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George Economides and Apostolis Philippopoulos

Fiscal Sustainability: Interest Rates, Growth and Debt-based Policy Rules*

Fiscal sustainability is a necessary condition for macroeconomic stability, which, in turn, is a prerequisite for economic growth and the financing of social policies. But how can we judge fiscal sustainability? The most popular approach, at least in policy reports and public debates, is based on the intertemporal government budget constraint (IGBC); see, for example, the European Commission's long-term fiscal sustainability indicators S1 and S2, as well as its recommendations for the public finances of EU countries (European Commission 2023a). We will therefore start our note by using the IGBC to provide some examples of public debt arithmetic. In this kind of analysis, fiscal sustainability boils down to the comparison between the real interest rate on sovereign bonds and the economy's real growth rate.

In turn, building upon the above, we will make a methodological point. We will argue that relying on the IGBC, one can get indicative results only. This is because the real interest rate on sovereign bonds, the economy's real growth rate, as well as most items incorporated in the primary fiscal balance, are all endogenous variables that depend on a number of factors, including the level of public debt itself (see also D' Erasmio et al. 2016). This can rationalize the use of structural macroeconomic models and, in turn, the necessity of debt-based rules according to which fiscal policy instruments react to public debt imbalances. We will close by connecting these arguments with the EU's fiscal rules. Data for euro area (EA) countries are used to support each stage of our analysis.

THE INTEREST RATE-GROWTH RATE DIFFERENTIAL

Table 1 reports data for the real interest rate on 10-year sovereign bonds, the real growth rate and their resulting difference in EA countries; these are averages of annual data over 2001–2022 for each country.¹ As can be seen in the third column, which covers the full euro period, growth rates have exceeded interest rates in most countries except Greece,

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¹ For the nominal interest rate on 10-year sovereign bonds, we have used the interest rate at which these bonds are traded in the secondary bond market.

KEY MESSAGES

- **Calculations based on the intertemporal government budget constraint can be only indicative regarding an economy's fiscal sustainability**
- **Sovereign interest rates, growth rates, as well as primary fiscal balances are all endogenous variables that are jointly determined. This rationalizes the use of structural macroeconomic models for the study of fiscal sustainability**
- **In the current situation and in most countries, macroeconomic stability can be guaranteed only if some fiscal policy instruments react systematically to public debt imbalances. This is consistent with the rhetoric in the new economic governance framework communicated by the European Commission**
- **Which fiscal policy instrument is being used to bring public debt down is essentially a fiscal policy multiplier problem**

Italy, and Portugal, where the differential has been unfavourable. However, once we exclude the sovereign debt crisis years during which Cyprus, Greece and Portugal, as well as Ireland, were shut out of bond markets and had to resort to official financial aid from the EC, the ECB and the IMF, the differential ceases to be positive in Greece and Portugal and becomes even more negative in Cyprus and Ireland (see the numbers in parentheses in the third column).² Thus, at first

² For these countries, we have re-calculated the average real interest rate, the average real growth rate as well as their differential, after we excluded the years during which the nominal interest rate on their 10-year sovereign bonds exceeded 6 percent. In particular, we excluded the period 2012–2014 for Cyprus, the period 2010–2017 for Greece, the period 2011–2012 for Ireland, and the period 2011–2013 for Portugal. The relevant values are the numbers in parentheses.



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Table 1:
Interest Rate-growth Rate Differential (2001-2022)

Country	Real interest rate	Real growth rate	Interest rate-growth rate differential	
			2001-2022	2001-2014
Austria	0.3	1.5	-1.2	0.1
Belgium	0.4	1.6	-1.2	0.2
Cyprus	2.5(1.9)	2.6(3.6)	-0.1(-1.7)	1.7(-0.7)
Finland	0.7	1.4	-0.6	0.5
France	0.9	1.2	-0.3	0.8
Germany	0.4	1.2	-0.7	0.6
Greece	4.4(1.3)	0.4(2.3)	4.0(-0.4)	5.1(-0.3)
Ireland	1.4(1.0)	5.5(6.0)	-4.1(-5.0)	-0.2(-1.1)
Italy	1.6	0.3	1.3	2.4
Latvia	-0.2	3.4	-3.6	-2.5
Lithuania	0.4	4.0	-3.6	-1.7
Luxembourg	0.1	2.6	-2.5	-1.7
Malta	1.2	4.0	-2.7	-0.7
Netherlands	0.1	1.5	-1.4	0.3
Portugal	2.1(1.3)	0.8(1.3)	1.2(0)	3.0(1.4)
Slovakia	-0.3	3.5	-3.7	-3.3
Slovenia	0.8	2.5	-1.6	0.2
Spain	1.0	1.4	-0.5	0.6

Source: Eurostat; OECD; World Government Indicators; own calculations.

sight, things are not bad. However, the last column repeats the same exercise except that now we cover the period 2001–2014 only, namely we leave aside the period of the ECB’s quantitative easing (QE) policies that started officially in the beginning of 2015. Comparing the figures in the last two columns reveals that, in most cases, the interest rate-growth rate differential turns from negative to positive, or to less negative, in the last column, which illustrates the beneficial effect of the ECB’s massive bond purchases on bond prices and their yields. Since such large-scale QE policies cannot continue for ever, things look worse now.

Therefore, the evidence is mixed, with both positive and negative differentials over time and across countries. Also, if we think of the period since 2015 as being temporary, in the sense that sooner or later the ECB will embark on a gradual quantitative tightening, positive, unfavourable differentials can be expected in several countries.

THE ABOVE DIFFERENTIAL AND THE ISSUE OF FISCAL SUSTAINABILITY

In this section, following most policy reports by the European Commission (see e.g., European Commission 2023a), we analyse the issue of fiscal sustainability through the lens of the government budget constraint. Based on Table 1, we will distinguish two cases: one in which the interest rate-growth rate differential is favourable (i.e., negative) and the other in which it is unfavourable (i.e., positive).

If the interest rate-growth rate differential is favourable, meaning negative, then the dynamic path of public debt is stable, in the sense that the government can roll over its debt, issuing new debt to pay for the interest, without the need to cut spending or raise taxes in the future (see Blanchard 2019).³ If, on the other hand, the interest rate-growth rate differential is not favourable, meaning positive, then the public debt ratio is not stationary in the sense that, given the inherited public debt, its path is explosive over time.

To show the quantitative importance of the interest rate-growth rate differential for fiscal sustainability within this commonly postulated policy context, we provide some numerical examples or what is known as debt arithmetic. Thus, using the simple tool of the government budget constraint, we will quantify the required fiscal adjustment under different scenarios regarding the interest rate-growth rate differential as well as the target for the public-debt-to-GDP ratio sometime in the future. As an example, we will refer to the case of Greece, which is the country with the highest public-debt-to-GDP ratio in the EU.

We start by imagining an unfavourable interest rate-growth rate differential. Let us say that the outstanding public-debt-to-GDP ratio is 171 percent, as was the case in Greece at the end of 2022. Also say that there is a positive, 1 percent, interest rate-growth

³ However, even if the public-debt-to-GDP ratio can remain finite, there might be fears of default if this finite ratio is believed to be “too” high. This can perhaps provide extra arguments for upper limits on the debt-to-GDP ratio like those of the Maastricht Treaty even when the differential is favourable (Wickens 2008; Blanchard 2019).

rate differential. We also consider a time horizon of 35 years, at the end of which the public debt ratio is lower than its starting value, as recommended by the EC—say, 100 percent of GDP. Thus, we ask what primary balance is needed to bring the debt ratio down to 100 percent after 35 years. Simple calculations can show that this requires an average annual primary fiscal surplus, as a percentage of GDP, equal to 3.4 percent over the next 35 years.⁴ A sustained surplus of such size is rather demanding.⁵ This unpleasant arithmetic can be compared to a scenario in which the interest rate-growth rate differential is favourable. Assume now that there is a negative, -1 percent, interest rate-growth rate differential. Focusing on the same experiment as before, where the end of period debt will be 100 percent of GDP 35 years from now, a primary surplus of 0.7 percent of GDP is needed.⁶ An average primary fiscal surplus of 0.7 percent is far more achievable than 3.4 percent for the next 35 years!

Thus, a favourable interest rate-growth rate differential can erode the burden of outstanding public debt so that public debt can be brought down without much fiscal effort (in our example, by just keeping the primary fiscal balance almost balanced). But is this the end of the story?

IS IT A GOOD IDEA TO RELY ON THE GOVERNMENT BUDGET CONSTRAINT ONLY?

Calculations like the above are sensitive to assumptions about sovereign interest rates and growth rates over time. More importantly, sovereign interest rates and growth rates are endogenous variables, and the same applies to several items included in the primary fiscal balance, such as tax revenues, social expenditure programs, etc. All these variables can hence depend, directly or indirectly, on the inherited public debt itself. Such endogeneity implies that the debt dynamics, and what is needed for debt stability and fiscal sustainability, are more complicated than those implied by the above analysis. Moreover, even when we introduce fiscal reaction functions (see below) to restore stability, the behaviour of economic agents may change and this can again affect the growth rate, the interest rate, tax bases, etc. All this, as pointed out by D' Erasmio et al. (2016), is a reflection of the Lucas critique.

The above implies that a more reliable fiscal sustainability analysis requires the use of structural mac-

roeconomic models where these three key drivers of public debt dynamics (real interest rate, growth rate, and primary fiscal balance) are all endogenous and jointly determined. There are many dynamic general (dis)equilibrium models of this type in the academic literature, but also by researchers in the EC, the ECB, the IMF, etc.⁷ To the best of our understanding, a common message from this literature is the following: Given the current situation, if a shock hits the economy, macroeconomic stability and determinacy can be guaranteed only if some fiscal policy instruments react systematically to public debt imbalances. And this seems to apply to most countries on both sides of the Atlantic. However, although such rules are a very common device to restore stability in research papers, there is no empirical evidence that this happens in reality (see Table 2 below).

As can be seen in the last column of Table 2, and for most of the EA countries, the correlation between current public debt to GDP and next year's primary fiscal surplus to GDP is negative, meaning that an increase in the public-debt-to-GDP ratio in the cur-

⁷ Applications to the Greek economy include Economides et al. (2021); Dimakopoulou et al. (2022); and Dendramis et al. (2022). Similar studies apply to the US economy (Leeper et al. 2010; Davig et al. 2010; Davig and Leeper 2011; Malley and Philippopoulos 2022.) as well as to the Eurozone as a whole (Dimakopoulou et al. 2023).

Table 2:
Correlation Between Public Debt and Next Year's Primary Fiscal Surplus

Country (average over 2001–2022)	Public-debt-to-GDP ratio	Correlation between current public-debt-to-GDP ratio and next year's primary fiscal surplus to GDP (2001–2022)
Austria	75.5	-0.26
Belgium	101.7	-0.13
Cyprus	78.7	0.22 (*)
Finland	55.0	-0.66
France	85.2	-0.44
Germany	68.7	0.39
Greece	149.4	0.19 (*)
Ireland	60.8	-0.07
Italy	123.7	-0.55
Latvia	30.7	-0.01
Lithuania	31.3	0.30
Luxembourg	16.7	-0.11
Malta	60.3	0.20
Netherlands	55.2	-0.32
Portugal	101.8	0.39 (*)
Slovakia	46.2	0.31
Slovenia	51.0	0.08
Spain	77.0	-0.21

Source: Eurostat; own calculations.

⁴ Here we work as chapter 3 and Annex A5.4 in European Commission (2023a). This unstable case is related to the "S2 indicator" of fiscal sustainability in the EC reports.

⁵ Note that these numbers are quite close to those reported by the EC in its Post Programme Surveillance Report on Greece published in Autumn 2022 (EC 2022a); the latter reports numbers between 1.4 percent (under a relatively optimistic scenario about the gap between the real interest rate and the growth rate) and 3.1 percent (under a relatively pessimistic scenario about the same gap).

⁶ Here we work as in chapter 3 and Annex A5.3 in European Commission (2023a). This stable case is related to the "revised S1 indicator" of fiscal sustainability in the EC reports.

rent period is associated with a lower primary fiscal surplus or a higher primary fiscal deficit in the next period. Exceptions include Germany, which has a relatively high positive coefficient, as well as Cyprus, Greece, and Portugal (marked with an asterisk). However, recall that Cyprus, Greece, and Portugal have been in enforced fiscal austerity programs as a condition for their official bailouts. We can therefore interpret these negative correlations as an indication of absence of stabilizing fiscal policy reactions. Evidence provided by the EC itself supports this absence (European Commission 2015).

The above can perhaps explain the recent change in the EC's rhetoric. Since the Maastricht Treaty in 1992, the agreement has been that fiscal rules at the national level are needed for the viability of the single currency. Various rules have been introduced and debated over the years without much success.⁸ In the new economic governance framework recently presented by the European Commission (2022b) and the European Council (2023), although references to the 3 percent ceiling for fiscal deficits remain, there is now a more explicit emphasis on the need to embark on debt-reducing policies on a systematic basis from 2024 onwards.

We close by asking a question. If, in practice, we do not observe any systematic fiscal reaction to public debt imbalances, then, by quoting Leeper et al. (2010), a natural question to ask ourselves is “Why do forward-looking agents continue to purchase bonds with relatively low interest rates?” The answer given by Leeper and his co-authors is that—to the extent that we want to maintain the assumption of rationality—economic agents believe that the current inaction is temporary and that it will be replaced by necessary policy corrections in the future. This is why trust, expectations about the future, and what is signalled by policymakers in the present are crucial. In this context, the announcement of simple and realistic debt-based policy rules is necessary for trust and confidence about the future.

POLICY CONCLUSIONS

Sovereign interest rates, growth rates and most items included in primary fiscal balances are all endogenous variables that are jointly determined. It is also obvious that all of them are affected by economic policies. This applies in particular to sovereign interest rates, which do not only reflect fundamentals but are also shaped by economic sentiments. This is why in case of an “accident” that triggers a loss of trust, sovereign interest rates jump upward; if this persists, it can become a vicious cycle. The Greek sovereign crisis of the previous decade is a well-known example.

⁸ For the history of EU fiscal rules as well as the current state of affairs and controversies, see Beetsma and Larch (2019); Bilbiie et al. (2021); Beetsma (2022) and the references cited there.

Acknowledgement of this is crucial for a reliable analysis of fiscal sustainability. This necessitates the use of structural macroeconomic models that avoid the Lucas critique. In such models, a common finding is that if we assume that fiscal policies remain unchanged as in the current data, the path of public debt is explosive over time in most countries. Hence, debt-based rules are needed according to which fiscal instruments (like public spending items and tax rates) react systematically to the gap between the inherited public debt and a policy target value. If the feedback reaction to public debt is strong enough, stability is restored or, equivalently, the public debt arithmetic turns from unpleasant to pleasant.

However, the adoption of such feedback policy rules comes at a fiscal cost, since reaction to outstanding public debt implies a relatively high primary surplus or a relatively low primary deficit. Here, there is a classic intertemporal tradeoff, in the sense that if a country follows a debt-contingent fiscal policy, it practically front-loads the cost of the fiscal adjustment, with higher fiscal costs in the short term and smaller sacrifices in the later periods. Front-loading the fiscal adjustment helps the country to gain credibility, but entails the risk of a recession and vicious cycles in the short term (see Alesina et al. 2019 and CESifo 2014, for the dynamics of austerity programs).

Finally, which fiscal policy instrument is being used to bring public debt down is essentially a fiscal policy multiplier problem. The macroeconomic literature suggests that a damage-minimizing policy mix is one in which we use fiscal instruments with small output multipliers to bring public debt down and—once public debt has been brought down—we allow fiscal instruments with large output multipliers to take advantage of the fiscal space created. Anticipation of the latter, if credible, shapes incentives and may mitigate the recessionary effects even in the short term. This is consistent with the “expenditures” rules suggested recently by the EC. However, one must be clearer regarding the kind of public expenditures that should be cut to bring public debt down.

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