Bond Convenience Curves and Funding Costs

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Consider two EUR-denominated investments with same duration
1. buy a German bond
2. buy a synthetic safe bond: Italian bond + CDS

Both have same cash flows ⇒ yields should equal

The latter trades on average at 40bps higher yield, gap spikes in a crisis

New policy interest due to ECB’s Transmission Protection Instrument (announced July 2022)
- activated if “experiencing a deterioration in financing conditions not warranted by country-specific fundamentals”

Spread betting: how will the ECB’s new bond-buying tool work?

Policymakers hope new programme will give central bank cover to raise rates without triggering market turmoil
The gap has several names: inconvenience yield (Jiang et al. 22), CDS-bond basis, segmentation premium

\[ icy_t^i(\tau) = y_t^i(\tau) - cds_t^i(\tau) - (y_t^{DE}(\tau) - cds_t^{DE}(\tau)) , \]

This paper:

- Two assumptions explain eurozone sovereign inconvenience curves:
  - Funding costs on riskier bonds higher
  - Funding costs uncertain and arbitrageurs risk averse
- Use exogenous changes in Eurosystem haircuts to find causal evidence that funding costs affect yields
- Changes in inconvenience yields key for monetary policy transmission to yields spreads
Facts
Stylized Fact 1

Riskier bonds, as measured by CDS premia, command higher inconvenience yields (weaker time-series relation)

plots the average inconvenience yield for each country against the corresponding average CDS premium.
Inconvenience yields are associated with funding costs and funding risks.

<table>
<thead>
<tr>
<th>(1) ICY Slope</th>
<th>(2) ICY Slope</th>
<th>(3) ICY Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>icy(t)</td>
<td>icy(t)</td>
<td>icy(t)(1Y) − icy(t)(1Y)</td>
</tr>
<tr>
<td>icy(t)(10Y)</td>
<td>icy(t)(1Y)</td>
<td>icy(t)(1Y)</td>
</tr>
<tr>
<td>CDS diff. (cds(t) − cds(t)DE)</td>
<td>0.037*</td>
<td></td>
</tr>
<tr>
<td>Repo rate diff.</td>
<td>0.80**</td>
<td></td>
</tr>
<tr>
<td>Repo rate vol.</td>
<td>3.24***</td>
<td></td>
</tr>
<tr>
<td>ICY Slope icy(t)(10Y) − icy(t)(1Y)</td>
<td>0.106***</td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.084</td>
<td>0.140</td>
</tr>
<tr>
<td>Country fixed effects</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

Note: *p<0.1; **p<0.05; ***p<0.01
Stylized Fact 3

The inconvenience curve is upward sloping on average

the average term structure of inconvenience yields. For each maturity the inconvenience yields are averaged both over time and countries.
Model
Model: Structure

• Builds on Vaynos & Vila (20) but with two countries and differential bond funding costs

• Debt issued by core riskless but that issued by periphery not
  • Default given by a Poission jump process with default intensity ψ and severity δ

• An arbitrageur (banks + hedge funds) trades all bonds

• Also preferred habitat investors
  • Demand shock induces funding risk since it implies arbitrageurs must finance more bonds.

• Bond funding costs depend on risk as well as bond funding market liquidity.

• Key assumptions: periphery funding cost Λ_\(t\) ≥ 0 and uncertain.

\[ \Lambda_t = \text{Constant} \times \text{Default probability} \times \text{Amount of bonds financed} \equiv \lambda B_t^* \]
Model: Results

- Model admits an affine solution for the prices of core, periphery and synthetic safe bonds as well as CDS premia.
- These depend on maturity, level of short rates and the demand shock

**Proposition 2** We can decompose a $\tau$-maturity inconvenience yield to an expected funding cost component and a funding risk component:

\[
icy(\tau) \approx \frac{1}{\tau} \mathbb{E}_t \int_t^{t+\tau} \Lambda_s ds + \text{Funding risk}_t
\]

Here $\text{icy}_t(\tau) \to \Lambda_t$ as $\tau \to 0$. The short end of the convenience yield curve is determined by the current funding cost. The long end also reflects expected future funding costs and a funding risk premium.
Causal Evidence for the impact of funding costs
Funding from Repo market and Eurosystem

- Key financial intermediaries in the bond market rely on external financing
  - Bonds financed through repo market or through more expensive unsecured funding (unsecured loans, deposits etc.)
- Collateralized funding can be obtained either from the private repo market or Eurosystem
  - Eurosystem TLTRO rates competitive for Italian bonds, but not German
- Funding cost of Italian bond depend on the funding rate and haircut
  - Haircut specifies the amount of funding available for a given collateral
Eurosystem Haircuts

- All eligible Italian bonds have a public Eurosystem haircut
- Focus on haircut changes due to switches in maturity
- Switches depend only on bond’s issue date, current date and the thresholds
- For each bond switching buckets there is a control group of similar bonds

![Haircut Schedule Graph](image)

shows the haircut schedule for a bond in the 2nd credit rating category with a tenor of 10 years in November 2012.
### Effects of Eurosystem Haircuts on Italian Yields

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( HCI )</td>
<td>-0.30 (-0.74)</td>
<td>-0.23 (-1.61)</td>
<td>-0.20 (-1.43)</td>
<td></td>
</tr>
<tr>
<td>( HCI1 )</td>
<td>-1.36*** (-3.44)</td>
<td>-0.39*** (-3.08)</td>
<td>-0.36*** (-2.83)</td>
<td></td>
</tr>
<tr>
<td>( HCI2 )</td>
<td>-0.44 (-1.05)</td>
<td>-0.23 (-1.41)</td>
<td>-0.19 (-1.20)</td>
<td></td>
</tr>
<tr>
<td>( HCIALL )</td>
<td></td>
<td></td>
<td></td>
<td>-0.25*** (-3.35)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>625981</th>
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<th>625981</th>
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</thead>
<tbody>
<tr>
<td># of Obs.</td>
<td>0.0001</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>( R^2 )</td>
<td></td>
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</tbody>
</table>

**Note:**

- \( HCI \) is indicator variable that gets value of one on the date the haircut changes in Eurosystem data, published at 18.15 CET on ECB’s website
- NO effect for German bonds
- NO effect for CDS
- NO effect when integer part of maturity changes without haircut change
Convenience yields and unconventional monetary policy
Convenience yields and unconventional monetary policy

<table>
<thead>
<tr>
<th>Policy</th>
<th>ICY Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collateral Policy Changes</td>
<td>66 %</td>
</tr>
<tr>
<td>Securities Market Program</td>
<td>39 %</td>
</tr>
<tr>
<td>Outright Monetary Transactions Program</td>
<td>9 %</td>
</tr>
<tr>
<td>Draghi Whatever-It-Takes Speech</td>
<td>15 %</td>
</tr>
<tr>
<td>Extended APP</td>
<td>36 %</td>
</tr>
<tr>
<td>PEPP</td>
<td>54 %</td>
</tr>
<tr>
<td>Liquidity Support</td>
<td>38 %</td>
</tr>
<tr>
<td>Average</td>
<td>48 %</td>
</tr>
</tbody>
</table>

shows the share of yield spread changes around monetary policy announcements that are due to changes in inconvenience yields.
• Two assumptions explain eurozone sovereign inconvenience curves:
  • Funding costs on riskier bonds higher
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• Use exogeneous changes in Eurosystem haircuts to find causal evidence that funding costs affect yields

• Changes in inconvenience yields key for monetary policy transmission to yields spreads