Fiscal Rules with a Financial Stability Fund

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Motivation

New Fiscal Rules build on Covid experience with escape clause. Since then,

- Debt situation not as bad as originally thought
- Fiscal pressure is getting larger (e.g. defence expenditure, competitiveness gap, and many other)

Escape clause appear the instrument of choice to deal with additional fiscal needs, even if some are not temporary (e.g. defence)

- Escape clause only delay the adjustment, and their activation rely on a vague debt sustainability check which relies on future commitment
- That risks to undermine the credibility of new framework from the start

Motivation

A fiscal rule system is arguably the best thing we can do to keep debt safe (or as some literature has argued, to align the incentive between Member States and the Union)

The long debate around SGP reflects lack of commitment and difficulty to enforce fiscal rules

- Do not have a theory to inform the design of rules
- Neither we have a framework to test compliance

Research Questions

If Fiscal Rules provide Union-wide benefits not internalized by the government

- How can we maximize the ability of Member States to respond to shocks while guaranteeing compliance with the rule? $\Rightarrow$ Theory of optimal fiscal stabilization

- Can a properly designed stabilization function enforce compliance and restore credibility?
  (e.g.rules are a pre-condition for TPI or ESM precautionary-lines)

So far no economic framework to think about these questions

Background

Part of a broader research agenda on the design of a Financial Stability Fund (FSF) to reduce countries' risks and make debt sustainable and safe.

Previous work characterizes the Fund Contract – the main instrument of the FSF – as a

- Constrained-efficient state-contingent contract between an impatient sovereign borrower and a lender/insurer, which maximizes the utility of the sovereign while ensuring that there is never sovereign's default or lender's expected losses.
- *Optimal Policy*: Front-load consumption and increase debt until borrower has incentive to stay in the contract

What is new?

- Trade-off between borrower's impatience and the necessity to satisfy a fiscal rule
- *Optimal policy*: Limit consumption until the debt target reached

This Paper

1. Introduce a fiscal rule in a canonical sovereign default model (benchmark IMD)
   - Self-fulfilling crises
   - Compliance is low unless penalty counterfactual and only close to default threshold
2. Theory of optimal design of Fiscal Stability Fund with a Fiscal Rule:
   - Contract between sovereign and risk neutral Fund subject to two sided Limited Enforcement.
   - Fiscal Rule as an additional LE constraint.
3. Welfare comparison

Fiscal Rule

Simple (but general) Fiscal Rule

$$s_t(\theta_t) \geq \underbrace{\alpha_d \bar{s}_t + (1-\alpha_d) s_{t-1}}_{target\ \ surplus} + \underbrace{\alpha_b(\bar{\omega}_t - \bar{\bar{\omega}})}_{debt\ \ feedback} + \underbrace{\alpha_y(\theta_t - \bar{\theta}) f(n(\bar{\theta}))}_{cyclical\ \ adjustment}$$

.

With Fund, liabilities can be decomposed in a *debt* and *insurance* component:

$$\omega_t = \bar{\omega}_t(\theta_{t-1}) + \hat{\omega}_t(\theta_t) \quad \text{with} \quad \mathbb{E}\left[q(\theta_{t+1})\hat{\omega}(\theta_{t+1})\right] = 0$$

⇒ From the sovereign's budget constraint: $\bar{s} = (1-q)\bar{\omega} + \hat{\omega}_t$

Fiscal Rule I

Set $\alpha_d = 0, \alpha_y = 0$

In an incomplete market economy

$$s_t(\theta_t) \geq (1-q)\bar{\omega}_t + \alpha_b(\bar{\omega}_t - \bar{\bar{\omega}})$$

.

In a Fund economy

$$s_t(\theta_t) \geq (1-q)\bar{\omega} + \alpha_b(\bar{\omega}_t - \bar{\bar{\omega}}) + \hat{\omega}$$

.

$\hat{\omega}$ takes care of cyclical stabilization

Fiscal Rule as a constraint to the Fund

The Fund looks forward and sets future primary surplus (hence insurance contracts) so that the sovereign can *best* satisfy the rule

$$s_t(\theta_t) \geq (1-q)\bar{\omega} + \alpha_b(\bar{\omega}_t - \bar{\bar{\omega}}) + \underbrace{s_t(\theta_t) + \mathbb{E}\left[\sum_{j=t+1}^{\infty} q(\theta_j \mid \theta_t) s(\theta_j) \mid \theta^t\right] - \bar{\omega}}_{\hat{\omega}}$$

.

$$\bar{\omega}_{t+1} = \mathbb{E}\left[\sum_{j=t+1}^{\infty} q(\theta_j \mid \theta_t) s(\theta_j) \mid \theta^t\right]$$

General Setting

- Small open economy in infinite discrete time:
  1. One risk neutral lender (i.e. the Fund) with discounting $\frac{1}{1+r}$.
  2. Risk averse sovereign borrower with discounting $\beta < \frac{1}{1+r}$ and additive separable utility.
- Sovereign borrower is a benevolent government:
  - Production technology $y = \theta f(n)$ where θ follows a Markov chain of order 1, $\pi(\theta'|\theta)$.
- No commitment (Arellano 2008)

Limited Enforcement

- Borrower cannot commit to repay (IMD economy) or stay in the (Fund) contract:
  - Outside option $V^o(s)$ given by default value in **?**.
  - Default output cost $\theta^D \leq \theta$ and fixed re-access probability $\lambda \geq 0$.
  - Violating fiscal rules imply a cost $\theta^P \leq \theta$.
- Fund admits permanent losses up to $Z \leq 0$:
  - Whenever $Z < 0$, the Fund allows for permanent transfers across contracts.
  - We will set $Z = 0$ meaning no permanent transfers.

Fund contract

The Fund contract with a fiscal rule (FC-FR) is the solution to the following problem:

$$\max_{\{c(\theta^t),n(\theta^t)\}_{t=0}^{\infty}} \left\{ \mathbb{E}\left[\mu_{b,0} \sum_{t=0}^{\infty} \beta^t U(c(\theta^t), n(\theta^t)) + \mu_{l,0} \sum_{t=0}^{\infty} \left(\frac{1}{1+r}\right)^t (\theta_t f(n(\theta^t)) - c(\theta^t)) \mid \theta_0 \right] \right\}$$

$$\text{s.t. } \mathbb{E}\left[\sum_{j=t}^{\infty} \beta^{j-t} U(c(\theta^j), n(\theta^j)) \middle| \theta^t \right] \geq V^d(\theta^t), \tag{1}$$

$$\mathbb{E}\left[\sum_{j=t}^{\infty} \left(\frac{1}{1+r}\right)^{j-t} \left(\theta_j f(n(\theta^j)) - c(\theta^j)\right) \mid \theta^t \right] \geq \theta_{t-1} Z, \tag{2}$$

$$(q(x_t, \theta_t) - \alpha_b)\,\bar{\omega}(\theta^{t-1}) + \alpha_b \bar{\bar{\omega}}_b \geq \mathbb{E}\left[\sum_{j=t+1}^{\infty} Q(x_j, \theta_j \mid \theta_t) \left(\theta_j f(n(\theta^j)) - c(\theta^j)\right) \mid \theta^t \right] \tag{3}$$

$$\mathbb{E}\left[\sum_{j=t+1}^{\infty} Q(x_j, \theta_j \mid \theta_t) \left(\theta_j f(n(\theta^j)) - c(\theta^j)\right) \right] \geq q(x_t, \theta_t)\bar{\omega}\prime(\theta^t), \tag{4}$$

for all $(t, \theta^t), t \geq 0,$ with $\mu_{b,0},\ \mu_{l,0}$ given,

Quantitative analysis - Transition from 100 percent Debt-to GDP

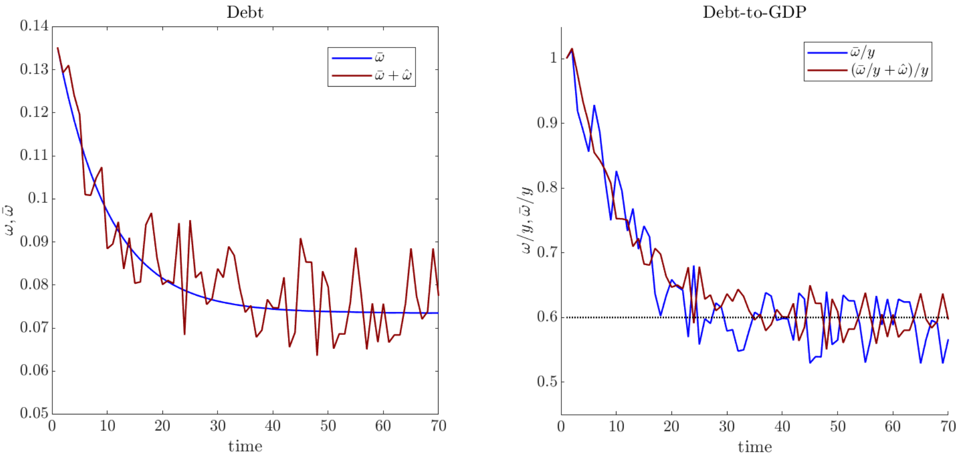
Productivity shock θ_t follows a Markov regime switching AR(1) process calibrated to the sample productivity series of Italy during the period 1992 to 2019

	$\mu(\varsigma)$	$\rho(\varsigma)$	$\sigma(\varsigma)$	Π	$\varsigma' = 1$	$\varsigma' = 2$	invariant dist.
$\varsigma = 1$	-0.0336	0.9018	0.0009	$\varsigma = 1$	0.6633	0.3367	0.0372
$\varsigma = 2$	0.0009	0.2167	0.0020	$\varsigma = 2$	0.0130	0.9870	0.9628

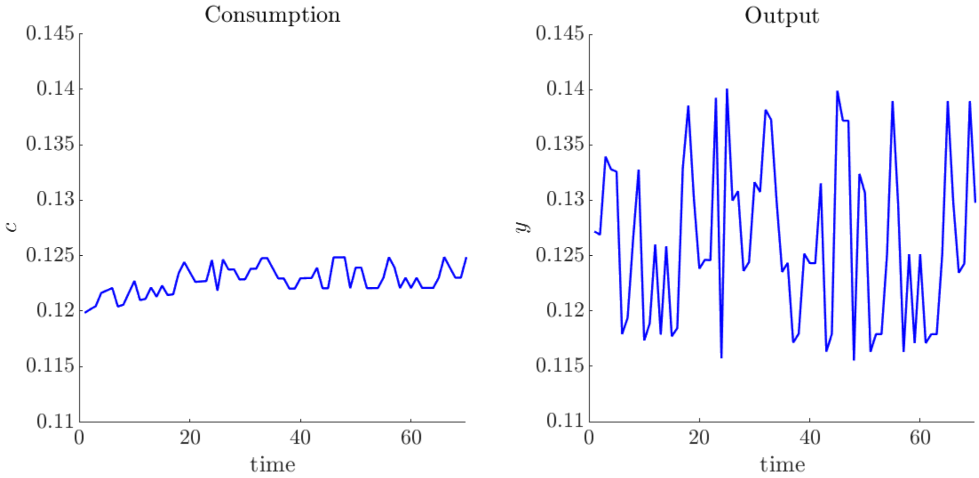
Calibration

Parameter	Value	Definition	Targeted Moment
A. Direct measures from data			
α	0.5295	labor share	labor share
r	0.0132	risk-free rate	annual real short-term rate
δ	0.839	bond maturity	bond maturity
κ	0.2172	bond coupon rate	bond coupon rate
B. Based on model solution			
β	0.97	discount factor	average b/y
d_0	-0.297	productivity penalty	average spread
d_1	2.195	productivity penalty	corr(τ/y, y)
ϱ	0.004	probability $\rho = 1$	corr(spread, y)
λ	0.054	return probability	$\sigma(\tau/y)/\sigma(y)$
ζ	0.2	labor elasticity	$\sigma(n)/\sigma(y)$
ξ	1.275	labor utility weight	average n
C. By assumption			
Z	0	Fund's outside option	

Exploring the mechanism



Exploring the mechanism



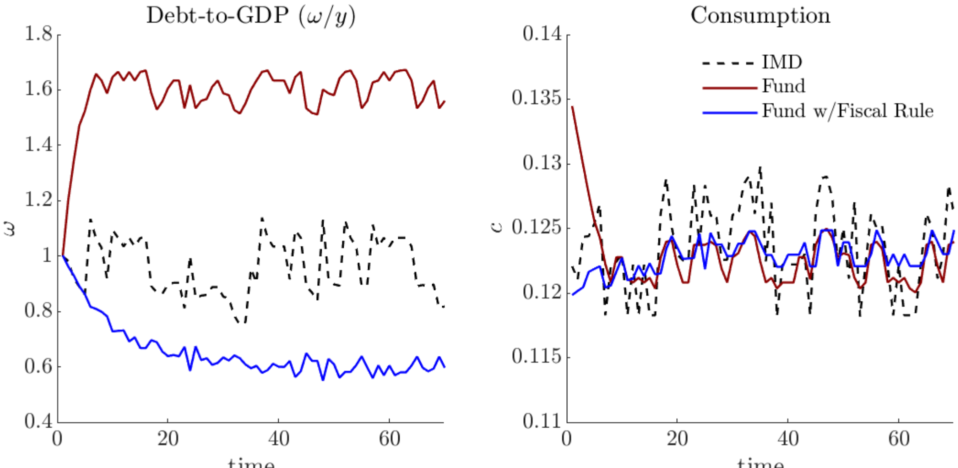
$$\sigma(c)/\sigma(y) = 0.3079$$

Welfare comparison

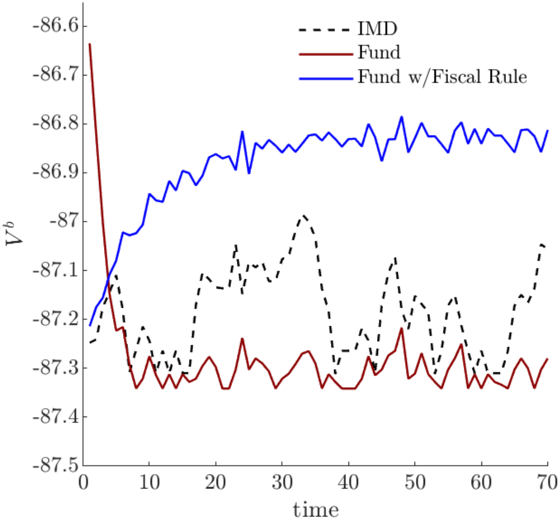
Two benchmarks:

- Incomplete Market Economy with default and a fiscal rule
  - Failure to comply with a fiscal rule causes an output cost (0.5 % of GDP)
  - Despite the high cost, compliance is low (about 13% of the time)
- Unconstrained Fund

Dynamic of debt and consumption



Welfare



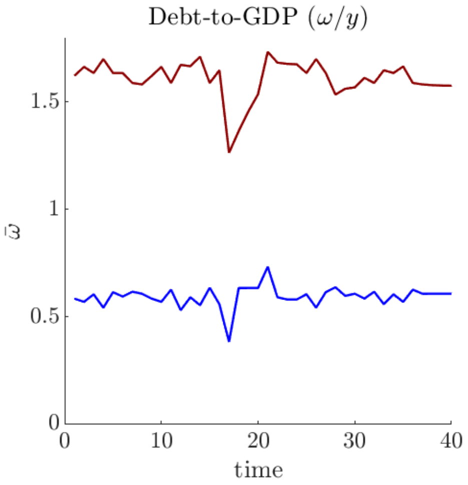
IMD
Fund
Fund w/Fiscal Rule
-86.6
-86.7
-86.8
-86.9
-87
-87.1
-87.2
-87.3
-87.4
-87.5
V^b
0
10
20
30
40
50
60
70
time

Welfare comparison between IMD and Fund with fiscal rule at 100% and 60% Debt-to-GDP

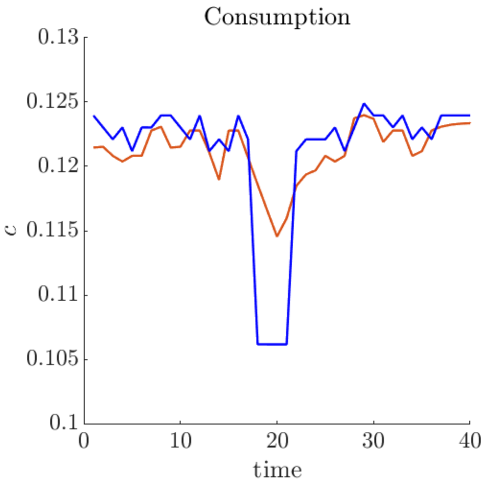
	IMD	Fund ($\theta_{t-1} = L$)	Fund ($\theta_{t-1} = M$)	Fund ($\theta_{t-1} = H$)	
$\theta_t = L$	-87.94	-87.56	-87.08	-87.06	-
$\theta_t = M$	-87.24	-87.52	-86.94	-86.90	
$\theta_t = H$	-87.22	-87.60	-87.01	-86.97	

	IMD	Fund ($\theta_{t-1} = L$)	Fund ($\theta_{t-1} = M$)	Fund ($\theta_{t-1} = H$)	
$\theta_t = L$	-87.56	-87.30	-86.89	-86.87	-
$\theta_t = M$	-86.82	-87.18	-86.68	-86.64	
$\theta_t = H$	-86.80	-87.25	-86.73	-86.69	

Tail events



Debt-to-GDP (ω/y)
$\bar{\omega}$
1.5
1
0.5
0
0
10
20
30
40
time



Consumption
c
0.13
0.125
0.12
0.115
0.11
0.105
0.1
0
10
20
30
40
time

Model comparison

Variables	Targeted	Data	IMD	IMD w/rule	Fund	Fund w/rule
A. First moments						
b'/y (%)	×	117.64	118.1	111.00	145.89	60.00
n (%)	×	38.64	38.46	38.20	39.07	38.03
Spread (%)	×	2.50	0.43	0.12	-	–
B. Second moments						
std(c)/std(y)		1.27	0.91	0.86	0.17	0.31
std(($y-c$))/std(y)	×	1.09	1.42	1.24	0.89	0.95
std(spread)		0.96	0.20	0.08	-	-
corr(c, y)		0.53	0.91	0.63	0.63	0.32
corr(n, y)		0.68	0.71	0.56	0.99	0.95
corr(($y-c$)/y, y)	×	0.29	0.42	0.34	0.96	0.94
corr(spread, y)	×	-0.16	-0.42	-0.44	-	-

Conclusions

This paper provides a theory of optimal fiscal stabilization in presence of a fiscal rule.

Fiscal rules are *self-enforcing* as the Fund contract is subject to limited enforcement constrains:

- Framework to analyze the *optimal design* of fiscal rules (and escape clauses)
- Supports the view that properly designed Institutional programmes could act as enforcing mechanism.