Linkages across Sovereign Debt Markets
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Overview

**Motivation**
- sovereign debt crises tend to occur in tandem
  - Latin America in the 80s
  - Europe today

**Main goal**
- extend workhorse model of sovereign default to two countries
- study simultaneity of debt crises

**Main channel: spillover effects**
- country’s actions affect other’s incentives to default
  - price of debt and recovery (haircut) on defaulted debt
- spillover effects quantitatively important
General reaction

- Important and timely topic

- Very interesting contribution
  - workhorse model of sovereign debt
  - extension: multicountry (Lizarazo (2009), Park (2013)) and risk averse lenders
  - non-trivial step forward

Outline

- description of model
- quantitative results
- comments: spillover channels
Model: ingredients

- Two symmetric countries and international lenders
  - infinite horizon

- Preferences: \( E \sum_{t=0}^{\infty} \beta^t u(c_t) \)
  - countries less patient than lenders

- Income:
  - countries: stochastic endowment
  - lenders: income from lending

- Asset markets:
  - non-contingent bond
  - sovereign risk
Model: timing and default

- In each period, two rounds:
  - round 1: repayment/renegotiation decision
  - round 2: borrowing decisions (Cournot)

- Costs of default:
  - financial autarky
  - loss of output

- To end default:
  - country must renegotiate with creditors
    - Nash bargaining
  - successful renegotiation at $t$ ends default from $t + 1$ onwards

- **Crucial assumption**: countries bargain *cooperatively*
  - take-it-or-leave-it offers, lenders must accept or reject all
  - if both countries negotiate: lenders’ outside option is autarky!
    - low recovery
Model: main results

- Spillover effects
  - one default raises likelihood of another
  - possibility of multiple equilibria

- Two channels:
  - bond prices
    - default hurts income of lenders: raises risk-free rate $r$
    - raises cost of repayment
  - recovery
    - in joint renegotiation, worse outside option for lenders
    - lower recovery: higher return to default

- Calibrate model to Europe:
  - borrower income process/preferences to match Greek data
  - lender income process/preferences to match German data
  - significant spillover effects on spreads and recoveries
Table 3: Debt Linkages

<table>
<thead>
<tr>
<th>Home</th>
<th>Overall Mean</th>
<th>Foreign Good Credit</th>
<th></th>
<th>Foreign Bad Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Repay</td>
<td>Default</td>
<td>Renegotiation</td>
</tr>
<tr>
<td>Default prob.</td>
<td>4.5</td>
<td>2.9</td>
<td>37.3</td>
<td>0.03</td>
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<tr>
<td>Renegotiation prob.</td>
<td>98</td>
<td>100</td>
<td>1</td>
<td>100</td>
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<tr>
<td>Recovery</td>
<td>66</td>
<td>71</td>
<td>90</td>
<td>58</td>
</tr>
<tr>
<td>Spread</td>
<td>1.6</td>
<td>1.6</td>
<td>1.9</td>
<td>1.1</td>
</tr>
</tbody>
</table>
Table 4: Types of Defaults and Renegotiations (%)

<table>
<thead>
<tr>
<th></th>
<th>Default</th>
<th>Repay</th>
<th>Renegotiation</th>
<th>Nonrenegotiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>75</td>
<td>73</td>
<td>7</td>
<td>0</td>
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<tr>
<td>Dependent</td>
<td>25</td>
<td>27</td>
<td>93</td>
<td>100</td>
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<tr>
<td>Self-fulfilling</td>
<td>14</td>
<td>0</td>
<td>36</td>
<td>87</td>
</tr>
</tbody>
</table>
Comment: spillover through bond prices

- In the model, spillover effects through
  - bond prices
  - recovery

- Bond prices: spillover always negative

- Why? Not obvious:
  - lower income of lenders: reduces bond prices
  - portfolio rebalancing: raises bond prices
  - higher market power of borrower (monopolist): raises bond prices
    - only first effect mentioned in paper
    - conceptual or quantitative?

- Possibly important during crises:
  - US and Germany during recent crisis
  - as “safe assets” disappeared, contagion vs. scarcity effects
  - investors flocked to US and German bonds, lowering interest rates
Comment: spillover through recovery rates

- Recovery rates
  - second channel for spillover effects
  - quantitatively, crucial
<table>
<thead>
<tr>
<th></th>
<th>Benchmark</th>
<th>Decomposing Mechanism</th>
<th>Correlated Shocks</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Linear</td>
<td>Low IES</td>
<td>Small Country</td>
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<tr>
<td>Mean (%)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Default probability</td>
<td>4.5</td>
<td>4.2</td>
<td>1.3</td>
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<tr>
<td>Spread</td>
<td>1.6</td>
<td>1.7</td>
<td>0.6</td>
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<tr>
<td>Recovery</td>
<td>66</td>
<td>66</td>
<td>62</td>
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<tr>
<td>Recovery multiple – single</td>
<td>-13</td>
<td>-10</td>
<td>-18</td>
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<tr>
<td>Debt service / GDP</td>
<td>6.3</td>
<td>6.3</td>
<td>5.9</td>
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<tr>
<td>Volatility (%)</td>
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<tr>
<td>Risk-free rate</td>
<td>1.6</td>
<td>0.0</td>
<td>4.0</td>
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<tr>
<td>Spread</td>
<td>1.8</td>
<td>1.7</td>
<td>1.2</td>
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<tr>
<td>Exposure</td>
<td>15</td>
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<td>17</td>
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<tr>
<td>Correlations across countries</td>
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<tr>
<td>Spreads</td>
<td>0.42</td>
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<td>0.52</td>
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<tr>
<td>Exposure</td>
<td>0.30</td>
<td>0.34</td>
<td>0.51</td>
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<tr>
<td>Default</td>
<td>0.34</td>
<td>0.45</td>
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<tr>
<td>Fraction dependent events (%)</td>
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<td></td>
</tr>
<tr>
<td>Default</td>
<td>25</td>
<td>35</td>
<td>31</td>
</tr>
<tr>
<td>Repay</td>
<td>27</td>
<td>27</td>
<td>22</td>
</tr>
<tr>
<td>Renegotiation</td>
<td>93</td>
<td>94</td>
<td>95</td>
</tr>
<tr>
<td>Nonrenegotiation</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Correlated Shocks</td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correlation</td>
<td>66</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Comment: spillover through recovery

- Recovery rates
  - second channel for spillover effects
  - quantitatively, crucial

- Yet, not very persuasive

- Theoretical perspective:
  - countries do not cooperate when they issue debt...
  - ...but they cooperate when they negotiate!
  - hard to justify

- Practical/empirical perspective:
  - is there any evidence of countries negotiating jointly?
  - paper motivated through Latam and Euro periphery
    - do they really limit outside options of investors?
Comment: spillover through recovery

- Paper provides some empirical evidence
  - recovery rates are lower when other countries are negotiating, i.e. \( \gamma_R < 0 \)

  \[
  \text{recovery}_{it} = \alpha + \gamma_D \text{FracDefault}_{it} + \gamma_R \text{FracRenegotiate}_{it} + \gamma_{dy} \text{Debt/GDP}_{it} + \epsilon_{it}
  \]

- Alternative story
  - defaults happen in tandem during “bad times”
    - common shocks
  - fraction of countries renegotiating is higher in aftermath of these large shocks
    - low recovery rates
  - in robustness, control for world GDP but probably not enough
Sovereign Defaults in Latin America

(in Percent of Countries)

Note: The bars indicate how many countries defaulted in each year (in percent of all countries).

Source: Kaminsky and Vega-García
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Source: Kaminsky and Vega-García
1826-28 Argentina, Greece, Chile, Mexico, Brazil, Colombia, Guatemala, Venezuela, Ecuador

1833 Mexico
1837 Spain, Portugal

1870-1890 Argentina, Chile, Mexico, Colombia, Peru, Turkey, Bolivia, Uruguay, Venezuela

1932-1945 Austria, Germany, Italy, Greece, Hungary, Colombia, Brazil, Japan, China, Turkey

1989 Argentina
2000 Ecuador
2001 Argentina
2004 North Korea

Sources: Standard & Poor’s; Kenneth Rogoff, Harvard; Carmen Reinhart, U. Maryland.
Conclusion

- Very nice paper
  - important and timely topic
  - extend workhorse sovereign debt model to analyze contagion

- Main comments:
  - “bond-price” channel can be further explored
  - recovery channel not quite convincing

- Alternatives:
  - trade linkages
  - (other) financial linkages (Lizarazo 2009, Park 2013)
  - information or “wake up” call
"Spain is not Greece" - Elena Salgado, Spanish Finance Minister, Feb 2010.

"Portugal is not Greece" - The Economist, April 2010.

"Greece is not Ireland" - George Papaconstantinou, Greek Finance Minister, Nov 2010.

"Spain is neither Ireland nor Portugal" - Elena Salgado, Spanish Finance Minister, Nov 2010.

"Ireland is not in 'Greek Territory'" - Irish Finance Minister Brian Lenihan, Nov 2010.

"Neither Spain nor Portugal is Ireland" - Angel Gurria, Secretary-general OECD, Nov 2010.

"Italy is not Spain" - Ed Parker, Fitch MD, June 2012.

"Spain is not Uganda" - Spanish PM Mariano Rajoy, June 2012.

"Uganda does not want to be Spain" - Ugandan Foreign Minister, June 2012.

Heard through Alex Banbury of Hamilton Capital who sent this to IFRAsia.