Fiscal Rules and the Sovereign Default Premium

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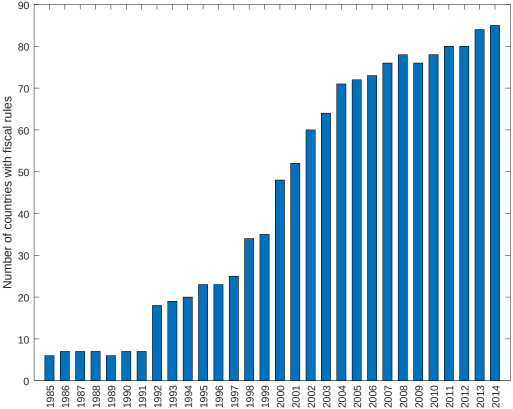
1. Motivation

Anchors and “prices vs. quantities”

- Fiscal policy frameworks do not have an anchor that improves commitment to future policies (unlike frameworks used for monetary analysis; Leeper, 2010).
- Are prices or quantities the best planning instrument under heterogeneity and uncertainty (Weitzman, 1974; Poole, 1970, for monetary policy)?

Fiscal rules could provide fiscal anchors

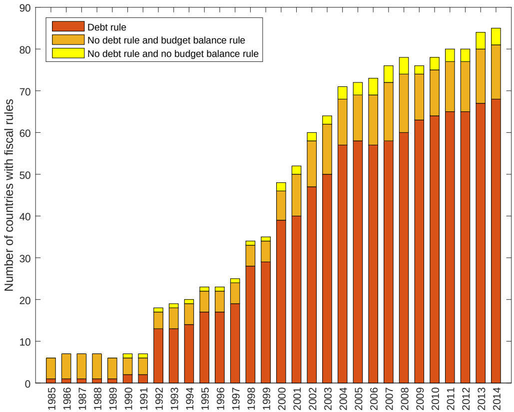
A large and increasing number of countries have fiscal rules with numerical targets.



Effects of fiscal rules: evidence

- Decreases the interest rate at which governments borrow:
  - National governments: Thornton and Vasilakis (EI, 2017), Iara and Wolf (EJPE, 2014).
  - US states: Eichengreen and Bayoumi (EER, 1994), Poterba and Rueben (1999, JUE 2001).
- Increase primary fiscal balances: DeBrun et. al. (EP, 2008), Deroose, et.al. (2008).
- Higher expenditure cuts to unexpected deficits in US states with stricter rules: Poterba (JPE, 1994).

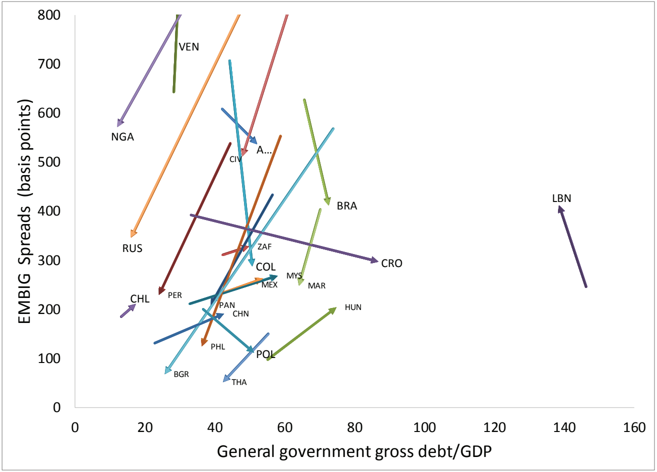
Most fiscal rules target debt levels



What is the optimal debt level?

- Blanchard (IMFdirect 2011): "Are old rules of thumb, such as trying to keep the debt-to-GDP ratio below 60 percent in advanced countries, still reliable?"
- The Fiscal Monitor (2013): "The optimal-debt concept has remained at a fairly abstract level... adjustment needs scenario has used benchmark debt ratios of 60 percent of GDP... But the appropriate debt target need not be the same for all countries..."
- Eberhardt and Presbitero (JIE 2015): impossibility of finding common debt thresholds across countries for the relationship between debt levels and long-run growth.

Debt intolerance (Reinhart et al., 2003)



This paper

- Substantial gains from a fiscal anchor.
- Debt brake vs. spread brake: a debt (spread) brake imposes a limit on the fiscal balance when the sovereign debt (spread) is above a threshold.
- The sovereign spread outperforms the debt level as the fiscal anchor.
    1. Better common anchor (EU).
    2. More robust anchor/policy advice (Croatia?).
    3. Could improve ownership/credibility/commitment.

2. Three-period model

Environment

- y_t = Income in period t .
  - $y_1 = y_2 = 0, \quad y_3 > 0$ and stochastic.
- A government makes its decisions on a sequential basis and solves
  - $V_3 = \underset{c_3 \geq 0}{\text{Max}}\ u(c_3)$ at $t = 3$. $V_2 = \underset{c_2 \geq 0}{\text{Max}} \{u(c_2) + \beta \mathbb{E} V_3\}$ at $t = 2$.
  - $V_1 = \underset{c_1 \geq 0}{\text{Max}} \{u(c_1) + \beta V_2\}$ at $t = 1$.
- $u' > 0, u'' < 0$, and $u'(0) = \infty$.
- Bonds issued at $t = 1$ pay $(\delta, 1 - \delta)$ at $t = (2, 3)$.
- Cost of defaulting:
  - Lose fraction ϕ of y_3.
  - $+\infty$ for $t = 1$ or $t = 2 \Rightarrow$ no default in first two-periods
- Lenders have a discount factor = 1, are risk-neutral, and atomistic.

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Equilibrium decision at $t = 3$

- b_t = number of bonds issued by the government at t.
- Government's problem at $t = 3 : V_3(b_1, b_2, y_3) = \underset{d}{\text{Max}}\, u(c_3)$:

$$\text{with } c_3 = \begin{cases} y_3 - b_1(1-\delta) - b_2 & \text{if } d = 0, \\ y_3 - \phi y_3 & \text{if } d = 1. \end{cases}$$

- Default in period 3 if $b_1(1-\delta) + b_2 > \phi y_3$:

$$\hat{d}(b_1, b_2, y_3) = \begin{cases} 1 & \text{if } y_3 < \frac{b_1(1-\delta)+b_2}{\phi}, \\ 0 & \text{otherwise.} \end{cases}$$

- A model with non-strategic defaults in which the government can pledge up to ϕy_3 to its creditors $\Rightarrow$ same default rule.

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Bond pricing equations

- Bond price menu at $t = 2$:

$$q_2(b_1, b_2) = \underbrace{\left[1 - F\left(\frac{b_1(1-\delta) + b_2}{\phi}\right)\right]}_{\text{Repayment prob. at } t=3}$$

$F =$ c.d.f. of y_3.

- Bond price menu at $t = 1$:

$$q_1(b_1, b_2) = \underbrace{\delta}_{\substack{\text{Sure repayment} \\ \text{at } t=2}} + (1-\delta)\underbrace{\left[1 - F\left(\frac{b_1(1-\delta) + b_2}{\phi}\right)\right]}_{\text{Repayment prob. at } t=3}$$

- Debt tolerance increases with ϕ.
- Higher $\phi \Rightarrow$ higher bond prices.

Optimal policies

- Ramsey policies: sequence of borrowing that maximizes the government's expected utility in period 1, given the default rule of the period 3 government.

- Markov policies: sequence of borrowing chosen sequentially by the governments in periods 1 and 2.

Time inconsistency (debt dilution)

Proposition

Suppose $\delta < 1$; i.e., the government issues long-term debt in period 1.

Then, Markov policies and Ramsey policies do not coincide.

Why?

- The period 2 Ramsey policy satisfies

$$u'\left(c_2^R\right)\left[q_2(b_1^R, b_2^R) + b_2^R \frac{\partial q_2(b_1^R, b_2^R)}{\partial b_2}\right] =$$
$$\beta \int_{\frac{b_1^R(1-\delta)+b_2^R}{\phi}}^{\infty} u'\left(c_3^R(b_1, y_3)\right) f(y_3) dy_3 - u'\left(c_1^R\right) b_1^R \frac{\partial q_1(b_1^R, b_2^R)}{\partial b_2}.$$

- But the period 2 Markov strategy satisfies

$$u'\left(c_2^M(b_1)\right)\left[q_2(b_1, b_2^M(b_1)) + b_2^M(b_1) \frac{\partial q_2(b_1, b_2^M(b_1))}{\partial b_2}\right] =$$
$$\beta \int_{\frac{b_1(1-\delta)+b_2^M(b_1)}{\phi}}^{\infty} u'\left(c_3^M(b_1, y_3)\right) f(y_3) dy_3.$$

(Without uncertainty or heterogeneity) Prices = quantities

- Idiosyncratic debt brake imposes a ceiling on the debt level, $(1-\delta)b_1 + b_2 \leq \bar{b}$.
- Idiosyncratic spread brake imposes a ceiling on the spread paid by the government and thus a floor on the sovereign bond price, $q_2(b_1, b_2) \geq \underline{q}$.

Proposition

If the government's choices in period 2 are limited with either a debt brake with threshold $\bar{b}^* = (1-\delta)b_1^R + b_2^R$ or a spread brake with threshold $\underline{q}^* = q_2(b_1^R, b_2^R)$, Markov policies coincide with Ramsey policies.

Optimal "common and robust" fiscal rules

- What if the same rule has to be applied to heterogeneous economies?
- Economies indexed by the vector $\theta \in \{\phi, \beta, \mathrm{f}\}$
- $\mathrm{v}(\mathrm{x};\theta)$ = expected utility in period 1 when the government decides sequentially and is constrained by a fiscal rule with threshold x.
- $\mathrm{h}(\theta)$ = density function for θ in the set.

Constrained Ramsey

1. Common rule under heterogeneity: planner needs to choose the same rule for every economy in set (giving weight $h(\theta)$ to economies with parameter value θ).

2. Robust rule under uncertainty: planner needs to chose a idiosyncratic non-contingent rule for one economy, before uncertainty about the value of the parameter θ is resolved (assigning the likelihood $h(\theta)$ to θ).

- The constrained Ramsey policy X^* maximizes

$$\max_{x} \int v(x;\theta)h(\theta)d\theta.$$

Why a common fiscal rule?

1. Political constraints limits variation of rules across countries.
2. A single economy when the planner is uncertain about the value of the parameter θ and assigns the likelihood $\mathrm{h}(\theta)$ to θ.

Less intolerance => higher Ramsey debt

Proposition

Suppose $u(c) = c$, $\delta = 0$,

$$\zeta_q(b) = \frac{b}{\phi} \frac{f\left(\frac{b}{\phi}\right)}{1 - F\left(\frac{b}{\phi}\right)}$$

is increasing with respect to b, and $\lim_{b \to \infty} \zeta_q(b) \geq 1$. Consider any set of economies that are different only in the value of the cost of defaulting ϕ. Then, Ramsey policies are given by $\{b_1^R = \eta\phi, b_2^R = 0\}$, where $\eta \in \mathbb{R}_{++}$ satisfies

$$1 - \eta \frac{f(\eta)}{1 - F(\eta)} = \beta^2.$$

- Objective of the Ramsey planner at $t = 1$:

$$\max_{c_1, c_2 \geq 0} \left\{ q(b_1 + b_2)b_1 + \beta q(b_1 + b_2)b_2 + \beta^2 \mathbb{E} c_3(b_1, b_2, y_3) \right\}.$$

- When $\beta < 1$, any path $\{b_1, b_2\}$ with $b_2 > 0$ is strictly dominated by $\{b_1 + b_2, 0\} \Rightarrow$ optimal path satisfies $b_1^* > 0, b_2^* = 0$.

$$\begin{aligned}
\text{FOC for } b_1: \quad q(b_1) + b_1 \frac{\partial q(b_1)}{\partial b_1} &= \beta^2 \int_{b_1/\phi}^{\infty} f(y_3) dy_3 \\
1 - F(b_1/\phi) + b_1 \left(-\frac{f(b_1/\phi)}{\phi} \right) &= \beta^2 \left[1 - F(b_1/\phi) \right] \\
1 - (b_1/\phi) \frac{f(b_1/\phi)}{1 - F(b_1/\phi)} &= \beta^2
\end{aligned}$$

- Optimal b_1^* satisfies $\boldsymbol{\zeta}(b_1^* / \boldsymbol{\phi}) = 1 - \boldsymbol{\beta}^2$

- Objective of the Ramsey planner at $t = 1$:

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- The preferred Ramsey planner allocation for each economy features debt $b_1^* + b_2^* = \phi\zeta^{-1}(1 - \beta^2) \Rightarrow$ optimal debt is proportional to ϕ.
  - Optimal debt brake $= \bar{b} = \phi\zeta^{-1}(1 - \beta^2)$ increases with ϕ.
  - Optimal spread brake $= \underline{q} = 1 - F(b_1^*/\phi)$ does not depend on ϕ.

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Common spread brake $\succ$ common debt brake

Proposition

Suppose $u(c) = c$, $\delta = 0$,

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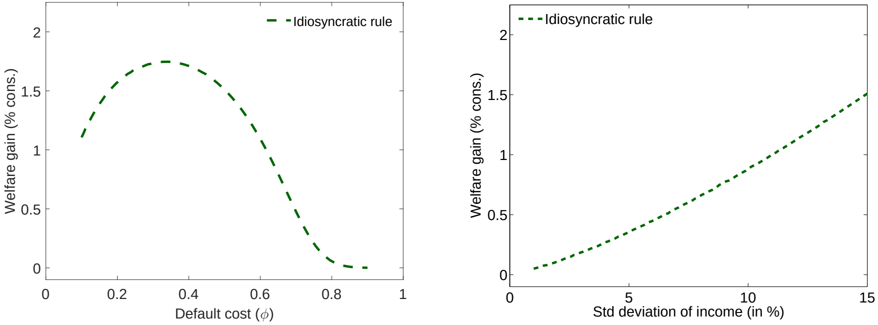
is increasing with respect to b, and $\lim_{b \to \infty} \zeta_q(b) \geq 1$. Consider any set of economies that are different only in the value of the cost of defaulting ϕ. The optimal common spread-brake threshold for any such set is $\underline{Q}^* = 1 - F(\eta)$ and achieves the Ramsey allocation in every economy of the set. Furthermore, $\underline{Q}^*$ generates larger welfare gains than any common debt brake $\bar{B}$.

Numerical example

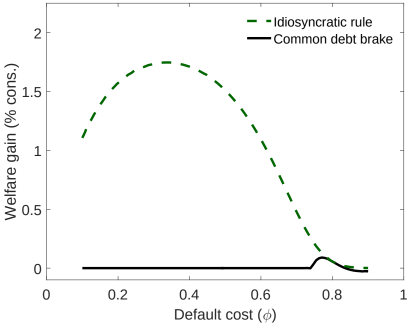
- Assume:
  - $u(c) = -c^{-1}$
  - $\beta = 1$,
  - $\log(y_3) \sim N(0, \sigma_y)$,
  - $\delta = 0$.
- Debt levels between 25 and 169 percent of average period 3 income, spreads between 1 and 12 percent.

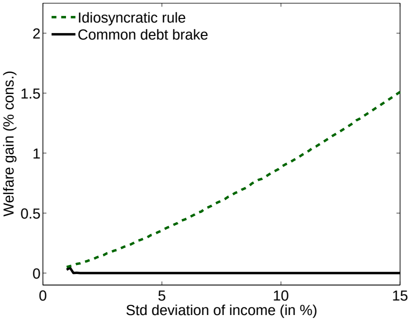
Welfare gains from idiosyncratic rule



Same welfare gains with either optimal idiosyncratic debt brake or optimal idiosyncratic spread brake

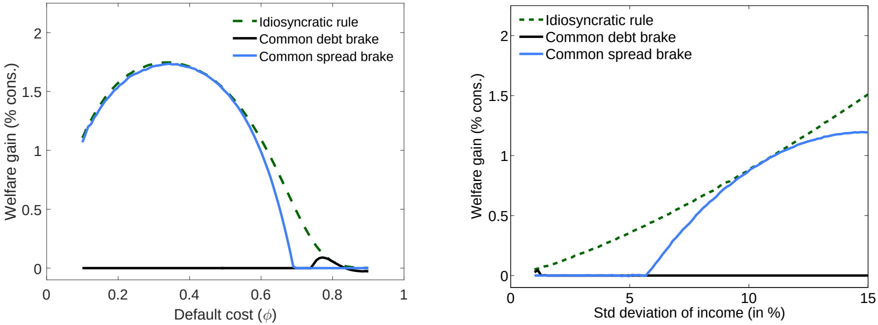
Common debt brake doesn't work well





The optimal common debt brake does not impose an excessive constraint in low-debt-intolerance economies and thus is not binding in most economies.

Common spread brake is better



A relatively low spread threshold still does not impose an excessive constraint in low-debt-intolerance economies but imposes a welfare improving constraint in high-debt-intolerance economies.

3. Quantitative model

1. The no-rule environment

Technology

- Linear technology in labor

$$y = e^{z} l$$

TFP shock z follows a Markov process.

Preferences

- Benevolent government

$$\max \; E_t \left[\sum_{j=0}^{\infty} \beta^j u\left(c_{t+j}, g_{t+j}, l_{t+j}\right) \right]$$

taking into account private consumption and labor decisions.

- g =public consumption.
- Government decides on a sequential basis.

If the government pays its debt obligations

- Issues long-term debt.
  - Bonds are perpetuities with geometrically decreasing coupon obligations
  - Important for the quantitative performance of the model (Hatchondo and Martinez 2009; Chatterjee and Eyigungor 2012).
- Chooses provision of public good: g
- Chooses labor tax: τ

Defaults

- Two costs of defaulting:
  1. Exclusion from credit market for a stochastic number of periods.
  2. Fall in TFP in every period in which the government is in default.
- With constant probability, the government can exit the default by exchanging α new bonds per bond in default (debt restructuring).
- $1 - \alpha =$ haircut
- Chooses g and labor tax τ while in default.

Lenders

- Foreign.
- Risk-neutral (later, same results with shock to the lenders' risk aversion)
- Opportunity cost of lending: risk-free bonds paying r.

Recursive formulation (without fiscal rules)

- Repay/default decision

$$V(b,z) = \max\left\{V^R(b,z), V^D(b,z)\right\}$$

b = debt, z = TFP.

- Value of repaying

$$V^R(b,z) = \max_{b' \geq 0, c \geq 0, g \geq 0, \tau \geq 0} \left\{u\left(c, g, 1-l\right) + \beta \mathbb{E}_{z'|z} V(b', z')\right\},$$

subject to

$$g = \tau e^z l - \delta b + q(b', z)\left[b' - (1-\delta) b\right],$$

$$c = (1-\tau) e^z l,$$

$$l = \hat{l}\left(z, \tau, c, g\right),$$

Value of defaulting

$$
\begin{aligned}
V^D(b,z) &= \max_{c\geq 0, g\geq 0, \tau\geq 0} u\left(c, g, 1-l\right) \\
&+ \beta \mathbb{E}_{z'|z}\left[(1-\xi)V^D(b(1+r), z') + \xi V(\alpha b(1+r), z')\right],
\end{aligned}
$$

subject to

$$g = \tau\left[e^z - \phi(z)\right] l,$$

$$c = (1-\tau)\left[e^z - \phi(z)\right] l,$$

$$l = \hat{l}\left(\log(e^z - \phi(z)), \tau, c, g\right).$$

Bond price

$$
\begin{aligned}
q(b',z)(1+r) &= \mathbb{E}_{z'|z}\left[\hat{d}\left(b',z'\right)q^{D}(b',z')\right.\\
&+ \left.\left[1-\hat{d}\left(b',z'\right)\right]\left[\delta+(1-\delta)\,q(\hat{b}(b',z'),z')\right]\right],
\end{aligned}
$$

$$
\begin{aligned}
q^{D}(b',z)(1+r) &= \mathbb{E}_{z'|z}\left[(1-\xi)(1+r)q^{D}(b'(1+r),z')\right.\\
&\left.+\xi\alpha\left[d'q^{D}\left(\alpha b',z'\right)+\left(1-d'\right)\left[\delta+(1-\delta)\,q(b'',z')\right]\right]\right],
\end{aligned}
$$

where $d' = \hat{d}\,(\alpha b', z')$, and $b'' = \hat{b}(\alpha b', z')$.

Equilibrium concept

- Markov Perfect Equilibrium.
  - Each period the government decides taking as given bond prices and future defaulting, spending, taxing, and borrowing strategies.
  - Current optimal choices are consistent with future government strategies.
  - Bond holders make zero expected profits.
- Limit of finite-horizon economy.

Calibration

- Preferences from Cuadra et. al. (RED, 2010):
  $u(c, g, l) = \pi \frac{g^{1-\gamma_g}}{1-\gamma_g} + (1-\pi) \frac{\left[c - \psi l^{1+\omega}/(1+\omega)\right]^{1-\gamma}}{1-\gamma}$

- TFP process: $z_t = (1-\rho)\,\mu_z + \rho z_{t-1} + \varepsilon_t,$ with $\varepsilon_t \sim N\left(0, \sigma_\epsilon^2\right)$.

- Output loss while in default: $\phi(z) = \max\left\{\lambda_0 e^z + \lambda_1 e^{2z}, 0\right\}$

- 1 period = 1 quarter

Calibration strategy

- Preference parameters for private consumption and leisure decisions: taken from prior literature
- Remaining parameters: based on data from a small-open economy that pays a default premium (Spain).
- $(\delta, \beta, \lambda_0, \lambda_1, \pi, \gamma_g)$ chosen to match: (i) average duration of government debt, (ii) average spread, (iii) average level of government debt, (iv) volatility of c, (v) average level of g, and (vi) volatility of g.

Calibrated without the simulations

Domestic income autocorrelation coefficient	ρ	0.97
Standard deviation of domestic innovations	σ_ϵ	1.04%
Mean productivity	μ_{y}	$(-1/2)\sigma_\epsilon^2$
Risk aversion of private consumption	γ	2
Inverse of labor elasticity	ω	0.6
Weight of labor hours	ψ	$2.48/(1+\omega)$
Risk-free rate	r	0.01
Recovery rate of debt in default	α	0.35
Duration of defaults	ξ	0.083
Minimum issuance price without fiscal rule	$\underline{\mathrm{q}}$	$0.3\bar{\mathrm{q}}$

Calibrated with the simulations

Duration of long-term bond	δ	0.0275
Discount factor	β	0.97
Income loss while in default	λ_0	-0.731
Income loss while in default	λ_1	0.9
Risk aversion for public consumption	γ_{g}	3
Weight of public consumption	π	0.182

Simulations match targets

	Data	No-rule benchmark
Annual spread (in %)	2.0	2.0
Mean debt-to-income ratio (in %)	61.8	61.5
Debt duration (years)	6.0	6.0
Mean g/c (in %)	36.5	36.5
$\sigma(\text{g})/\sigma(\text{y})$	0.9	0.9
$\sigma(\text{c})/\sigma(\text{y})$	1.1	1.1

3. Fiscal rules

Debt brake

$$b' \leq \max\{\bar{b}, (1-\delta)b\}$$

- Find the optimal value for $\bar{b}$.
- We first assume an initial state with mean TFP and no debt (other initial states are also investigated in the paper).

Spread brake

Find the optimal value for $\underline{q}$ in the constraint under repayment:

$$\underbrace{q(b',z)}_{\substack{\text{Price at which}\\\text{bonds are issued}}} \geq \underline{q} \quad \text{if } b' > b.$$

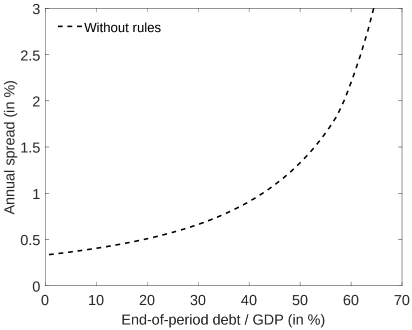
- Find the optimal value for $\underline{q}$.
- We first assume an initial state with mean TFP and no debt (other initial states are also investigated in the paper).

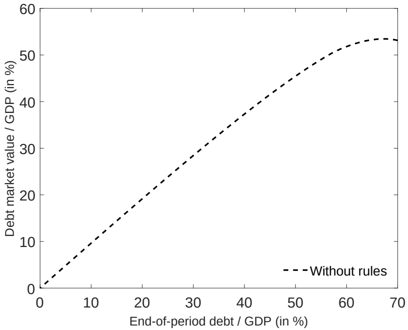
4. Quantitative results

Idiosyncratic debt brake $\simeq$ idiosyncratic spread brake

	Without rule	Debt brake (52.5%)	Spread brake (0.45%)
Mean debt-to-income ratio	61.5	54.9	59.4
Annual spread (in %)	2.0	0.5	1.0
Mean g/c (in %)	36.5	37.1	36.9
$\sigma(\mathrm{g})/\sigma(\mathrm{y})$	0.9	0.9	1.0
$\sigma(\mathrm{c})/\sigma(\mathrm{y})$	1.1	1.1	1.1
Defaults per 100 years	2.9	0.8	1.1
Welfare gain (in %)		0.5	0.4

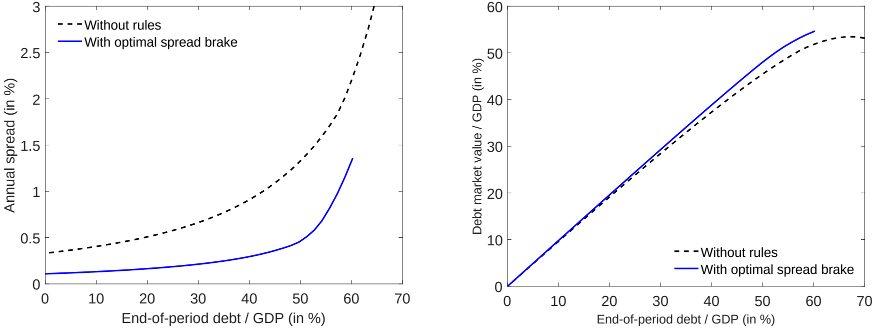
Borrowing without a fiscal anchor



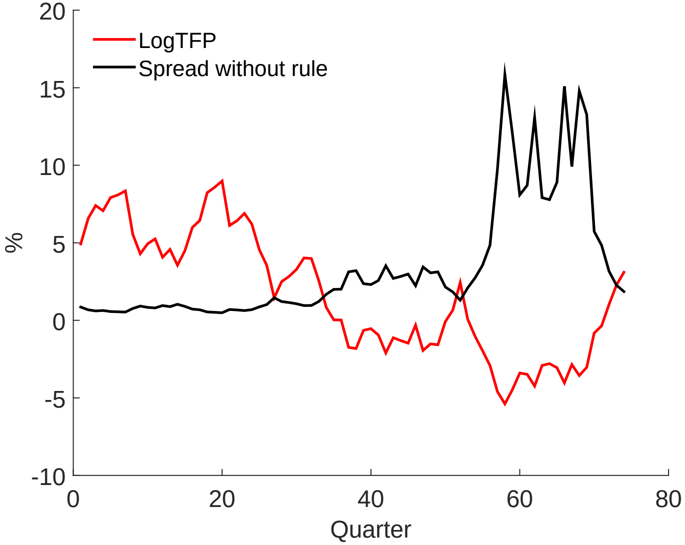


Borrowing with a fiscal anchor

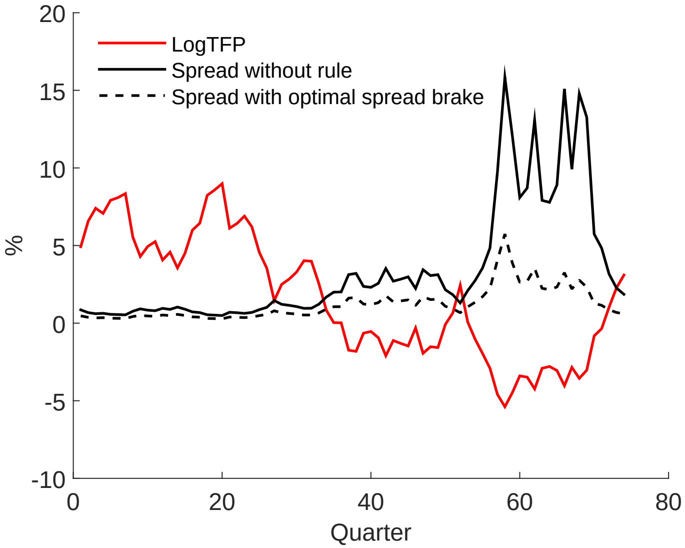
The fiscal anchor allow for less debt (lower face value) but may allow for more borrowing (because of the higher interest rate)



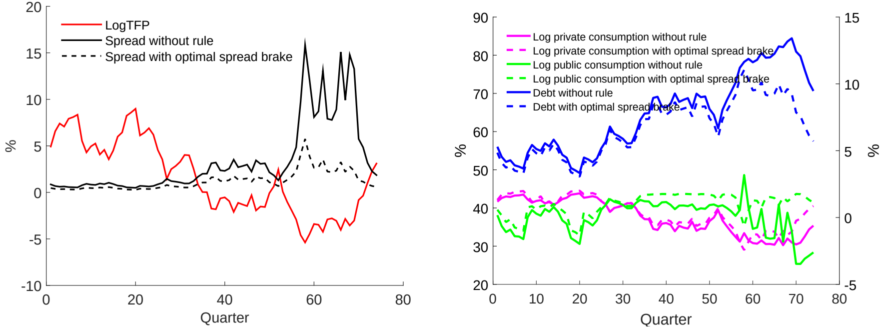
Negative shocks without a fiscal anchor



Negative shock with a fiscal anchor



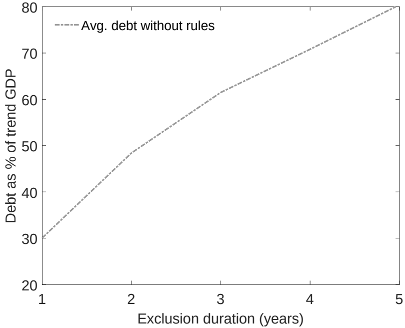
Consumption is not more volatile with the spread brake

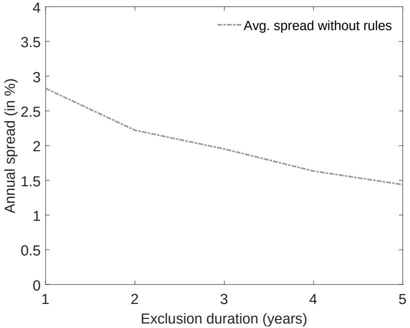


Common rules in heterogeneous economies

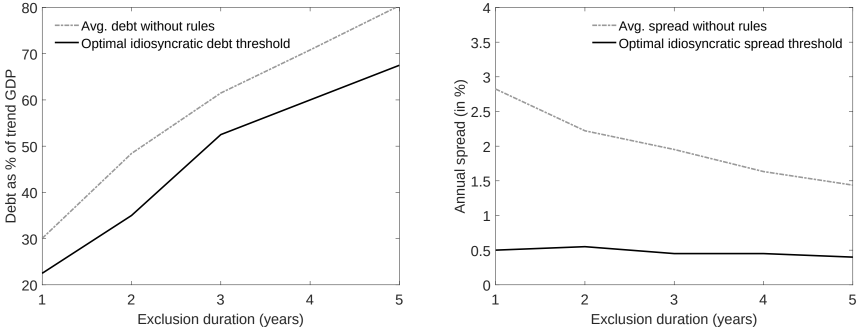
- Longer exclusion $\Rightarrow \uparrow$ cost of defaulting $\Rightarrow$ more debt.
- Higher recovery $\Rightarrow \downarrow$ benefit of defaulting $\Rightarrow$ more debt.
- More impatience $\Rightarrow \uparrow$ benefit of borrowing $\Rightarrow$ more debt.
- We assume exclusions between 1 and 5 years (benchmark = 3), recovery rates between 10% and 60% (benchmark = 35%), and discount factor between 0.96 and 0.985 (benchmark = 0.97).
- Thus, we study economies with average debt levels between 30% and 90%, and average spreads between 0.5% and 5.5%.

Heterogenous economies





Optimal idiosyncratic thresholds



The optimal idiosyncratic debt threshold changes almost one to one with the average debt level in the no-rule economy.

Optimal common rules

- Let $W(b, z; \bar{b}, \underline{q}, \theta)$ denote the welfare in an economy with targets $\bar{b}$, $\underline{q}$ for the fiscal rules and parameters θ.
- Optimal common debt brake $\bar{B}^*$ satisfies

$$\bar{B}^* = \underset{\bar{b}}{\text{Argmax}} \int W(b, z, \bar{b}, 0, \theta) F_\theta(d\theta)$$

- Optimal common spread brake $\underline{Q}^*$ satisfies

$$\underline{Q}^* = \underset{\underline{q}}{\text{Argmax}} \int W(b, z, \infty, \underline{q}, \theta) F_\theta(d\theta)$$

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Common debt brake $\prec$ common spread brake

	Exclusion	Recovery	β
$\bar{\text{B}}^*$ (in %)	60	70	50
$\underline{\text{Q}}^*$ (spread, in %)	0.45	0.40	0.50
	Welfare gains with $\bar{\text{B}}^*$		
Average (in %)	0.24	0.29	0.55
Maximum (in %)	0.55	0.55	1.35
Minimum (in %)	0.00	0.00	-0.01
	Welfare gains with $\underline{\text{Q}}^*$		
Average (in %)	0.34	0.34	0.57
Maximum (in %)	0.36	0.42	1.44
Minimum (in %)	0.28	0.20	0.04

Enforcement of fiscal rules

- Allow the government to deviate from the rule in place.
- Investors are surprised in the deviation period.
- Economy experiences a one-time TFP loss x in the deviation period (included to quantify commitment in terms of output).
- Formally, $\hat{V}^R$ = welfare in the deviation period.

$$\hat{V}^R(b, z, x) = \max_{b' \geq 0, c \geq 0, g \geq 0, \tau \geq 0} \left\{ u\left(c, g, 1 - l\right) + \beta \mathbb{E}_{z'|z} V^{Cont}(b', z') \right\},$$

subject to

$$g = \tau e^z x l - b + q^{Rule}(b', z)\left[b' - (1 - \delta)b\right],$$

$$c = (1 - \tau)e^z x l,$$

$$l = \hat{l}\left(\log(x) + z, \tau, c, g\right)$$

No extra commitment necessary if the government loses credibility

$$\hat{V}^{R}(b,z,x) = \max_{b'\geq 0, c\geq 0, g\geq 0, \tau\geq 0} \left\{ u\left(c,g,1-l\right) + \beta \mathbb{E}_{z'|z} V^{Cont}(b',z') \right\},$$

subject to

$$g = \tau e^{z} x l - b + q^{Rule}(b',z)\left[b' - (1-\delta)b\right],$$

$$c = (1-\tau)e^{z}xl,$$

$$l = \hat{l}\left(\log(x) + z, \tau, c, g\right)$$

- When $V^{Cont} = V^{No\ rule}$, the government loses all credibility to enforce rules.
  - It is never optimal to deviate from the optimal debt or spread rule.

Modest extra commitment necessary if the government does not lose credibility

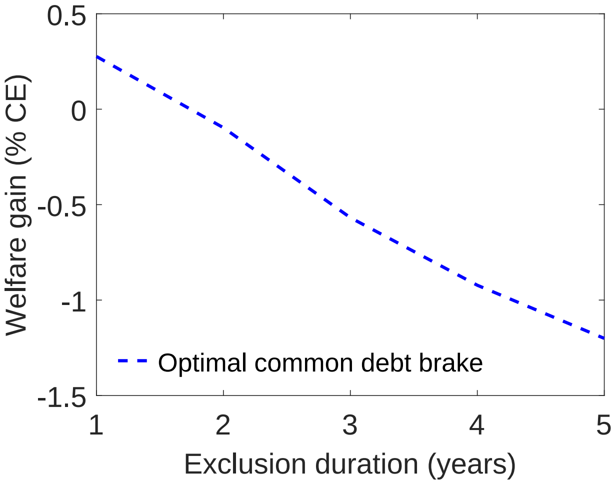
$$\hat{V}^{R}(b,z,x)=\max_{b'\geq 0,c\geq 0,g\geq 0,\tau\geq 0}\left\{u\left(c,g,1-l\right)+\beta\mathbb{E}_{z'|z}V^{Cont}(b',z')\right\},$$

subject to

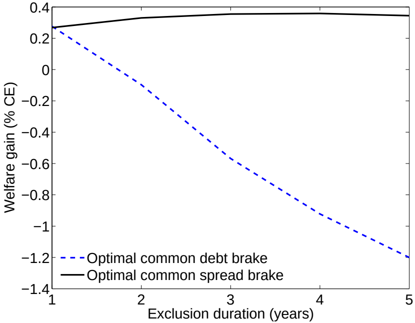
$$g=\tau e^{z}xl-b+q^{Rule}(b',z)\left[b'-(1-\delta)b\right],$$

- When $V^{Cont}=V^{Rule}$, the government does not lose any credibility to enforce rules.
  - Maximum deviation gain = 1.1% of mean annual output for the optimal spread brake rule.
  - Maximum deviation gain = 0.7% of mean annual output for the optimal debt brake rule.
  - Median gain $\simeq 0$.

Rawlsian debt brake (23%)

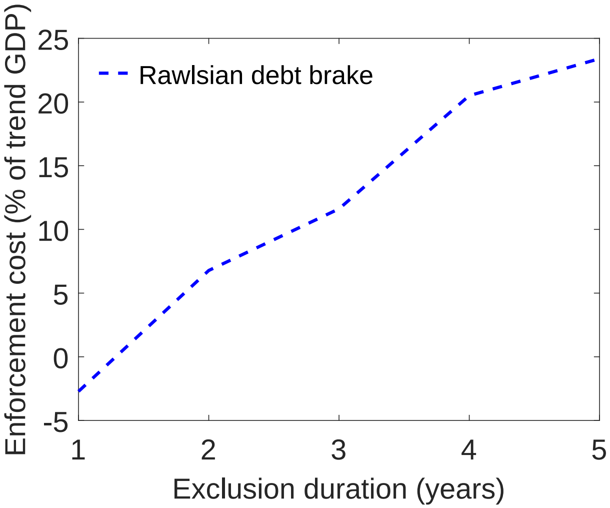


Rawlsian spread brake (0.5%) $\succ$ Rawlsian debt brake

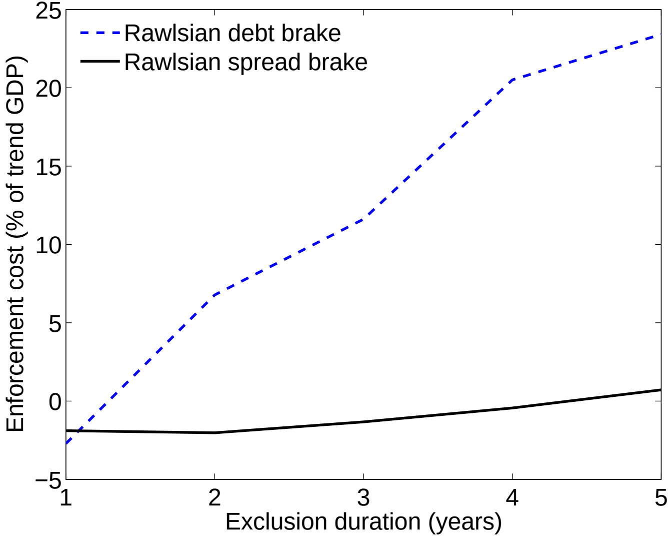


The optimal Rawlsian spread brake is binding in high-debt-intolerance economies without imposing an excessive constraint in low-debt-intolerance economies.

Penalty needed to enforce the Rawlsian debt brake



Penalty needed to enforce the Rawlsian spread brake



7. Conclusions and extensions

Conclusions

- Maybe sovereign spreads should play a more prominent role in anchoring discussions of fiscal policy
  - Economies that suffer less debt intolerance should be allowed to issue more debt.
- It may be much easier to enforce a spread brake than to enforce a debt brake.
- Also
  - a market-determined fiscal anchor could be less susceptible to creative accounting
  - more comprehensive measure of fiscal risks (e.g., debt maturity, currency composition, implicit or contingent liabilities)

Need for future work?

- What should the spread-brake threshold be? Should it be reduced gradually (mimicking disinflation periods)?
- Which interest rates should fiscal rules use?
- The average spread over which period should be used to trigger the spread brake?
- How should a spread brake be complemented with other numerical targets?
- How fast should the fiscal adjustment triggered by the brake be?
- Would the spread limit help with other shocks (bailout probability, multiple equilibria, political shocks, debt shocks)?