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**Research Report**

## The interplay of interest rates and debt-financed government spending

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## The Interplay of Interest Rates and Debt-Financed Government Spending

Bev Dahlby and Ergete Ferede

### Key Messages

- A favorable differential between the interest rate on government debt and the growth rate of the economy does not mean that debt-financed spending has low or no fiscal cost.
- Higher public sector debt levels can lead to higher real interest rates and lower economic growth rates, forcing the government to run a smaller primary deficit to stabilize the debt ratio.
- This will push up the average fiscal cost (AFC) of program spending, defined as the ratio of taxes to program spending.
- Marginal fiscal cost (MFC), i.e., the additional taxes imposed to stabilize the debt ratio, can exceed the increase in deficit-financed spending.
- Our calculations indicate that six of the EA12 countries had an MFC greater than one in 2019. Small increases in the debt ratios or the interest rate-growth rate differentials in Finland, Germany, and Austria would push their MFCs to a value higher than one.



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# The Interplay of Interest Rates and Debt-Financed Government Spending\*

Bev Dahlby and Ergete Ferede\*\*

Persistently low interest rates on government debt over past decades have prompted some economists to question the wisdom of fiscal policies that restrict the use of deficits to finance government spending ([Blanchard](#), 2023; [Eichengreen et al.](#), 2021; [Furman and Summers](#), 2020). This position is based on a simple model of public debt dynamics which posits that when the interest rate on public debt is less than the growth rate of the economy, the ratio of the government debt to GDP can be stabilized, even if the government runs a primary deficit, i.e., current revenues are less than program expenditures. [Mian, Straub, and Sufi](#) (2022) argue that under these conditions “the fiscal cost of increased debt may be zero or even negative” and that higher deficits are akin to a “free lunch,” in the sense that “permanent increases in deficits do not require tax increases going forward, even if they lead to permanently greater (non-explosive) debt levels.”

In a [recent paper](#) we argue that fiscal policies based on the current favorable differential between the interest rate on government debt and the growth rate of the economy can mislead policymakers into believing that debt-financed spending has a negligible fiscal cost (Dahlby and Ferede 2022). Econometric studies indicate that higher public-sector debt levels can lead to higher real interest rates and lower economic growth rates. In other words, the differential between the interest rate on government debt and the growth rate of the economy increases as the ratio of debt to GDP increases. This means that with a deficit-financed increase in program spending a government has to run a smaller primary deficit (or larger primary surplus) to stabilize its debt ratio. Therefore, the average fiscal cost of program spending, defined as the ratio of the taxes to program spending, will increase. As is well known, when average cost increases, marginal cost is greater than average cost. In other words, the marginal fiscal cost of debt-financed spending is greater than the average fiscal cost and, under certain conditions, described below, the marginal fiscal cost can be greater than one. In other words, the

\* A [version of this briefing note](#) is on the Finances of the Nation website.

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increase in taxes needed to stabilize the debt ratio can exceed the increase in deficit-financed spending. Thus, a debt-financed increase in government spending can have a high fiscal cost even if the interest rate on government debt is lower than the economy's growth rate.

[Blanchard et al.](#) (2021) note that there are two channels through which government deficits and debt can raise interest rates on public debt. The first is crowding out of private sector investment, "which raises the marginal product of capital, and by implication increases all interest rates, risky or safe, in some proportion." The second "is the increase in the supply of sovereign bonds of a particular country relative to the total supply of sovereign bonds. Even in the absence of default risk, sovereign bonds from different member countries are not perfect substitutes, because of either liquidity or price-risk differences." Econometric studies have indicated that a one-percentage-point increase in the US government debt-to-GDP ratio is associated with a 2 to 5 basis point increase in the real interest rate on government debt. However, since changes in US deficits and debt levels can have a major impact on global financial markets, the more relevant studies from a Canadian perspective are studies of the effects of higher debt levels on interest rates in OECD countries. Studies based on panel data from OECD countries have found that a one-percentage-point increase in the debt ratio increased interest rates on government debt by between 3 and 10 basis points ([Ardagna, Caselli, and Lane](#) (2004), [Kinoshita](#) (2006), [Grande, Masciantonio, and Tiseno](#) (2013), and [Jiang et al.](#) (2022)).

Since the publication of Reinhart and Rogoff's book, *[This Time Is Different](#)*, many empirical studies have investigated the impact of public debt levels on economic growth rates. There are a variety of mechanisms by which higher public debt level can reduce investment and hence economic growth. Higher public-debt levels can mean higher taxes to finance higher interest payments, and these erode incentives to save and invest. It can also result from reductions in infrastructure investment by governments. In our paper mentioned above, we provide an overview of econometric studies of the linkage between public debt, lower investment, and economic growth rates. The most comprehensive of these studies is by [Woo and Kumar](#) (2015), which concludes that a 10-percentage-point increase in an advanced economy's debt ratio reduces its annual economic growth rate by 0.15 percentage points.

[Turner and Spinelli](#) (2012) and recent IMF working papers by [Lian, Presbitero, and Wiriadinata](#) (2020) and the European Central Bank—by [Checherita-Westphal and Domingues Semeano](#) (2020) (hereinafter CWDS)—have focused on the impact of higher government debt ratios on the differential between the interest rate and the growth rate because it is a key determinant of fiscal sustainability. The latter study contains the most comprehensive econometric analysis of the impact of public debt and other

factors on the interest rate-growth rate differential using panel data from euro area (EA) and other advanced OECD countries from 1985 to 2017, using a wide range of panel econometric techniques. Here we focus on their main results for 12 EA countries, where they concluded that a one-percentage-point increase in the debt ratio increased the differential between the nominal interest rate on government debt and the growth rate of nominal GDP by 4 to 6 basis points. Below we use this range of estimates to determine the marginal fiscal cost of deficit-financed spending among these EA12 countries.

## The Marginal Fiscal Cost of Deficit Financed Spending

Those who argue that the fiscal cost of debt financed spending is low are focused on the average fiscal cost (AFC), which is the ratio of taxes to program spending required to stabilize the debt ratio. The average fiscal cost can be defined as:

$$AFC = 1 + v(b/\gamma)$$

where  $v$  is the difference between the interest rate on government debt and the growth rate of the economy,  $b$  is the debt ratio, and  $\gamma$  is the ratio of program spending to GDP.

When the interest rate is lower than the growth rate, making  $v$  negative, the debt ratio can be stabilized with a primary deficit, and the AFC is less than one. In the absence of a need for fiscal expansion due to deficient demand, optimal government spending is determined by “the marginal benefits of spending, the marginal costs of taxation and of debt.” ([Blanchard 2023](#)).

The marginal fiscal cost (MFC) is the additional taxes that must be imposed to stabilize the debt ratio for a debt-financed increase in program spending; i.e., it is the cost of debt financing. We can define MFC as:

$$MFC = 1 + v + b(dv/db)$$

where  $dv/db$  is the rate at which the interest rate-growth differential increases as the debt ratio increases.

The MFC will grow as the debt ratio increases, the interest rate-growth rate differential rises, and the rate of increase in the differential as the debt ratio increases. If  $v + b(dv/db) > 0$ , the MFC will be greater than one, and the increase in taxes needed to stabilize the debt ratio will exceed the increase in deficit-financed spending. If  $b(dv/db)$

is sufficiently large, i.e., exceeds  $-v$ ,<sup>1</sup> the MFC can be greater than one even if the growth rate exceeds the interest rate on government debt.

## The MFCs for EA12 Countries

As noted above, a large body of econometric studies indicate that growth rates decline and/or interest rates increase with an increase in the public debt, implying that  $dv/db$  is positive. Here we use the range of estimates for  $dv/db$  of 0.04 to 0.06 from the CWDS (2020) study to calculate the MFCs for the EA12 countries. The other variables used in the calculations, debt ratios and interest rate-growth rate differentials are based on the AMECO database, which is the source of the data used in the CWDS study. Table 1 shows that in 2019 the MFC exceeded one for six of the EA12 countries if the  $dv/db$  is 0.04. With a  $dv/db$  of 0.06, nine countries had MFCs greater than one. Calculations of the average MFCs from 2015 to 2019 yield very similar estimates for the MFCs.

**Table 1: Marginal Fiscal Cost of Deficit-Financed Spending by EA12 Countries**

	$dv/db$			
	0.04		0.06	
	2019	Average 2015 to 2019	2019	Average 2015 to 2019
Ireland	0.93233	0.90155	0.94378	0.91511
Netherlands	0.9679	0.98772	0.9776	0.9991
Luxembourg	0.96985	0.97292	0.97432	0.97714
Germany	0.99023	0.99345	1.00201	1.00648
Finland	0.99742	0.99953	1.00933	1.01182
Austria	0.99784	1.00048	1.01196	1.01611
Belgium	1.00175	1.01197	1.02129	1.03236
France	1.00853	1.01949	1.02802	1.03897
Portugal	1.00981	1.02882	1.03313	1.05389
Spain	1.01217	1.01603	1.03183	1.0363
Italy	1.05943	1.05364	1.08626	1.08055
Greece	1.07765	1.12723	1.11378	1.16338

Authors' calculations.

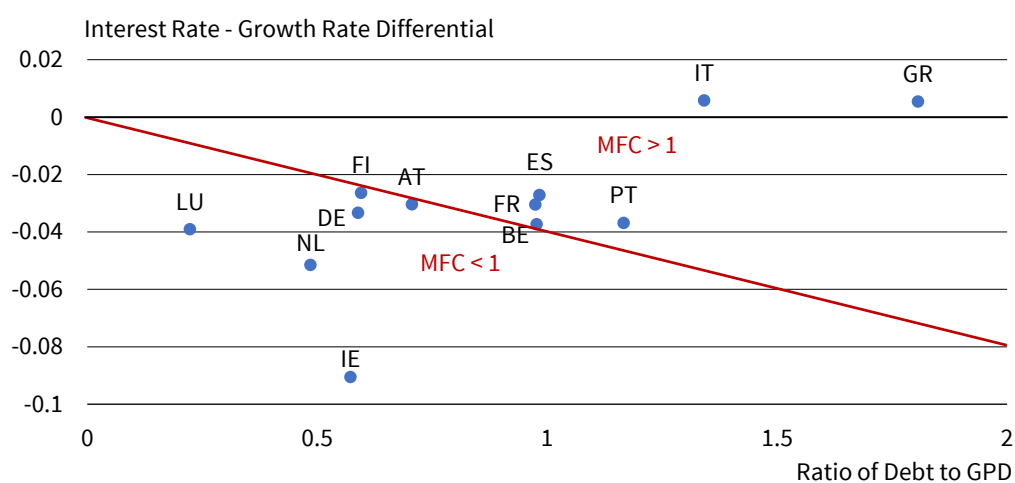
Figure 1 provides some insights into why the MFC varies among the EA12 countries. The downward-sloping red line represents the combinations of the interest rate-growth rate differentials and the debt ratios, such that the MFC equals one when  $dv/db$  is equal to

<sup>1</sup> Equivalently, the MFC exceeds one if the elasticity of interest rate-growth rate differential with respect to the debt ratio is less than  $-1$  when the differential is negative.

0.04. The MFC is greater than one in the region above this line and lower than one in the region below. Consistent with the calculations in Table 1, six EA12 countries have a combination of interest rate-growth rate differentials and debt ratios that were above the MFC = 1 line in 2019. Note as well that Finland, Germany, and Austria were just below the MFC = 1 line, so that even small increases in their debt ratios or their interest rate-growth rate differentials would push their MFCs above one.

**Figure 1:**

**The Determinants of the MFCs of EA 12 Countries in 2019**



Source: Authors' calculations.

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## Policy Implications

The widely held view that there is no, or only a low, fiscal cost from debt-financed increases in program spending can be misleading. Proponents focus on the average fiscal cost of program spending when the interest rate on government debt is lower than the economy's growth rate. They ignore the potentially large marginal fiscal cost of deficit-financed increases in spending that arise when higher public debt raises interest rates on government debt and lowers growth rates. Our calculations, based on the impact of public debt on the interest rate-growth rate differentials in the euro area countries, indicate that the additional taxes required to stabilize debt ratios can exceed deficit-financed spending increases. An additional reason for exercising fiscal prudence is that international financial markets and economic conditions may quickly change, and the current favorable gap between the interest rate and the growth rates could be reversed. Such a reversal would require a large fiscal adjustment to stabilize the public-debt ratio at its current level.



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