Breaking the Sovereign-Bank Diabolic Loop: A Case for ESBies

by
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“Euro-nomics Group”
Diablic Loop

- Banks’ CDS vs. Sovereign CDS

![Graph showing the relationship between change in CDS premia of average banks and change in sovereign CDS premia. The graph includes points labeled GBR, GER, FRA, ITA, SPA, IRE, and POR.]
Diabolic Loop: Banks’ CDS vs. Sovereign CDS

- Vulnerable countries

- Non-vulnerable countries

Source: Altavilla, Pagano, Simonelli (2015)
Credit Diabolic Loop

- Less lending to real economy

- GDP and tax revenue declines by $\tau \psi L_0$
Roadmap

- Diabolic Loop: Stylized Facts

- Single country case
  - Model of Diabolic Loop
  - Tranching only

- Multiple country case
  - Pooling
  - Pooling and Tranching -> ESBies

- Flight to Safety
Model of Diabolic Loop

\[ t \]

- sunspot stage
- bailout stage

\[ S \]
\[ \bar{S} \]

\[ 1 - p \]
\[ p \]

\[ \pi \]
\[ 1 - \pi \]
Model of Diabolic Loop

- Sunspot stage
  - Sunspot
  - Price drop
- Bailout stage
  - Bailout
  - Credit crunch at $t=2$

Equation:

$$t = 1 - \tau \psi L_0$$
Model of Diabolic Loop

- Sunspot stage
- Bailout stage

- Credit crunch at $t=1$
- Price drop
- Bailout
- No bailout

$1 - p$
$p$

$\pi$
$1 - \pi$

$S$
$\overline{S}$

$-\tau\psi L_0$

Time-inconsistency problem
Model of Diabolic Loop

- Sunspot stage
- Bailout stage

\[ t = 1 - \psi \]

\[ \pi \]

\[ S \]

\[ \frac{1}{S} \]

- Credit crunch at time 1
- Price drop
- Bailout dilutes bonds

- Time-inconsistency problem
Model of Diabolic Loop

\[ \text{time-inconsistency problem} \]

\[ \pi \]

\[ 1 - \pi \]

\[ S \]

\[ \overline{S} \]

\[ t = 0 \]

\[ t = 1 \]

\[ t = 2 \]

\[ t = 3 \]

Sunspot stage

Bailout stage

Credit crunch \( t = 1 \)

Price drop

Diabolic loop

Total payoff

\[ \alpha (B_1 - B_0) - E_0 \]
Single Country: No Tranching

- $F = S$ face value of government debt
Single Country: No Tranching

- $F = S$ face value of government debt
- Banks hold
  - At $t = 0$

\[\begin{array}{c|c|c}
A & L \\
\hline
\text{Loans } L_0 & \text{Deposits} \\
\text{Gov. B } \alpha B_0 & \text{Equity } E_0 \\
\end{array}\]

$\alpha =$ fraction of gov. bonds held by banking system
Single Country: No Tranching

- $F = S$ face value of government debt

- Banks hold
  - At $t = 0$
  - At $t = 1$ Bond price drop

  \[ B_0 = S - \pi pC \]

  \[ -\alpha (B_1 - B_0) > E_0 \]

  Endogenous bailout cost =

  \[ = \tau \psi L_0 - [\alpha (B_1 - B_0) - E_0] \]
Single Country: No Tranching

- \( F = S \) face value of government debt
- Banks hold
  - At \( t = 0 \)
  - At \( t = 1 \) Bond price drop \( -\alpha(B_1 - B_0) > E_0 \)
    
    \[
    B_0 = S - \pi p C
    \]
    
    Endogenous bailout cost = \( \tau \psi L_0 - [\alpha(B_1 - B_0) - E_0] \)

- Proposition 1:
  - Maximum sovereign holdings of banks to avoid diabolic loop:
    \[
    \frac{E_0}{\alpha S} \geq (1 - p)\pi \frac{\tau \psi L_0}{S}
    \]
Single Country: No Tranching

- $F = S$ face value of government debt

- Banks hold
  - At $t = 0$
  - At $t = 1$ Bond price drop $-\alpha(B_1 - B_0) > E_0$  
    \[ B_0 = S - \pi p C \]

- Proposition 1:
  - Maximum sovereign holdings of banks to avoid diabolic loop: 
    \[ \frac{E_0}{\alpha S} \geq (1 - p) \pi \frac{\tau \psi L_0}{S} \]
  - Maximum amount of safe assets $\alpha \ast B_0$
Single Country: Tranching

- $\alpha^S, F^S; \quad E_0$

  Face value of senior bond = tranching point

\[
\begin{array}{c|c|c}
\text{A} & \text{L} \\
\text{single Gov.-Bond} & F^S - (C^S - (S - F^S)) & \text{Junior}
\end{array}
\]

- Banks can only hold senior bond
**Single Country: Tranching**

- \(\alpha^s, F^s; \ E_0\)

  Face value of senior bond = tranching point

\[
\begin{array}{c|c}
A & L \\
\hline
\text{single Gov.-Bond} & F^s - (C^s - (S - F^s)) \\
\_S \text{ or } S & \underline{\text{Junior}}
\end{array}
\]

- Banks can only hold senior bond

- **Proposition 2:**
  - Maximum sovereign holdings of banks to avoid diabolic loop:
    \[
    \frac{E_0}{\alpha_S} \geq (1 - p) \pi \frac{\tau \psi L_0 - (S - F^s)}{S}
    \]
Single Country: Tranching

- $\alpha^S, F^S; \quad E_0$
  
  Face value of senior bond = tranching point

<table>
<thead>
<tr>
<th>A</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>single Gov.-Bond $S$ or $S$</td>
<td>$F^S - (C^S - (S - F^S))$</td>
</tr>
<tr>
<td>Junior</td>
<td></td>
</tr>
</tbody>
</table>

- Banks can only hold senior bond

- Proposition 2:
  - Maximum sovereign holdings of banks to avoid diabolic loop:
    \[
    \frac{E_0}{\alpha S} \geq (1 - p)\pi \frac{\tau \psi L_0 - (S - F^S)}{S}
    \]
  - Maximum amount of safe assets $\alpha^{S*} = 1, F^{S*} = \ldots$
    - Larger than without tranching
Two Countries: Only Pooling

- 2 countries
  - Currency union: sovereign bonds are “subsovereign”
  - Same size
  - Realization of $S$ vs. $\bar{S}$ is i.i.d. with same probability $\pi$

- Banks in each country hold fraction $\alpha^p$ of pooled asset
  - Hold indirectly fraction $\frac{1}{2} \alpha^p$ of each country’s government bond

- Proposition 3:
  - 50-50 pooling has no advantage!
  - Perfect correlation
    - Banks in both countries are identical and are either bailed out or not (by both countries)
    - Risk spreading vs. risk sharing
Two Countries: Pooling & Tranching

- ESBies = European Safe Bond

\[ \begin{align*}
&\text{A} & \text{L} \\
&\text{sovereign bonds} & \text{ESBies} \\
& & \text{EJB}
\end{align*} \]
Two Countries: Pooling & Tranching

- ESBies = European Safe Bond

- Proposition 4
  - For a given $F^E = F^S, \alpha^E = \alpha^S$, ESBies lower capital requirements
  - ESBies generate large amount of safe assets
  - Even Junior bond (EJB) is risk-free (in equilibrium)
Two Countries: Pooling & Tranching

- ESBies = European Safe Bond

- Proposition 4
  - For a given $F^E = F^S$, $\alpha^E = \alpha^S$, ESBies lower capital requirements
  - ESBies generate large amount of safe assets
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- Intuition:
  - Push (off-equilibrium) losses to junior bond holders
  - Tranching is more powerful after pooling
Flight to safety

Today: asymmetric shifts across borders

- Value of German debt decreases
  - German CDS spread rises, but yield on bund drops (flight to quality)
- Value of Italian/Spanish/Greek... sovereign debt declines

Flight to safety asset is endogenous (coordination problem)
Flight to safety

- Today: asymmetric shifts across borders
  - Value of German debt decreases
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  - Value of Italian/Spanish/Greek... sovereign debt declines

- With ESBies: Negative co-movement across tranches
  - Value of ESBies expands – due to flight to quality
  - Value of Junior bond shrinks – due to increased risk
  - Asset side is more stable
Conclusion

- **Diabolic loop**
  - Bank bailout dilutes bond holders, which in turn held by banks

- **Tranching without pooling (single country)**
  - Bank capital requirement reduced due to protection from junior bond

- **Pooling across sovereigns**
  - No advantage – same bank capital requirements
  - Perfect correlation across countries
    - (banks default in both countries)

- **ESBies pooling & tranching**
  - Now pooling has bite
  - Now capital requirements are lower than in single tranching case
  - More safe assets for economy
  - Junior bond is also risk-free!