



# The implications for public debt of high inflation and monetary tightening

**Expected increases in interest rates and reductions in real GDP growth rates will result in relatively small increases in public debt-to-GDP ratios.**

**Zsolt Darvas<sup>1</sup>**

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Rising inflation has triggered monetary tightening in several countries. The Federal Reserve and the Bank of England have already increased their key interest rates, while the European Central Bank will start to hike rates soon.

Higher interest rates raise concerns about public debt sustainability in countries with high public debt. In the euro area, government bond yields have already started to increase in anticipation of ECB monetary tightening. The increase has been higher in higher-debt countries, such as Greece and Italy, than in lower-debt such as Germany and the Netherlands. Economic slowdown in the wake of the Russian invasion of Ukraine might aggravate debt sustainability concerns.

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<sup>1</sup> Zsolt Darvas, a Hungarian citizen, is a Senior Fellow at Bruegel, and also a Senior Research Fellow at the Corvinus University of Budapest. From 2005 to 2008, he was the Research Advisor of the Argenta Financial Research Group in Budapest. Before that, he worked at the research unit of the Central Bank of Hungary (1994-2005) where he served as Deputy Head. Zsolt holds a Ph.D. in Economics from Corvinus University of Budapest where he teaches courses in Econometrics but also at other institutions since 1994. His research interests include macroeconomics, international economics, central banking, and time series analysis. This paper was initially published on the Bruegel Blog <https://www.bruegel.org/blog-post/implications-public-debt-high-inflation-and-monetary-tightening>

In this context, it may look puzzling that the European Commission and the International Monetary Fund have cut their public debt ratio forecasts for most countries. In May 2022, the Commission revised down its November 2021 forecasts of public debt ratios in 2023 in the United Kingdom, the United States, and all EU countries bar Poland. The IMF publishes longer-range forecasts: in April 2022 it revised down forecasts made in April 2021 of public debt ratios in 2026 in all EU countries except Germany, Malta, the Netherlands, and Romania. The IMF also revised downward the UK and US debt ratio forecasts, while there was an upward revision for Japan. The IMF Fiscal Monitor did not decompose the factors behind the 2026 debt-to-GDP ratio forecast revisions but looked at only the impact of surprise inflation on the 2021 debt to GDP ratio, and the results were presented for the US, China, and three country groups (Figure 1.10 of the Fiscal Monitor).

This blogpost examines why public debt ratio forecasts have been revised, focusing on the IMF's 2026 debt ratio forecasts for 16 countries. Using accounting identities and the 'everything else remains unchanged' assumption (note: I do not use a full-fledged macroeconomic model in which I can simulate the impact of an inflation shock), my main conclusion is that interest rates and real GDP growth developments would increase 2026 public debt ratios to a relatively small extent, but inflation makes big cuts to debt ratios.

To assess the impact of expected changes in interest rates, I calculated a hypothetical path for public debt ratios from 2021-2026 based on data in the April 2021 IMF forecasts (including the inflation forecast) but applying the interest rate assumption from the April 2022 IMF forecasts.

Similarly, to assess the impact of the inflation shock, I inserted the 2022 inflation forecast into the 2021 dataset and calculated a hypothetical path for the public debt ratio from 2021-2026. In this calculation the inflation shock influences the public debt ratio via three channels: (1) it increases tax revenues because of higher nominal GDP, thus leading to a lower budget deficit and lower public debt; (2) lower debt implies lower interest payments, implying less borrowing and lower debt; and (3) higher nominal GDP means that for the debt to GDP ratio, a higher denominator is used, which reduces the ratio. I made similar calculations for the revenue/GDP ratio (which, for simplicity, I call the change in the tax rate), primary (non-interest) expenditure, and the so-called stock-flow adjustment).

The interest rate and inflation shocks are interrelated because the inflation shock is the main driver of central bank rate hikes. This interrelation is taken into account in IMF forecasts (see the IMF's methodological annex). Also, the inflation shock reduces the real value of public spending which governments might compensate for later. Thus, while my calculations, assuming 'everything else remains the same', do not capture the overall impact of the inflation shock, it is nevertheless telling to calculate by how much interest rates, inflation, and some other factors, each contributed to the revision of IMF debt ratio forecasts for 2026.

### The interest rate – growth rate differential

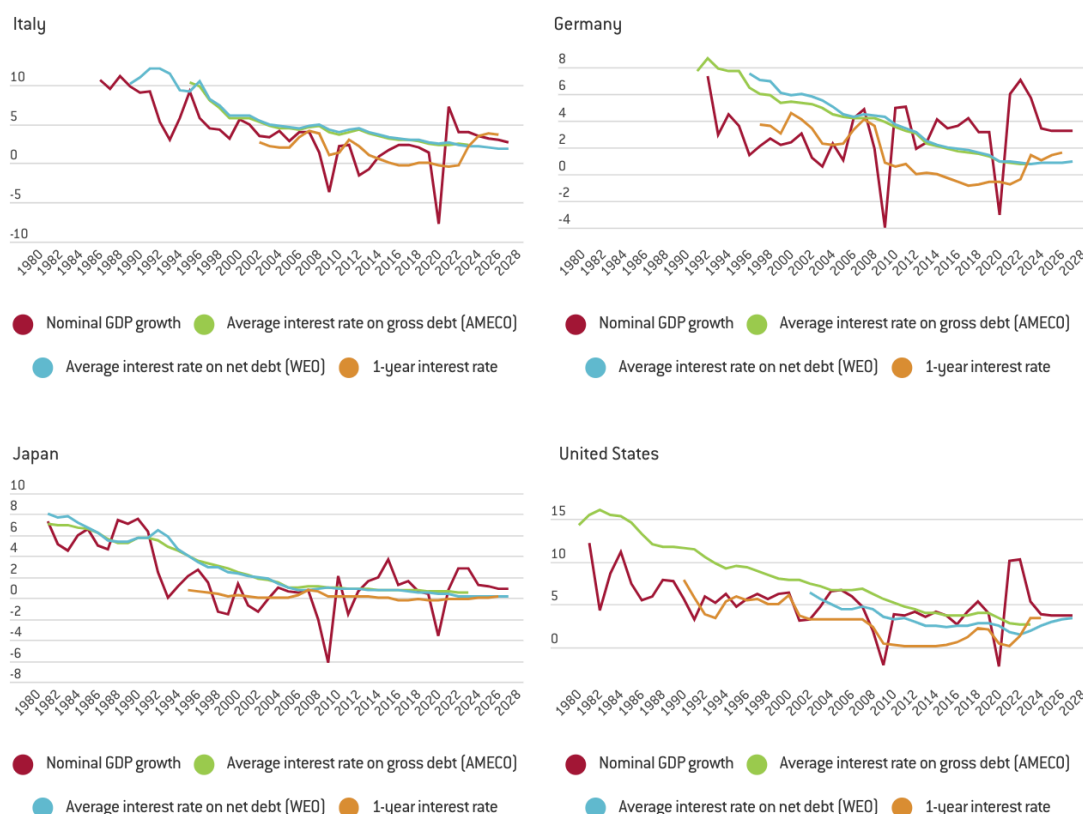
I focus on Italy, Germany, Japan, and the United States, which all have unique features worth emphasising (see charts for other countries in the annex).

The difference between the interest rate and growth rate is an important determinant of public debt sustainability. When the interest rate is higher than the growth rate, the government must maintain a primary budget surplus (more revenues than non-interest expenditures) to prevent the debt-to-GDP ratio from exploding. But when the interest rate is below the growth rate, the debt ratio could decline even if there is no primary surplus.

For nominal GDP, I used the April 2022 IMF World Economic Outlook (WEO) database, which includes projections up to 2027. Finding an appropriate measure of the interest rate which can be compared to the growth rate is more difficult. The EU's AMECO dataset provides an "implicit interest rate" indicator, which is the total interest payment over a year divided by the debt stock at the end of the previous year. This is an indicator of the average interest rate on public debt. The AMECO dataset includes past and projected values (up to 2023) of this variable, and the calculation is based on gross interest payments and gross public debt. The WEO does not include this variable directly but includes overall and primary budget balances from which interest payments can be calculated. The WEO primary balance indicator is calculated on the basis of net interest payments and thus must be compared to net public debt. For many countries, the average interest rates calculated on the basis of gross (AMECO) and net (WEO) debts and interest payments are rather similar. The advantage of the WEO-based average interest rate indicator is that projections are available up to 2027.

The average interest rate mostly reflects past borrowing costs. For example, when a government issues a 10-year bond, the interest paid on that bond will not change for 10 years. In contrast, the borrowing costs of, say, a 3-month treasury bill change every third month. A government borrows to finance the budget deficit and to refinance maturing bonds and bills. Thus, a higher interest rate immediately increases the cost of borrowing on newly issued debt, but the interest cost of already issued debt does not change. Consequently, the average interest rate on public debt could still decline when government bond yields increase if the maturing debt has a higher interest rate than the interest rate on new borrowing.

Figure 1: Nominal GDP growth and nominal interest rates (%)



Source: Bruegel based on the April 2022 IMF World Economic Outlook database, the May 2022 AMECO database, and Bloomberg data on government bond yields. For the one-year interest rate data, the 2022 average refers to the period 3 January - 15 June 2022, while the projections for 2023-2026 are based on average values between 1-15 June 2022.

To illustrate the development of new borrowing costs, I also include a market-based interest rate expectation: the expected one-year maturity interest rate. Under certain assumptions, the expectations hypothesis of the term structure of interest rates allows the calculation of expected future interest rates. By using the one, two, three, four and five-year government bond yields, I calculated the expected one-year interest rate one year from now, the expected one-year interest rate two years from now and so on.

For Italy, the average interest rate was higher than the nominal growth rate from 1990 to 2020 (Figure 1 above). For Japan, the US and, especially, Germany, this was the case only before the global financial crisis; since then, the two variables have been either broadly similar, or growth has been above the interest rate.

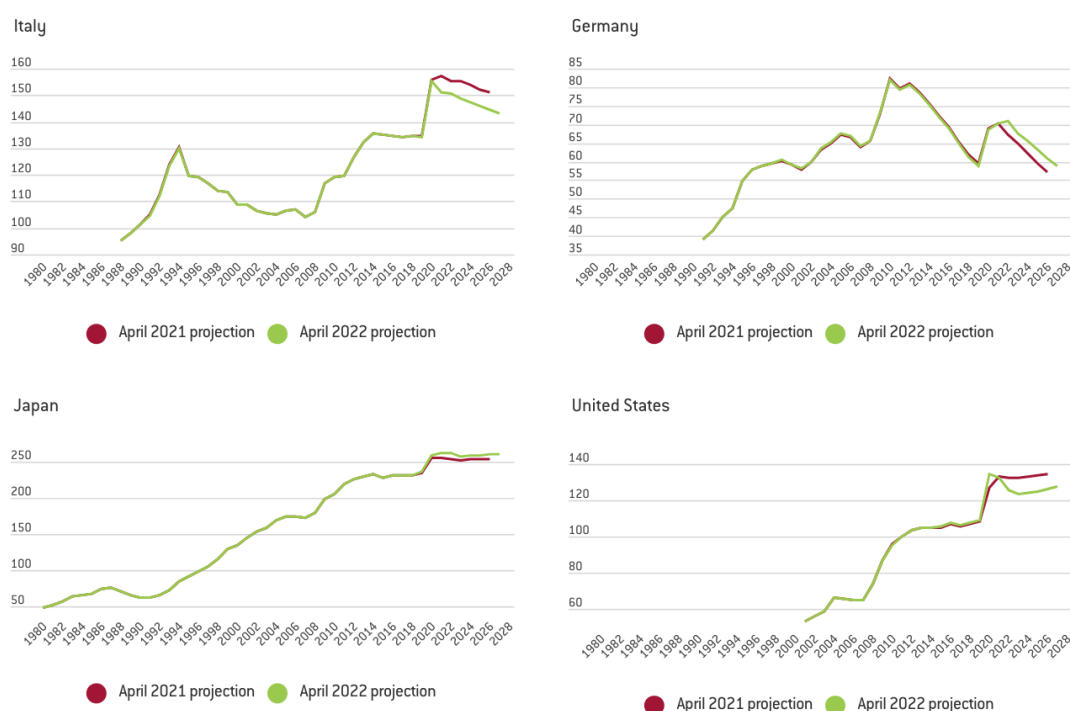
### Unexpected changes in public debt ratios

Since most of the unexpected surges in inflation and central bank tightening have occurred since spring 2021, Figure 2 below, compares the IMF's April 2021 and April 2022 public debt

ratio projections. The start of the Russian aggression against Ukraine in February 2022 also falls within this time period. The war will likely have adverse economic impacts on the world economy.

For Italy and the United States, the IMF debt ratio projections were revised significantly downward, but for Germany and Japan they went up (Figure 2). This might seem counterintuitive because Italy's interest rate is higher and faster-rising than Germany's. Also, the Federal Reserve has already started interest rate hikes, but the Bank of Japan has not.

Figure 2: Gross public debt to GDP ratio, comparing the April 2022 and April 2021 IMF World Economic Outlook projections (% of GDP)



Source: Bruegel based on April 2021 and April 2022 IMF World Economic Outlook databases.

## Components of the debt ratio change

The change in the debt-to-GDP ratio has six possible components: interest rate change, GDP deflator change, real GDP development change, tax rate change, primary (non-interest) expenditure change, and stock-flow adjustment change (the latter is the difference between net borrowing and the change in debt, see an explanation here). For each of these factors, I consider the impact of the change between the April 2021 and April 2022 WEOs for 2021-2026, by keeping other variables at their April 2021 values. The six factors do not add up to

the total change in the debt ratio, because there are interactions between the factors, so I also include an 'other changes' category. For example, for the tax rate impact, I apply the 2022 WEO revenue/GDP ratio values for 2021-2026 to the 2021 WEO nominal GDP values for 2021-2026 to obtain the impact of this variable. But obviously, the 2022 WEO revenue/GDP ratio path actually applies to the (much higher) 2022 WEO nominal GDP path.

Table 1 shows results for those 16 countries for which the average implicit interest rates based on gross debt (AMECO) and net debt (WEO) are reasonably similar.

Table 1: Decomposition of the change in the 2026 public debt to GDP ratio from the April 2021 WEO projection to the April 2022 WEO projection assuming "everything else remains the same" (GDP percentage points)

	2026 debt ratio from April 2021 WEO	Change in interest rates	Change in inflation	change in real growth	change in tax rate	Change in primary expenditure	Change in stock-flow adjustment	Other factors	2026 debt ratio from April 2022 WEO
Austria	78.0	-1.4	-12.9	-1.8	0.7	12.5	-0.7	-2.1	72.4
Belgium	122.2	1.0	-21.8	-1.6	6.5	15.9	3.2	-9.8	115.6
Czechia	55.0	3.0	-17.8	5.3	-6.1	8.2	6.4	-11.0	43.0
France	116.9	1.2	-10.4	0.5	1.8	9.3	-1.3	-4.4	113.6
Germany	57.1	0.5	-12.2	2.9	-3.4	17.1	3.8	-4.9	60.9
Ireland	54.4	-0.6	1.7	-18.5	2.7	6.2	0.5	-2.8	43.6
Italy	151.0	1.0	-11.9	-7.5	-3.8	19.1	0.2	-3.9	144.3
Japan	254.7	-0.6	7.8	2.6	-5.2	2.9	-5.9	4.1	260.5
Netherlands	51.8	0.0	-9.2	-5.0	6.2	12.6	0.0	-2.5	54.1
Poland	55.4	5.5	-35.0	-3.1	4.0	34.8	7.1	-18.8	50.0
Portugal	110.6	-0.9	-9.1	-1.0	-3.7	9.6	-6.0	7.9	107.3
Romania	64.5	0.1	-6.8	6.1	-8.3	14.1	-0.6	-2.8	66.4
Slovenia	74.2	0.2	-29.0	-9.6	8.3	30.3	1.0	-8.4	66.9
Spain	118.4	0.7	-5.0	-0.8	-4.7	4.6	0.7	0.5	114.5
United Kingdom	113.0	7.3	-22.1	-1.8	0.7	9.3	-15.2	-17.7	73.4
United States	134.5	5.9	-20.2	-0.8	-3.9	11.4	6.2	-6.8	126.2
mean	100.7	1.4	-13.3	-2.1	-0.5	13.6	0.0	-5.2	94.6
median	94.3	0.6	-12.0	-1.3	-1.4	12.0	0.3	-4.1	72.9

Source: Bruegel based on the April 2021 and April 2022 IMF World Economic Outlook databases.

The impact of the unexpected interest rate change is positive for 12 countries, with the largest impacts on the UK (7.3 percentage points of GDP), US (5.9), Poland (5.5) and Czechia (3.0). For Italy, the interest impact is just 1.0, for Germany it is 0.5, and for Japan it is negative at -0.6 (implying that the expected Japanese interest rate declined from the April 2021 to the April 2022 projection).

Interest rate impacts are dwarfed by the impact of unexpected inflation, which is expected to reduce UK and US debt ratios by more than 20 percentage points of GDP, and Italian and German debt ratios by about 12 percentage points. The largest decline arising from unexpected inflation, of a staggering 35 percentage points, is expected in Poland, resulting from a huge revision of the GDP deflator outlook: the April 2021 WEO foresaw that the



Polish GDP deflator would increase by 18% from 2020 to 2026, while the April 22 WEO forecast a 41% increase over the same period. Among the 16 countries in Table 1, the unexpected change of inflation increases the debt ratio only in Ireland (1.7 percentage points) and Japan (7.8 percentage points), reflecting a reduced inflation outlook for these two countries.

The impact of a revised real growth outlook decreases the debt ratio in three-quarters of the countries, but generally by small amounts, except in Ireland and Slovenia. In Ireland, real GDP forecasts were revised upward very substantially: the April 2021 WEO foresaw a 23% increase in Irish real GDP from 2020 to 2026, while the April 2022 WEO lifted the outlook to 38%. The revised real GDP outlook from 2020 to 2026 is expected to increase the public debt ratio in five of the 16 countries: Czechia, France, Germany, Romania and Japan.

The impact of the tax rate change varies, increasing the debt ratio in half of the countries and reducing it in the other half. There is no clear pattern for the revisions to stock-flow adjustments either. The biggest revision in the stock-flow adjustment is for the UK, resulting in a 15-percentage point of GDP decline in the debt ratio.

These factors combined would imply very big reductions in public debt-to-GDP ratios. But non-interest public expenditures cannot stay intact in the face of a big inflation shock. Certain expenditures might be indexed to inflation, like pensions, while unexpected inflation reduces the real value of public expenditure. That implies that fewer goods and services can be purchased for the same amount of nominal expenditure, and thus governments might be inclined to increase nominal spending, especially since they receive much higher tax revenues because of higher inflation.

Moreover, the Russian aggression against Ukraine has encouraged many countries to spend more on defence and the energy transition. Governments have also rushed to shield consumers from rising energy prices. The arrival of millions of Ukrainian refugees will imply major fiscal costs for several member states.

It is unclear to what extent WEO projections took into account such increased non-interest expenditures. The IMF methodological description says “The medium-term fiscal projections are similarly based on a judgment about policies’ most likely path”. Nevertheless, increased expenditures are expected to lift the debt ratios in all 16 countries we have analysed, by an average of about 12 percentage points of GDP. For example, for Germany, the April 2021 WEO foresaw €1,942 billion (or 45.8% of GDP) primary expenditure in 2026, while the April 2022 WEO increased this to €2,064 billion (or 46.4% of GDP).

## Conclusions

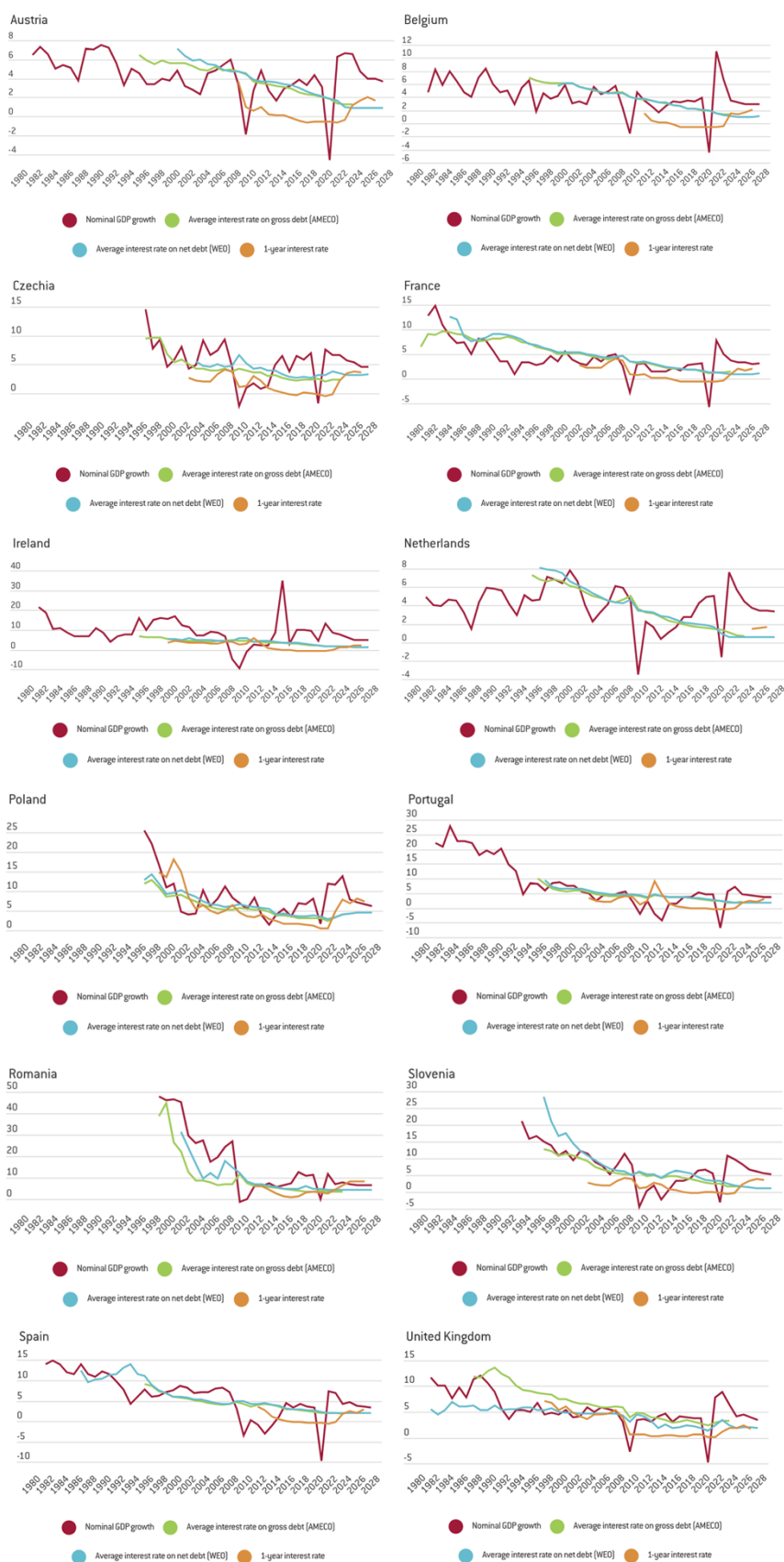
Decomposing the changes in the 2022 and 2021 IMF public debt-to-GDP ratio forecasts for 2026 suggests that the impact of monetary tightening and worsened economic outlook is

relatively small, while inflation reduces debt ratios very substantially. This explains why both the IMF and the European Commission lowered the public debt-to-GDP ratio forecasts for most EU and advanced countries.

Of course, these calculations are based on IMF projections, which could underestimate the extent of monetary tightening (though they might also underestimate the inflation rise). Also, if high interest rates persist longer-term, the average interest cost on public debt could increase beyond 2026. Increased inflation could also increase the risk premium of long-term debt, unanchored inflation expectations, and depress investment and growth. All these factors could weaken the debt sustainability of high-debt countries. Nevertheless, for the next few years at least, the rise of government borrowing costs on newly issued debt should be more than counterbalanced by the debt-reducing impact of higher-than-expected inflation.



### Annex A1: Nominal GDP growth and nominal interest rates (%) for 12 other countries



For the one-year interest rate data, the 2022 average refers to the period 3 January - 15 June 2022, while the projections for 2023-2026 are based on average values between 1-15 June 2022.

Annex A2: Gross public debt to GDP ratio, comparing the April 2022 and April 2021 IMF World Economic Outlook projections (% of GDP) for 12 other countries

