Discussion on

Optimal External Debt and Default

Bernardo Guimaraes

Alberto Martin
CREI and Universitat Pompeu Fabra

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This paper

• Analyzes whether sovereign default can be interpreted as a contingency of optimal contracts

• Develops a small open economy model:
  – With capital accumulation
  – Without commitment
  – In which default generates permanent exclusion and permanent loss of output

• Model applied to the debt reduction obtained by Latin American countries within the Brady plan
Outline of this discussion

- Simple model to illustrate the mechanism
- Comment on theoretical results
- Comment on application to Brady plan
- No self-promotion
The Model

- Assume three-period world: \( t = 0, 1, 2 \)

- Small open economy,
  - maximizing \( u(c_2) \)
  - with investment opportunities at \( t = 0 \) and at \( t = 1 \) such that
    \[ y_{t+1} = (I_t)^\alpha, \text{ where } \alpha \in (0, 1) \]
  - no endowments

- To finance investment, borrow from abroad
  - at \( t = 0 \), gross international rate is \( r \)
  - at \( t = 1 \), gross international rate is \( \left\{ \begin{array}{ll} r_H & \text{with probability } \frac{1}{2} \\
                          r_L & \text{with probability } \frac{1}{2} \end{array} \right. \\

- The country cannot commit to repay, whenever it defaults it
  - loses fraction \( \gamma \) of output from there onwards
  - financial autarky

- Everything is observable
### Timeline

<table>
<thead>
<tr>
<th>$t = 0$</th>
<th>$t = 1$</th>
<th>$t = 2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>country borrows and invests $D_0 = I_0$</td>
<td>$r_i, i \in {L, H}$ realizes and country may EITHER:</td>
<td>country may EITHER:</td>
</tr>
<tr>
<td></td>
<td>REPAY</td>
<td>REPAY</td>
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<tr>
<td></td>
<td>- repays $I_0r$</td>
<td>- repays $D_ir_i$</td>
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<tr>
<td></td>
<td>- borrows $D_i$</td>
<td>- $c_2 = (I_0^a - I_0r + D_i)^a - D_ir_i$</td>
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<tr>
<td></td>
<td>- invests $(I_0^a - I_0r + D_i)$</td>
<td>DEFAULT</td>
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<tr>
<td></td>
<td>DEFAULT</td>
<td>- invests $(1 - \gamma)(I_0^a)$</td>
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Equilibrium

- Assume borrowing constraints are always binding
- Assume repayment at $t = 1$ is NOT contingent
- Starting at $t = 2$, the IC constraint pins down $D_i$,
  \[ \gamma \cdot y_2 = \gamma \cdot (I_0^\alpha - rI_0 + D_i)^\alpha \geq r_i D_i \]
  so that $D_L > D_H$

- Going back to $t = 1$, the IC constraint is that, for all $i \in \{H, L\}$
  \[ (1 - \gamma) \cdot (I_0^\alpha - rI_0 + D_i)^\alpha \geq (1 - \gamma) \cdot ((1 - \gamma) \cdot I_0^\alpha)^\alpha \]
  \[ \iff \gamma I_0^\alpha + D_i \geq rI_0 \]
- What goes on?
  - when $i = H$, IC binding (few fresh funds from abroad)
  - when $i = L$, country could pay back more (IC slack)
cost and benefit of default

benefit of default

$rI_0$

$I_0$
The graph shows the cost and benefit of default, with the cost of default $D_H$ and the benefit of default $rI_0$. The x-axis represents $I_0$, and the y-axis represents the cost and benefit of default.
cost and benefit of default

$\text{cost of default}_{L}$

$\text{cost of default}_{H}$

$rI_0$  →  benefit of default

$I_0$

$D_L$

$D_H$
cost and benefit of default

no default  default₇₀  always default

cost of default₇₀

cost of default₇₀

benefit of default

$D_L$

$D_H$

$I_0$
cost and benefit of default

no default  default_H  always default

max \{I_0\}

D_L

D_H

rI_0

benefit of default

cost of default_L

cost of default_H
What can be done?

- Since the IC constraint binds when $r$ is high, the country can:
  - promise to pay less $(I_H < rI_0)$ when $i = H$
  - promise to pay more when $(I_L > rI_0)$ $i = L$
  - while satisfying 0 profits for creditors

- $I_0$ expands until constraints bind in all states

- In this model, $I_L - I_H$,
  - increases with $r_H - r_L$ (which increases $D_H - D_L$)
  - increases with the persistence of the shock
  - the paper also analyzes the relationship with $k$ which is ambiguous

- Bernardo considers shocks to productivity at $t = 1$, which are
  - qualitatively the same
  - quantitatively of a lower order of magnitude (not very clear why)
Application to Brady Plan

- The model is calibrated and predicts:
  - a reduction of approximately 18% in debt in response to
  - an increase of 4% in the real interest rate

- The paper claims that this is consistent with Brady plan
  - debt reduction of 29% for Latin America in 1989
  - “in response” to increase in $r$ in early 80’s
Application to Brady Plan: comment 1

- Simple comments on the calibration:
  - More info on interest rate process (why average persistence of 10 years?)
  - Same for productivity shock (same persistence as interest rates?)
Application to Brady Plan: comment II

• From a broader perspective, Brady agreements implied many other things;
  – “commitment” to undertake reforms
  – change from bank- to market- based system of lending

• To interpret this debt reduction as optimal contract, the numerical exercise should be tighter
  – either tailor the model to Brady circumstances, or
  – look at other instances where debt reduction follows increase in \( r \)
Conclusions

- This is a very interesting paper

- The theoretical model is:
  - well-crafted and contains robust insights
  - it would be nice to deepen the analysis on interest rates vs. productivity shocks

- The application to the Brady debt reduction, though, I find less convincing:
  - more thorough numerical exercise

- Perhaps an interesting avenue to pursue is on the design of optimal indexed assets