The Effect of Central Bank Informal Communication on Bond Markets: The Evidence from the Bank of England

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Agenda

1. Research motivation and contribution to literature
2. Prior expectations and hypotheses
3. Data and methodology
4. Results and conclusion
Introduction and literature review

Context

- Central banks have direct control over very short-term interest rates.
- Number of both qualitative formal and informal as well as quantitative channels are used by the policymakers.
- Understanding the effect of central bank communication can contribute to effective monetary policy.

Existing research

- Indirect approach
  - It analyses changes in volatility and returns over a short window.
  - This method does not say what information moves markets.
- Manual approach
  - Manually classifying text.
  - Hard to replicate and very subjective.
- Computational approach
  - Various techniques: external measures, semantic analysis, predefined dictionaries.
  - Most relevant to this paper.
**1 This paper in relation to the literature**

<table>
<thead>
<tr>
<th>Focus of the paper</th>
<th>Contribution to the literature</th>
</tr>
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<tbody>
<tr>
<td>• This paper investigates the effect of positive or negative <strong>sentiment about economic conditions</strong> conveyed in the speeches by the Bank of England on <strong>bond yields</strong> in the UK.</td>
<td>• This paper combines <strong>dictionary methods</strong> and <strong>Latent Dirichlet Allocation</strong> to estimate the sentiment about economic conditions.</td>
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<tr>
<td>• Main findings:</td>
<td>• The effect is estimated for <strong>different positions</strong> within the Bank of England.</td>
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<tr>
<td>o Speeches by the <strong>Governor</strong> and the <strong>Chief Economist</strong> have been found to have <strong>the greatest impact</strong>.</td>
<td>o The effect on <strong>real</strong> and <strong>inflation components</strong> of nominal bond yields is investigated.</td>
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<tr>
<td>o <strong>Members of MPC</strong> have no effect.</td>
<td></td>
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<tr>
<td>o <strong>The stock of prior communication</strong> influences the size of the effect.</td>
<td></td>
</tr>
</tbody>
</table>
2 Prior expectations

Nominal yields decomposition

• **Real rate**
  o A positive sentiment can be interpreted as a positive shock, which leads to an increase in the real component.

• **Inflation**
  o Positive shock tends to increase inflation.
  o Supported by the fact that inflation was often low and below the target during the analysed period.

Hypothesis

1. **A positive sentiment** (tone) about economic conditions conveyed in speeches should have a positive effect on bond yields.

2. The impact of a speech should vary by the position of a speaker. Speeches by more senior people should have a larger effect.

3. The stock of communication matters. If there was little communication prior to the speech, the impact of a speech should be bigger.
## Data

### Main variable of interest
- Speeches made by the members of the Bank of England during the period 2005 – 2016 (525 in total).
- Most common words in the whole corpus:
  - The sentiment index about economic conditions is estimated by calculating the number of positive and negative words in the parts of speeches discussing economics.

### Dependent variable
- Daily returns of 2, 5 and 10-year nominal government bonds.
- 10-year real and inflation breakeven rates.

### Control variables
- Monetary policy surprises (daily change in 3-month Sterling future).
- Surprise components of macroeconomic data releases, which are defined as the difference between the actual value and the Bloomberg consensus before the release.
Quantification of speeches

Overview

3 Techniques

- Latent Dirichlet Allocation
  - The final output is the distribution of words in each topic and the distribution of topics within each document.
  - The advantage is that a researcher does not have to define a topic.

- Dictionary methods
  - Counting positive and negative words using Loughran and McDonald (2011) word lists.

Example of a topic:

- The size of the words indicates the relative probability of that word.

Formula for sentiment index:

\[
\text{Index} = \frac{\# \text{ of positive words} - \# \text{ of negative words}}{\# \text{ of positive words} + \# \text{ of negative words}}
\]
3 Methodology

Econometric model

- An **EGARCH (1,1)** model is used in order to account for **volatility clustering** in the financial series.
- The structural breaks in variance are estimated using **ICSS algorithm** as regular GARCH overstates variance persistence (Lamoureux and Lastrapes 1990).
- Base model specification:
  1. \[ r_t = \alpha + \gamma r_{t-1} + \psi Speech_t + \beta Speech \times Index_t + \delta S_t + \Phi News_t + \epsilon_t \]
  2. \[ \ln(h_t) = \omega + \theta_1 \left| \frac{\epsilon_{t-1}}{\sqrt{h_{t-1}}} \right| + \theta_2 \left( \frac{\epsilon_{t-1}}{\sqrt{h_{t-1}}} \right) + \theta_3 \ln(h_{t-1}) + \kappa \text{Break}_t + \mu_t \]
- Our parameter of interest is \(\beta\) and it should be **positive** according to Hypothesis 1.
4 Results: aggregate

Comments

• A one-standard-deviation increase in sentiment index leads to around a 0.3-0.5 bp rise in the bond yields.

• The effect is much smaller compared to the surprise components of CPI releases.

<table>
<thead>
<tr>
<th></th>
<th>2y</th>
<th>5y</th>
<th>10y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sentiment Index</td>
<td>0.0112**</td>
<td>0.0185**</td>
<td>0.0224**</td>
</tr>
<tr>
<td></td>
<td>(0.00502)</td>
<td>(0.00813)</td>
<td>(0.00883)</td>
</tr>
<tr>
<td>CPI Release</td>
<td>8.591***</td>
<td>9.733***</td>
<td>5.607**</td>
</tr>
<tr>
<td></td>
<td>(2.027)</td>
<td>(2.292)</td>
<td>(2.299)</td>
</tr>
</tbody>
</table>

N = 3128

Robust standard errors in parentheses

*p < 0.10, **p < 0.05, ***p < 0.01

The effect of 1-std change in sentiment index and CPI surprise on bond yields
4 Results: by the position of a speaker

Comments

- The effect **varies significantly** by the position of a speaker within the Bank of England.

- A **1-std increase** in the sentiment index of Governor’s speeches leads to around **a 1-1.7 bp rise** in the bond yields.

- The size of the effect is very similar to that of CPI releases.

- The **Chief Economist** has a surprisingly large influence.

- **Members of MPC and Deputy Governors** do not have a significant impact.

- Significant at 5% level for at least one of the maturities
4 Results: stock of communication

Comments

• **The stock of communication** influences the size of the effect.

• If there was another informal communication in the week prior to the speech by the Governor or the Chief Economist, the effect is **reduced** by **more than half**.

• The effect is statistically significant only for **2y bond yields** (Chief Economist or Governor’s speeches).

• Other speeches have **no effect** no matter what the stock of communication is.
4 Results: decomposition into real and inflation components

Comments

- The inflation part is strongly *influenced* by the Governor.

- Two possible *transmission channels*:
  - Expected inflation rate.
  - Inflation risk premium.

- The latter is a *more likely candidate* as the former has been shown to be quite constant (Guimares 2012).

- The effect on real yields is very *similar* to that on nominal yields: Governor and Chief Economist have comparable effects.

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inflation</td>
<td>Real Rate</td>
</tr>
<tr>
<td>Chief Economist</td>
<td>0.0129*</td>
<td>0.0465***</td>
</tr>
<tr>
<td></td>
<td>(0.00701)</td>
<td>(0.0174)</td>
</tr>
<tr>
<td>Deputy Governors</td>
<td>0.00731*</td>
<td>0.0159*</td>
</tr>
<tr>
<td></td>
<td>(0.00427)</td>
<td>(0.00957)</td>
</tr>
<tr>
<td>Governor</td>
<td>0.0262***</td>
<td>0.0405*</td>
</tr>
<tr>
<td></td>
<td>(0.00744)</td>
<td>(0.0211)</td>
</tr>
<tr>
<td>Other members of MPC</td>
<td>-0.00404</td>
<td>-0.00212</td>
</tr>
<tr>
<td></td>
<td>(0.00800)</td>
<td>(0.0159)</td>
</tr>
<tr>
<td>Others</td>
<td>0.0146</td>
<td>0.00896</td>
</tr>
<tr>
<td></td>
<td>(0.0125)</td>
<td>(0.0203)</td>
</tr>
<tr>
<td>N</td>
<td>3128</td>
<td></td>
</tr>
</tbody>
</table>

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
## Robustness

### Robustness checks

1. Used **IGARCH model** instead of ICSS-EGARCH.
2. Changed **LDA parameters** and re-estimate the model.
3. Restricted the sample period to **2008 onwards**.
4. A different way to estimate **the sentiment index**:

   \[
   \text{Index} = \frac{\# \text{ of positive words} - \# \text{ of negative words}}{\text{Total } \# \text{ of words}}
   \]

### Results

1. The results are both **quantitatively and qualitatively similar**, albeit standard errors are a bit larger.
2. No significant differences.
3. No significant differences. It seems that there was **no structural break** around the financial crisis.
4. The results for the Governor become insignificant. However, it is not surprising as **the interpretation of the index** changes.
4 Conclusion

Policy implications

• The effect of speeches by the Governor and Chief Economist are of similar magnitude as that of CPI releases.

• Other members of MPC and Deputy Governors do not have a significant effect on bonds.

• Central banks can shape agents’ expectations not only through formal meetings but also using informal communication. Sentiment (tone) in speeches is important.

• The results are similar to those of Ehrmann and Fratzscher (2007).

Further research

• To estimate the effect for longer period than one day to see whether the effect persists.

• To investigate which particular topics affect markets.

• To decompose bond yields further.

• To expand research for more central banks and types of communication.

• To examine international linkages to determine whether the effect of speeches can be observed in foreign markets.
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