Fiscal Rules, Bailouts, and Reputation in Federal Governments

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ADEMU
How Much of a Fiscal Union for the EMU?
Banco de España
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Overview

- In federal states, local govts may over-borrow if expect bailout
  - Central govt cannot commit to no-bailout clauses
  - Examples: Argentina, Brazil, German länders, EMU

- One proposed solution is to use fiscal rules
  - Defined as borrowing limits and punishments if these are violated
  - Example: Stability and Growth Pact

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- **Why can the central govt commit to fiscal rules?**
  - but not to no-bailout clauses?

European Constitution

"The Union shall not be liable for or assume the commitments of central governments, regional, local or other public authorities..."

— Article 125, TFEU

"For a euro area Member State, the stepping up of the EDP may result also in the imposition or strengthening of sanctions in the form of a fine of 0.2% of GDP..."

— Stability and Growth Pact

This Paper

- Study efficacy of fiscal rules when the central govt can't commit
  - No-bailout clauses
  - Enforcing fiscal rules
- Local govts uncertain about the type of the central govt
  - Commitment type: always enforces fiscal constitution
  - No-Commitment type: chooses policy sequentially
- Compare equilibrium outcomes with and without fiscal rules

Fiscal Rules Can Promote Fiscal Indiscipline

When reputation is low (low probability of facing commitment type)

- Debt issued can be larger when constitution contains fiscal rules
- With binding rules type of the central govt is revealed earlier
  - **Rules increase cost of maintaining good reputation**
- Early revelation of type reduces cost of issuing debt for local govt

Equilibrium Fiscal Rules

- Why do we observe fiscal rules in equilibrium?
  - When reputation is low rules can be detrimental
- Outcome of a signaling game between two types of central govt
- When reputation is low
  - Commitment type finds it optimal to set tight rules
  - No-commitment type initially mimics but not does not enforce
  - Rules are violated by local gov'ts
- Rationalize several examples when:
  - Tight fiscal rules arise when the reputation is low
  - Fiscal rules have been instituted but not enforced

Related Literature

- Lack of commitment and bailouts:
  - Chari and Kehoe (2007, 2008), Cooper Kempf and Peled (2008), Rodden (2002)
- Using fiscal rules to overcome commitment problem:
  - Beetsma and Uhlig (1999), Alfaro and Kanczuk (2016), Hatchondo, Martinez and Roch (2015), Amador et al (2006), Halac and Yared (2014)
- Reputation:
  - Phelan (2006), D'Erasmo (2008)
- Uncertainty as commitment
  - Nosal and Ordonez (2013)

MODEL

Environment

- $t = 0, 1, 2$
- Small open economy composed of two regions, $i \in \{N, S\}$
- Representative citizen has preferences over local public good

$$U = \sum_{t=0}^{2} \beta^t u(G_{it}).$$

  Assume throughout: coefficient of absolute risk aversion small

- Benevolent local governments
  - Tax revenues: Y_{it} with $Y_{S0} < Y_{N0}$ and $Y_{it} = Y$ for $t \neq 0$

Environment

- Benevolent central government chooses
  - Transfers T_{it} such that $\sum_i T_{it} = 0$
  - Enforcement of fiscal rule $\sigma \in \{0, 1\}$
- Central government can be one of two types
  - Commitment type (c): always enforces constitution
  - No-Commitment type (nc): chooses policy sequentially
- Prior probability of being the c type is π

Fiscal Constitution

Two Clauses:

- No bailout clause: $T_{it} = 0$

- Fiscal rule: $(\bar{b}, \psi)$
  - Debt limit: $\bar{b}$
  - Punishment ψY if $b_{i1} > \bar{b}$, where $\psi < \infty$

Timing and Actions

- At $t = 0$, the local govts choose G_{i0} and b_{i1} subject to

$$G_{i0} \leqslant Y_{i0} + q b_{i1}.$$

- At $t = 1$
  - No-commitment type
    - Chooses transfers $\{T_{i1}\}$ and enforcement of fiscal rule $\sigma \in \{0, 1\}$
  - Local govts
    - Update their prior about central government type
    - Choose G_{i1} and b_{i2} subject to

$$G_{i1} + b_{i1} \leqslant Y_{i1} - \sigma \psi Y 1_{b_{i1} > \bar{b}} + T_{i1} + q b_{i2}.$$

- At $t = 2$
  - No-commitment type decides whether to make a transfer $\{T_{i2}\}$
  - Local govt consumes $G_{i2} = Y - b_{i2} + T_{i2}$

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Characterize perfect bayesian equilibrium (pure strategies)

Over-borrowing in the Model

- Why is there over-borrowing?
  - Central govt wants to equalize local public good provision ex-post
  - Local govts anticipate transfers and do not internalize full cost of debt issuance
  - If $\pi < 1 \Rightarrow$ inefficient front-loading of public good consumption

$$q u'(G_{it}) < \beta u'(G_{it+1})$$

- Reputation lowers incentives to over-borrow
  - Local govts anticipate transfers with lower probability

- If enforced, fiscal rules lower incentives to over-borrow
  - If local govt over-borrows, it must pay penalty

FISCAL RULES INCENTIVIZE OVER-BORROWING

Fiscal Rules Incentivize Over-borrowing

Compare equilibrium outcomes when the constitution contains

- Only a no-bailout clause
- No-bailout clause and fiscal rules

Results

If reputation is low (π low enough) and $\beta \leqslant \bar{\beta}$ then

- Without rules ($\psi = 0$): unique equilibrium where
  - NC type enforces fiscal constitution in period 1 (no-bailout)
  - Central govt type is not revealed in period 1 (late revelation)

- With binding rules ($\psi > 0$, $\bar{b}$ small): unique equilibrium
  - Fiscal rule is violated by the South
  - NC type does not enforce fiscal constitution in period 1
  - Central govt type is revealed in period 1 (early revelation)

- Under sufficient conditions debt issued is larger with rules
  - Early revelation implies lower cost of issuing debt

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No Rules: Incentives to Enforce Constitution at $t = 1$

Without rules only choice for central govt. is whether to bail out

- Costs: Dispersion in local public good provision
- Benefits: Less over-borrowing due to maintained reputation
  - Euler equation without bailout, $\pi' = \pi$

$$u'\left(Y - b_{i1} + q b_{i2}\right) q = \beta \pi u'\left(Y - b_{i2}\right) + \frac{\beta}{2}\left(1 - \pi\right) u'\left(Y - \frac{b_{i2} + b_{-i2}}{2}\right)$$

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More dispersed debt decreases incentives to enforce constitution

No Rules ⇒ Late Revelation

For $\pi \approx 0$

- Costs are second order
  - Local gov'ts expect a bailout almost surely in period 2
  - So adjust their borrowing to keep period 1 consumption constant

$$qu'(G_{i1}) = \beta\pi u'(Y - b_{i2}) + \frac{\beta}{2}(1-\pi)\ u'\left(Y - \frac{b_{i2}+b_{-i2}}{2}\right)$$

so for $\pi \to 0 \Rightarrow G_{N1} = G_{S1}$

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- So for low level of reputation optimal to enforce constitution

No Rules ⇒ Late revelation of central govt type

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Fiscal Rules: Incentives to Enforce Constitution at $t = 1$

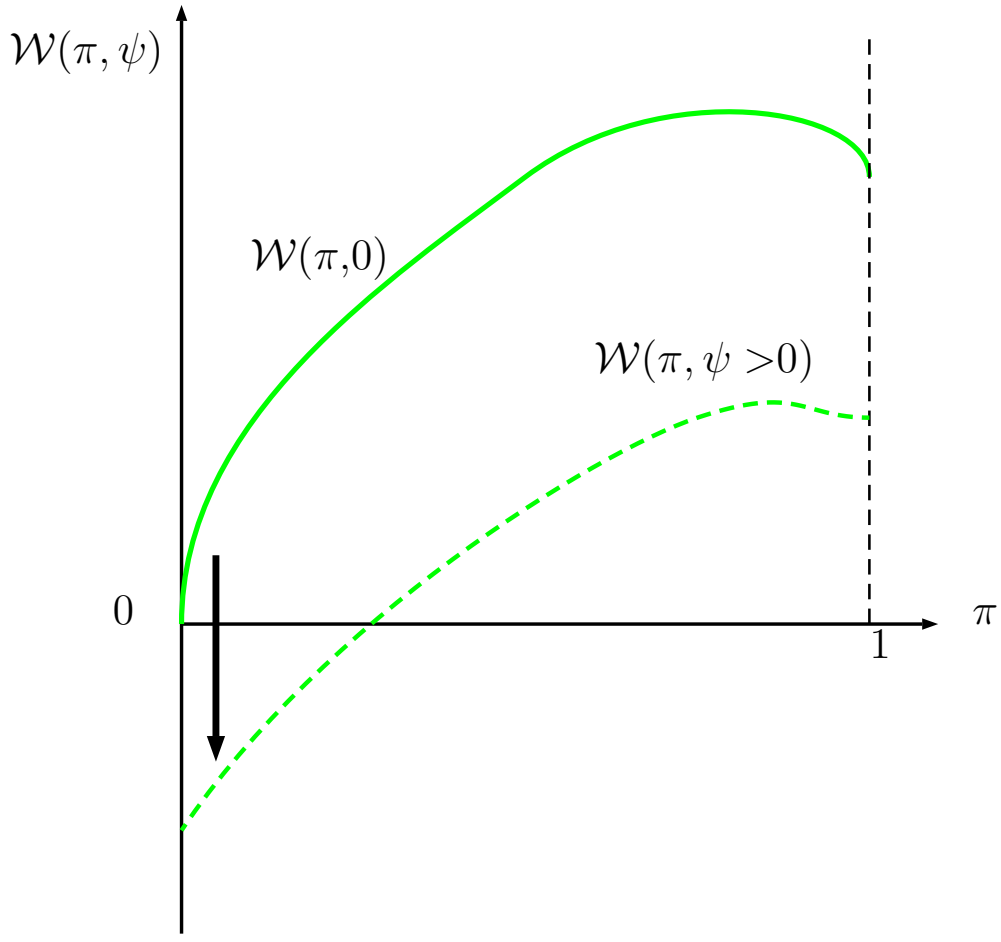
With rules decision is about bailout and enforcement of fiscal rule

- Costs:
  - Dispersion in local public good provision (as w/out rules)
  - Enforce penalty on local gov't that violates the rule (which already has low marginal utility)
    $\Longrightarrow$ For $\pi \approx 0$ cost of enforcing constitution not second order

- Benefits: Less over-borrowing due to maintained reputation

Rules increase costs of maintaining good reputation

With Low Reputation NC Type Does Not Enforce



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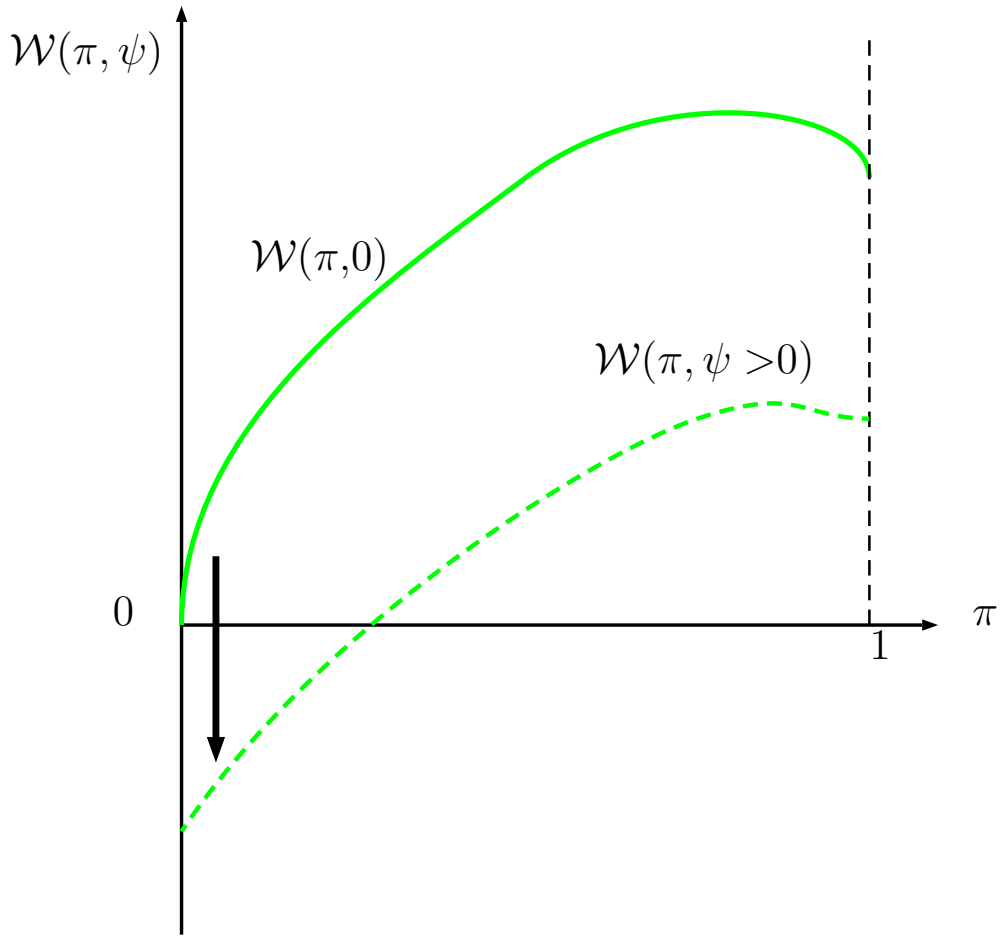

Rules $\Rightarrow$ Early revelation of central govt type

Results

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Early Revelation and Debt Issuance

With early revelation more borrowing in period 0

- Debt issued in period 1 is contingent on central gov't type
- Lowers marginal cost of issuing debt in period 0 via two channels
  - **Strategic**
  - **Prudence**

Early Revelation and Debt Issuance

Consider the case without fiscal rules (no bailout in period 1)

- Period 0 Euler equation

$$qu'\left(G_{i0}\right) = \beta u'\left(Y - b_{i1} + q\mathbf{b}_{i2}\left(b_1, \pi, 0\right)\right) + \frac{\beta^2}{2}\left(1-\pi\right)u'\left(Y - \frac{\mathbf{B}_2\left(b_1, \pi, 0\right)}{2}\right)\frac{\partial \mathbf{b}_{-i2}\left(b_1, \pi, 0\right)}{\partial b_{i1}}$$

- Period 1 Euler equation

$$qu'\left(Y - b_{i1} + q\mathbf{b}_{i2}\left(b_1, \pi, 0\right)\right) = \beta\pi u'\left(Y - \mathbf{b}_{i2}\left(b_1, \pi, 0\right)\right) + \frac{\beta(1-\pi)}{2}u'\left(Y - \frac{\mathbf{B}_2\left(b_1, \pi, 0\right)}{2}\right)$$

- Substitute period 1 Euler into period 0 Euler

Early Revelation and Debt Issuance

- Without rules, b_{S1} must equate $qu'(Y_{S0} + qb_{S1})$ to

$$\frac{\beta^2}{q}\pi u'\left(Y - \mathbf{b}_{S2}\left(b_1, \pi, 0\right)\right) + \frac{\beta^2}{2q}\left(1-\pi\right)u'\left(Y - \frac{\mathbf{B}_2\left(b_1, \pi, 0\right)}{2}\right)$$
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- With rules, b_{S1} must equate $qu'(Y_{S0} + qb_{S1})$ to

$$\frac{\beta^2}{q}\pi u'\left(Y - \mathbf{b}_{S2}\left(b_1, 1, \psi\right)\right) + \frac{\beta^2}{2q}\left(1-\pi\right)u'\left(Y - \frac{\mathbf{B}_2\left(b_1, 0, \psi\right)}{2}\right)$$
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With rules, b_2 contingent on type of govt

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With rules, more debt: two channels

Strategic Channel

$$qu'\left(Y_{S0}+qb_{S1}\right)=$$

$$\frac{\beta^2}{q}\pi u'\left(Y-\mathbf{b}_{S2}\left(b_1,\pi,0\right)\right)+\frac{\beta^2}{2q}\left(1-\pi\right)u'\left(Y-\frac{\mathbf{B}_2\left(b_1,\pi,0\right)}{2}\right)$$

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Strategic Channel

- Debt issued by N depends negatively on the inherited debt of S

$$\frac{\partial \mathbf{b}_{N2}\left(b_1, \pi, 0\right)}{\partial b_{S1}} < 0$$

- Elasticity increasing in π

- If central govt type is known

$$\left|\frac{\partial \mathbf{b}_{N2}\left(b_1, \pi, 0\right)}{\partial b_{S1}}\right| < \left|\frac{\partial \mathbf{b}_{N2}\left(b_1, 0, 0\right)}{\partial b_{S1}}\right|$$

- This reduces marginal costs of issuing debt for the South

Prudence Channel (if marginal utility convex)

$$qu'\left(Y_{S0}+qb_{S1}\right)=$$

$$\frac{\beta^2}{q}\pi u'\left(Y-\mathbf{b}_{S2}\left(b_1,\pi,0\right)\right)+\frac{\beta^2}{2q}\left(1-\pi\right)u'\left(Y-\frac{\mathbf{B}_2\left(b_1,\pi,0\right)}{2}\right)$$

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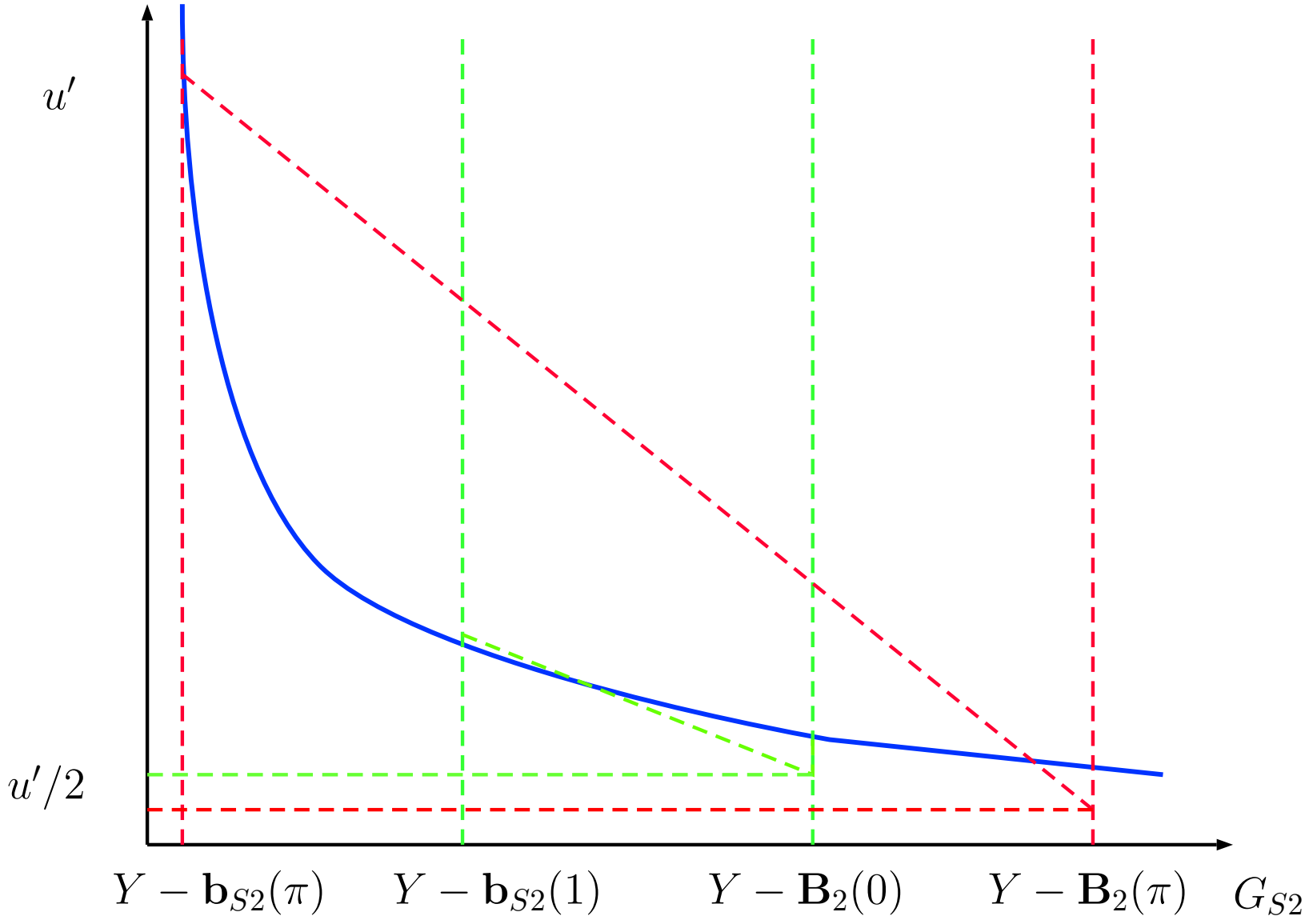

Early Revelation and Debt Issuance

- Both strategic and prudence channels lower cost of issuing debt
- As a result more debt when constitution has fiscal rules

Early Revelation and Debt Issuance

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For π small optimal to set $\psi = 0$ (no fiscal rules)

EQUILIBRIUM FISCAL RULES

Equilibrium Fiscal Rules

- Why do we observe rules in equilibrium?

Equilibrium Fiscal Rules

- Why do we observe rules in equilibrium?
- Outcome of a signaling game between two types of government:
  - Both types announce constitution before period 0
  - NC type chooses whether to enforce in period 1
- For $\pi \approx 0$, $\beta < \underline{\beta}$, unique equilibrium constitution with no rules
- For $\pi \approx 0$, $\beta \in [\underline{\beta}, \bar{\beta}]$, unique equilibrium constitution with rules
  - **Rules are violated and not enforced**
  - **Early resolution of uncertainty**

Equilibrium Fiscal Rules

- For π low and $\beta < \bar{\beta}$ no-commitment type does not enforce rule
- For π low and $\beta > \underline{\beta}$ commitment type values separation
  - Reputation jumps to 1
  - No over-borrowing in period 1
- For $\beta \in [\underline{\beta}, \bar{\beta}]$ unique equilibrium with rules and no-enforcement

Equilibrium Fiscal Rules

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- For $\beta \in [\underline{\beta}, \bar{\beta}]$ unique equilibrium with rules and no-enforcement
- **Rationalizes why we often observe central gov'ts with low reputation setting up tough fiscal rules**

Fiscal Rules in Practice

- Previous results account for
  - episodes where fiscal rules instituted but not enforced
  - fiscal rules being instituted by govts with low reputation

- Two examples
  1. Eurozone ▸ Details
  2. Brazil ▸ Details

Extensions

- Local govt's cannot commit to repay
  - Fiscal rules (and early revelation) relax debt limits
- Dynamic extension ▸ Details
- Atomistic vs. Non-atomistic local governments
- Monetary union as in Chari-Kehoe (2007) ▸ Details
- (In progress) Different motives for bailout
  - Spillovers like in Tirole (2015)

Conclusion

- Fiscal rules are often imposed to promote fiscal discipline
  - Especially when central govts cannot commit
- If cannot commit, fiscal rules detrimental when reputation low
  - Incentivize over-borrowing
  - Increase costs for central govt to maintain good reputation
- Arise in equilibrium when reputation low even if detrimental
- Rationalize several historical examples when:
  - Fiscal rules have been instituted but not enforced
  - Tight fiscal rules arise when the reputation is low

ADDITIONAL SLIDES

Monetary Economy

- Consider a monetary version of baseline model
- Central govt chooses the inflation and enforcement of fiscal rule
- Local govt
  - Preferences

$$\sum_{t=0}^{3} \beta^t \left[u\left(G_{it}\right) - \tau_t\left(\Pi_t\right) \right]$$

  - Budget constraint

$$G_{it} \leqslant Y - \psi Y \mathbb{I}_{b_{it} > \bar{b}} + Q_{t+1} b_{it+1} - \frac{b_{it}}{\Pi_t}$$

- Continuum of risk-neutral lenders who price debt to break even

$$Q_t\left(b_t, \pi\right) = q\left[\pi + \left(1 - \pi\right) \frac{1}{\Pi_t\left(b_t, \pi\right)}\right]$$

Free-Rider Problem

- Temptation to inflate depends on distribution of debt
- Local govts. do not internalize effect of borrowing on Q_t
- Issuing debt more costly when inflation is high
- Can fiscal rules undo the free-rider effect?

Non-Atomistic Local Governments

Fiscal rules can improve outcomes when local govts are measure zero

Proposition

There exists $\psi > 0$ *and* $\bar{b}$ *such that for all* π *there exists an equilibrium outcome with fiscal rules that can improve upon the equilibrium outcome without fiscal rules.*

Non-Atomistic Local Governments

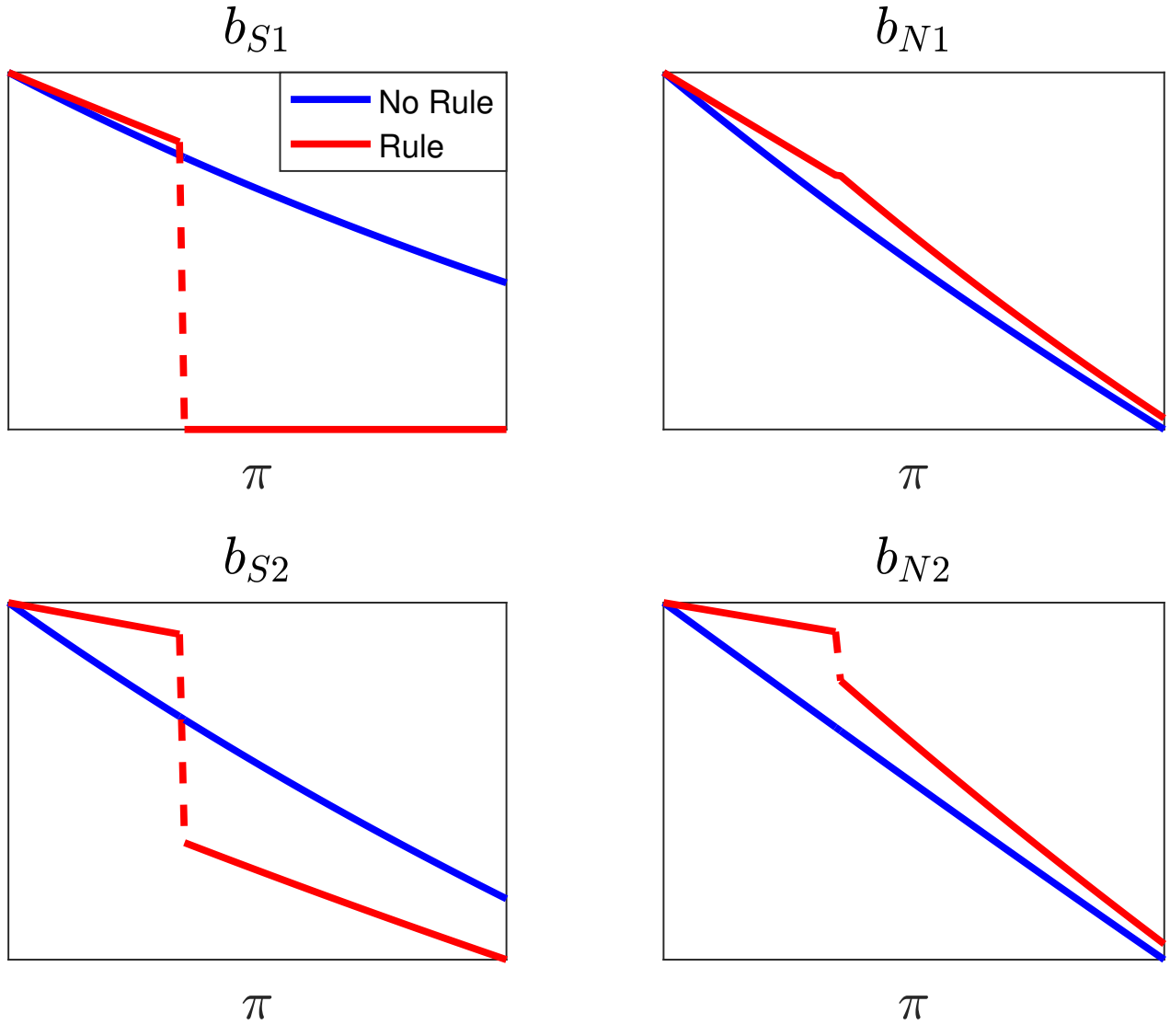
- Costless to enforce rule for measure zero local govt.
- Optimal for local govt. to respect rule if all others are doing so
- Result is *fragile*
  - Always an equilibrium in which rule is ignored and not enforced

Atomistic Local Governments

- When local govts are large forces emphasized earlier present
- For π small costs of enforcement outweigh benefits of reputation
- Unique equilibrium with no-enforcement of rules

back

Numerical Example: Overborrowing in period 0



Stability and Growth Pact in the Eurozone

- In 2003 FR and DE violate SGP but sanctions not imposed
  - Power to discipline fiscal policy weakened
- In 2009 European debt crisis and bailout of Greece
  - Reputation and credibility of central authorities low
- Introduce "Six-Pack,"Fiscal Compact" to strengthen fiscal rules
- Provisions violated by Spain and Portugal without sanctions

"My perception is that the European Commission has basically given up on enforcing the rules of the Stability and Growth Pact."

— Jens Weidmann, governor of the Bundesbank

back

Brazil

- Fiscal behavior of the states major source of instability
  - Resulted in sub-national debt crises in 1989, 1993, and 1997
- Large bailout in 1997 by the federal government
  - Reputation and credibility of central authorities low
- Subsequently govt approves the Fiscal Responsibility Law
  - Fiscal rules and sanctions for noncompliance

back

A Dynamic Model

- Consider an infinite repetition of this environment
- Stage game: three sub-periods (morning, afternoon, night)
  - Central govts choose rule in the morning
  - Local govts can only issue new debt in morning and afternoon
  - Reputation the only state variable (updated after each sub-period)
- Suppose in each $\mathbf{t}$ central gov can be replaced with prob λ
- Finally suppose there is an exogenous cost of setting up rule

Equilibrium Dynamics (Work in Progress)

- Consider some period t with reputation π_t
- For π_t sufficiently large no fiscal rule instituted
- Suppose large dispersion in revenues between N, S
- Then central gov bails out in last sub-period
  - Reputation falls, $\pi_{t+1} < \pi_t$
  - If fall sufficiently large may be optimal to set up rules in $t+1$
- Endogenously generate cycles of bailout and tough fiscal rules

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