Debt sustainability and fiscal space in a heterogeneous Monetary Union: normal times vs the ZLB

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CEMLA (online), 7-08-2020
High gov. debt/GDP in EMU members raise concerns about debt sustainability:

- Is debt sustainability different for a EMU member? Normal times vs ZLB
- Are there spillover effects on debt sustainability within EMU?
- Are effects of fiscal consolidation & coordination different within EMU?
Structure of presentation

1. Introduction
2. Preview of results
3. Model
4. Fiscal limit
5. Long-run fiscal consolidation
6. Short-run discretionary fiscal policy
7. Conclusions
- **Standard Monetary union DSGEs** assessing policy effects do not account for default risks: Gali & Monacelli (2008), Ferrero (2009).

- **Debt sustainability** literature use DSGEs with exogenous risk premia: Mendoza and Oviedo (2004), Corsetti et al. (2013).


- **Default in EMU** is more likely the result of accidents, than strategic.
• **Normal times:** Risk channel matters significantly when debt is >90%.
  - Makes long run consolidation to 60% costly, with spillovers to EMU.
  - Reduces significantly multiplier of discretionary fiscal policy.
  - Endogenous risk premium explains 40% of that reduction.

• **ZLB:** Risk channel becomes muted
  - Consolidation generates deflation expectations ⇒ ↑ real int. rate
  - Policy coordination favors expansion in EMU.
Model highlights

Two-country New Keynesian model (Benigno & Benigno (2005)), modified for:

1. Periphery’s High debt is subject to default risk, Core with low debt.
2. Endogenous debt sustainability risk: distance to fiscal limit (Bi (2012))

Other characteristics:

- Total home bias in debt & gov spending.
- Distortionary taxes on income.
- Calibration: Periphery (Spain) & Core (Germany).
Main Mechanism:
1) RISKY PERIPHERY’S GOVERNMENT DEBT

- Periphery’s government debt \( (b_{t-1}) \) is subject to default risk, with haircut \( \delta \) (\( = 0.3 \) annually, Bi (2012)) and risky yield \( R_t \)

\[
\delta_t = \begin{cases} 
0 & \text{if } b_{t-1} < B(S_t) \\
\delta & \text{if } b_{t-1} \geq B(S_t)
\end{cases}
\]

where \( B(S_t) \) is a random draw from fiscal limit distribution
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- Periphery household’s Euler eq includes risky yield & expected haircut:

\[
\lambda_t = \beta E_t \frac{R_t(1 - \delta_{t+1})\lambda_{t+1}}{\pi_{t+1}}
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- Core gov debt is NOT risky: \(\delta^* = 0, R^* = R_t^{ECB}\)
Main Mechanism:

2) PERIPHERY’S DEBT SUSTAINABILITY RISK = FISCAL LIMIT

Debt sustainability defined as distance to stochastic Fiscal Limit ($\mathcal{B}(S_t)$)

- Fiscal limit is max debt that can be supported without default.
- Iterate on the gov. budget constraint, assuming no default & tax rate $\tau^{\text{max}} = 0.435$ (Spain’s marginal rate)

\[
\mathcal{B}(S_t) = \beta_t^p \pi(S_t) \mathbb{E}_t \sum_{j=0}^{\infty} \beta^j \frac{\lambda(S_{t+j})}{\lambda(S_t)} \frac{\tau^{\text{max}} y(S_{t+j}) - g_{t+j}}{\text{tot}(S_{t+j})^{1-\eta}}
\]

where state of the economy $S_t = \{g_t, g^*_t, \text{tot}_{t-1}\}$
Main Mechanism:

2) PERIPHERY'S DEBT SUSTAINABILITY RISK = FISCAL LIMIT

\[ \mathcal{B}(S_t) = \beta_p^t \pi(S_t) E_t \sum_{j=0}^{\infty} \beta^j \frac{\lambda(S_{t+j})}{\lambda(S_t)} \frac{\tau^{\text{max}} y(S_{t+j}) - g_{t+j}}{\text{tot}(S_{t+j})^{1-\eta}} \]

- **Endogenous**: depends on state of economy \((S_t = \{g_t, g_t^*, \text{tot}_{t-1}\})\).
- **Captures private sector's perception**: HH's discount factor.
- **\(\beta_p^t\)** = **stochastic political risk** → brings risk premium closer to evidence (in 2018 Spain had debt/y=97% & spread≈100bp).
- **FL distribution** simulated using Markov Chain Monte Carlo method.
Periphery’s Fiscal Limit:
DISTRIBUTION COMPUTED USING B(St)

- FL approx symmetric with mean = 125\%, sd = 24
- Prob of default = 0 for B/Y < 80\% & = 1 for B/Y > 200\%
- Between 80-180\%: ↑B/Y → ↑default Prob
**Periphery’s FL MP or ZLB.**

10% CHANGE IN \( g \) OR \( g^* \)

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**NORMAL MP:** \( \uparrow \) deficit, \( Y \), \( \pi \) \( \rightarrow \) \( \downarrow \) FL (shift UP/LEFT)

MP channel weak: small \( \uparrow \) \( Y^{EA} \), \( \pi^{EA} \) \( \rightarrow \) small \( \uparrow \) \( R^{ECB} \) \( \rightarrow \) \( \downarrow \) FL

\( \Rightarrow \) Both \( \downarrow \) FL (shift UP/LEFT) \( \rightarrow \) \( \uparrow \) default prob (3% B/Y=125%)

**ZLB:** NO MP channel \( \Rightarrow \) SMALLER effect of \( \Delta g \), \( g^* \) on FL
Fiscal policy exercises.

1. Peripheries’ long-run consolidation from B/Y=100 to 60%
2. Discretionary short-run fiscal policy (transitory $\Delta g, g^*$)

- Under two regimes for Monetary Policy:
  - Normal times
  - Zero lower bound
Policy scenario 1:

Peripherys’ long-run consolidation from B/Y=100 to 60%

What we do: set Periphery’s debt at 100% & let fiscal/monetary rules bring economy back to 60%
Periphery’s long-run Consolidation:
B/Y FROM 100 TO 60%

- High debt requires significant ↑ tax, ↓ B/Y slowly, with high risk premium
- Long and costly process (↓ Y, C & L), spillover to Core (↓ Y*).
- With NO default lower cost of financing. → smaller Y loss
Frontloaded ↓ risk premium & long-run cost.

Initial greater ↓Y due to flex wages: stronger ↑tax→↑W→↑R^ECB

GDP loss from frontloading is lower when FL is Endogenous.
Policy scenario 2:

Discretionary short-run fiscal policy (transitory $\Delta g$, $g^*$)

Monetary Policy in **normal times regime**

IRFs show marginal effects with respect to long-run consolidation.
Discretionary fiscal policy: 1% rise in g

- With high debt, $g \uparrow \rightarrow \downarrow FL, \uparrow \text{risk premium} \rightarrow \uparrow R/\pi$
- Initial rise in Y, but falls after 10q
- MP channel weak: $\uparrow \pi^{EA} \rightarrow \text{small} \uparrow R^{ECB} \rightarrow \downarrow FL$
Risk premium channel becomes relevant for debt > 90%
Below 90% periphery is closer to low-debt Core
When FL is Exogenous RP does not jump↑, rises only as ↑debt
When debt is not risky, RP is constant, Y doesn’t fall.
Policy scenario 2:

Discretionary short-run fiscal policy (transitory $\Delta g$, $g^*$)

Monetary Policy in **Zero Lower Bound** regime
ZLB, Discretionary FP: 1% rise in g

Under ZLB the RP channel is muted:

- $\uparrow g \rightarrow \downarrow FL \rightarrow \uparrow RP \rightarrow \text{initially } \uparrow Y, \inf$
- ZLB $\rightarrow$ constant R, $\uparrow \inf \rightarrow \downarrow \frac{R}{P} \rightarrow \uparrow FL \rightarrow \downarrow RP$

$\implies$ net effect $\rightarrow$constant RP $\rightarrow$ multiplier $\approx$ No default case
At ZLB $\rightarrow$ NO MP channel $\rightarrow$ RP constant $\rightarrow$ best is $\uparrow g^*, g$. 
Risk premium reduces multiplier by 76bp, 29bp due to endo FL
Spillover to EMU reduces multiplier by 35bp, 13bp due to endo FL.
ZLB kills RP channel $\rightarrow$ multiplier $\approx$ No default case
Conclusions:

- **Normal times:** Risk channel matters significantly when debt is $>90\%$.
  - Makes long run consolidation to 60% costly, with spillovers to EMU.
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Further work

- Calibrate impact of Covid-crisis on Fiscal limit
- Effect of productive government spending
- Effect of structural reforms.
Further work: Impact of Covid on FL

Cumulative density function (cdf)  10% Δ Periphery’s g

According to pre-crisis FL (movement along the curve). The increase in public debt (ES: 95%->120%) augments prob of default by 30bp. But the increase in gov spending (by 4% of GDP) also shifts FL to the LHS. Increasing prob of default for all debt levels.
An increase of g by 4% of GDP increases risk premium by 100bp under a Taylor rule, but leaves it unchanged under the ZLB
Further work: Gov Productive spending

- If part of $G$ is productive, $y = Af(G)L$, an increase in $G$ augments productivity, increasing $y$ and $FL$.
- EU plans to finance national governments investments may help high debt countries.
Further work: Structural reforms

Impact of change in prod

Structural reforms help fiscal sustainability in 2 ways:
- Increase productivity $A$ in $y = Af(G)L$, increasing $y$ and FL.
- Fiscal reforms may push up the max tax rate and increase FL

$$B(S_t) = \beta^p_t \pi(S_t) E_t \sum_{j=0}^{\infty} \beta^j \frac{\lambda(S_{t+j})}{\lambda(S_t)} \frac{\tau_{max} y(S_{t+j}) - g_{t+j}}{\text{tot}(S_{t+j})^{1-\eta}}$$
Conclusions:

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THANK YOU FOR YOUR ATTENTION
Calibration:

Periphery = Spain, Core = Germany

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- $\beta$: the discount factor
- $\theta$: elasticity of substitution
- $\psi$: Rotemberg adjustment parameter
- $\alpha_\pi$: Taylor rule parameter to inflation
- $\gamma_b$: tax response parameter to changes in debt
- $b/y$: steady state debt to output ratio (home)
- $b^*/b^*$: steady state debt to output ratio (foreign)
- $g/y$: steady state gov spending to output ratio (home)
- $g^*/y^*$: steady state gov spending to output ratio (foreign)
- $\tau$: steady state income tax rate (home)
- $\tau^*$: steady state income tax rate (foreign)
- $a, a^*$: steady state technology
- $\rho^a, \rho^{a*}$: AR(1) coefficient in government spending rules
- $\sigma_g, \sigma_{g^*}$: standard deviation of government spending shock
- $s$: share of home country
- $\eta$: home country bias in home goods
- $\eta^*$: foreign country bias in home goods
- $\delta$: quarterly haircut on debt if default occurs
**Standard Fiscal/Monetary Policy:**

- **Fiscal policy rule** in each country:
  \[ \tau_t = \tau + \gamma_b (b_{t-1} - 0.6) \]

- **Monetary policy**
  \[
  R_{t}^{ECB} = \begin{cases} 
  R_{t}^{ECB} + \alpha \pi (\pi_{MU,t} - \pi_{MU}) & \text{if } s_{t}^{R} = 1 \\
  1 & \text{if } s_{t}^{R} = 2 
  \end{cases}
  \]

MP regime evolves exogenously according to 
\[
\begin{pmatrix}
  p_1 & 1 - p_1 \\
  1 - p_2 & p_2
\end{pmatrix}
\]
prob to stay in regime \( p_1 = .99, \ p_2 = .65. \)
10% ↑g:

- ↑deficit, Y, π → ↓FL (shift UP/LEFT)
- MP channel weak: small ↑YEₐ, πEₐ → small ↑Rₑcb → ↓FL

⇒ Both ↓FL (shift UP/LEFT) → ↑ default prob (3% B/Y=125%)
10% $\uparrow g^* \rightarrow \uparrow \text{deficit}^*, Y^*, \pi^* \rightarrow \underline{\text{spillover}} \text{ to Periphery due to:}$

- **MP channel:** $\uparrow R^{ECB} \rightarrow \uparrow \text{financing costs of debt} \rightarrow \downarrow \text{FL}$
- **Trade channel:** $\uparrow M^*=X \rightarrow \uparrow \text{FL (shift DOWN/RIGHT)}$

$\Rightarrow$ Net effect $\downarrow \text{FL (shift UP/LEFT)} \rightarrow \uparrow \text{default prob (1.5% B/Y=125%)}$  
Spillover is 50% of own effect (3% vs 1.5%).
Fiscal coordination in EMU:
JOINT CONSOLIDATION IS BEST POLICY

- $\uparrow g^* \rightarrow$ strong MP channel: $\uparrow R^{ECB} >$ Trade channel
- Thus, best coordination policy is joint consolidation.