ECB Bond Market Contact Group

Market Outlook

Alessandro Tentori
Interest Rate Strategy
alessandro.tentori@citi.com
+ 44 (0)207 986 9224

See Appendix A-1 for Analyst Certification, Important Disclosures and non-US research analyst disclosures

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This presentation was approved for distribution on 29 June 2015; the disclosures in Appendix A1 are current as of the same date.
The Recent Sell-Off
EGBI Performance

Last time we had two consecutive months with negative returns was May/Jun-2013

| EGBI Return and Risk Parameters - Issuer Countries |
|-------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Date | EMU | Austria | Belgium | Finland | France | Germany | Ireland | Italy | Holland | Spain |
| 2009 | 4.3% | 4.5% | 5.0% | 5.1% | 2.9% | 1.9% | 3.3% | 7.9% | 3.8% | 3.6% |
| 2010 | 1.0% | 6.5% | 1.9% | 5.6% | 5.1% | 6.0% | -15.1% | -0.8% | 6.0% | -4.3% |
| 2011 | 3.3% | 5.8% | 3.9% | 6.6% | 4.5% | 9.2% | 10.9% | -5.9% | 8.5% | 7.0% |
| 2012 | 10.1% | 10.1% | 15.2% | 6.9% | 9.5% | 4.4% | 25.5% | 19.0% | 5.8% | 5.5% |
| 2013 | 2.2% | -1.0% | -0.5% | -1.8% | -0.5% | -2.3% | 10.7% | 7.0% | -2.1% | 10.5% |
| 2014 | 12.4% | 11.9% | 13.2% | 9.7% | 11.4% | 9.8% | 13.0% | 14.3% | 10.8% | 15.4% |
| 2015 YTD | -1.4% | -2.3% | -2.1% | -2.0% | -2.0% | -1.9% | -1.5% | 0.0% | -2.0% | -1.5% |
| May-15 | -1.5% | -1.2% | -1.5% | -1.0% | -1.2% | -1.1% | -1.3% | -2.1% | -1.2% | -2.0% |
| Outstanding (EUR bn) | 5598 | 222 | 359 | 82 | 1332 | 1066 | 109 | 1341 | 357 | 730 |
| Index yield (%) | 0.74 | 0.39 | 0.58 | 0.33 | 0.49 | 0.25 | 0.66 | 1.35 | 0.34 | 1.25 |
| Index volatility (%) | 5.7 | 5.9 | 6.5 | 5.0 | 6.0 | 5.8 | 5.3 | 7.7 | 5.8 | 7.2 |
| Yield/vol ratio | 0.13 | 0.07 | 0.09 | 0.07 | 0.08 | 0.04 | 0.13 | 0.17 | 0.06 | 0.17 |
| Index duration | 7.2 | 7.6 | 8.1 | 6.9 | 7.6 | 7.3 | 6.4 | 6.8 | 7.4 | 6.5 |

| EGBI Return and Risk Parameters - Curve |
|-------------------------|---------|---------|---------|---------|---------|---------|
| Date | EMU | 1-3y | 3-5y | 5-7y | 7-10y | 10-15y | 10+ |
| 2015 YTD | -1.4% | 0.3% | 0.0% | -0.8% | -2.2% | -2.7% | -3.4% |
| May-15 | -1.5% | 0.0% | -0.1% | -0.7% | -1.5% | -2.7% | -3.9% |
| Outstanding (EUR bn) | 5598 | 1145 | 1078 | 759 | 989 | 654 | 1066 |
| Index yield (%) | 0.74 | -0.06 | 0.25 | 0.58 | 0.95 | 1.40 | 1.58 |
| Index volatility (%) | 5.7 | 0.4 | 1.6 | 3.3 | 6.1 | 9.2 | 13.3 |
| Yield/vol ratio | 0.13 | -0.15 | 0.16 | 0.18 | 0.15 | 0.15 | 0.12 |
| Index duration | 7.2 | 1.9 | 3.8 | 5.5 | 7.5 | 9.9 | 13.8 |

Source: Citi
Liquidity Monitor (1)

Electronic volumes are holding up, but…

…and the “perception” is:

1) Flows keep slowing down;
2) Volatility has surged;
3) Bid/ask spreads have not yet reflected the increase in EGB market risk;
4) End users split tickets across dealers.

Q2 volumes on electronic platforms are -17% vs Q1…

Source: Tradeweb, Bloomberg, Bondvision, Citi
Futures liquidity has picked-up significantly in the sell-off

Source: Citi
EGB Flow Monitor (1)

From our trading desks

Citi Euro Rates (2015), “Will Foreign Investors Sell to the ECB?”

Source: Citi
EGB Flow Monitor (2)

External sources

Japan: International transactions in securities

EGB holdings by US investors

International reserve assets (ex Gold)

Banks: Domestic EGB holdings

Source: MOF, US Treasury, IMF, ECB, Citi
Explosion in Bond Market Risk

Higher market duration x Increased market size x Increased market vol → Risk explosion

EGBI: Volatility of curve sub-indices

EGBI total market risk


Source: Citi
Queuing Theory: Applications to Bond Markets

Don’t need bond sellers to create a bond market sell-off

For a given steady-arrival of new issues (~17bn/week) and risk-processing time by dealers, we can compute the time a bond spends in queue waiting to be processed:

\[ W = \frac{1}{\mu - \lambda} - \frac{1}{\mu} \]

Tracking the PSPP

Enough bonds (for now), signs of “dv01-based QE”

<table>
<thead>
<tr>
<th></th>
<th>Mar-15</th>
<th>Apr-15</th>
<th>May-15</th>
<th>May Δ (€bn)</th>
<th>May Δ (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Govts / Agencies</td>
<td>41.7</td>
<td>42.0</td>
<td>45.5</td>
<td>3.5</td>
<td>8%</td>
</tr>
<tr>
<td>Supras</td>
<td>5.7</td>
<td>5.7</td>
<td>6.2</td>
<td>0.4</td>
<td>7%</td>
</tr>
<tr>
<td>Total PSPP</td>
<td>47.4</td>
<td>47.7</td>
<td>51.6</td>
<td>3.9</td>
<td>8%</td>
</tr>
<tr>
<td>ABSPP</td>
<td>1.2</td>
<td>1.2</td>
<td>1.4</td>
<td>-1.4</td>
<td>-12%</td>
</tr>
<tr>
<td>CBPP3</td>
<td>12.4</td>
<td>11.5</td>
<td>10.0</td>
<td>2.8</td>
<td>5%</td>
</tr>
<tr>
<td>TOTAL QE</td>
<td>60.9</td>
<td>60.3</td>
<td>63.1</td>
<td>2.8</td>
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</tr>
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</table>

HOLDINGS (€bn)

<table>
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<tr>
<th></th>
<th>Germany</th>
<th>France</th>
<th>Italy</th>
<th>Spain</th>
<th>Netherlands</th>
<th>Belgium</th>
<th>Austria</th>
<th>Portugal</th>
<th>Finland</th>
<th>Ireland</th>
<th>Other sovs</th>
<th>Supras</th>
<th>Total PSPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar-15</td>
<td>11.1</td>
<td>8.8</td>
<td>7.6</td>
<td>5.4</td>
<td>2.5</td>
<td>1.5</td>
<td>1.2</td>
<td>1.1</td>
<td>0.8</td>
<td>0.7</td>
<td>1.0</td>
<td>5.7</td>
<td>47.4</td>
</tr>
<tr>
<td>Apr-15</td>
<td>11.1</td>
<td>8.6</td>
<td>7.6</td>
<td>5.5</td>
<td>2.5</td>
<td>1.5</td>
<td>1.2</td>
<td>1.1</td>
<td>0.8</td>
<td>0.7</td>
<td>1.3</td>
<td>5.7</td>
<td>47.7</td>
</tr>
<tr>
<td>May-15</td>
<td>12.1</td>
<td>9.5</td>
<td>8.2</td>
<td>5.9</td>
<td>2.7</td>
<td>1.7</td>
<td>1.3</td>
<td>1.2</td>
<td>0.8</td>
<td>0.8</td>
<td>1.3</td>
<td>6.2</td>
<td>51.6</td>
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<tr>
<td>May Δ (€bn)</td>
<td>1.00</td>
<td>0.86</td>
<td>0.64</td>
<td>0.44</td>
<td>0.14</td>
<td>0.13</td>
<td>0.11</td>
<td>0.09</td>
<td>0.06</td>
<td>0.04</td>
<td>-0.01</td>
<td>0.43</td>
<td>3.92</td>
</tr>
<tr>
<td>May Δ (%)</td>
<td>9%</td>
<td>10%</td>
<td>8%</td>
<td>8%</td>
<td>5%</td>
<td>8%</td>
<td>8%</td>
<td>6%</td>
<td>8%</td>
<td>-1%</td>
<td>7%</td>
<td>8%</td>
<td></td>
</tr>
</tbody>
</table>

Total                   | 34.4    | 26.9   | 23.4  | 16.8  | 7.7        | 4.7     | 3.7     | 3.3      | 2.4     | 2.2     | 3.5       | 17.6   | 146.7      |

Capital Key             | 26%     | 21%    | 18%   | 13%   | 6%         | 4%      | 3%      | 3%       | 2%      | 2%      |           |        |

MATURITIES (yrs)

<table>
<thead>
<tr>
<th></th>
<th>Germany</th>
<th>France</th>
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<th>Spain</th>
<th>Netherlands</th>
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<th>Austria</th>
<th>Portugal</th>
<th>Finland</th>
<th>Ireland</th>
<th>Supras</th>
<th>PSPP</th>
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<tbody>
<tr>
<td>Mar-15</td>
<td>8.1</td>
<td>8.2</td>
<td>9.1</td>
<td>11.7</td>
<td>6.7</td>
<td>8.8</td>
<td>7.8</td>
<td>11.0</td>
<td>7.3</td>
<td>9.4</td>
<td>7.3</td>
<td>8.6</td>
</tr>
<tr>
<td>Apr-15</td>
<td>7.9</td>
<td>7.8</td>
<td>8.4</td>
<td>9.7</td>
<td>7.0</td>
<td>9.1</td>
<td>8.0</td>
<td>10.8</td>
<td>7.2</td>
<td>9.1</td>
<td>8.1</td>
<td>8.3</td>
</tr>
<tr>
<td>May-15</td>
<td>7.1</td>
<td>7.8</td>
<td>8.7</td>
<td>9.7</td>
<td>6.9</td>
<td>9.1</td>
<td>7.8</td>
<td>10.8</td>
<td>7.2</td>
<td>9.6</td>
<td>7.8</td>
<td>8.1</td>
</tr>
</tbody>
</table>

May change          | -0.8    | 0.0    | 0.3   | 0.0   | -0.1        | 0.0     | -0.2    | 0.1      | 0.0     | 0.5     | -0.3   | -0.2 |

Citi Euro Rates (2015), “QE Front-Loading in May – The Details”

Source: ECB, Citi
The Outlook
The Future of Monetary Policy

The global game of FX interventions

Policy surprises:
Standard (rates)
Non-standard (balance sheet)

→ increased market uncertainty
→ positive effect on term- and inflation-premia


Source: Citi
ECB Expectations

Variables: Lift-off date, excess liquidity conditions, policy corridor

ECB market expectations

First rate hike priced in by Sep-17

Expected ECB policy rates (Citi) under excess liquidity

Lift-off: Dec-17 ECB meeting

<table>
<thead>
<tr>
<th>Spot Eonia</th>
<th>Fwd-1y Eonia (implied from spot)</th>
<th>Exp. fixings (Citi)</th>
<th>Fwd-1y Eonia (implied from fixing scenario)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1y</td>
<td>-0.12</td>
<td></td>
<td>-0.15</td>
</tr>
<tr>
<td>2y</td>
<td>-0.10</td>
<td>1y1y</td>
<td>-0.15</td>
</tr>
<tr>
<td>3y</td>
<td>-0.02</td>
<td>2y1y</td>
<td>-0.07</td>
</tr>
<tr>
<td>4y</td>
<td>0.11</td>
<td>3y1y</td>
<td>0.22</td>
</tr>
<tr>
<td>5y</td>
<td>0.26</td>
<td>4y1y</td>
<td>0.86</td>
</tr>
</tbody>
</table>

Citi Euro Rates (2015), "Eonia: Between PSPP-Tapering and Liftoff"

Source: ECB, Citi
Bunds: Term & Inflation Premium

The combined effect of higher volatility, lower liquidity and improving cyclical fundamentals

Bund: Swap Spread

Between market liquidity risk and credit risk

Swap spreads model: Liquidity variables

Swap spreads model: Credit risk variables

Bund swap spread model

Source: Citi
Signs of Inflation? Yes and No

Four charts to follow trends in Eurozone inflation

**Business cycle expectations and inflation**

**Monetary transmission and inflation**

**Labor market and core inflation**

**Commodities and EUR inflation**

Source: Bloomberg, Citi
EGB Risk-Adjusted Yields

Yields are historically low also when adjusted for their realized volatility.

Front-end of non-core looks attractive in risk-adjusted terms, while investors need to extend into the long-end of core to expect positive risk-adjusted returns.

Citi Euro Rates (2015), “Risk vs Return: Look at the Front-End”
“It is cruel that such revolutions in private fortunes should be at the mercy of avaricious adventurers, who, instead of employing their capital, if any they have, in manufactures, commerce, and other useful pursuits, make it an instrument to burden all the interchanges of property with their swindling profits, profits which are the price of no useful industry of theirs” (Thomas Jefferson, 1814)

The Asset Allocation Conundrum

Regulation is the key to Draghi’s “portfolio re-balancing”

Despite a structurally higher yield (relative to bonds), European equities have failed to attract enough domestic demand to shift existing asset allocations.

Strict regulation as well as risk-averse preferences seem to make European asset markets quite different from the US.


Source: EFAMA, Citi
A Changing Industry

Different players & US concentration, but the (European) devil is in the details...

"The sector’s composition has changed over time. By region, North American asset managers have increased their market share by 11 percentage points over the last decade. They now account for more than half of total AUM and approximately two thirds of the assets managed by the top 20 managers. By type, independent managers have been rapidly displacing bank- and insurer-owned managers at the top”.


Source: BIS, Citi
Discussion Points
Discussion Points

1. How has the uncertainty over Greece affected primary and secondary markets? Have you done any contingency planning?

2. Will additional/new regulation support the steady flow of issuance?

3. What can be done to prevent volatility of market liquidity? Circuit breakers, designated market makers for Bund futures...

4. Asset re-allocation: From riskless to risky?

5. Has the ECB a role in asset allocation?

6. Reflation vs secular stagnation: Are we missing something?

Source: Citi
Annex
Anatomy of a Flash Crash: 15 October 2014

Liquidity is becoming an issue even in benchmark markets

“Without the buoyant liquidity provided by the Federal Reserve, the liquidity-inhibiting impact of regulatory changes, industry consolidation and other secular factors will likely become more pronounced” (IMF Apr-15)

Anatomy of a Sell-Off: Treasuries in 2003

What happened and why did Tnotes sell off 150bp in two months?

Tnotes sold off from 3.1% to 4.6% in just two months, moves amplified by mortgage prepayment hedging.

Market was complacent in Greenspan’s ability to keep an accommodative stance for longer, thus supporting the USD carry trade.

Analogy to today’s EGB?

FF priced 70% of a 50bp cut to 0.75% at the Jun-03 FOMC.

Market positioning was at – then – historical long in TY.

Risk of deflation mentioned by Bernanke in Nov-02 speech.

Source: Bloomberg, Citi Research
Anatomy of a Sell-Off: Central Banks’ Flows

Buyers’ strike rather than liquidation

A slowdown in the pace of bond accumulation was sufficient to create a bottleneck in 2003…

…while outright sellers appeared in summer 2013 (but still net buyers over that year).

Source: Bloomberg, US Treasury, Citi Research
Appendix A-1

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<table>
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<tr>
<th>Data current as of 30 Jun 2012</th>
<th>12 Month Rating</th>
<th>Relative Rating</th>
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<tbody>
<tr>
<td>Citi Research Global Fundamental Coverage</td>
<td>Buy 53%</td>
<td>Hold 37%</td>
</tr>
<tr>
<td>% of companies in each rating category that are investment banking clients</td>
<td>44%</td>
<td>43%</td>
</tr>
</tbody>
</table>

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