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Which Fiscal Rule for France? Lessons from the DSGE Model of CEPREMAP

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1. Introduction

Over the past quarter century, public debts of the major European countries have had very different dynamics (Figure 1). France and Germany, which had a relatively stable public debt around 60% of GDP between 1995 and 2007, diverge after the financial crisis: Germany is rapidly returning to the 60% target while France shows a growing debt even after 2011, to approach 100% of GDP in 2017. Starting from very high levels (above 100% of GDP), Italy saw its debt as a share of GDP decreasing before 2007, then increasing during the crisis before it stabilizes in 2012. Spain, meanwhile, was not heavily indebted before the crisis, seeing its debt-to-GDP ratio reach 40% in 2007, which leaves important "fiscal space" to increase its debt at the critical moment and then stabilize it after 2012.

Reducing public debt today seems necessary if one wishes to give the possibility to government to use the fiscal instrument in the event of a new crisis. This requires consolidation efforts. Indeed, for the debt to remain constant, and if the real interest rate is higher than the potential growth rate, it is necessary to obtain a positive fiscal balance (general government revenues minus expenditures) to reimburse interest payments. Such balance is called a "debt-stabilizing balance". As shown in Figure 1, fiscal balances have been mostly below debt-stabilizing balances since 1995, which automatically leads to increases in debt, and therefore to a growing share of revenues that government devote to repayment of interest. In France, the fiscal balance is always lower than the debt-stabilizing balance (see Figure 1), which explains the continuously increasing dynamics of its debt. On the other hand, when the current fiscal balance meets or exceeds the stabilizing balance, then an inflection of the debt dynamics is observed.

Public debt dynamics mainly reflect political choices.1 Since the crisis, the Figure 2 shows that France is the only country to maintain a high level of public expenditure while trying to reduce the deficit by raising the tax burden from 50% of GDP to 54% of GDP in 2017, whereas it remained stable in Germany (45%), fell in Spain and Italy (37% and 46.5% respectively in 2017). This strategy has not made it possible to reduce debt in France, while a stricter control of spending seems to have succeeded in our partners.

In a context of rising interest rates and a very strong tax burden, there is still a need to reduce public debt to restore fiscal space so that, in the event of a new adverse shock, the government can again mobilize fiscal instrument to support activity and avoid the deflationary spiral. What is the strategy for recovering such fiscal space?

- A first strategy is to avoid the short-term costs of the decline in growth inherent in fiscal consolidation. But this choice also consists in depriving oneself for the years after of an expansionary

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1 We do not discuss here choices about the "size" of governments.

Figure 1: Government accounts

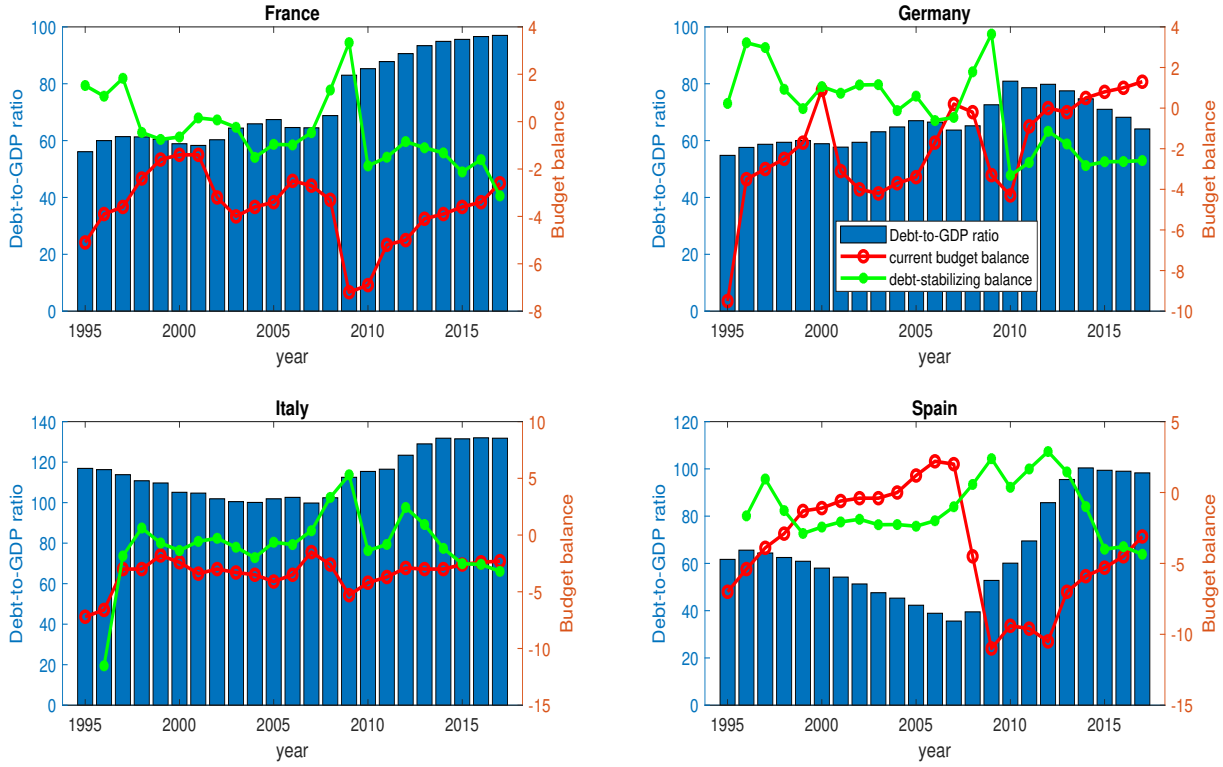
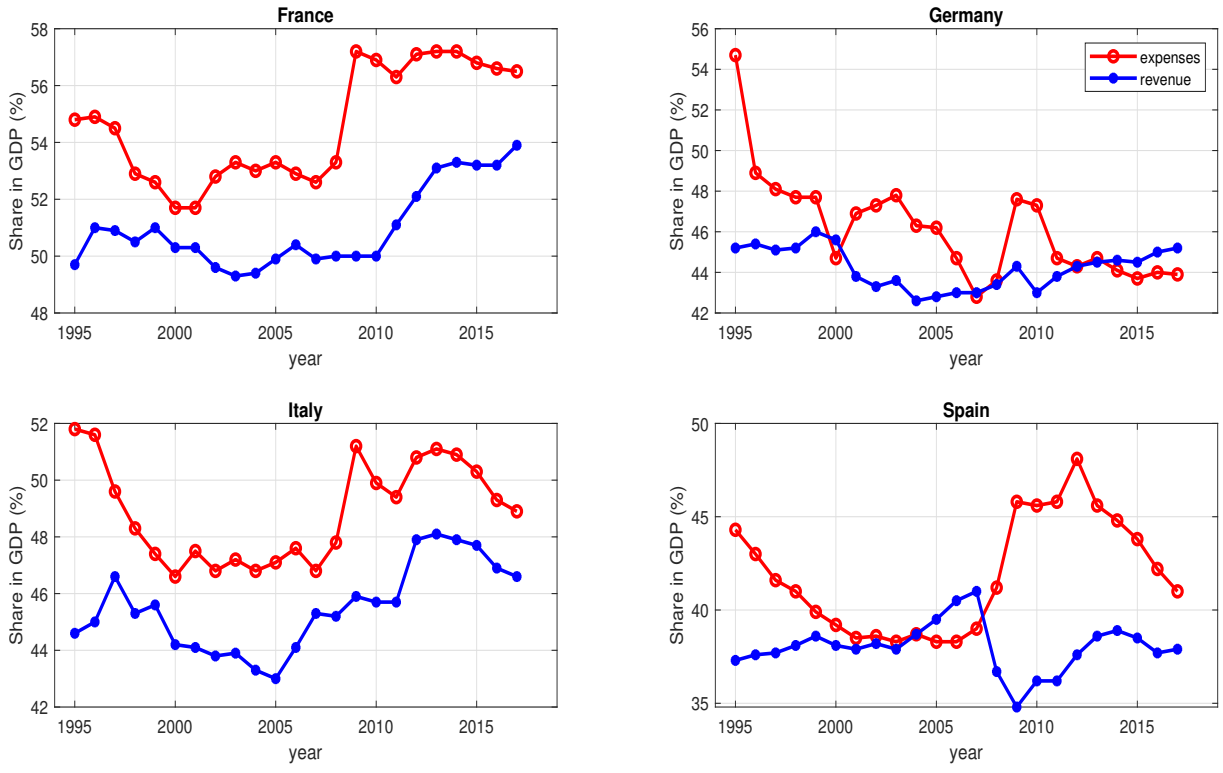


Figure 2: Government revenues and expenditures



fiscal policy, constrained by a debt too high. This scenario is only an extension of what France has known since the financial crisis.

- A second strategy is to accept a cost in terms of growth in the short term, in order to be able to re-use public spending policy in two or three years if necessary. The central point of this strategy is the transition to a positive primary balance in order to stabilize and then reduce the debt.

The analysis of debt dynamics is mainly a medium and long-term problem. Indeed the first question is to evaluate if the expenditures choices as well as the tax policy of the government are sustainable in the long run (see the comments of Figure 1). The non-explosion of the debt induces sustainable expenditures, for a given fiscal policy. Therefore, any fiscal rule must take into account this long term constraint in order to ensure the intertemporal consistency of the government choices. Obviously, these medium and long-term adjustments of the government spending have a serious impact on the economic activity, which itself gives credibility to the government decisions. Hence, a coherent modeling is necessary to evaluate a fiscal reform: a general equilibrium model is thus the perfect candidate for this type of policy evaluation. A byproduct of this approach comes from the consistency it proposes with respect to agent and government expectations. Indeed, in the short-run, fiscal policies are based on expected inflation and expected growth rate of the potential GDP. General equilibrium models provide a tool for the government to determine these expectations which are consistent with the different scenarii proposed before voting for the finance bill.

In a strategy to reduce debt without changing taxes and using general equilibrium model, we get three results.

- France has put a lower weight than its major European partners (Germany, Italy and Spain) on the evolution of its debt to choose its expenditure, which partly explains the continued growth of the debt-to-GDP ratio in this country.

- In order to improve and make transparent these debt-sensitive *practices* to choose its current expenditure, we show that the implementation of an explicit expenditure *rule* introducing stronger debt brakes when the deviation to the target of 60% is large, allows to choose a path of debt reduction, which would be less than 90% before 2025.

- In 2019, the cost of the adoption of such a fiscal rule is -0.17 point of output gap compared to the scenario without such rule, -0.23 in 2020, -0.19 in 2021. From 2019 to 2050, this rule induces output losses lower than the other examined strategies, the cumulative sum of the negative output gaps is smaller than 5 points with this rule. Therefore, the rule where the brake varies with the level of debt makes it possible to damp the production losses induced by the consolidation to the extent that this brake decreases. To do this, the growth rate of public spending must be negative for 3 years, generating the budget surplus that stabilizes and then reduces the debt.

2 Methodology

The study of the debt-to-GDP dynamics goes well beyond government account. As it depends on the relative evolution of debt and GDP, it requires their joint study. In addition, public debt evolves according to the decisions of expenditure and taxation of the government which will directly impact GDP via private sector decisions. Coherent modeling of these interactions is therefore desirable: to do so, we have chosen a dynamic general equilibrium model (see Brand and Langot (2018) for model details).

2.1 Government accounts

Dynamics of the public debt. The evolution of the debt-to-GDP ratio is given by

$$\frac{\text{debt in } t}{\text{GDP in } t} = \frac{\text{debt in } t-1}{\text{GDP in } t} - \left(\frac{\text{revenue in } t}{\text{GDP in } t} - \frac{\text{expenses in } t}{\text{GDP in } t} - \frac{\text{interest on the debt in } t-1}{\text{GDP in } t} \right)$$

Deflating by the nominal GDP at date t, it appears in the right-hand side that the debt and the GDP are not taken at the same dates. As

$$\frac{\text{debt in } t-1}{\text{GDP in } t} = \frac{\text{debt in } t-1}{\text{GDP in } t-1}\frac{\text{GDP in } t-1}{\text{GDP in } t} = \frac{\text{debt in } t-1}{\text{GDP in } t-1}(1-\gamma_t-\pi_t)$$

where γ_t is the growth rate in t and π_t the inflation rate in t,[2] it follows that

$$\frac{\text{debt in } t}{\text{GDP in } t} = \frac{\text{debt in } t-1}{\text{GDP in } t-1} \underbrace{-\left(\frac{\text{revenue in } t}{\text{GDP in } t} - \frac{\text{expenditures in } t}{\text{GDP in } t} - \frac{\textbf{net} \text{ interest on the debt in } t-1}{\text{GDP in } t}\right)}_{\text{primary balance over GDP in } t}$$

where **net** interest on the debt is $(R_t - \pi_t - \gamma_t) \times$ debt at date $t-1$, with R_t denoting the nominal interest rate.

If the primary balance is positive (negative), then the debt-to-GDP ratio decreases (increases). In the long run, ie. when $\frac{\text{debt variation}}{\text{GDP}} = 0$, we deduct

$$\begin{pmatrix}\text{net interest}\\ \text{over debt-}\\ \text{to-GDP}\end{pmatrix} = \underbrace{\begin{pmatrix}\text{share of government}\\ \text{revenue}\\ \text{in GDP}\end{pmatrix} - \begin{pmatrix}\text{share of government}\\ \text{expenditures}\\ \text{in GDP}\end{pmatrix}}_{\text{debt-stabilizing balance}}$$

This condition of stability (non-explosion) for the debt dynamics induces a constraint on the expenditure of the government: it gives the "sustainable" part of the public expenditure in the GDP, for a taxation and a debt ratio on given GDP. If the public expenditure is higher than this threshold, then the debt will increase.

Modeling past government expenditures choices. Real government spending evolves around their "sustainable" level. It is assumed that practices for the past government expenditures choices are summarized by:[3]

$$\log(g_t) = \underbrace{\rho_g \log(g_{t-1})}_{\substack{\text{persistence}\\ \text{of expenses}}} + \underbrace{(1-\rho_g)\log(g)}_{\substack{\text{anchoring expenses}\\ \text{on the long-run}}} + \underbrace{\mu_y(\gamma_t - \Delta y_t)}_{\substack{\text{automatic}\\ \text{stabilizer}}} - \underbrace{\lambda \log\left(\frac{\widetilde{b}_t}{\overline{b}}\right)}_{\substack{\text{debt}\\ \text{brake}}} + \underbrace{\sigma_g \zeta_t^g}_{\substack{\text{discretionary}\\ \text{spending}}} \quad (1)$$

- g_t is the level of public spending,
- g is the "sustainable" level of public spending (ensuring the sustainability of long-term debt),
- γ_t the growth rate of potential GDP,
- Δy_t the GDP growth rate,
- $\widetilde{b}_t$ current debt-to-current ratio,
- $\overline{b}$ the long-term targeted debt-to-GDP ratio.
- $\zeta_t^g \sim \mathcal{N}(0,1)$ discretionary government spending, with σ_g their standard deviation.

Even for the past behaviors, we restrict ourself to government choices ensuring that the path of the government expenditures doesn't lead to debt explosion. Indeed, e.g. in the case where $\rho_g = 1$ in equation (1), the path of government expenditures is independent from g (the level of sustainable expenditures), leading them to have an undetermined level in the long run.

[2] We use the approximation $\frac{1}{(1+\gamma_t)(1+\pi_t)} \approx 1-\gamma_t-\pi_t$

[3] Lowercase variables represent values deflated by growth in potential GDP and inflation.

Tax rates. We assume that discretionary tax rate changes may occur in each Euro area country. All tax rates follow autoregressive processes of order one.

2.2 The private sector and the economic equilibrium

The evolutions of the large economic aggregates are solutions of a dynamic model solved in an uncertain environment, under the assumption of rational expectations. This model is estimated in order to reproduce exactly one set of series observed for each "country" (Euro area, France, Germany, Italy, Spain) between 1995T1 and 2016T4.[4] The features of the model are as follows:

- each country is a small open economy, with international trade in goods and services as well as inflows and outflows of capital,
- nominal rigidities in the goods and labor markets ensure the non-neutrality of monetary policy,
- some agents have financial wealth, while others do not,
- the financial sector imperfectly controls the risks associated with loans,
- the European Central Bank controls the nominal interest rate of non-risky assets,
- general government expenditures are divided into three main items, spending on consumer goods (a public good providing utility to households), investment goods (a public good increasing business productivity) and transfers to households, ensuring redistribution. All these expenses are chosen according to equation (1).
- government revenues come from taxes on labor, capital and consumption.

2.3 The lessons of the estimation of the DSGE on European data

The parameter estimation on aggregated data for the Euro area is simultaneously conducted with those for France, Germany, Italy or Spain respectively. The identification is based on the following restrictions:

- households have the same preferences everywhere in Europe,
- everywhere in Europe, firms have the same possibilities of choice for the combination of their factors of production,
- Euro area data (20 series) are used to identify the structural parameters and shocks common to all Euro area countries,
- data from each country (France, Germany, Italy, Spain, ie 19 series per country) can be used to identify country-specific shocks that measure temporal changes in market differentials between each country and the Euro area.

The table 1 shows that:

Result 1a. In the Euro area, as in France, Germany, Italy and Spain, public spending has been held back by debt often above its target between 1995Q1 and 2016Q4 (λ positive and meaningful);

Result 1b. France is the country that put the lowest weight on its debt to decide its expenditures.

[4] The numerical resolution of the model and its estimation were carried out using Dynare software (`www.dynare.org`). The codes are available here: `https://git.nomics.world/macro/mars/tree/fiscalrule`.

Table 1: Estimation of public spending choices — 1995Q2-2016Q4

	Debt brake λ	Automatic stabilizer μ_y	Persistence ρ_g
Euro Area	0.0106	0.1816	0.9340
	(0.0010)	(0.0195)	(0.0155)
France	0.0075	0.1666	0.9454
	(0.0002)	(0.0495)	(0.0160)
Germany	0.0136	0.2430	0.9323
	(0.0045)	(0.0311)	(0.0022)
Italy	0.0203	0.2623	0.9226
	(0.0022)	(0.0326)	(0.0047)
Spain	0.0299	0.0580	0.9823
	(0.0066)	(0.0098)	(0.0012)

Standard errors in parenthesis

The table 1 also points out that the automatic stabilizer is less present in France than in the Eurozone on average and in Germany and Italy. Lastly, the persistence of public spending is very similar in France and in the rest of the Eurozone.

Thus, introducing a fiscal rule that takes into account the current-account spread to its target value will transform government "practices" into "rules", making it possible to anticipate the trade-offs of the government. Once implemented, the question on fiscal rules is about how much debt is taken into account in the budget decision (parameter size λ).

3 Simulation of a public expenditure rule

The reform. Compared to the rule estimated in the past, the new fiscal rule ensures an increase in public spending indexed to inflation and long-term growth. However, it penalizes spending when the debt-to-GDP ratio exceeds the target, but this penalty can vary according to the level of the debt-to-GDP ratio. So we have

$$G_t = \widetilde{G}_{t-1}\left(1+\pi_t^e\right)\left(1+\gamma_t^e\right)\left(1-\lambda(\widetilde{b}_t)\log\left(\frac{\widetilde{b}_t}{\overline{b}}\right)\right)$$

where π_t^e and γ_t^e are respectively the expectations of the government in $t-1$ for the values of the inflation in t and the growth rate of the potential output between $t-1$ and t. To anchor this public expenditure dynamics on the long-term sustainable expenditure level (see section 2.1), we define $\widetilde{G}_{t-1} = G_{t-1}^{\rho} G^{1-\rho}$, with $\rho \in (0,1)$ and $G = z_{t-1}p_{t-1}g$, where z_{t-1} and p_{t-1} are respectively the technology and the price levels at time $t-1$. This restriction is necessary in order to ensure that the government expenditures converge toward their long-term sustainable level, ie. $g_t = g$. This constraint must then be introduced in an analysis focusing on the sustainability of the public debt. This fiscal rule can then be written

$$\log(g_t) = \rho\log(g_{t-1}) + (1-\rho)\log(g) - \lambda(\widetilde{b}_t)\log\left(\frac{\widetilde{b}_t}{\overline{b}}\right) + (\gamma_t^e - \gamma_t) + (\pi_t^e - \pi_t) \tag{2}$$

Contrary to equation (1), public expenditure rule (equation (2)) depends on surprises on inflation and potential output growth. The government's expectations for inflation and potential growth can be biased, ie. based on a model not necessarily consistent with the expectations that would come from the model of the private sector. At the opposite, if the government expectations are not biased, then $\pi_t^e = \mathbb{E}_{t-1}\pi_t$ and $\gamma_t^e = \mathbb{E}_{t-1}\gamma_t$, meaning that the government use the same model than the private agents to determine its expectations.[5] If the inflation is lower in the government expectations, then the

[5] From an historical perspective, the introduction of biased expectations has often been used in the Keynesian models. The new Keynesian macroeconomics gives up this inconsistency, what seems to be in accordance with empirical analysis.

fiscal rule generates an increase of the government spending. This can be a stabilizing property in the case of a recession driven by an unexpected negative demand shock. At the opposite, an unexpected recession caused by a negative supply shock will be magnified by this fiscal rule.[6] The debt gap at its target level plays a variable role, which allows staggering efforts:

$$\lambda(\widetilde{b}_t) \quad = \quad \begin{cases} \lambda_1 & \text{if} \quad \widetilde{b}_t \geq 100\% \\ \lambda_2 & \text{if} \quad 90\% \leq \widetilde{b}_t < 100\% \\ \vdots & \vdots \quad \vdots \\ \lambda_6 & \text{if} \quad 55\% \leq \widetilde{b}_t < 60\% \\ \lambda_7 & \text{if} \quad \widetilde{b}_t < 55\% \end{cases}$$

Compare two strategies for the sequence of λ_i.

- **A fiscal rule with long-term adjustments.** If the λ_i, for $i = 1, 2, 3, 4$, are low while the λ_i, for $i = 5, 6, 7$, are strong, the effect of the public expenditure gap between current and targeted debt is greatly reduced when the debt is high (a small slowdown in public spending when the debt is high). But the brake that grows for small differences between current and targeted debt comes and then introduce a strong consolidation when the debt is low. It then seems intuitive that this scenario "confiscates" the government's fiscal tool for a very long time, and puts the risk of never reducing the debt: public expenditure is always slowed down because the magnitude of the gap between current and targeted debt plays its role as a brake at the beginning of the adjustment, even if it is amortized by low values of λ_i, and when this gap is reabsorbed, it is amplified by a harder brake (high value of λ_i).

- **A fiscal rule with short-term adjustments.** If the λ_i, for $i = 1, 2, 3, 4$, are strong while the λ_i, for $i = 5, 6, 7$, are weak, the brake played by the difference between current and targeted debt is amplified when the debt is high (a sharp slowdown in public spending when the debt is high). Then this brake that the debt gap on its target plays is amortized by a more flexible rule. This allows the government to recover the fiscal instrument after a period of fiscal consolidation. These short-term efforts make it possible to influence an ever-increasing debt trajectory (no inflection is possible without a budget balance above the stabilizing balance in the short term).

Given that the problem of the fiscal rule mainly concern the middle and the long run adjustments toward a sustainable budget policy, we first propose deterministic simulations of the model where the initial condition is the vector of endogenous variables that matches the last point of the model estimation.[7] In this deterministic endowment, the gaps between expected and current values of inflation and growth rate of the potential output do not matter because the forecasts are perfect.

The figure 3 presents the adjustments of the French economy according to three scenarios: *(i)* a scenario "without rule" where the past practices are not modified, fixing then the budgetary choices on the estimation of the equation (1), *(ii)* a scenario where the fiscal rule described in the equation (2) is adopted with a short-term adjustment strategy, ie. where the hardness of the rule is stronger when the debt is high ($\lambda_1 > \lambda_2 > ...$).[8] and finally *(iii)* a scenario where the fiscal rule is adopted but with

Indeed, various international organizations (in particular the central banks) show that there is less and less gap between the announcements of the governments expectations and the forecasts of the models with rational expectations.

[6] Remark that this destabilizing property of the fiscal rule with respect to the supply shocks is not true for the supply shocks that change transitory the growth rate of the potential output. Indeed, for this type of shock, $\gamma_t^e - \gamma_t > 0$ can overcompensate $\pi_t^e - \pi_t < 0$.

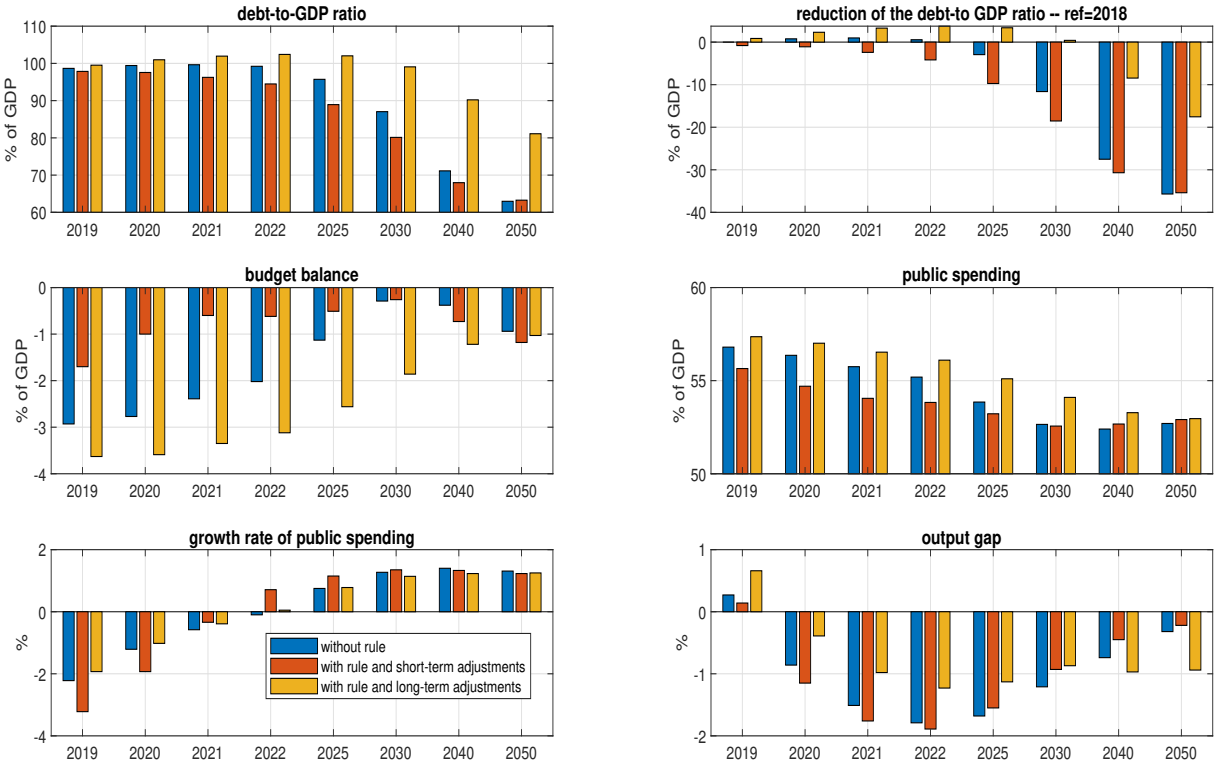
[7] In order to be transparent, we do not introduce new information on the exogenous variables during our forecast. This could allow us to match some particular targets, such as the expected GDP growth rate or the expected inflation. But, this exercise is more relevant from the perspective of a short term forecast, and subject to the choice of the scenario for the future of the endogenous variables.

[8] In the scenario with "rule and short-term adjustments", the values of λ_i are

λ_1	λ_2	λ_3	λ_4	λ_5	λ_6	λ_7
$\widetilde{b}_t \geq 100\%$	$90\% \leq \widetilde{b}_t < 100\%$	$80\% \leq \widetilde{b}_t < 90\%$	$70\% \leq \widetilde{b}_t < 80\%$	$60\% \leq \widetilde{b}_t < 70\%$	$55\% \leq \widetilde{b}_t < 60\%$	$\widetilde{b}_t < 55\%$
0.012	0.0084	0.006	0.0048	0.0048	0.0036	0.006

a strategy where the debt reduction effort is pushed back in time, which results in a less severe brake when the gap between the current debt and the targeted debt is high ($\lambda_1 < \lambda_2 < ...$).[9]

Figure 3: Simulation results



Result 2a. In France, when the budget brake is strong if the current debt is far from its target, then low if this gap weakens, the deleveraging is continuous (contrary to the other scenarii, this strategy avoids the oscillations of the debt-to-GDP ratio) and the target of 60% of the GDP is reached in 2050.

Result 2b. The fiscal rule with short-term adjustments induces output losses lower than the other strategies (the fiscal rule with long-term adjustments or the lack of reforms). The cumulative sum of the negative output gaps is smaller than 5 points with this rule.

The introduction of a rule requiring a short-term adjustment makes it possible to increase the reduction of the debt-to-GDP ratio compared to the scenario "without a rule", by 0.8 point in 2019, -1.9 point in 2020, -3.3 points in 2021 and -6.8 points in 2025. In order to obtain a turning point in the evolution of the French debt, the introduction of this rule makes it possible to sharply reduce the public deficit, which is allowed thanks to a strong reduction in the short term of public expenditure in GDP: compared to the scenario "without rule", this policy reduces by 1.3 point in 2019, 1.8 point in 2020, 1.7 point in 2021 and 1 point in 2025, but this share then becomes 0.6 point higher in 2040. There is a cost in terms of GDP growth. Between 2019 and 2020, the budgetary consolidation (reduction of the public deficit) represents a share of 0.7% of the GDP, which widens the output gap of 1.3 point (the instantaneous multiplier is thus equal to 1.85). Between 2020 and 2021, the consolidation effort continues with 0.4 GDP point, widening the output gap by 0.6 point. From 2023, the consolidation effort is sharply reduced, allowing to close up gradually the output gap. In the medium term, as the brake is reduced

[9] In the scenario with "rule and long-term adjustments", the values of λ_i are

λ_1	λ_2	λ_3	λ_4	λ_5	λ_6	λ_7
$\widetilde{b}_t \geq 100\%$	$90\% \leq \widetilde{b}_t < 100\%$	$80\% \leq \widetilde{b}_t < 90\%$	$70\% \leq \widetilde{b}_t < 80\%$	$60\% \leq \widetilde{b}_t < 70\%$	$55\% \leq \widetilde{b}_t < 60\%$	$\widetilde{b}_t < 55\%$
0.0002	0.0003	0.0036	0.0042	0.0072	0.0120	0.0060

as well as the debt, the growth of public expenditure can resume (+1.12% in 2025), which supports the GDP, the output gap being always lower than that of the scenario of reference.

Without this fiscal rule, the debt would increase in the short term, falling below 90% in 2028, and still 87% in 2030, the target of 60% being attained by 2055. Even though the results on the debt remain modest, they have a cost in terms of production. Indeed, with a debt that persists to high levels, the reduction in public spending should extend until 2023. The inflection of the debt dynamics is not allowed because of a public balance remaining very negative (below -1 % until 2025), strongly influenced by the too small reduction of public expenditure. Past budget practices therefore suggested postponing the inflection of debt dynamics after 2025, when production losses became more important in this scenario.

It is possible, thanks to the flexibility of the proposed fiscal rule, to postpone even more the effort required to influence the dynamics of the debt: this is the scenario with "rule and long-term adjustments". In this case, the rule with a brake is less severe when the gap between the current debt and the targeted debt is high ($\lambda_1 < \lambda_2 < ...$). The fiscal restraint effect needed to alter the debt trajectory then rests entirely on the size of the debt gap. By moderating the effect of this brake today, when the debt is high, so we push the consolidation effort tomorrow. The debt-to-GDP ratio is still 99% in 2030, 17.42 points higher than in the scenario where the brake falls with the level of debt (scenario with "rule and short-term adjustments"). The speed of the decline in the debt-to-GDP ratio is therefore very slow; it even leads to an increase in the debt-to-GDP ratio until 2025. This scenario repels the decline in the share of public expenditure in GDP. This postponement of consolidation does not prevent the shift of production below its potential level. The surplus of production compared to the scenario with "rule and short-term adjustments", in 2019 and 2020, has a cost: as the debt persists at high levels, the brake also persists, thus depriving the government of a return to a public expenditure comparable to that of the scenario where the brake falls with the level of debt. This scenario condemns France to the greatest losses in production after 2030, when the debt begins to fall.

To summarize these results, the fiscal rule with short-term adjustments allows the government to reach the debt target with a cost measured by the not discounted sum of output gaps (negative) between 2019 and 2050 equal to -25 points. With the two other strategies, the sum of the output gaps are equal to -30 points. Let us notice that the fiscal rule with long-term adjustments does not reach the debt target and the negative output gap will persist after 2050.

These results thus show that the short-term costs associated with debt reduction are a necessary evil to find tomorrow an effective budgetary tool for growth.

Short-term implications of the fiscal rule: does it generate counter-cyclical public spending? Figures 4 and 5 show how the French economy responds to a demand shock (negative change in the nominal interest rate)[10] or a supply shock (positive change in the efficiency of the technology).[11] These shocks hit the economy in 2019Q1, along the adjustment path. We compare the case where the fiscal rule is not adopted to the one where the reform introduces a budget brake that decreases when the debt is reduced (scenario with "rule and short-term adjustments").

Following a demand shock (see figure 4), rising inflation lowers public spending because the rule ensures nominal growth based on expected inflation. Even as GDP grows, the sharp initial drop in public spending reduces its share of GDP. After two years, the impact of inflation surprises on government expenditure disappears, and the higher reduction of the debt induced by these two first periods of budgetary contraction damps the debt brake. Some additional margins are thus been found in the middle term with the rule. The response of public expenditure to inflation reduces the impact of the positive demand shock on activity compared to the economy without a fiscal rule. The rule is therefore stabilizing following a demand shock.

Following a supply shock (see figure 5), the fall in inflation is a potential force that can increase public spending and thus amplifies the impact of the supply shock: the rule is therefore destabilizing in this case. However, this mechanism seems to be dominated, even in the short term by the sharp decline in the debt, which allows, through the reduction of the brake, to increase sustainable public

[10] The size of the shock is equal to its estimated standard deviation 4.68×10^{-4}.
[11] The size of the shock is equal to its estimated standard deviation 3.090×10^{-3}.

Figure 4: Impact of a demand shock: fall in the interest rate

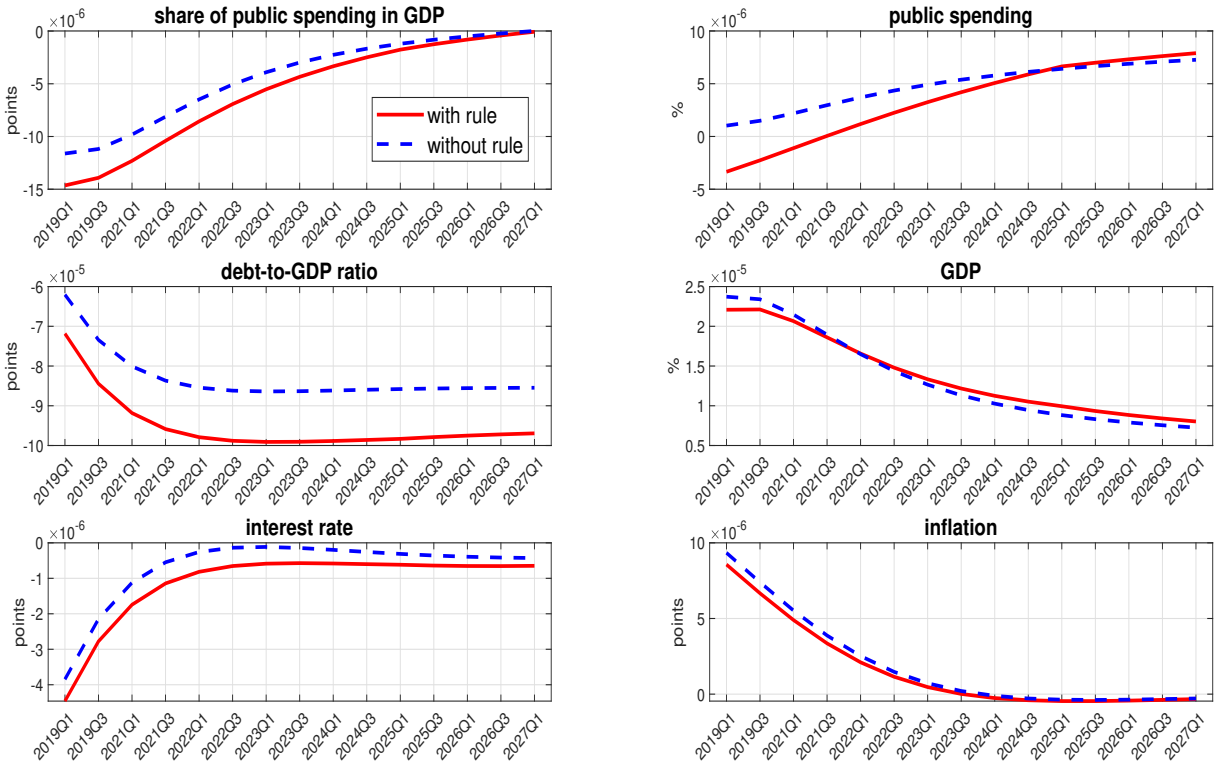
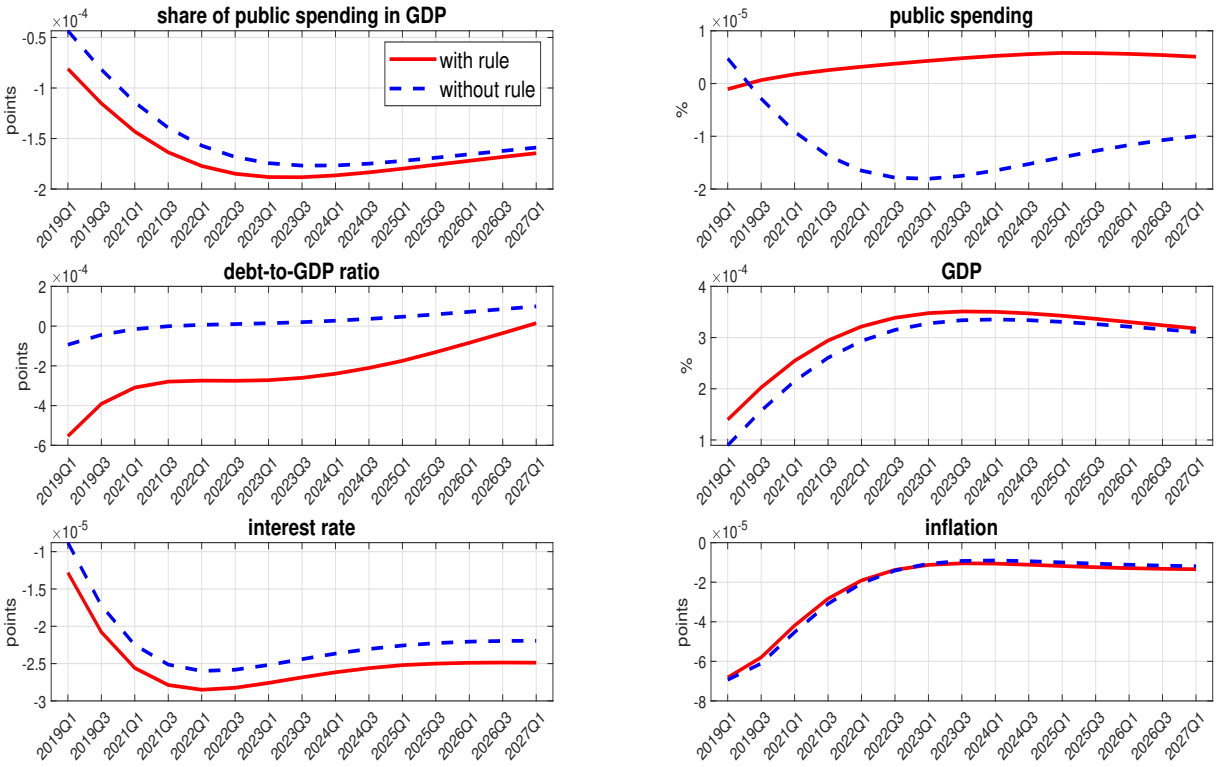


Figure 5: Impact of a supply shock: increase in the efficiency of technology



spending. Note that the share of public spending in GDP remains countercyclical with this new rule, as would be the case if we don't change past practices.

4 Conclusion

In this study, the budget rule deals equally with all components of public spending (government consumption and investment, transfers, and other types of expenditures). It is clear that each of these positions does not contribute in the same way to the efficiency of production, to the welfare of households or to social justice. As shown in figure 6, France is characterized by increases in general government consumption and transfers that did not decline after the crisis. In Germany, transfers fell (dividends from structural reforms that reduced the share of health, retirement and unemployment insurance expenditures in GDP), while general government consumption remained stable after the crisis. In Italy and Spain, the fiscal effort has been on government consumption, with transfers remaining high. Such an analysis of the adjustments specific to each item of public expenditure would suggest priorities if France wishes to reduce its public expenditure.

Figure 6: Composition of public expenditure