

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

Gytautas Karklius

University of Warwick

International Atlantic Economic Conference

Montréal, Canada

7th October 2017



Agenda

1 Research motivation and contribution to literature

2 Prior expectations and hypotheses

3 Data and methodology

4 Results and conclusion

1 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

Focus of the paper

- This paper investigates the effect of positive or negative **sentiment about economic conditions** conveyed in the speeches by the Bank of England on **bond yields** in the UK.
- Main findings:
 - Speeches by **the Governor** and **the Chief Economist** have been found to have **the greatest impact**.
 - **Members of MPC** have no effect.
 - **The stock of prior communication** influences the size of the effect.

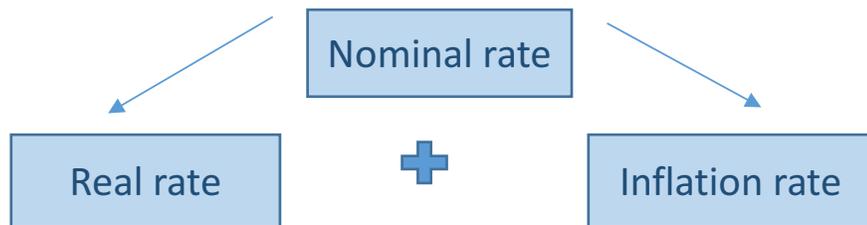
Contribution to the literature

- This paper combines **dictionary methods** and **Latent Dirichlet Allocation** to estimate the sentiment about economic conditions.
- The effect is estimated for **different positions** within the Bank of England.
- The effect on **real** and **inflation components** of nominal bond yields is investigated.

2 Prior expectations

Nominal yields decomposition

- **Real rate**
 - A positive sentiment can be interpreted as **a positive shock**, which leads to **an increase** in the real component.
- **Inflation**
 - Positive shock tends to increase inflation.
 - Supported by the fact that **inflation** was often **low** and **below the target** during the analysed period.

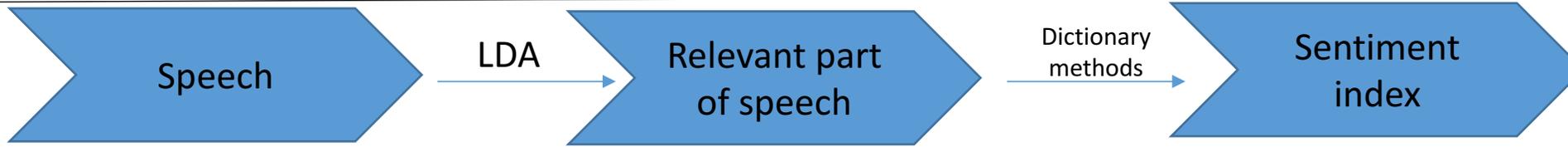


Hypothesis

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**.

3 Quantification of speeches

Overview



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:

$$Index = \frac{\# \text{ of positive words} - \# \text{ of negative words}}{\# \text{ of positive words} + \# \text{ of negative words}}$$

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:

$$1 \quad r_t = \alpha + \gamma r_{t-1} + \psi Speech_t + \beta Speech \times Index_t + \delta S_t + \Phi News_t + \epsilon_t$$

$$2 \quad \ln(h_t) = \omega + \theta_1 \left| \frac{\epsilon_{t-1}}{\sqrt{h_{t-1}}} \right| + \theta_2 \left(\frac{\epsilon_{t-1}}{\sqrt{h_{t-1}}} \right) + \theta_3 \ln(h_{t-1}) + \kappa Break_t + \mu_t$$

- Our parameter of interest is **β** and it should be **positive** according to Hypothesis 1.

4 Results: aggregate

Comments

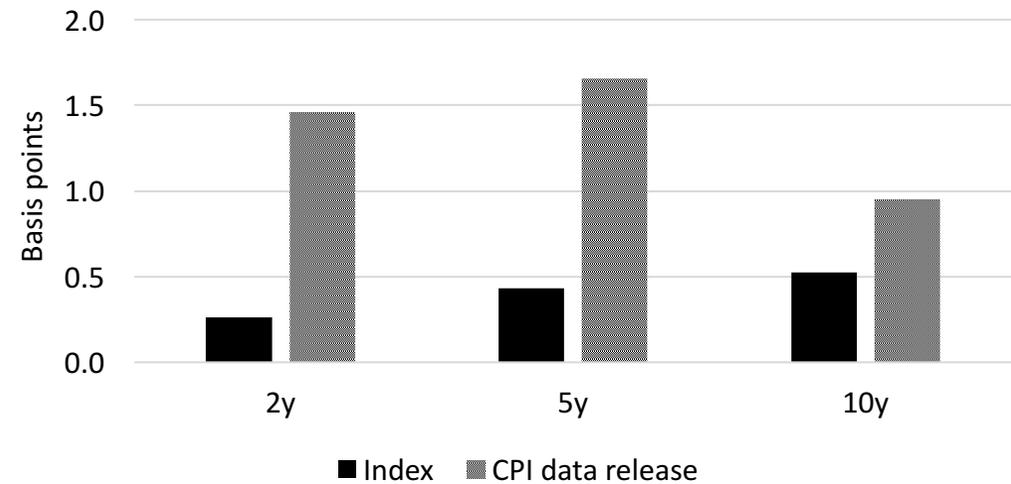
- A one-standard-deviation increase in sentiment index leads to around a **0.3-0.5 bp rise** in the bond yields.
- The effect is much **smaller** compared to the surprise components of CPI releases.

	(1)	(2)	(3)
	2y	5y	10y
Sentiment Index	0.0112** (0.00502)	0.0185** (0.00813)	0.0224** (0.00883)
CPI Release	8.591*** (2.027)	9.733*** (2.292)	5.607** (2.299)
<i>N</i>	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

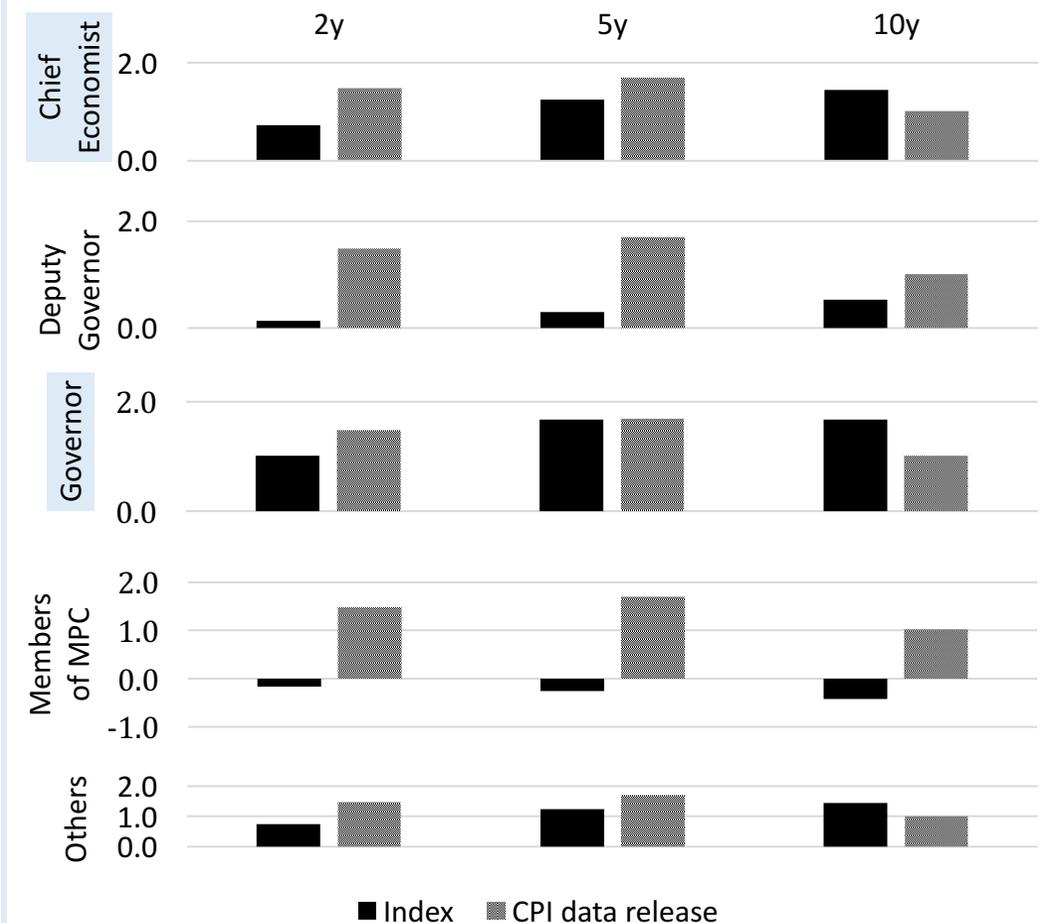


4 Results: by the position of a speaker

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.

The effect of 1-std change in sentiment index and CPI surprise on bond yields



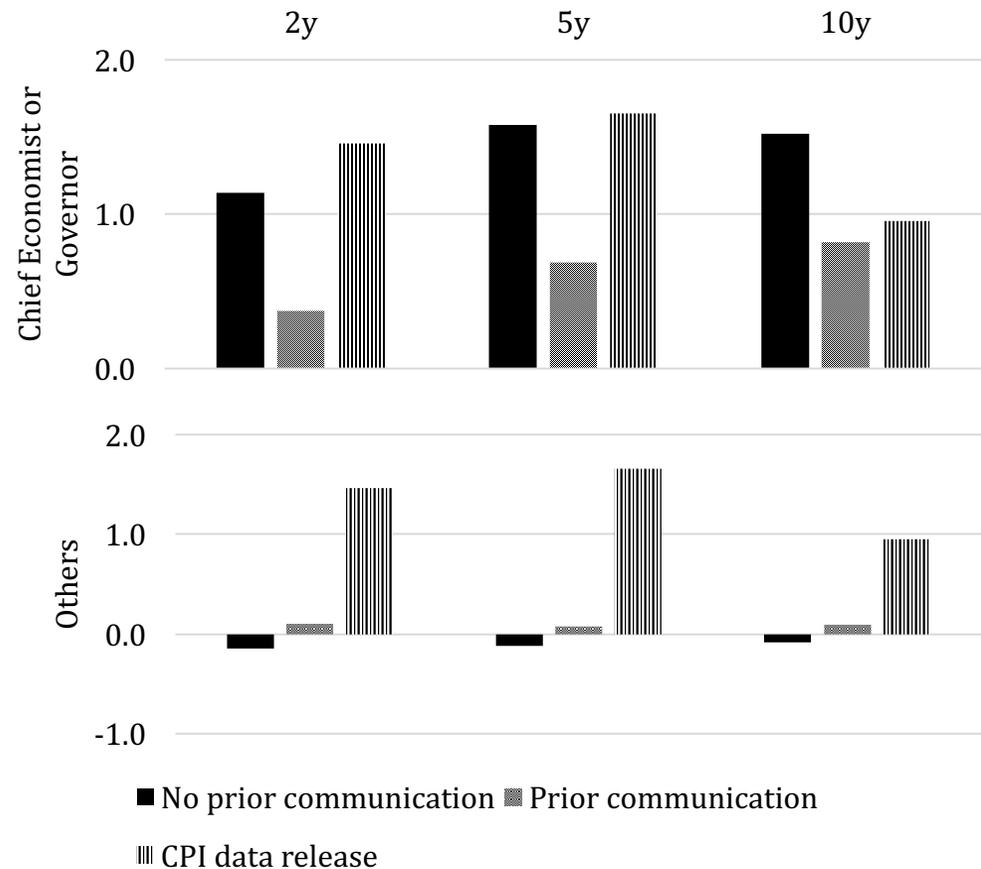
- significant at 5% level for at least one of the maturities

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.

The effect of 1-std change in sentiment index and CPI surprise on bond yields



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.

The effect on real and inflation components of nominal bond yields

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

Robust standard errors in parentheses

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

4 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**:

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

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.

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

Gytautas Karklius

University of Warwick

International Atlantic Economic Conference

Montréal, Canada

7th October 2017

