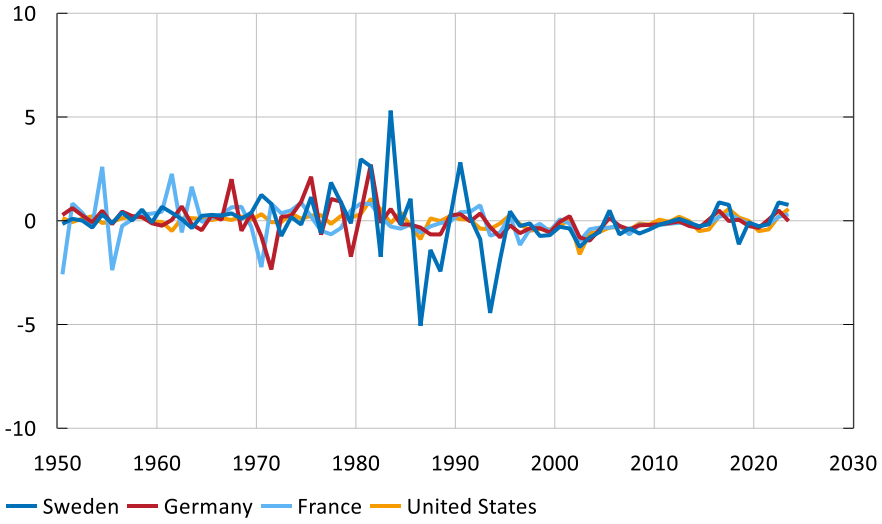



Note. See Table B1 for details on transformations.

Sources: AMECO, Reinhart and Rogoff (2010) and own calculations.

**Figure B6. Implicit interest rate**

Per cent, first difference




Note. See Table B1 for details on transformations.

Sources: AMECO, IMF and own calculations.