The Economics of Sovereign Debt, Bailouts and the Eurozone Crisis

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ESM WORKSHOP: DEBT SUSTAINABILITY: CURRENT PRACTICE AND FUTURE PERSPECTIVES

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Motivation

- No Bailout clause: art. 125 of Lisbon Treaty:

  "A Member State shall not be liable for or assume the commitments of central governments, regional, local or other public authorities, ... of another Member State"

- ECB Executive Board member, Jurgen Stark (January 2010):

  "The markets are deluding themselves when they think at a certain point the other member states will put their hands on their wallets to save Greece."

- German finance minister Peer Steinbrueck (February 2009)

  "The euro-region treaties don't foresee any help for insolvent countries, but in reality the other states would have to rescue those running into difficulty."

- Economics Commissioner Joaquin Almunia (January 2010):

  "No, Greece will not default. Please. In the euro area, the default does not exist."

Objectives

- We have seen both some default (Greece) and large loans of EFSF/ESM to Cyprus, Greece, Ireland, Portugal and Spain: transfers/bailouts have materialized
- What is the effect of "no bailout clauses" if they are not fully credible?
- What determines the existence and size of bailouts?
- What consequences on risk shifting, debt issuance and yields?
- Is an ironclad no bailout clause desirable?
- What about debt monetization?

Main results

- Estimate of implicit NPV transfers from Europeans to crisis countries: lower bound from 0% (Ireland) to more than 40% of GDP (Greece)
- Theoretical model of monetary union with collateral damage of default/exit and ex-post efficient bailouts to prevent default/exit
- Bailouts do not improve welfare of crisis country: creditor countries get entire surplus from avoiding default (Southern view)
- Ex-ante, bailouts generate risk-shifting and over-borrowing (Northern view)
- No-bailout commitment reduces risk-shifting but may be not ex-ante optimal for creditor country, if risk of immediate insolvency: "kicking the can down the road" may make sense

Size of implicit transfers during crisis

- Crisis countries (Ireland, Greece, Cyprus, Portugal, Spain) received loans from GLF/EFSF/EFSM/ESM and IMF; see Corsetti, Erce and Uy (2017)
- How much implicit transfers in the loans?
- Key issue: how much default risk and therefore what discount rate? If discount rate reflects default risk then no transfer
- Default risk on European institutions lower than on private creditors
- Assumption for discount rate: risk of default on European institution loans = IMF $\Rightarrow$ Lower bound estimate of transfer
  - IMF programs are short to medium term (3 to 9 years): if increasing yield curve, underestimate NPV of transfer
  - Risk of default higher on ESM than on IMF (loans to IMF are senior)
  - We assume no more debt renegotiations

Size of implicit transfers during crisis

- Methodology (Zettelmeyer and Joshi, 2005) to estimate NPV of total transfers $Tr_t^{i,j}$ (borrower i; creditor j, time t)

- We discount at Internal rate of return (irr) of IMF program for same borrower:

$$Tr_{2010}^{i,j} = \sum_{t=2010}^{T} \frac{1}{(1 + irr^{i,IMF})^t} NT_t^{i,j}$$

- Series of net transfers with $irr^{i,j}$ such that =0:

$$NT_t^{i,j} = D_t^{i,j} - R_t^{i,j} - i_{t,1}^{i,j} \tilde{D}_{t,1}^{i,j} - \ldots - i_{t,\tau}^{i,j} \tilde{D}_{t,\tau}^{i,j}$$

$R_t^{i,j}$ =repayments; $D_t^{i,j}$ = disbursements;
$\tilde{D}_{t,\tau}$ = outstanding balance at t on amount disbursed at $t - \tau$;
$i_{t,\tau}$: interest rate at t on amount disbursed at $t - \tau$.

Borrower i	Lender j	$irr^{i,j}$	$\Delta irr^{i,j}$	$\sum D^{i,j}$	$TR^{i,j}$	$Tr^{i,j}/GDP^{i}$
Cyprus	ESM	0.89	0.82	6.30	0.66	3.25%
	IMF	1.71		0.95		
Greece	EC	1.06	2.09	52.90	15.49	6.85%
	EFSF post June 2018	0.69	2.47	167.05	66.39	28.01%
	ESM	1.63	1.52	61.90	17.47	7.67%
	IMF	3.16		31.99		
Ireland	EFSF	2.28	0.20	17.70	0.54	0.31%
	EFSM	3.17	-0.70	22.50	-1.84	-1.07%
	IMF	2.48		22.61		
Portugal	EFSF	2.08	1.21	26.00	4.43	2.38%
	EFSM	3.04	0.25	24.30	0.66	0.36%
	IMF	3.29		26.39		
Spain	ESM	0.83	1.82	41.33	5.87	0.51%
	IMF*	2.66				

∗ For Spain, average of IMF irr for other countries.

Theory

- Start with a version of Calvo (1988) model
- 2 periods: $t = 0, 1$
- 3 countries: i, g (inside monetary union) and u (rest of the world)
- g is fiscally sound (safe bonds as u), i is fiscally fragile
- i's output is uncertain: $y_1 = \bar{y}_1^i \epsilon_1$ with $E[\epsilon_1] = 1$, cdf $G(\epsilon_1)$
- Preferences of country j:

$$U^j = c_0^j + \beta E[c_1^i] + \omega^j \lambda^s \ln b_1^{s,j} + \omega^j \lambda^{i,j} \ln b_1^{i,j}$$

  - Risk neutral over consumption
  - ω^j: country size
  - Bonds from i provide liquidity services $\lambda^{i,j}$ to j with: $\lambda^{i,i} > \lambda^{i,g} \geq \lambda^{i,u}$ (ECB collateral policy)

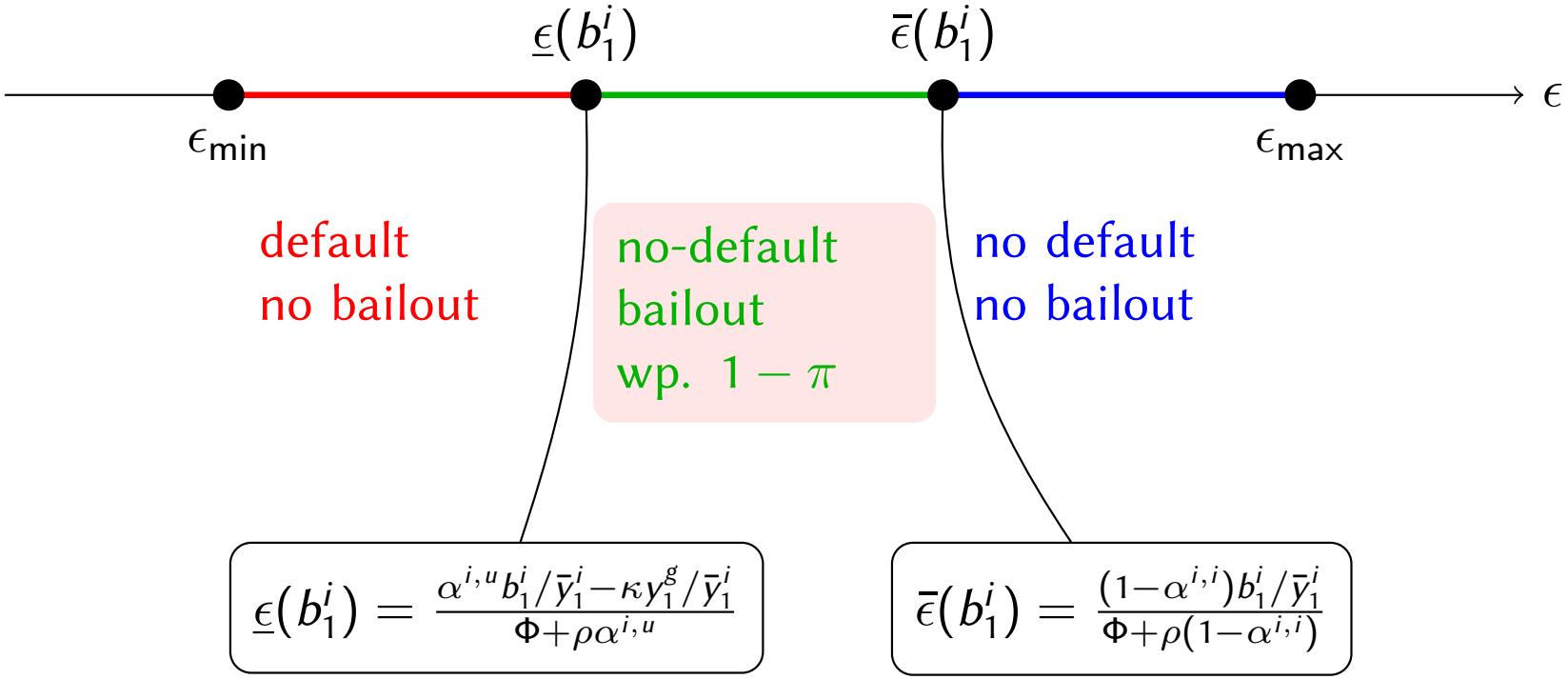
Default & Bailout at $t = 1$

- i can strategically default (*pari passu*)
- g can unilaterally offer a bailout $\tau_1 \geq 0$ to avoid default, financed by lumpsum taxes
- Cost of default to i : $\Phi y_1^i + \tau_1$
  - Φy_1^i: disruption cost of default/exit
  - No bailout
- Benefit to i : $(b_1^i - \rho y_1^i)(1 - \alpha^{i,i})$
  - $0 \leq \rho \leq 1$: recovery rate
  - $1 - \alpha^{i,i}$: debt held externally (in g and u).
- Cost to g: $(b_1^i - \rho y_1^i)\alpha^{i,g} + \kappa y_1^g$
  - direct portfolio exposure: $(b_1^i - \rho y_1^i)\alpha^{i,g}$;
  - collateral damage κy_1^g (monetary union)
- Benefit to g: saves bailout τ_1

Institutions, no-bailout clauses and political uncertainty

- Legality of bailouts has been questionned (article 125 of European Treaty) with Karlsruhe court or ECJ
- Political controversy on bailouts in Germany: transfers are uncertain even if ex-post efficient
- Exogenous parameter π: probability that ex-post transfers **cannnot** be implemented

Optimal Ex-Post Bailout Policy



- Commitment to no bailout clause is not credible
- minimum transfer/bailout to avoid default:

$$\tau_1 \geq b_1^i(1-\alpha^{i,i}) - y_1^i\left[\Phi + \rho(1-\alpha^{i,i})\right] \equiv \underline{\tau}_1$$

- g offers minimum transfer to avoid default: residual claimant and captures all surplus from avoiding surplus (Southern View):
  - i receives transfer but no better off than in default
  - g gets all efficiency gain of no default: $\Phi y_1^i + \kappa y_1^g - \alpha_1^{i,u}(b_1^i - \rho y_1^i)$

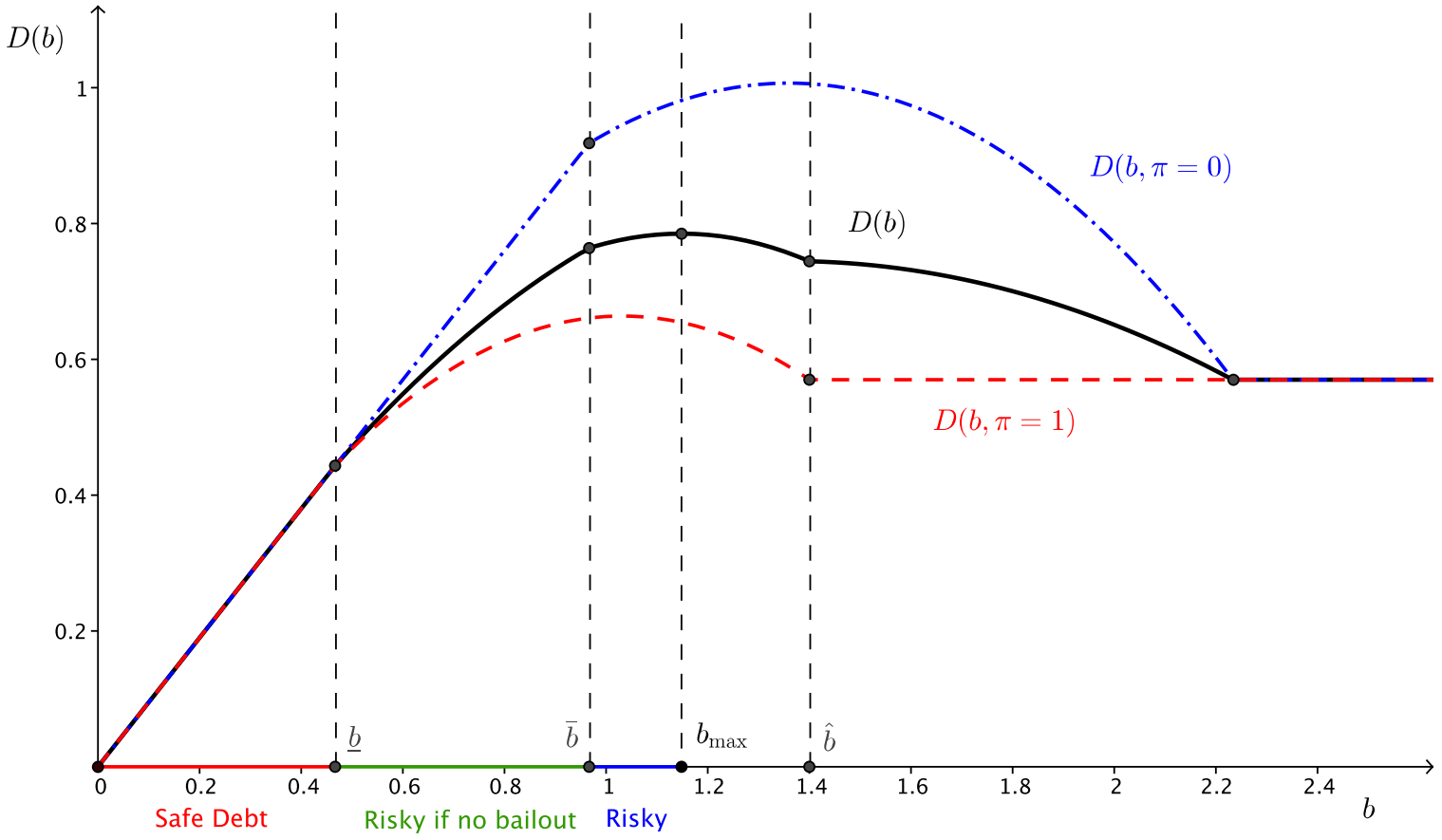
Debt rollover problem at $t = 0$

Fiscal revenues $D(b_1^i) = b_1^i / R^i$ raised by the government of country i in period $t = 0$:

$$D(b_1^i) = \beta b_1^i (1 - \pi_d) + \beta \rho \bar{y}_1^i \left(\int_{\epsilon_{\min}}^{\underline{\epsilon}} \epsilon dG(\epsilon) + \pi \int_{\underline{\epsilon}}^{\bar{\epsilon}} \epsilon dG(\epsilon) \right) + \overline{\lambda}^i$$

- $D(b)$ defines a *debt-Laffer curve*
- ex-post bailout likelihood affects the shape of the debt-Laffer curve
- under some regularity assumptions, debt-Laffer curve is well behaved (convex over the relevant range) although not continuously differentiable.

The Debt-Laffer Curve: $D(b)$



$D(b)$ for $\pi = 0$ (max bailout), $\pi = 0.5$ and $\pi = 1$ (no bailout).

$\underline{b}$: max debt level, full repayment w/o bailout; $\bar{b}$: max debt level, full repayment with bailout
$\hat{b}$: min debt level above which default occurs with certainty w/o bailout

Optimal Debt

First-order condition for i (bondless limit, interior solution):

$$D'(b_1^i) = \beta(1 - G(\bar{\epsilon}))$$

Interpretation: marginal gain of issuing debt equals discounted probability of repayment without transfer:

- If default: repayment proportional to output
- If bailout: marginal debt is repaid by g

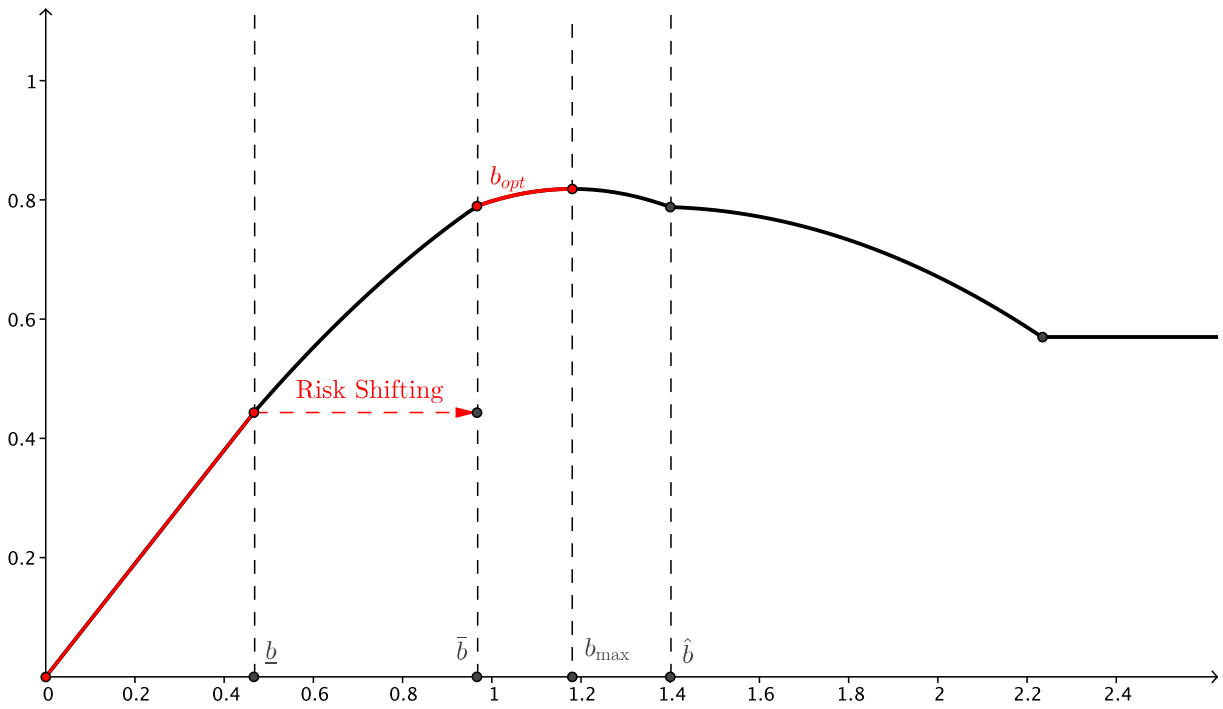
Optimal Debt

Rewrite first-order condition:

$$(G(\bar{\epsilon}) - G(\underline{\epsilon}))(1-\pi) = (b_1^i - \rho \bar{y}_1^i \underline{\epsilon})(1-\pi) g(\underline{\epsilon}) \frac{d\underline{\epsilon}}{db} + (b_1^i - \rho \bar{y}_1^i \bar{\epsilon}) \pi g(\bar{\epsilon}) \frac{d\bar{\epsilon}}{db}$$

- Gain: probability that marginal debt paid by transfer from g
- Costs: increases $\underline{\epsilon}$ (outright default more likely) and $\bar{\epsilon}$ (default due to political uncertainty more likely)
- With bailouts, i trades off increased riskiness of the debt (higher yields) against the likelihood of a bailout (risk shifting): Northern view
- Characterize the extent of risk shifting
- If $\pi = 1$ (commitment for no bailout): $g(\bar{\epsilon}) = 0$ or $\bar{\epsilon} \leq \epsilon_{min}$, no incentive to issue excessive debt

Optimal Debt Issuance: Risk Shifting



Optimal Debt Issuance for $\pi = 0.5$.

Choose safe debt if π high and if $\alpha^{i,i}$ high

Choosing No-Bailout Clauses Commitment level

- Legal institutions, international treaties... may increase π
- b_{opt} decreases with π: g can eliminate risk-shifting by choosing $\pi \geq \pi_c$
- Will g always choose high π (strong no bailout clause)?
- Not necessarily: higher π could force i to default in period 0 because it reduces resources available if high initial debt in $t = 0$
- Option value to wait or "kick the can down the road" by g: what if y^i high tomorrow?
- Optimal choice is $\pi < \pi_c$ if i has high initial level of debt. Relevant for current discussions of Eurozone reform.

Extensions and current policy discussions

- Extensions: exit vs default and debt monetization (overburdened ECB)
- Current policy discussions
  - Strengthening the no-bailout commitment should be done with prudence especially for high debt countries:
    - may precipitate immediate insolvency
    - may overburden ECB (debt monetization less efficient than transfers)
  - Orderly restructuring in case of default reduces collateral damage (lower κ)
    - increases likelihood of default
    - but reduces incentive for excessive debt