Economia Politica
https://doi.org/10.1007/s40888-023-00319-6

ORIGINAL PAPER

Threats of sovereign debt overhang in the EU, the new fiscal rules and the perils of policy drift

Willi Semmler[1,2,3] · **Brigitte Young**[4]

Received: 13 January 2023 / Accepted: 4 November 2023

Abstract

After the Great Recession and the Covid Crisis the sovereign debt sustainability has again become a major public policy issue. Since the Great Recession Olivier Blanchard (2019) has put forward the theory of a "good and bad" debt equilibrium. The good debt equilibrium is usually supported by high economic growth rates, low risk premia, and lower interest rates, being sustainable and self-stabilizing. The bad debt equilibrium is driven by a self-fulfilling prophesy where higher risk premia, higher interest rates, and sovereign debt destabilize each, as also studied empirically by Paul De Grauwe (The Aust Econ Rev 45:255–68, 2012). Reconstructing those two equilibria and the threat of debt overhang for specific EU countries, we then: first explore possible escape routes from sovereign debt threats; second, evaluate the new EU fiscal rules that constrain the deficit spending to the growth rate of potential output; and third, evaluate the possible future EU policy drift endangering the new fiscal rules. Finally we stress the need for social buffers in the EU while intending to stabilize sovereign debt.

Keywords Perils of sovereign debt · Debt sustainability · Fiscal rules · Primary deficit · Good and bad debt equilibrium · Escape routes from perils of sovereign debt · Perils of EU policy drift

JEL Classification E6 · E62 · H6 · H63

We want to thank Olivier Blanchard for sharing his discussion with the authors of the article by Cousin et al. (2022) and their data set on the US and EU countries. We are also grateful to the referees for commenting on our paper and to the editors of the special issue of the journal.

✉ Willi Semmler
semmlerw@newschool.edu

Brigitte Young
byoung@uni-muenster.de

[1] The New School for Social Research, New York, USA

[2] Bielefeld University, Bielefeld, Germany

[3] IIASA, Laxenburg, Austria

[4] University of Muenster, Munster, Germany

Published online: 18 December 2023

1 Introduction

Sovereign debt overhang in the Euro Area became an important topic after the monetary easing and fiscal stimuli following the Great Recession of 2007–9, and the monetary and the fiscal rescue and recovery programs during and after the Covid pandemic. Our paper has two parts. In part one, Sects. 2 through 4, we provide a model-guided study of the EU sovereign debt dynamics. In part two, we analyze the political economy dimensions of the EU sovereign debt dynamics including a discussion and evaluation of the new EU New Fiscal Rules and their effectiveness.

Part one, provides an overview of the theoretical and empirical studies of sovereign debt overhang. The literature has shown that there are different measures of debt overhang. This could mean a steadily rising debt to GDP ratio or actual sovereign debt over and above a level of sustainable debt (measured according to agreed upon debt standards). It could also imply debt over and above the EU defined 60 percent rule, or a debt to GDP ratio that is not declining in the long run. There are also diverse economic tests to estimate sustainable debt, including one put forward by Bohn (1998), and Boekemeier and Greiner (2012), where the government's primary balance (or primary surplus) should respond positively to the rising debt to GDP ratio.

The Bohn economic test would generate a mean reversion of the debt to GDP ratio initiated by fiscal policy makers. Such a policy has been shown to hold for US time series data in Bohn (1998) and for the EU in Boekemeier and Greiner (2012). A second approach tests whether debt is sustainable using Blanchard's recent work on drivers of sovereign debt, that is the interest rate and the growth rate of the economy, see (Blanchard, 2019, 2022). The working hypothesis for Blanchard's economic test is if the interest rate is smaller than the growth rate the sovereign debt will be sustainable in the long run.

An important third approach based on the theory of two debt equilibria (one good and one bad) to study unsustainable debt is proposed and developed by Blanchard (1983, 2019) and De Grauwe (2012). Debt close to a good debt equilibrium would be sustainable since it is self-stabilizing, while debt close to the bad equilibrium sets in motion destabilizing forces, producing a further departure from sustainable debt. In the bad debt case, macroeconomic nonlinearities may be involved, such as jumping vulnerabilities of risk premia, thresholds and tipping points, disruptions, state dependent effects of shocks, fragmentation, and diverse debt dynamics. We use the two debt equilibria model as a theoretical guidance for an empirical debt sustainability study for some EU countries employing recent Bloomberg data, made available by Olivier Blanchard. We start with the well-known earlier work by Blanchard (1983) and work out the technical aspects of this view in appendix 2.

This fragile debt equilibrium raises the question of whether this situation is driven by what Brunnermeier has called "financial dominance" where central banks and monetary policy need to respond to the turbulence of the financial market that dominates these dynamics. As was done in the EU in the years 2011–12, escape routes from sovereign debt can be contemplated and proposed, before perils of debt crises become acute. After elaborating on the two debt equilibria in Sect. 2, and our study of the EU evolution toward such a situation in Sect. 3, we explore in Sect. 4

possible fiscal, as well as financial escape routes from the perils of sovereign debt. We then analyze whether they can restrain the EU debt dynamics.

Given our model-guided and empirical elaborations, we then discuss the political economy dimensions of our analysis starting in Sect. 5. In the light of Sects. 2, 3, 4, we evaluate the proposed New EU Fiscal Rules which are set out to align the growth rate of public consumption spending with the growth rate of potential output. While the new proposal of EU Fiscal Rules has wide support among economists, the simple rules may cause problems and could be challenged by policy drifts among EU Member States. Yet, the fiscal and financial escape routes could also provide an increase of fiscal space, to avoid public " bads" – and in the process create a more fair and green transition. Nevertheless, possible policy drifts among Member States in the negotiations of their fiscal rules need to be taken into account.

Besides fiscal policy, a further important force driving debt sustainability is the monetary policy of the ECB. The interest rates set by the ECB is of relevance, since the ECB's increase in interest rates and buying fewer bonds provide a serious challenge to highly indebted countries. If, given interest rate rise, debt financing increases, it puts economic growth and debt sustainability under considerable pressure. It is in this context of increasing interest rates (and risk premia) that the present discussion on the reforms of the EU Fiscal Rules and debt sustainability need to take place.

But there are also political drifts observable among EU Member States. Unlike the past, the North–South cleavage between strict rule-abiding Northern countries and the more flexible rules proposed by Southern countries seems to have narrowed. In fact, a joint paper by the Netherlands and Spanish governments (CITE) has shattered the coalition of the "frugal 4" (Germany, The Netherlands, Austria, Finland) during the European sovereign debt crisis. The Netherlands/Spanish proposal converges largely with the EU Commission on ensuring debt sustainability. Even in Germany, the strict rule-abiding stance of the German Council of Economic Experts (GCEE) has embraced more flexibility as the Annual Report 2022/23 demonstrates. At the same time, the Minister of Finance, Christian Lindner, a member of the Free Democratic Party, with his adviser, Prof. Dr. Lars Feld, Director of the Eucken Institute, are of the opinion that the rules should have stricter compliance and enforcement. The final positioning of Member States will only come apparent during the further negotiations toward the beginning of 2024.

Finally, in Sect. 6, we stress that despite the importance of debt sustainability, social buffers are needed to make individuals and societies more resilient to unexpected shocks (Brunnermeier, 2021). Given that we are confronted with multiple crisis, social buffers in the form of a " Social Fund" can shield against such destabilizing traumas. One possible solution could be, as Sigl-Glöckner suggests, to add a "Social Imbalance Procedure" to the "Macroeconomic Imbalance Procedure (MIP) outlined in the Commissions" Proposal on Fiscal Rules.

Facing demographic challenges, geopolitical divisions on the world stage, and increasing military conflicts, creating an EU Social Fund would provide public investment in health, energy, climate challenges, education, and the care sector. Such a move would shift the traditional economic narrative of redistribution to an EU vision of collective and inclusive investment for the common good to mitigate asymmetric shocks.

2 Perils of European public debt overhang

In order to discuss the drivers of sovereign debt, and then to study the two debt equilibria approach, we use the Blanchard (2019) model that states that for an economy holds that there are real debt B_t and real GDP Y_t (both terms are deflated), and the primary balance $G_t - T_t$, such that

$$\frac{B_t}{Y_t} = (1 + r - g)\frac{B_{t-1}}{Y_{t-1}} + \frac{G_t - T_t}{Y_t} \tag{1}$$

$$\frac{B_t}{Y_t} - \frac{B_{t-1}}{Y_{t-1}} = (r - g)\frac{B_{t-1}}{Y_{t-1}} + \frac{G_t - T_t}{Y_t} \tag{2}$$

Whereas the Eq. (1) represents Blanchard's evolution of the debt to GDP ratio, Eq. (2) is written in terms of the growth rate of that ratio. Note that the interest rate on debt and the growth rate of GDP are here as important as the primary balance.

For the above two dynamic equations one knows from US data, see Blanchard (2019), that roughly the following hold:

$$1950 - 1980; r < g$$
$$1980 - 1996; r > g$$

$$1996 - 2007; r < g$$

Using the definitions on the growth rate g and interest rate r, and the sustainability condition written in discrete time, with $d_t = B_t/Y_t$, we can write

$$d_t = \frac{1 + r_{adj}}{1 + g_t} d_{t-1} + x_t \tag{3}$$

with $x_t = \frac{G_t - T_t}{Y_t}$, whereby the r_{adj} is now the weighted average of the short-term (three month) and long term (ten years) treasury bond interest rate.[1]

In eq (3) we observe three drivers of the sovereign debt: 1. the adjusted interest rate, 2. the growth rate of GDP, and 3. the primary budget balance. Blanchard argues that as long as the interest rate is smaller than the growth rate – and the primary balance is zero or small – one can obtain sustainability of public debt in the long run.

For the US, this seems to have been the case r < g from 1950–1980, and 1996–2007, but less so for the period of high inflation rates after the 1980s. Blanchard in (2019) stated that again after some short period, such as 2007–9, the case of $r < g$ holds, or at least seems to hold until 2022. However, there was recently, the high rate, a rapidly rising interest rate when the Federal Reserve attempted to raise the real interest rate close to the level of the natural rate. Then, of course, it was heavily debated how exactly to estimate the natural rate. In any case, given the spiking

[1] For the assumptions and data sources Blanchard uses, see appendix 1.

Fig. 1 Three variable time paths, US and Canada

inflation rate, the interest rate hike starting in 2022 and further increasing in 2023, has let the market mortgage rate jump up causing the real estate sector to contract.

What are the longer run trends of data for the US and some European country, and also for the UK? To estimate the debt sustainability of sovereign debt for those countries we can use Blanchard's methodology, by looking at the trends of the three variables (interest rate, growth rate and primary balance). A presentation and discussion of Blanchard's assumptions and the data sources (2019) and the Bloomberg authors Cousin et al. (2022) are relegated to Appendix 1.

Subsequently, the data sources by European Commission (2022) are deployed and depict the time paths of the three variables: GDP growth rate, interest rate and primary balance for six countries. Note, however, given that the assumptions the authors make (see Appendix 1), these three variables can be seen as giving us only approximated trends which might become inaccurate for time periods beyond 2025.

Figure 1 shows the nominal growth rate of GDP, the interest rate and the primary balance for the US and Canada, obtained from Cousin et al. (2022), and the Bloomberg Data sources (2022) data set. Note that the primary balance indicates that sovereign debt is rising when the expenditure G is greater than the tax revenue, T, which will also make the debt to GDP ratio rise in relation to the GDP. Past data is shown until 2022Q3 with predicted trends until 2040. Details of the data set and their computation can be found in Cousin et al. (2022).

Looking at eq (1) past trends and predictions for both the US and Canada, mean that the recovery from the Great Recession 2007–9 and from the Covid

Fig. 2 Three variable time paths; UK and Germany

crisis, occurred at the expense of a negative primary balance, which for Canada then stays close to zero, but for the US will be roughly − 2%. The interest rate - growth rate difference stays near zero for both Canada and US. The figure for the US indicates that the debt to GDP ratio will rise at about 2%, given the negative primary balance in the future. For the US, Cousin et al. (2022), p.3 then concludes: "The US, which benefits from global reserve currency status, may not feel the pressure in the same way as other borrowers, but its public finances do not look sustainable (Fig. 2)."

A case similar to the US can be observed for the UK, although the outlook is worse since the interest rate will be above the growth rate in the future. Accordingly, "The UK is at the heart of a storm in markets. An ill-judged package of unfunded tax giveaways has led investors to doubt the competence of the government and reappraise the outlook for interest rates. As a result, yields have spiked, forcing intervention from the Bank of England.... to restore credibility", Cousin et al. (2022, p. 3).

The German case appears to have a negative primary balance until 2025, but at the same time there is still a bit higher growth rate than interest rate, so the debt to GDP ratio does not appear to increase significantly but then from 2025 on, given that interest rate will be equal to the growth rate, the debt will decrease (Fig. 3). Therefore Cousin et al. (2022) conclude: "Canada and Germany, which have in common low debt and a history of running primary budget surpluses, remain in a robust position" (Cousin et al., 2022), p. 3)

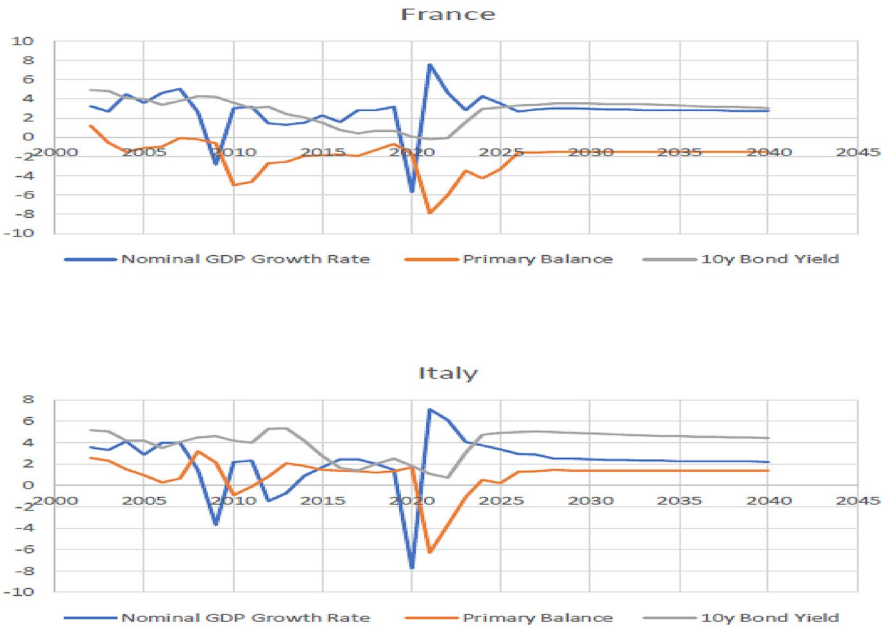

Fig. 3 Three variable time paths; France and Italy

In the case of France the budget deficits appear to decrease toward 2025, but still threaten the sovereign debt sustainability if the interest rate becomes higher than the growth rate.

The most difficult case appears to be Italy. Though Italy appears to obtain a fiscal balance until 2025, and then even a surplus is predicted, however the huge excess of the interest rate over the growth rate will make Italy's debt to GDP ratio steadily grow. This debt to GDP ratio will then be magnified in the next few years, since the interest rate will rise, the growth rate fall and the primary deficit will still be there: "Italy looks the most vulnerable. Despite having run a significant primary surplus for much of the past decade, the country's mountain of debt means it remains exposed to rising global rates. Our fear is that, with a deteriorating debt outlook, the ECB will be unable to act on Italian borrowing costs, raising the likelihood of a crisis erupting before a solution can be negotiated." Cousin et al. (2022, p.3).

For all the countries, it holds that if their sovereign debt is rising due to low growth rates, a high interest rate and primary deficit, this may exacerbate the situation and lead to a bad debt equilibrium,[2] to be discussed next.

[2] Blanchard (2019,1226) characterizes this as follows: "If however, investors believe that debt is risky and ask for a risk premium to compensate for that risk, debt payments will be larger, and debt will indeed be risky, and investors' expectations may be self-fulfilling... In this case, over a wide range of debt, there may be two equilibria, with the good one being the one where the rate is low, and the bad one characterized by a high risk premium on public debt, and a higher interest rate. The question is what practical implications this has for debt levels."

1. Low financial stress (good equilibrium):

=> Convergence to sustainable debt (higher r, left trajectory; lower r, right trajectory,) but with fixed r => global convergence

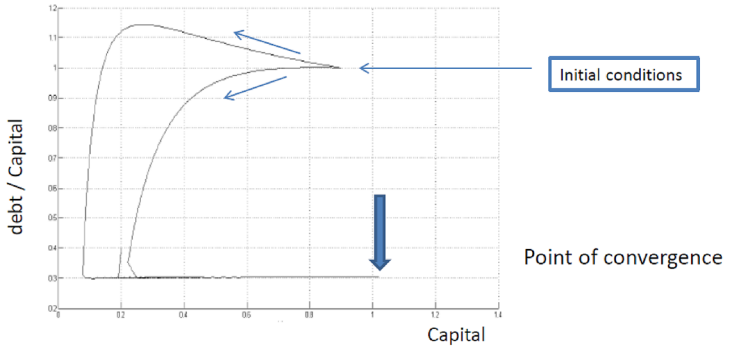

Fig. 4 Debt dynamics for the good equilibrium, Blanchard (1983,2021,1226-7)

3 Sustainable and unsustainable debt dynamics

There could be stable debt dynamics, with all initial conditions moving toward an equilibrium. But on the other hand, taking the combination of bad trends and cyclical perils together, we also want to demonstrate the perils of a bad debt equilibrium. For this purpose, we sketch a model with two equilibria: One stable (good) and another one an unstable (bad) and there can be a regime switching from a low to high financial stress equilibrium, see (Blanchard, 1983), and De Grauwe (2012); In 2019, Blanchard (1226-7) calls the second equilibrium a bad equilibrium.

Let us look first at the good, the stable, equilibrium.[3] This has the feature of a low debt equilibrium, as there are low interest rates and risk premia for this equilibrium. The dynamic equations for generating Fig. 4 are introduced in the appendix 2, using data and illustrations from De Grauwe (2012).

Solving such a model with a good equilibrium, as formulated in the appendix 2, Scenario 1, gives us Fig. 4, which exhibits a convergence to a unique steady state, as stated in Blanchard (1983,2021,1226-7)

Yet there can be a second equilibrium with high endogenous risk, arising from non-sustainable debt as mentioned before, displaying both a high financial stress and a high risk premium. This has the features of self-fulfilling expectations, see De Grauwe (2012), Blanchard (2019:1226) and Lorenzini and Werning (2019).

For a high debt with rising perils of default the investors will require a high risk premium but because of the high risk premium the debt will rise further, see the

[3] How the structures of the subsequent two basic Figs. 4 and 5 are generated are explained in appendix 2 and are detailed in Mittnik and Semmler (2018).

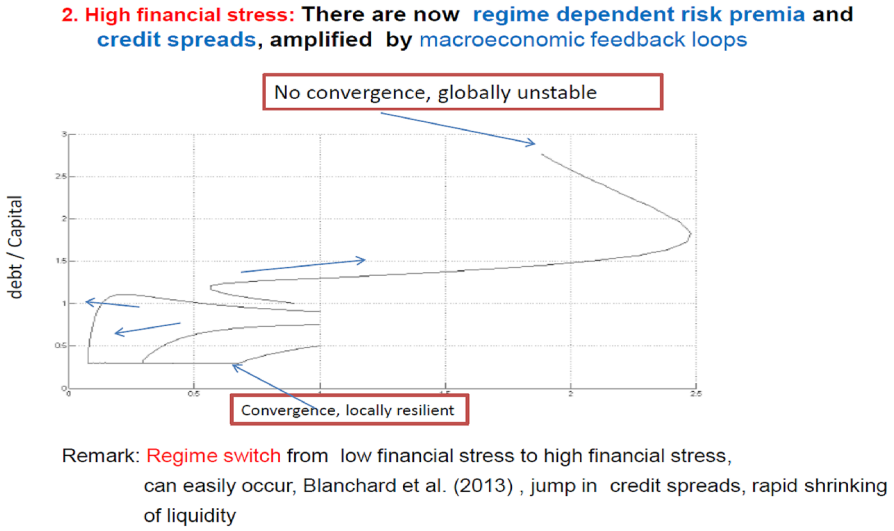

Fig. 5 Debt dynamics for the bad equilibrium, Blanchard (2019:1226-7)

stated dependent credit cost on the right hand side of the Fig. 5, and appendix 2, Scenario 2. This has been called a self-fulfilling expectations equilibrium.

To stylize a case with a good and bad equilibrium, with detailed dynamic equations, the reader is again referred to appendix 2, Scenario 2, where the dynamics is specified. From the solution of that dynamics of appendix 2, Scenario 2, we can obtain the following trajectories of Fig. 5, starting from different initial conditions.

As we can observe in Fig. 5, below a certain threshold of the debt to capital stock ratio, and a low risk premia, the debt GDP ratio will decline reverting to sustainable debt to GDP ratio.

On the other hand, above a certain threshold, the financial stress, the risk premia, as well as the debt to GDP ratio are rising making the debt explosive and unsustainable,[4] unless further fiscal or financial policy measures are undertaken. Thus, the bad equilibrium dynamics are not necessarily unavoidable.

4 Policies to support sustainable debt

An apparent task of our study is to point out policies for avoiding sovereign debt overhang. One should find the fiscal tools to prevent sovereign debt moving into the range of a bad debt equilibrium, with a jump in sovereign and corporate risk

[4] The two equilibria are well defined in Blanchard (2019:1226): "Under either formal or informal dynamics, the good equilibrium is stable, while the bad equilibrium is unstable. However, what may happen in this case, is that the economy moves to a position worse than the bad equilibrium, with interest rates and risk premia increasing over time from then on."

premia, borrowing and finance constraints, and a spreading lack of liquidity with rising insolvency risks –and to avoid tipping points and financial market dominance. The other important issue for fiscal and monetary policies is nowadays the green transition and the support of the decarbonization of economies, a task that should not get lost when one faces financial dominance.

4.1 Fiscal escape routes from sovereign debt risk

The conventional way to escape from such a bad debt equilibrium and to avoid financial dominance is to consolidate the public budget by increasing revenue through higher taxes (product taxes, excise tax, import tax, consumption tax, and income tax on capital or labor income) and/or reducing public expenditure.The expenditure side usually adversely affects public infrastructure and social services, and is strongly opposed by labor and unions. If the interest rate and growth rate are seen to be given by fiscal policy makers, the first line of action is usually to attempt to change the primary fiscal balance: reducing the primary deficit or increasing the primary surplus through either difficult tax raises or contractionary expenditure cuts— two usually difficult tasks in a regime in the range of a bad debt equilibrium. The impact of such expenditure cuts on actual and potential growth rates is modeled in appendix 2 and discussed in Sect. 5.2, see also Sim (2022).

Fiscal measures to avoid sovereign debt fragility have been tried in the European sovereign debt crisis after the Great Recession 2008–9.[5] What has been practiced was a delay of interest rate payments and stretched out repayment of the principle of debt. Further measures were the change of the maturity structure of debt, i.e. conversion of short term to long term debt, debt guarantees and debt reduction programs such as for example for the Greek sovereign debt. Such fiscal escape routes from sovereign debt and their historical success are extensively empirically studied in Semmler and Proano et al. (2013).

The actual interest rate, and the financial conditions that affect the sovereign debt dynamics, are driven by the central bank's monetary policy primarily being a response to the inflation rate, and in some countries also a response to the unemployment rate. Both the growth rate and interest rates are sometimes viewed by fiscal policy makers as exogenously given – since they usually don't want to criticize the independence of the central banks – they focus frequently on the fiscal revenue or expenditure side to affect the primary fiscal balance, with high uncertainty with respect to the multiplier effect – which could be regime dependent, see (Mittnik & Semmler, 2012). Yet, of course the interest rate and risk premia play an important role in the debt dynamics, as shown in Goodhart (2020) and is also illustrated in a model in appendix 2.

Increasing the growth rate of GDP, another important variable for budget consolidation, could be an important tool but it is usually more difficult to control with monetary

[5] Though the European Troika first pursued an austerity program of budget cuts for Southern European countries after the Great Recession, it was neither successful nor perceived well. The paper by Blanchard and Leigh (2013) can be viewed as a turning point for the IMF of this type of fiscal stabilization policy.

and fiscal budgetary policy since it involves as cyclical dynamics in the medium run and can rarely be impacted in the shorter run. There is also usually a long delay of policy effects and other drivers of the GDP growth, such as international trade effects, and financial conditions, labor market bottlenecks, and resource availability (supply bottlenecks) affecting growth.

Price level dynamics has been the major obstacle to balancing the finance of a public budget under insolvency threat and distress, beside debt overhang and the bad debt equilibrium. As has been pointed out by the fiscal theory of the price level, the price level can change related to fiscal borrowing, see Woodford (1996). Though in the long run the fiscal theory of the price level seems to hold – though also doubted by much academic research – in the shorter run there are many other drivers of the inflation rate these days, like the supply chain bottlenecks after the Covid crisis, the price rise of fossil fuels, prices of agricultural products and food prices, the latter partly due to climate related weather extremes.

The inflation rate is also related to the business cycles as well. In the medium run, one can roughly stylize the inflation dynamics by a nonlinear (segmented) Phillips curve that becomes steep, due to bottle necks, when in expansionary periods output gaps become positive, see (Gross & Semmler, 2019). In this context (Goodhart, 2020) suggests that the reduction of real sovereign debt is likely to come through higher inflation rates causing a decreasing real sovereign debt.

Another important issue involved in the discussion on the sovereign debt is the currently enormous task of climate protection through the decarbonization of the energy sector, posing great challenges in the medium run. Nowadays an urgent goal of public policies is climate protection, the decarbonization of the energy sector, and the economy at large, and electrification through renewable energy – and to achieve it with the strategy of a just and fair transition, without an adverse distributional effect. In this context often the issue of greenflation is brought up that could expedite inflation rates.

As to the current fiscal policy, there have been several (partly conflicting) urgent issues come up that need to be considered simultaneously: Addressing climate change and the transformation of the energy sector, correcting current income and wealth distribution, and avoiding budgetary problems leading to a bad debt equilibrium. In addition to the above, concerning fiscal escape routes from high sovereign debt, there are still ways to address those goals, but the essential one is on the public financing side – which should allow for some degree of debt finance of the sovereign debt.

4.2 Financial escape routes from sovereign debt risk

In order to avoid tipping points and financial dominance and to pursue a green transition, the following suggestions can be made.

4.2.1 Issuing of convertible debt by the public

Public debt can be made convertible by issuing convertible bonds. Those convertible bonds have recently been issued with green labels as an alternative to conventional fixed income bonds (see Braga et al., 2021). On the private sector side, firms need

funds and debt issuing in the form of bonds is a way to achieve this before they can issue equity. A convertible green bond is a solution that can address these challenges by issuing debt obligations. A similar use of convertible bonds can be made by the public sector, see for example the New York state-approved referendum of $4.2 Billion on environmental bonds and climate protection, see the Guardian (2022).

Convertible corporate bonds are securities that can be converted into shares at a later point. The condition of convertibility to equity might be tied to an equity price through a strike price, as the Merton model for debt and the Black & Scholes model for derivatives suggest. The existence of this option allows issuers to obtain funding at lower yields in the debt market and investors can gain benefits along business cycles, with protection in downturns and gains in upturns.

If the issuer succeeds and the stock price rises, in the example of a company using green bond revenue, the issuer of the bonds has the option to convert bonds into equity and earn capital gains. For the public as an issuer of convertible bonds this would create the option to sell the equity obtained from the capital gains and repay the debt. This could be especially helpful for activities initiated by the public with high externalities and risks, such as innovative and environmental projects, and green energy.[6]

A recent stock price surge can be explained by some market downturns and by the governance profile of the convertible bond issuers. Public bond issuing for environmental, and in particular for climate related infrastructure, charging stations for electrical cars, and development of new forms of green energy such as solar, wind, hydro and in particular hydrogen power, could use this financing method as well without overburdening public budget. Given market uncertainties and technology requirements for green investments, convertible bonds should be supported as a sustainable finance instrument of the public sector.

Following this trend, different issuers from distinct sectors issued green convertible bonds in 2020, for a total amount of $1.1 billion. Though this represents only 1 percent of global issuance of bonds, but a growing trend can be observed. The benefits of convertible green bonds for climate finance are obvious, as these bonds allow investors to benefit from the positive externalities from green assets and help protect against negative externalities from carbon-intensive sectors. On the other hand, the public is initially involved by issuing debt but the funds can flow back to the public when the green enterprises or climate related infrastructure investments are successful.

Also, the mind set of institutional investors (such as pension funds, university endowments, sovereign wealth funds and a number of small and medium size new investment firms and their portfolio divisions) is currently leaning toward socially responsible and climate investments. Such a preference of investors is shown to drive up green bond prices and reduce yields such that (negative) green premia can

[6] A surge in the convertible bond market was also observed in 2020 following the COVID-19 crisis. An important role for issuing convertible bond could be played by climate investment oriented quasi public banks such as the German KfW and the Brazilian BNDES. In this context see also the work by Mazzucato (2016) on the role of the State as a market creating institution.

arise, leading to lower capital cost for green investments, see Lichtenberger et al. (2022).

4.2.2 Windfall profit tax on winners of fossil energy booms

A windfall profit tax was already suggested by Keynes, in current days the cash flows from fossil fuel is a kind of scarcity price with cash flows rising resulting from the declining supply of fossil fuel energy, arising from bottlenecks in the supply chain, the Ukrainian war, and Russian sanctions. On the other hand, the aggregate demand due to the Covid recovery was rising. The rapid rise of the global oil price, in particular natural gas, and the rising scarcity generating oligopoly cash flows,[7] gave rise to the request from some population segments and politicians for a fossil fuel price cap and a tax on windfall profits.

Though the argument could be made that the fossil fuel will flow somewhere else to be sold, this however neglects the considerable bargaining power of the Euro area, that a single country of Europe would not have. If the large oil corporations with their oligopoly mark-up pricing want to operate in the European market and maintain their infrastructure of distribution and sales and keep their customers they need to deal with the EU as a bargaining party and the oil oligopolies will have to accept lower prices, at least for the products coming out of refineries. This at least will hold in the shorter run.[8] In the longer run, outside options for the oil companies might develop as well. Yet, many European politicians seem to believe rightly that this is a source of public finance to compensate for the fossil energy cap, and the real income losses by lower income segments of the population, and to finance alternative energy sources.

4.2.3 Tax on carbon intensive wealth

Given the urgent issues of increasing disparity in wealth distribution, climate challenges, and needs for public finance, another method of fiscal stress reduction could be pursued – serving also simultaneously the other goals of policy objectives, such as providing funds for green energy. Therefore, Bastos and Semmler (2022) worked out a proposal for a tax on carbon intensive wealth that may serve several policy goals. There has been a long tradition of studying wealth distribution – that seems to be more severe than income distribution – and proposals of wealth tax, in terms of a tax on wealth stocks (equity, bonds, real estate, land and natural resources). In terms of theory, it was argued by the opponent side that this will limit capital increase and hurt employment. In practical terms it has been argued that the stock of wealth is hard to measure empirically and such a wealth tax will lead to capital flights. An inheritance tax has also been pursued, and activated to some extent.

The tax on carbon intensive wealth can be justified through traditional public finance theory, starting in the 19th century and used in Wicksell and Lindahl. It is

[7] The Financial Times published a report on November 5, 2022, with the following title "US oil producers reap $200bn windfall from Ukraine war price surge"

[8] For a game theoretic view, see Semmler et al. (2022).

a public finance principle that those who enjoy a greater fraction of public goods should pay proportionally higher taxes. Since production and market activities also create public "bads" – pollution, environmental damages and Green House Gas emission through fossil fuel use - those who create more "public bads" should also pay a higher share of public expenditures which helps to avoid or remove public bads – a simple principle of justice and fairness.

The problem, however, is how to identify public bads, or in our case carbon intensive wealth. Bastos and Semmler (2022), therefore identify several mechanisms for this identifications. For example, a sectoral classification using Leontief input–output systems could be pursued for countries, and already exist for advanced countries on an annual or bi-annual basis. These advanced countries have 60–70 sectors and they can be classified and ordered by their energy use. The energy per unit of output can be converted into CO2 emission per unit of output, see Kato et al. (2015). For the same sectors one can get also time series data of growth rates and employment from the OECD Klems data sets. Assets and wealth are however held primarily by corporations and not sectors, though financial indexes could be created – and have already been created –that are also traded and thus those more carbon intensive stock indexes could be taxed.

Another identification scheme could be used as proposed in Bastos and Semmler (2022).This aligns with the disclosure requirements of ESG firms and other defined requirements to release information on the CO2 activities of corporations. Then firms in the MSCI index of 9700 listed firms can be identified and tracked through the time series of their asset values. A tax on their returns could be levied on firms that are identified as carbon intensive corporations. In fact it can be shown that the stock of wealth does not have to be taxed but rather the simpler measure, the return on wealth – and one can be translated into the other. The issue is still however, that those disclosures are so far voluntary and thus open to green washing, however the US SEC wants to require such disclosure soon as compulsory and the EU will also start requiring this beginning in 2025.

So, given the sectoral indexes and the required disclosure of CO2 emission this could solve the identification problem and a tax on carbon intensive wealth would then be helpful as an important measure for climate protection. Furthermore, it could help to correct wealth distribution, make funding available for the public budget to combat the public "bads", support the decarbonization of the economy, and/or compensate losses at lower income segments of the population and thus support a fair transition.

4.2.4 Inflation adjusted green bonds

The currently most important impediment of climate policies is the energy crisis starting in the year 2022, rapidly rising fossil fuel prices, and high inflation rates, which increased in the US toward 7–8% and in Europe there was a threat to rise above 10% in the year 2022. In the second half of the year 2023 the inflation rate moved down again in the US toward 3–4% and in Europe toward 5–6%. But here another instrument could be used that might ease public borrowing and help climate protection. Given the currently ongoing rush to stabilize asset returns and prevent

devaluation of assets, inflation adjusted green bonds could be issued by the public as discussed in Chiarella et al. (2016) and Tahri (2022).

Those inflationary times are the occasion when inflation adjusted bonds can be introduced. In those times there are public budget gains from the increased tax revenue through the price increase of goods and services. On the other hand asset value could be protected, as the US is practicing through TIP (inflation adjusted bonds) already. The advantage is that portfolios of wealth holdings with inflation adjusted bonds, such as portfolios of managed pension funds, sovereign wealth funds, university endowments and individual investors, could be protected and at the same time generating revenue for the public and having funding for climate protection.

The above suggestions for escape routes and control of sovereign debt have implications for the current discussion of EU debt and the reform of the fiscal rules. The EU Commission published its Reform Proposal on the 9th of November in 2022 (EU Commission, 2022), but the question, given the current interest rate rise, is whether the EU can address the challenges of the energy crisis and move forward with policies to support sustainable debt and introduce an energy-social fund, as well as make permanent the joint borrowing enacted during the Covid 19 crisis laying the groundwork for European safe assets. Or will such efforts be derailed by future policy drifts among Member States within the EU?

5 Policy drift and EU debt stabilization?

In response to the economic uncertainties of the pandemic and the Russian invasion of Ukraine, the EU Commission suspended the budget rules of the Stability and Growth Pact (SGP) starting in 2020 and extended the general escape clause until 2023. The Commission had indicated in March 2022 that it would propose a reformed EU economic governance framework and it would not insist on the disputed rule under which governments had to cut debt by 1/20th of the excess above 60% of GDP (Reuters, 2022). The Macroeconomic Policy Institute (IMK, 2022) had warned that returning to the existing stringent rules of the SGP in the four biggest economies, France, Italy, Germany, and Spain, would lead to severe cuts in public spending. Against the background of the increasing geo-economic and geo-political risks, the EU-Commission adopted an orientation paper on the 9th November to build "an economic governance framework fit for the challenges ahead" (EU Commission, 2022).

5.1 The new fiscal rules

According to the Commissioner for the Economy, Paolo Gentiloni, "The proposal we are putting forward today aims to reconcile three imperatives, which are complementary and not contradictory. First, we want to support growth and enhance debt sustainability. Second, we want to strengthen national ownership of economic decisions—fiscal policies, reforms and investments – and at the same time embed these in a new common framework. And third, we want to simplify our rules while preserving their

intelligence. In short, we want to put, at long last, growth and stability on the same level and to work effectively towards achieving both. That is in essence the challenges we have before us – and a pressing priority at the current critical juncture for our economies" (EU Commission, 2022).

In general, economists have reacted positively to the EU Commission's tabled orientation proposal for revising the fiscal rules of the European economic framework, signaling feasible improvements over the existing SGP with some suggestions for minor changes (Blanchard et al., 2022a; Burns, 2022). Essentially, the EU Commission sets out the following steps for a revised new economic framework. First, it proposes a debt sustainability analysis (DSA) with national medium-term fiscal structural plans as a basis to ensure country-specific debt sustainability. This new fiscal rule has two components: Step 1. a single operational indicator -- an expenditure rule which aligns the growth of Government consumption with the growth of potential output. Step 2. it sets out a debt adjustment path for high, medium and low-debt risk countries creating a direction for a flexible and plausible declining debt reduction plan.

Step 1 represents a long-run new fiscal rule which restricts public consumption growth to the growth rate of potential output, whereby the growth rate of government consumption is supposed to be measured net of interest payment and by assuming that there will not be much space to vary tax rates. This amounts to letting the deficit grow at the rate of potential output. It is a rule similar to the Bohn rule (Bohn 1998) which lets government deficit grow in the long run aligned to output growth and thus holds the debt-to-output ratio constant over time. This is in contrast to rules derived from long-run (or infinite) horizon models where the public debt has to approach zero in the long run.

In step 2, concerning the actual budget planning and the debt adjustment path, member states are required to submit first a "medium-term fiscal plan" outlining fiscal adjustments, priority reforms and public investment commitments in accordance with EU priorities and targets. A flexible extension of up to three years is granted for additional adjustments for deficit reduction. In the next phase of budget planning, the EU Commission will assess the plans and either approve or reject the individual country-specific debt reduction strategies. Finally, the Commission will continue to monitor the implementation of the plans on a yearly basis and will put in place more stringent EU enforcement tools to ensure delivery.

Fiscal limits of 3 % deficit, as well as the 60% debt-to GDP threshold would be maintained, but function as a long-term anchor in the new framework rather than as short-term debt limit. In order to prevent and correct potential macroeconomic imbalances in the future, the EU Commission suggests a dialogue between the Commission and the Member States under the Macroeconomic Imbalance Procedure (MIP) to identify potential risks early on (EU Commission, 2022).

5.2 Debt stabilization and some possible policy drifts among member States

The debate on revising the fiscal rules has traditionally centered around the different positions of the Southern and Northern countries. The former endorses more flexible rules to stabilize debt and call for future investment while for the northern countries, rules are not the problem, if anything rules are too flexible and lack stringent

enforcement (Reuter & Feld, 2022; Reuters, 2022). Yet, the gap between the North and South has narrowed as the joint paper between the governments of the Netherlands and Spain demonstrates (Government of the Netherlands, 2022). This joint endeavor has also shattered the coalition of the Frugal 4 (Germany, Netherlands, Finland, Austria) who advocated austerity measures to reign in fiscal debt during the Sovereign Debt Crisis in 2012.

The Dutch and Spanish outline for an EU economic policy agenda, which was written prior to the publication of the EU's Reform proposal, converges largely with the EU Commission on ensuring debt sustainability, on more effective and efficient fiscal policy objectives, the virtuous circle between national ownership, accountability, enforcement of common fiscal rules, and transforming the medium-objectives into a simple expenditure rule, which is a better operational target than the fiscal balance used by the present Stability and Growth Pact.

Agreeing with the Commission on the importance of national ownership, they call for the increase of national independent fiscal institutions to analyze debt sustainability through Independent Fiscal Institutions (IFI). However, as Blanchard et al. (2022) comment on the Commission's plan that the present national IFIs barely exist, they need to be upgraded, and provided with better resources and authority. Moreover, it is unclear how the role of the EU member states independent fiscal Institutions can be balanced with the large role of the Commission. In fact, the EU determines the debt agenda proposing the terms of the initial medium-term adjustment plan on debt reduction, assesses the member states counter offer, and subsequently decides to accept or reject the national plans. As Blanchard et al. (2022a) argue, the Commission's oversized power seems inconsistent with strengthening national ownership and goes against the initial intent of the Commission.

Another weakness, as Garicano (2022) points out, is whether European debt is a safe asset, since the Next Generation EU is an exceptional instrument invoked as a tool against the economic fall-out of Covid, but the Achilles heel is the lack of EU taxing power, so that the "lender of last resort" meaning that national governments have to pick up the bill, remains at the national level. Equally important is the question of whether the EU Commission can be trusted as a neutral referee in enforcing the medium-term adjustment plan on debt reduction over an extended time period.

But the elephant in the room is Germany. The hawkish views of many German economists and policy leaders during the Sovereign Debt Crisis have softened, as demonstrated by the German Council of Economic Experts (GCEE), in their Annual Report 2022/23 on the reform perspective for European Fiscal Policy. At the same time, the reliance on strict enforcement of rules is still espoused by the Secretary of the Treasury, Christian Lindner, a member of the Free Democratic party. In this, Lindner is supported by the well-known Prof. Lars Feld, Director of the Walter Eucken Institute, who advocates increasing compliance rather than flexibility (Reuter & Feld, 2022; Reuters, 2022).

While the annual Report of the German Council of Economic Experts on the future of the German economy is not binding on the government, its public presentation receives substantial media attention. The just-published Annual Report 2022/23 differs from past endeavors, in that many conservative economists have

been replaced not only by three women economists, but the entire group (Five Sages as they are called) are more diverse in their views. It is thus not surprising that many of their suggestions for reforming the fiscal rules are quite complementary with the Netherlands/Spanish and Commission proposals. They agree that new fiscal rules are necessary, since the existent rules have repeatedly failed to effectively limit debt ratios, and were often pro-cyclical. Agreeing with the Commission, they call for a binding expenditure rule which could make the EU fiscal rules more transparent and verifiable, and can set incentives for future-oriented government investment. In contrast to the more hawkish German Treasure Secretary, they call for the prioritization of government spending as well as improving the conditions for private capital formation. Unlike the proposal of the EU Commission, the GCEE places the reforms of the fiscal rules in the larger context of completing the economic and monetary union, thus enhancing the fiscal and taxing capacity of the EU (GCEE Report (2022/23)).

In contrast, a prominent opposing German view against flexibility, exceptions, and discretionary judgments comes from Lars Feld, who in a joint paper (Reuter & Feld, 2022; Reuters, 2022) declares these suggestions as counter-productive. At the same time, Feld cautions against taking these personal views as synonymous with those of the Germany Ministry of Finance. The authors agree that the pandemic and the Ukrainian war has increased the challenges to ensure the sustainability of public finances, given that the EU does not have a central fiscal authority, but the answers lie in more enforcement and compliance with the fiscal rules through increasing political costs of non-compliance and more automatism through automatic correction mechanism.

The authors suggest that rules should be part of national legislation and assessed nationally so that non-compliance cannot be blamed on remote experts in Brussels. They argue against (Blanchard et al., 2021) who propose to replace the fiscal rules with expert-based, country-specific assessments and debt sustainability analysis. Reuter and Feld see a danger in that it permits too many exceptions and maximizes flexibility at the EU level.

Another disagreement addresses the single expenditure rule, which is seen by many economists as a better guide than the present fiscal balance used by the Stability and Growth Pact. Yet, Reuter and Feld (2022); Reuters (2022) caution that a single expenditure rule may not guarantee reliable reductions of debt ratios. Instead, the authors propose to link the limit on expenditure growth to debt ratios and to the medium-term development of the structural balance. One could thus make three cautionary remarks on upcoming issues.

First, in this context, they criticize the call for exceptions for investment or "green expenditures" and argue against Blanchard (2019) that climate investment is only admissible when crowding out other public investments. Nothing is gained, so the authors, if such exceptions are a means to allow for higher deficits and debt ratios. However, as discussed above, climate investment can be financed differently than just increasing public expenditure (see Sect. 4 and Mittnik and Semmler (2022).

Furthermore, a cautionary remark should be made that the new EU fiscal rule, as discussed in Sect. 5.1, might not work to keep the public expenditure growth aligned with potential output growth. High-interest payments, if close to the above-discussed bad debt equilibrium, may crowd out the aligned public expenditure growth, in part

if tax variations are politically not feasible. Thus, it is important to watch what the European Central Bank is doing, since its interest spikes, as shown in Sect. 3 and appendix 2 may undo the public stabilization effort if the economy is close to a bad equilibrium.

Finally, the designers of new fiscal rules overlook that there are considerable macroeconomic studies which argue that temporary spending increases or cuts may have permanent effects on potential output, see (Sim, 2022). What has been called potential output growth is quite complex to measure[9] and may be difficult to separate from feedbacks from actual growth. Nicholas Kaldor and James Tobin have argued some time ago: Temporary Government spending can affect capacity utilization rates, and the composition and change of human and physical capital have long-run effects on potential output. Thus, Milton Friedman's theory of the separation of the natural laws of the markets (natural unemployment for example), as being driven by long-run trends, and actual macro fluctuations and expansion due to fiscal stimulus is often not feasible, in particular, if temporary spending reduces market constraints and spurs economic growth, see (Mittnik & Semmler, 2012).

To conclude, the response to the EU Commission's proposal on revising the fiscal rules from the 9th of November 2022 has been met with considerable approval by many economists and even more surprising by the convergence among some Northern and Southern Member States. The final goal is to have the new fiscal rules in place before the start of 2024.

5.3 Difficult negotiations to avoid a "bad debt equilibrium" outcome in the EU

Taking into account the response of member states to the initial EU proposal from November 2022, the Commission issued its new economic governance rules on April 26, 2023 including more rigid safeguards taking aboard some of the critical issues raised by the Germans (EU Commission 2023). In a Financial Times article, Christina Lindner, the German Finance Minister, alerted the EU Commission and the Member States that "We need to strengthen EU Fiscal Rules, not dilute them", reiterating his stance for clear fiscal rules, better accountability and stricter enforcement (FT April 25 2023). At the same time, the German government launched a non-paper with six proposals following up on selected issues identified by the ECOFIN conclusions (Bruegel, 2023).

While the Federal Ministry of Finance, under Christian Lindner, is in charge of coordinating the negotiations on the reforms of the Fiscal Rules with the EU Commission and among the EU Finance Ministers in Brussels, nevertheless, according to a member of the Federal Chancellery, these proposals have the full support of the Federal Ministry of Economic Affairs and Climate Action (held by the Green Party), the Chancellery which is occupied by the Social Democrat Olaf Scholz, and the Federal Ministry of Finance in the hands of the Free Democratic Party (FDP). As such, the three political parties making up the coalition

[9] See Holston et al. (2017).

government are in support of the position Christian Lindner is taking in the negotiations (Friedrich Ebert Stiftung, 2023).

Evaluating the German paper with the six proposals, Blanchard and Zettelmeyer (April 2023) conclude that while some of the German concerns in terms of EU-linked investment programs and creating additional safeguards may be valid, but two proposals would further the "bad debt equilibrium". Essentially, Germany distrusts the EU proposed Debt Sustainability Analysis (DSA) which would ensure country-specific debt sustainability based on expenditure rules (deficit to grow at the rate of potential output) and a debt-adjustment plan for high-, medium and low risk countries. Germany criticizes the DSA for excessive discretion and the possibility for political maneuvering. Instead, Germany suggests a mechanical expenditure rule (standardized rules), which would require greater adjustments from countries with greater debt overhang. But this would undermine the objective of national ownership. In a second step, Germany demands "a binding lower limit for a necessary decline in the debt ratio of an appreciable magnitude in each year" (Blanchard & Zettelmeyer, 2023). Heavily indebted countries are called upon from the start of the reformed fiscal framework to reduce debt to GDP by 1 percent per year, low-risk countries 0.5 percent. Instead of identifying the debt risk and providing an adjustment period between 4–7 years to reduce the deficit as set out by the Commission, the German proposal would reduce the adjustment period to zero. These changes "would defeat the entire purpose of devising a new framework for member states' fiscal policies" (Reichlin, 2023).

As discussed in the previous section on escape routes from a bad debt equilibrium (monetary, fiscal and financial), softening the bad debt dynamics, the frugal states adhere to two outdated economic assumptions. First, calling for standardized numerical rules accepts the stock of government debt as given, instead of taking into account the debt variance through debt-financed investment. Secondly, by declaring "debt is debt', the focus is on net-financial debt instead of including non-financial assets which are created through public investment in energy and climate resilience, public transportation, educational and early childhood facilities as well as investment in health and pandemic prevention.

Before the meeting of the EU Finance Ministers in Luxembourg on June 16, 2023 to discuss the revamped proposal, the German Federal Ministry of Finance issued an op-ed piece in Die Welt and other European newspapers signed by the Finance Ministers of the Czech Republic, Austria, Bulgaria, Denmark, Croatia, Slovenia, Lithuania, Latvia, Estonia and Luxembourg essentially calling for a stricter course on the Fiscal Rules. It is thus not surprising that European finance ministers clashed at their meeting in Luxembourg on 16 June 2023. Particularly, Bruno Le Maire, the French Finance Minister, rejected the German demand for automatic, uniform debt-reduction rules arguing that the imposition of automatic rules in the past has led to a decline in growth rates and counteracts national ownership (FT 17/18. June 2023). And the Italian finance minister, Giancarlo Giorgetti, criticized that the Commission did not exclude public productive investments from the country's deficit targets.

5.4 What to expect next?

At the panel discussion organized by the Friedrich Ebert Foundation on 20 June 2023 in Berlin on Fiscal Rules, a member of the Federal German Chancellery called for separating the issues of fiscal rules and the need for investments. In fact, he declared that neither the national level nor the EU fiscal rules negotiations should be the place to decide the investment question for the transition. Fiscal rules should not function as a tool for the required investment purposes. As arranged during the Covid crisis, the necessary investment for climate and energy transition should be decided outside of the budget via a special fund, such as was done with the Next Generation EU. The European Commission decided to use the proceeds of EU-bond issuance to fund EU policy programs on the basis of member states' solidarity (Friedrich Ebert Foundation, 2023).

Not surprisingly, the rest of the panel members consisting of economists and members of the European Parliament rejected strongly the suggestion to separate the two issues. In fact, the tenor of the discussion was that nation states had to be guaranteed the flexibility for climate and energy transition funding within the bounds of sustainable debt targets. Given that the United States and China do not have the strict debt requirements, it is thus all the more necessary that the financing for the transition is done through a common investment strategy at the EU level to harvest the advantages of EU-wide networks. A possible game plan could be the introduction of the "golden Rule" for investment[10] which would exclude investment programs from debt targets as the Italians have suggested.

At the moment, the different positions between the German strict observations of standardized rules and those of a more flexible country-specific debt sustainability target based on expenditure rules seem to be incompatible. Despite the progress the EU has made during the Covid crisis in designing solidarity policies, mistrust among Northern and Southern countries remains. Strict standardized rules are "no substitute for trust" (Reichlin, 2023).

The question arises whether parliaments of national governments and/or the EU Parliament are able to intervene in the present stand-off. It is true that national ownership means that nation-states have more flexibility in designing their individual path to debt sustainability. However, national parliaments are not part of the negotiations of the fiscal rules and thus are not active players in the negotiations. The situation is somewhat different, but more complex, at the level of the EU Parliament. The new economic governance rules consist of three interconnected proposals, but there is only one co-decision between the EU Parliament and the Council at the proposal to replace the regulation on the strengthening of the surveillance of budgetary positions and the surveillance and coordination of economic policies (1466/977/EC). On May 9 2023, the EU Parliament held a debate on the revision of the SGP, following the Council and Commissions statements and demanded the importance of the Parliament's full involvement in the reform

[10] The US under the Biden administration has passed the Inflation Reduction Act whereby the climate investment parts are considered productive public investments by many economists, including Larry Summers.

of the economic governance framework and in the future conduct of economic governance in the EU (EU Parliament, 2023).

Rather than being involved in the full procedure of the negotiations between the EU Parliament, the Commission and the Council, the Parliament seems to point to the democratic deficit in these procedures. Yet, a new framework for a credible approach to public finance must articulate a shared dialogue between national and European parliaments with the EU in order to build a common governance system that is transparent and acceptable to the European citizenry.

6 Conclusion: The need for social buffers for EU debt sustainability

The global Covid-19 crisis made visible the asymmetric impacts of the development of the pandemic on economic sectors and labor market segments, and on society in general. It has exacerbated the global inequalities that already existed placing a spotlight on the low wages, fewer labor rights, particularly in the informal economy, and the impact on "essential workers", mostly women, who ensured economic sustainability during the crisis (Fonte, 2022; Young, 2023).

Yet the pandemic has also led to the realization that societies need to be made more resilient to unexpected shocks (Brunnermeier, 2021). This is all the more important, since we are not only confronted with the challenge of one crisis – the sovereign debt control problem – but rather with multiple crises, a situation in which several crises interact: The pandemic and then the energy crisis, financial volatility, high inflation rates, climate disasters such as wildfire, drought and food shortages, and the Russian aggression on the borders of Europe which in turn shut off the "cheap" energy source which was the motor of many European economic engines. Mastering such unforeseen multiple challenges, the EU and global policy makers need also to design social buffers in the form of social insurance to enable individual and societal resilience against such destabilizing multiple shocks.

Even the new EU fiscal rules remain heavily focused on the debt holdings, which is not taking into account the additional financing resources as discussed in Sect. 4, this is criticized in a discussion by women economists (Wilson, 2022) calling for the inclusion of "human capital" in order to complete the balance sheets by looking at the assets and the liabilities. Rather than counting health, education and safety measures as expenditures, they should be regarded as an investment. This could be done by adding to the Macroeconomic Imbalance Procedure (MIP) a "Social Imbalance Procedure", as Sigl-Glöckner advocates, which would not just look at debt and deficit, but include long-run public investment to ameliorate the social imbalances.

A start was made at the European level with the introduction of The Next Generation EU (NGEU) which is a radical shift from the previous handling of the European Sovereign Debt crisis with its single focus on budget consolidation and austerity. The EU initiated a new borrowing strategy to raise money on capital markets laying the groundwork for European safe assets (Christie et al., 2021). The new strategy was a recognition that member states needed help to cope with the economic fallout from the Covid pandemic. The Recovery and Resilience Facility (RRF) was to provide financial support for member states in the form of grants and loans. In order

to access the funds, countries had to draft national Recovery and Resilience Plans (RRP) to be reviewed and monitored by the European Semester. A pre-requisite for the national growth plans was to include an investment-led growth strategy including expenditures related to climate and digital transformation (Vanhercke & Verdun, 2022; Wilson, 2022).

Despite the unprecedented shift of the EU fiscal frameworks to increase the borrowing power of the EU, the Next Generation EU can only be a start for a long-term sustainable common social buffer at the EU level. The weak point in the institutional structure to support member states is its temporary nature restricted to the Covid crisis. To be effective macroeconomically, EU borrowing instruments should be made permanent to provide a European safe asset. However, the EU Commission's proposal did not go beyond the revision of fiscal rules to facilitate joint financing for EU-wide projects as the German Council of Economic Experts suggested in their most recent Annual Report (GCEE 2022/23).

In addition, "social targets" failed to be included in the initial draft of the RRF. Only through the lobbying of the European Parliament were the principles of the European Pillar of Social Rights next to the green and digital transformation inserted in the final Regulation. The recovery plans had to include 30% of total expenditures towards social policy, including a focus on gender equality. However, these goals remain rather vague and are subject to be watered down at the implementation stage of the National Recovery and Resilience Plans which is in the hands of the European Semester. There is the danger that the social objectives will be subordinated to the economic goals within the EU's post-crisis fiscal framework (Zeitlin/Vanhercke 2018; O'Dwyer/Wöhl forthcoming).

Equally problematic from a social perspective is the recently announced Social-Climate Fund, a provisional agreement reached by the EU Council and Parliament on 18 December 2022 (EU Council, 2022). The agreement on the EU Emissions Trading System and the Social Climate Fund intends to facilitate the climate objectives within the main sectors of the economy, and at the same time ensure that vulnerable citizens and small enterprises are supported in the climate transition. Vulnerable households, small firms, and users of transport systems are supported to cope with the price impacts of an emissions trading system for buildings and road transport and fuels for additional sectors. The fund would be established over the period of 2026–2032, and would be part of the EU budget with external funding up to a maximum amount of €65bn.

The inclusion of the Social Fund in the EU Transmission Trading System is a much welcome shock-absorber for the fall-out of the energy transition for vulnerable groups. However, as with many other EU projects, the "social" is interpreted within a too narrow range instead of creating a separate financial instrument, such as an EU "Social Fund" which would address long-run public investment in health, education, care, job security, climate challenges as a regional public good to create sustainable wealth for the European society. Such a focus on an EU Social Fund would shift the narrative from the traditional economic policy making of redistribution to a vision of collective investment for the common good that is both inclusive and sustainable (Mazzucato, 2022).

Revising the joint EU Fiscal Rules is a first step in accommodating debt sustainability – if done in accordance with what has been proposed in Sect. 4. Yet given the demographic challenges, the geopolitical challenges of increasing defense spending and the urgency of the energy transition will require a common EU fiscal social funding capacity to promote comprehensive economic strategies to mitigate the effects of large asymmetric and global shocks.[11]

Technical appendices: data sources and dynamic model

Appendix 1: Data Sources on growth rate, interest rate and primary balance

We want to report here the Bloomberg analysis, undertaken by Cousin et al. (2022), for each of the countries, as compared what Blanchard (2019) assumes in his study for the US. The Bloomberg team takes the expected GDP growth as derived from their own forecasts which in the long term are generally seen to be determined by a recent historical average of TFP growth and an assessment of the impact of the demographics on the participation rate in the labor market. In contrast, Blanchard's analysis uses the actual past growth rate of nominal GDP over time.

In the Bloomberg analysis, the effective interest rate on debt, that is, interest paid on debt minus any return received on assets, divided by gross debt is derived using market futures for government bonds, taking into account the actual composition of debt at the end of 2021. On the other hand, Blanchard's analysis uses the weighted average the 10 years Treasury bond rate and 1-year Treasury bill rate. The 10-year bond rate is the Federal Reserve Board market yield on U.S. Treasury securities at 10-year constant maturity, quoted on investment basis. The 1-year Treasury bill secondary market rate, quoted on discount basis from Economic Reports of the President and FRED database.

In Bloomberg's forecast analysis, the authors assumed that the primary balance as a share of GDP would remain the same as that observed on average over 2015–2019. In contrast, Blanchard's analysis indicates that primary balances will have to decline.

Appendix 2: Dynamic model and solutions about the two debt equilibria

Since there is so far no analytical solution to the Blanchard two debt equilibria model we illustrate the possible dynamics for the two debt equilibria using a numerical method. A related model of multiple debt equilibria is sketched in De Grauwe (2012). The results shown here are the modeling and solution paths of the two types of dynamics represented in Figs. 4 sand 5. We here also illustrate the evolution of debt and the cost of public debt for the Euro area countries, as discussed in Grauwe (2012). We are solving the proposed basic debt dynamics by Blanchard (1983) which is only verbally extended in Blanchard (2019) where the two debt equilibria are discussed.

[11] A more detailed empirical study on precarious sovereign debt outlook for the EU, the US and Emerging Markets can also be found in Scope Ratings (2023).

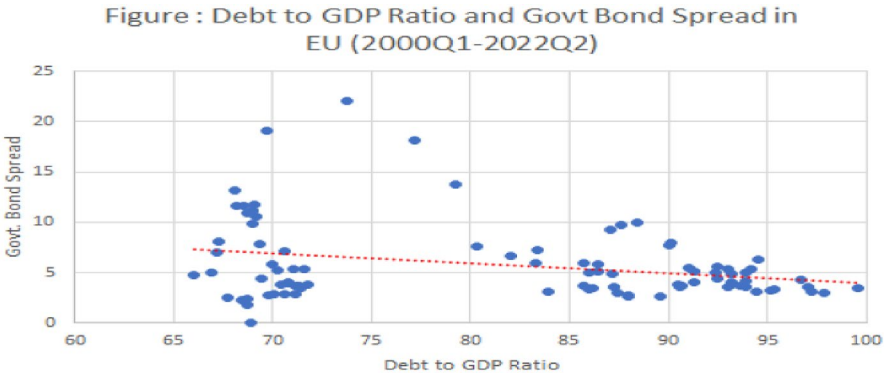

Fig. 6 European sovereign debt and the cost of debt dynamics

In the basic Blanchard model (1989), the interest rate is constant and low. This case can be viewed as representing the Fig. 4, the good debt equilibrium, in the Sect. 3, where one observes a convergence toward a low steady state of the debt to GDP ratio (i.e. mean reversion after a shock). Figure 5, the two equilibria model, in Sect. 3 shows the case when there is not mean reversion but diversion, resulting from the high level of debt and high interest rates including a hight risk premium.

To illustrate the relevance of the two equilibria, see Fig. 6 which is based on Euro area data demonstrates the two cases and their underlying mechanisms. For low and fixed levels of interest rates, the debt dynamics stay below the red line, roughly below 70% of GDP.[12] Yet, the higher state dependent interest rates, the higher risk premia and a higher debt reveal positive feedback mechanisms between debt and the cost of debt, including a high and rapidly rising risk premium. Yet, as also can be seen from Fig. 6 low debt to GDP ratios do not guarantee "good debt" equilibria with low risk premia.

However, when the monetary authority, the ECB began using QE to buy EU treasury bonds, the interest rates and risk premia fell and, though debt stays high in Fig. 6, the low interest rates and lower risk premia stabilize the debt dynamics. As generally recognized the monetary intervention of the ECB through purchasing of sovereign debt, thus Draghi's "whatever it takes", has eventually stabilized the debt dynamics.

Next we want to mimic in a more formal model the two specific phases in two scenarios, representing the Figs. 4 and 5 in Sect. 3.

Scenario 1:

We present here in Scenario 1 a formalized version of the Blanchard (1983) standard model with constant interest rate on debt and the basic debt dynamic.

[12] The data sources for Fig. 6 for the Euro area are: The data source for debt to the GDP ratio is from https://www.ceicdata.com. For government bond spread, the data source is https://fred.stlouisfed.org/series/IRLTLT01EZM156N. Data frequency is quarterly. Note that these are computations for average debt to GDP ratios and sovereign debt costs. There is, however, as well known, a great difference across States depending on dispersion for the EU countries over time. Yet for a rough illustration of the Blanchard theory of the two dominant equilibria of Figs. 4 and 5 this will be sufficient.

Scenario 1 is the case of a (unique) good debt equilibrium. We start with a model where the interest rate on debt is given exogenously and remains stable at a low level (with small or no risk premia). Such a scenario may be represented by a central bank pursing a low interest rate, which might be close to zero, trying to keep the economy in a low financial stress regime. This is the case of sustainable debt showing mean reversion to a stable equilibrium of Fig. 4.

The following dynamic equations are adopted from Blanchard (1983). This case of a stable debt equilibrium is also verbally discussed in Blanchard (2019:1226-7). To illustrate this case let us specify the dynamic equations.

$$V(k,b) = \max \int_0^T e^{-rt} U[c_t - \chi(\mu_t - \mu^*)^2]dt \tag{4}$$

s.t.

$$\dot{k}_t = (g_t - \delta)k_t + \epsilon_t \tag{5}$$

$$\dot{b}_t = rb_t - (y_t - c_t - i_t - \varphi(i_t)) \tag{6}$$

Equation (4) is an intertemporal payoff function, containing preferences over consumption, reduced by the welfare loss from excess debt, see Eq. (4). The first state equation, Eq. (5), represents capital accumulation and the second Eq. (6) denotes the evolution of debt. The Blanchard (1989) standard model with a constant and low interest rate on debt is here illustrated.

Note that in Eq. (4) we model the pay-off function for a finite decision horizon T. The pay-off can be defined as consumption oriented pay-off function with the term $-\chi(\mu_t - \mu^*)^2$defining the distress effects of higher debt above some mean value μ^*. Decision variables are c_t and g_t, the latter is the growth rate of the capital stock. Thus in our case it is presumed that a decision has to be made on investment (growth rate of capital, $g_t = i_t k_t$) and consumption, c_t which appear in equations (5) and (6). More specifically, Eq. (5) shows the law of motion for the capital stock. The capital stock grows with rate g_t and depreciates at a given rate δ.

Equation (6) represents the debt dynamics for the economy where we allow for external borrowing.[13] As can be seen from Eq. (6) the debt increases with interest payments on debt, given by rb_t, but, at the same time, debt also changes by $(y_t - c_t - i_t - \varphi(i_t))$, which represents the difference between income and spending – and when the latter is greater than the former this increases the external debt. Hereby $\varphi(i)$ is a quadratic adjustment cost for investment. One can observe that whenever interest service on debt is greater than the second term -(..), debt will rise. Lastly, it is to be stressed, we presume a finite decision horizon T.

Scenario 2:

In Scenario 2 a state dependent risk premia for sovereign debt is introduced, reflecting what is stated in Blanchard (2019: 1226) as the "bad" debt equilibrium.

[13] See Blanchard (1989) for further details.

We explore Scenario 2 where we introduce a state dependent risk premium and a reaction of the macro variables to the financial stress.

$$\dot{b}_t = r(s_t|\gamma, c^*)b_t - ({y^a}_t - c^a_t - i^a_t - \varphi(i_t)) \tag{7}$$

In this variant of our model, in Eq. (7), where the superscripts ^{a} mean that macro variables can be adjusted downward due to a lack of effective demand, and hereby we allow now for increasing financial stress due to default risk and further contractions.[14] Hereby the nonlinear cost of public borrowing is defined as credit spread $r(s_t|\gamma, c^*)$with:

$$r(s_t|\gamma, c^*)b_t = 1 + exp[-\gamma(s_t - c^*)] - 1, \gamma > 0, c^* > 0, \tag{8}$$

This is roughly the function that has been used to produce Fig. 5 in Sect. 3 and has been indicated in De Grauwe (2012) as a nonlinear risk premia, see also Mittnik and Semmler (2018). Yet, we want to note, as Blanchard (2019) also states, there is not likely to be an exact form of the nonlinearity of the sovereign debt cost related to the debt to GDP ratio.[15]

In Eq. (8), the interest payment on borrowing (bank credit or bonds) rises with the debt to capital stock ratio in a non-linear way: slowly in the beginning, then more rapidly but it is finally bounded. We include both an interest rate and add an endogenous risk premium and capital utilization. Empirically, these are important macroeconomic feedback loops that can often be observed during periods of financial stress, and that we have discussed at the beginning of this section.

For solving the Scenario 1 and Scenario 2, we solve the implied intertemporal models for finite decision horizon where the NMPC algorithm (see Gruene et al., 2015) is used.[16] We obtain hereby the graphs of Fig. 4 and 5 in Sect. 3.

We also want to note that finally the purchase of sovereign debt, setting in 2011/12, stabilized the debt dynamics, through monetary policy interventions. Starting from the high debt, and high cost of sovereign debt, the public debt in Fig. 4 can be stabilized by bringing down the interest rate and risk premia for sovereign debt. This is also shown in the middle part of the Fig. 6. Though the cost of sovereign debt went further down in Fig. 6, obviously the debt to GDP ratio did not get stabilized completely as indicated in Fig. 6, but still remained higher due to additional disruptive shocks occurring – the Covid meltdown, after 2020 and the energy crisis starting with 2022.

Finally we want to make a reference to the literature on self-defeating debt restructuring. The additional feedback effects of Eq. (8) can indeed lead to further contractions and rising public debt– even if there is an attempt to consolidate the public budget. Much of the empirical literature after the financial market crisis

[14] See Mittnik and Semmler (2018).

[15] A typical example is Japan, where the debt to GDP ratio is beyond 200% but the cost of the (mostly domestically held) sovereign debt has little relationship with the debt to GDP ratio.

[16] For details on solving the dynamic decision model, represented in Fig. 4 and 5, see also Mittnik and Semmler (2018). There is also an explanation of how a stochastic version can be applied.

2008–09 on the limited multiplier effects or state dependent multipliers, see Batini et al. (2014) and on significant forecast errors, as stated in Blanchard and and Leigh (2014) seem to result from the increasing constraints on product, labor and financial market in economic contractions as discussed in Mittnik and Semmler (2012). This is then not only leading to further contraction of output and self-defeating fiscal consolidation, but also is having an impact on the potential output and long run growth. This of course can be counteracted, as Goodhart (2020) suggests by counteractions of monetary policy bringing the interest rate down, as indicated in our Eqs. (6) and (7).

References

Alcidi, C., & Corti, F. (2022). The EU response to Covid-19: Breaking old taboos? In B. Vanhercke & S. Spasova (Eds.), *Social Policy in the European Union: State of Play 2021. Re-emerging social ambitions as the EU recovers from the pandemic.* European Trade Union Institute and European Social Observatory.

Bastos Neves, J. P., & Semmler, W. (2022). A proposal for a carbon wealth tax: Modeling, empirics, and policy. *SSRN*. https://doi.org/10.2139/ssrn.4114243

Batini, N., Eyraud, L., & Weber, A. (2014). A simple method to compute fiscal multipliers, IMF working paper, WP/14/93.

Blanchard, O. (2022), Data source on Real GDP: https://www.measuringworth.com/datasets/usgdp/sourcegdp; 1-year T-bill rate: https://fred.stlouisfed.org/series/DTB1YR; 10-year bond rate: https://fred.stlouisfed.org/series/; Construction of the adjusted rate: www.gpo.gov/fdsys/pkg/ERP-2013.

Blanchard, O., & Leigh, D. (2013), Growth Forecast Errors and Fiscal Multipliers. IMF working paper WP/13/1.

Blanchard, O., & Zettelmeyer (2023). Fixing Germany's fixes of the European Commission's fiscal governance proposal Bruegel (April 18). https://www.bruegel.org/analysis/fixing-germanys-fixes-european-commissions-fiscal-governance-proposal

Blanchard, O., Leandro, A., & Zettelmeyer, J.(2021). Redesigning EU fiscal rules: From rules to standards, in economic policy. April: 195-236.

Blanchard, O., A. Sapir, J. Zettelmeyer (2022a). Bruegel. The European Commission's fiscal rules proposal: A bold plan, with flaws that can be fixed. (30. November). https://www.bruegel.org/blog-post/european-commissions-fiscal-rules-proposal-bold-plan-flaws-can-be-fixed

Blanchard, O. (1983). Debt and the current account deficit in Brazil. In Ruediger Dornbusch & Maurice Obstfeld (Eds.), *Financial policies and the world capital market: The problem of Latin American countries* (pp. 187–198). University of Chicago Press.

Blanchard, O. (2019). Public debt and low interest rates. *American Economic Review, 109*(4), 1197–1229.

Bloomberg Data sources. (2022). https://www.bloomberg.com/professional/datasets/.

Boekemeier, B., & Greiner, A. (2012). How to Assess Debt Sustainability? *Some Theory and Empirical Evidence for Selected Euro Area Countries, Applied Economics, 44*(28), 3717–3724.

Bohn, H. (1998). The behavior of U.S. public debt and deficits. *Quarterly Journal of Economics, 113*, 949–963. https://doi.org/10.1162/003355398555793

Braga, J. P., Semmler, W., & Grass, D. (2021). De-risking of green investments through a green bond market - Empirics and a dynamic model. *Journal of Economic Dynamics and Control, 131*, 104201.

Bruegel. (2023). German technical non-paper following up on selected issues identified by the ECOFIN conclusions (April). https://www.bruegel.org/sites/default/files/2023-04/Germantechnicalnonpaper.pdf

Brunnermeier, M. (2021). *The resilient society*. Endeavor.

Brunnermeier, M. K., & Sannikov, Y. (2014). A macroeconomic model with a financial sector. *American Economic Review, 104*(2), 379–421.

Burns, A. (2022). Reaction: European Commission proposes approach to fiscal rules review. Finance-Watch (9. November). https://www.finance-watch.org/press-release/reaction-european-commission-proposes-approach-to-fiscal-rules-review/

Chiarella, C., Semmler, W., Hsiao, C.-Y., & Mateane, L. (2016). *Sustainable asset accumulation and dynamic portfolio decisions*. Cham: Springer Publishing House.

Christie, R., Claeys G., & Weil, P. (2021). Next Generation EU borrowing: a first assessment. Policy Contribution 22/2021, Bruegel.

Cousin, M., Rush, J., & Orlik, T. (2022). Global insight, first UK then who? Debt sustainability forecasts, Bloomberg 10/11/2022, Bloomberg Intelligence.

De Grauwe, P. (2012). The governance of a fragile eurozone. *The Australian Economic Review, 45*(3), 255–68.

EU Parliament. (2023). New economic governance rules. European Parliamentary Research Service (EPRS) (May 2023) New economic governance rules (europa.eu).

European Commission. (2020). Communication from The Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: A Union of Equality: Gender Equality Strategy 2020-2025. COM/2020/152 final, Brussels. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0152

European Commission. (2022). Building on economic governance framework fit for the challenges ahead (9. November). https://ec.europa.eu/commission/presscorner/detail/en/ip_22_6562

European Commission. (2023). Commission proposes new economic governance rules fit for the future. https://ec.europa.eu/commission/presscorner/detail/en/ip_23_2393

European Council. (2022). "Fit for 55': Council and Parliament reach Provisional Deal on EU Emissions Trading System and the Social Climate Fund (18 December). https://www.consilium.europa.eu/en/press/press-releases/2022/12/18/fit-for-55-council-and-parliament-reach-provisional-deal-on-eu-emissions-trading-system-and-the-social-climate-fund/

Federal Ministry of Finance. (2023). Op-ed by German Finance Minister Christian Lindner and other European finance ministers on the reform of Europe's fiscal rules. https://www.bundesfinanzministerium.de/Content/EN/Standardartikel/Press_Room/Namensartikel/2023-06-15-reform-of-europes-fiscal-rules.html

Financial Times. (2022). Meloni premiership to test Italy's relations with Brussels. (24.10.) https://www.ft.com/content/b5faa66b-1195-4af4-b1ac-049446f6a725

Financial Times. (2023). Germany and France spar over strictness of EU's future budget rules (June 17/18). https://www.ft.com/content/5b450f9b-698a-4709-9803-4e7963307d72

Fonte, G., & Gavin, J. (2022). Italy economy minister promises fiscal prudence, lower debt (9. November). https://www.reuters.com/markets/europe/italy-economy-minister-promises-fiscal-prudence-lower-debt-2022-11-09/

Friedrich Ebert Foundation. (2023). Finanzierung der Transformation – Transformation der Finanzierung: Fokus Europe. Tag der Progressiven Wirtschaftspolitik 2023. Kongresstag 20. Juni 2023.

Garicano, L. (2022). Debt and the Euro. Markus Academy. Princeton. 15. December 2022

German Council of European Experts (Sachverständigenrat). (2023). Annual Report 2022/23. managing the energy crisis in solidarity and shaping the new reality. https://www.sachverstaendigenrat-wirtschaft.de/en/publications/annual-reports.html

Goodhart Pradhan, M. (2020). *The great demographic reversal: aging societies, waning inequality, and an inflation revival*. MacMillan/Springer.

Government of the Netherlands. (2022). Spain and the Netherlands call for a renewed EU Fiscal Framework fit for current and future challenges (4. April). https://www.government.nl/latest/news/2022/04/04/spain-and-the-netherlands-call-for-a-renewed-eu-fiscal-framework-fit-for-current-and-future-challenges

Gross, M., & Semmler, W. (2019). Mind the output gap: The disconnect of growth and inflation during recessions and convex Phillips curves in the euro area. *Oxford Bulletin of Economics and Statistics, 81*(4), 817–848.

Grüne, L., Semmler, W., & Stieler, M. (2015). Using nonlinear model predictive control for dynamic decision problems in economics. *Journal of Economic Dynamics and Control, 60*, 112–133. https://doi.org/10.1016/j.jedc.2015.08.010

Guardian. (2022). New York passes $4.2bn environmental bond act on midterm ballot. https://www.theguardian.com/us-news/2022/nov/10/new-york-passes-environmental-bonds-midterm-elections.

Heimberger, P. (2023), Reform of EU fiscal rules - more ambition needed, Social Europe. (June 6th). https://www.socialeurope.eu/reform-of-eu-fiscal-rules-more-ambition-needed.

Holston, K., et al. (2017). Measuring the natural rate of interest: International trends and determinants. *Journal of International Economics, 108*(supplement 1), S39–S75.
Jepsen, M. (2021). Good news for gender equality as we exit the Covid-19 crisis? In Social Europe, April 26, 2021.
Kato, M., Mittnik, S., Semmler, W., & Samaan, D. (2015). Employment and output effects of climate change policies. In L. Bernard (Ed.), *The macroeconomics of global warming*. Handbook of Oxford University Press.
Lichtenberger, A., Braga, J., & Semmler, W. (2022). Green bonds for the transition to a low-carbon economy. *Econometrics, 10*(1), 11.
Lindner. L. (2023). We need to strengthen EU fiscal rules, not dilute them. Financial Times (April 25). https://www.ft.com/content/8ec1d936-aabb-4f8a-b8db-ed45430888ab
Lorenzoni, G., & Werning, I. (2029). Slow moving debt crises. *American Economic Review, 109*(9), 3229–63.
Macroeconomic Policy Institute (IMK). (2022). The Macroeconomic Effects of Re-Applying the EU Fiscal Rules. Returning to the status quo ante or moving to expenditure rules? IMK Policy Brief No. 132. (September 2022).
Mazzucato, M. (2022) Toward a progressive economic agenda. Social Europe (10. October). https://www.socialeurope.eu/toward-a-progressive-economic-agenda
Mittnik, S. & Semmler, W. (2022), Die Substitution fossiler Energieträger – die Analyse wirtschaftlicher Kurz- und Langfristwirkungen, Vierteljahrshefte zur Wirtschaftsforschung, DIW Berlin, vol. 3, https://elibrary.duncker-humblot.com/article/68458/die-substitution-fossiler-energietrager-die-analyse-wirtschaftlicher-kurz-und-langfristwirkungen
Mittnik, S., & Semmler, W. (2012). Regime dependence of the fiscal multiplier. *Journal of Economic Behavior and Organization, 83*(3), 502–522.
Mittnik, S., & Semmler, W. (2018). Overleveraging, financial fragility and the banking-macro-link: Theory and empirical evidence. *Macroeconomic Dynamics, 22*(2018), 4–32.
O'Dwyer, M. & S. Wöhl. (2023). Social reproduction in pandemic economics: The case of the EU recovery and resilience facility.
Pisani-Ferry, J. (2021) Europe needs a new fiscal framework. project syndicate. 29. April. https://www.project-syndicate.org/commentary/eu-fiscal-rules-need-reform-by-jean-pisani-ferry-2021–04?utm
Proano, C., Schoder, C., & Semmler, W. (2013). Financial stress, sovereign debt and economic activity in industrialized countries: Evidence from nonlinear dynamic panels. *Journal of Applied Econometrics, 28*(7), 1179–1204.
Reichlin, L. (2023). The fight over EU fiscal reform, project syndicate (June 5th). https://www.project-syndicate.org/commentary/european-commission-flawed-reform-of-stability-and-growth-pact-by-lucrezia-reichlin-2023-06
Reuter, W.F., & Feld, L. (2022). Reforming the European fiscal framework: Increasing compliance, not flexibility. VOXEU. CEPR. https://cepr.org/voxeu/columns/reforming-european-fiscal-framework-increasing-compliance-not-flexibility?utm
Reuters. (2022). EU Commission to propose keeping fiscal rules suspended in 2023. https://www.reuters.com/markets/europe/eu-commission-propose-keeping-fiscal-rules-suspended-2023-officials-2022-05-19/
Saraceno, F., Semmler, W., & Young, B. (2020). European economic, fiscal and social policy at the crossroads. *Constellations, 27*(4), 573–93.
Scope Ratings. (2022). Sovereign Outlook 2023, https://www.scopegroup.com/dam/jcr:dfdea09e-a08e-4b0d-969e-5ec5f814e25b/Scope%202023%20Sovereign%20Outlook_2022%20December_Final12122022.pdf
Semmler, W., Di Bartolomeo, G., Fard, B., & Braga, J. (2022). Limit pricing and entry game of renewable energy firms into the energy sector. *Structural Change and Economic Dynamics, 61*, 179–190.
Semmler, W., Braga, L. P., Lichtenberger, A., Toure, M., & Hayde, E. (2021). *Fiscal policies for a low-carbon economy*. World Bank.
Semmler, W., & Proano, C. (2015). Escape Routes from Sovereign Default Risk in the Euro Area, ZEW discussion paper No 15 020, published in Monetary Policy in the Context of the Financial Crisis. In W. Barnett & J. Jawadi (Eds.), *International symposia in economic theory and econometrics* (pp. 163–195). Springer.
Sim, J. (2022). Demand Shocks, Hysteresis and Monetary Policy, Finance and Economics Discussion Series 2022-080. Washington: Board of Governors of the Federal Reserve System. https://doi.org/10.17016/FEDS.2022.080.

Suvajevs, A. (2023). New EU fiscal rues: a democratic deficit. Social Europe (June 14) https://www.socialeurope.eu/new-eu-fiscal-rules-a-democratic-deficit

Tahri, I. (2022). *Inflation and green bonds, manuscript*. PIK.

Vanhercke, B., & Verdun, A. (2022). The European semester as goldilocks: Macroeconomic policy coordination and the recovery and resilience facility. *Journal of Common Market Studies, 60*(1), 204–223.

Wilson, R., (2022). Tackling the cost-of-living crisis. Social Europe. 20.12.2022. https://www.socialeurope.eu/tackling-the-cost-of-living-crisis

Woodford, M. (1996), Control of the Public Debt: A Requirement for Price Stability? NBER Working Paper No. 5684, July.

Young, B. (2023). Covid-19 and the gender dilemma: Blind spots in both macroeconomics and feminist economics. In A. Garcia, Ch. Scherrer, & J. Wullweber (Eds.), *Handbook on critical political economy and public policy* (pp. 65–79). Edward Elgar Publications Ltd.

Zeitlin, J., & Vanhercke, B. (2018). Socializing the European Semester: EU social and economic policy co-ordination in crisis and beyond. *Journal of European Public Policy, 25*(2), 149–174.