Fiscal Policy in the Bundestag: Textual Analysis and Macroeconomic Effects*

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Motivation

Nature of the parliamentary process itself contains valuable information for understanding the drivers and consequences of fiscal policy shocks.
Aim of this project

Quantify fiscal-policy-related sentiment

Evaluate whether fiscal sentiment causes government expenditure and, thus, macroeconomic responses
**Project Pipeline**

**Data Preparation**
- German Bundestag speeches
- Data Preparation & Texts Preprocessing

**Word Embeddings**
- Define relevant terms to describe expansionary/contractionary fiscal policy
- Represent documents in a shared vector space using Word(Doc)2Vec models
- Construct sentiment indicators

**VAR-Models**
- Use the constructed text based fiscal sentiment indices to measure their impact on the real economy with VAR-models
Each XML-Protocol of the legislative periods 1-18 is structured by only six tags.
Data

- Full data set comprises a total of 877,140 speeches

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<th>speech_identification_ent</th>
<th>date</th>
<th>period</th>
<th>session</th>
<th>pos_speechbeginning</th>
<th>Party</th>
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<td>07.09.1949</td>
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<td>1</td>
<td>\nAlterspräsident Labe:</td>
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<td>Alterspräsident</td>
<td>no-text</td>
<td>Meine Damen und Herren! Abgeordnete des Deuts...</td>
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<td>Dr. Adenauer (CDU):</td>
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<td>\nDr. Adenauer (CDU):</td>
<td>CDU/CSU</td>
<td>MdB</td>
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<td>Namens der Fraktion der CDU/CSU schlage ich a...</td>
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<td>\nAlterspräsident Löbe:</td>
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<td>Das Wort hat der Herr Abgeordnete Reimann, n...</td>
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<td>Alterspräsident</td>
<td>no-text</td>
<td>Sie haben die Vorschläge gehört: Hans Böhm u...</td>
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</tbody>
</table>

...
Common text preprocessing steps

- Data set as of 1960 since most macroeconomic time series are available from 1970 onward
- Dataset: 235,129 speeches (1960-2021)
- Common text preprocessing steps and removal of domain-specific stop words that were previously identified as such
Word (Document) Embeddings

**WORD2VEC/DOC2VEC**

- Unsupervised method to represent natural language in a high-dimensional vector space
- Ability to capture semantic characteristics of the words/texts
- Additive property of the resulted vectors and the interpretability of the distances

In this paper, Doc2Vec models are used to construct speech representations as well as vectors representing expansionary/contractionary fiscal policy.
Proposed **Dynamic** Doc2Vec approach

- Based on the approach described by Kampfhammer et al. (2020), we propose a dynamic Doc2Vec approach with a rolling forecast architecture to construct the fiscal sentiment time series:
Proposed **Dynamic** Doc2Vec approach

1. **Define relevant fiscal policy-specific terms**

- **Expansionary**: government investment, tax reduction, create jobs, ...
- **Contractionary**: cut spending, tax increase, deficit reduction, consolidation ...
Proposed **Dynamic** Doc2Vec approach

### 2. Train Doc2Vec Models for Each Period M (10 Years Window)

<table>
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<tr>
<th></th>
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<th>doc₂</th>
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<th>term₁</th>
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</tbody>
</table>

- Vector representations for speeches
- Vector representations for **expansionary**/**contractionary** terms

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Proposed **Dynamic** Doc2Vec approach

3. **Infer Speeches Vectors** and fiscal policy vectors for the subsequent forecast period $H$ (1 Quarter Window) and **calculate similarities** to fiscal policy vectors

- Expansionary vector
- Contractionary vector
- Document vectors
Proposed **Dynamic** Doc2Vec approach

4. **CONSTRUCT CONTINUOUS SENTIMENT INDICATOR**

\[ \text{Sentiment}_{hi} = \text{Sim. to expansionary vector} - \text{Sim. to contractionary vector} \]

\[ \text{Sentiment}_{hi} \in [-1, 1] \]
Results: Fiscal policy sentiment

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VAR models

• Include the constructed fiscal policy sentiment time series in conventional VAR models

<table>
<thead>
<tr>
<th>Baseline Model</th>
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<tbody>
<tr>
<td>- <strong>Endogenous variables:</strong></td>
</tr>
<tr>
<td>- ( \log(\text{real government expenditure}) ),</td>
</tr>
<tr>
<td>- ( \log(\text{GDP}) ),</td>
</tr>
<tr>
<td>- ( \log(\text{real private consumption}) ),</td>
</tr>
<tr>
<td>- Sentiment (one of three time series)</td>
</tr>
</tbody>
</table>

• Sentiment ordered last
Figure 9: Response to fiscal sentiment (government)
Figure 11: Response to fiscal sentiment (government): extended VAR
Figure 12: Response to fiscal sentiment (government): extended VAR
Conclusion

• Aim: evaluate whether fiscal sentiment causes government expenditure and, hence, macroeconomic responses

FINDINGS

- Sentiment series has real economic effects: results suggest that an increase in fiscal sentiment towards a more expansionary policy stance increased government spending, output and consumption.

- Parliamentary data is very informative about economic policy-making.
Outlook

PUBLIC DISCOURSE

- Economy related news articles from FAZ
- What topics are talked about in public as opposed to parliament? How is the evolution of these topics over time?
- To what extent does the public fiscal policy-related sentiment differ from that in parliament?

DISAGREEMENT

- Study the consequences of disagreement about fiscal policy between government and the opposition
Thank you for your attention!

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