Sovereign Default and Capital Controls

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April 19, 2018
Motivation

- Sovereign debt is subject to lack of commitment, and there are greater incentives to default on external public debts.
- Emergence of domestically & externally held public debts introduces new dimension in repayment decisions.
- Recent literature explores domicile/default relationship.
Question

What does lack of commitment to repay imply for optimal capital control policy?

- The domicile of bondholders matters
- Distinct from conventional capital control theories

**New insight** Controls as a commitment device

- Optimal controls support equilibrium with foreign lending, mitigate default risk
- Controls employed during bad times
The Canonical Model

Setup

Two period model $t = 0, 1$. Endowment economy inhabited by a sovereign and foreign lenders.

- **Sovereign**
  - Benevolent, must finance some expenditure ($g_0$)
  - Chooses how much to borrow from abroad ($B_f$)
  - Lacks commitment to repay at $t = 1$ ($\delta = 0$ denotes default)

- **Exogenous cost of default ($\phi$)**

- **Foreign lenders**
  - Deep pocketed, risk neutral. Price bonds according to

\[
q = \frac{\delta}{R}
\]
The Canonical Model

Planner's Pb.

The period 0 sovereign solves

$$\max\{ V_{aut}, V_{rep} \}$$

Where

$$V_{aut} = u(y_0 - g_0) + \beta u(y_1)$$

$$V_{rep} = \max_{c_0, c_1, B_f} u(c_0) + \beta u(c_1)$$

st.

$$c_0 \leq y_0 - g_0 + qB_f$$

$$c_1 \leq y_1 - B_f$$

$$B_f \leq \phi$$
The solution amounts to choosing between the allocations implied by autarchy and repayment.

- Under repayment the sovereign borrows $B_f$ at price $\frac{1}{R}$ according to

$$u'(c_0) = \beta Ru'(c_1) + \mu R$$

Where $\mu$ is the Lagrange multiplier on the borrowing constraint ($B_f \leq \phi$)
The Model
Implementing the Optimal Allocation

Implementation naturally yields a role for capital control policy.

Economy inhabited by a sovereign, domestic households, and foreign lenders.

- **Sovereign**
  - Benevolent, sets capital control policy ex-ante ($\tau$), lacks commitment to repay.
- **Households**
  - Smooth consumption, save in government bonds ($B_d$)
- **Foreign lenders**
  - Deep pocketed, risk neutral, purchase government bonds ($B_f$)
The Model

Households

\[ V = \max_{c_0, c_1, B_d} u(c_0) + \beta u(c_1) \]

\[ \text{st.} \]
\[ c_0 = y_0 - qB_d - T_0 \]
\[ c_1 = y_1 + \delta B_d - T_1 \]
\[ B_d \geq 0 \]

FOC on interior

\[ q = \frac{\beta u'(c_1)}{u'(c_0)} \]

- Higher return on public debt (\( \downarrow q \)) increases household savings
The Model

Foreign Lenders

Risk neutral, deep pockets, access to risk-free asset (return $R$).

Break even constraint

$$\frac{q(1 + \tau)}{\delta} - \frac{1}{R} = 0$$

$$q = \frac{\delta}{R(1 + \tau)} \text{ if } B_f > 0$$

- Capital controls ($\tau$) produce wedge between return on debt for foreign lenders and domestic households
The Model

Sovereign

- Must finance expenditure $g_0$ at time 0
- Issues bonds ($B = B_d + B_f$) and sets capital controls ($\tau$)
- Subject to HH implementability condition ($q = \frac{\beta u'(c_1)}{u'(c_0)}$) and pricing equation

Faces budget constraints

$$ (1 - \delta) T_0 = g_0 - q[B + \tau B_f] $$
$$ T_1 = \delta B + (1 - \delta) \phi $$

Where $\phi$ denotes exogenous cost of default.

- Sovereign wants to smooth $g_0$
The Model
Ramsey Problem, Primal Approach

\[ V_{rep} = \max_{c_0, c_1, B_f} u(c_0) + \beta u(c_1) \]

subject to

\[ c_0 \leq y_0 - g_0 + \frac{B_f}{R} \quad (1) \]
\[ c_1 \leq y_1 - B_f \quad (2) \]
\[ B_f \leq \phi \]

\( (1) \) and \( (2) \) collapse to the economy-wide constraints at risk-neutral prices.
Solution

Implementation

First order condition

\[ u'(c_0) = \beta R u'(c_1) + \mu R. \]

Implementing the optimal allocation yields a natural role for capital controls.

\[ \tau = \begin{cases} 
\frac{u'(c_0)}{\beta R u'(c_1)} - 1 & \text{if } \mu > 0 \\
0 & \text{Otherwise}
\end{cases} \]

- Implies an optimal capital control that is countercyclical.
- Imposition of controls displays threshold behavior in initial domestic disposable income.
Solution
Numerical

Table: Parameterization

<table>
<thead>
<tr>
<th>$\beta$</th>
<th>$R$</th>
<th>$\phi$</th>
<th>$y_0$</th>
<th>$y_1$</th>
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</thead>
<tbody>
<tr>
<td>0.96</td>
<td>1.04</td>
<td>0.12</td>
<td>1.05</td>
<td>1.0</td>
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</tbody>
</table>

Table: Comparison for $g_0 = .35$

<table>
<thead>
<tr>
<th></th>
<th>Welfare</th>
<th>$\frac{Internal}{Total\ debt}$</th>
<th>$\tau$</th>
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</thead>
<tbody>
<tr>
<td>Commitment</td>
<td>1</td>
<td>0.5789</td>
<td>0</td>
</tr>
<tr>
<td>No Commitment</td>
<td>0.9687</td>
<td>1</td>
<td>0</td>
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<tr>
<td>Capital Controls</td>
<td>0.9985</td>
<td>0.7035</td>
<td>0.1666</td>
</tr>
</tbody>
</table>
Solution

Controls to support markets

![Optimal Capital Controls](image)

**Figure:** Welfare Comparison
Solution

Controls in bad times

Figure: Countercyclical Controls
Conclusion

- A novel rationale for countercyclical capital control policy
- Controls support foreign lending in an environment without commitment
- Uncertainty introduces further tradeoff
  - mitigation of default risk & increased bond revenue vs. distorting consumption/savings & the option value of default