Speaking Under Stress + Developing Credibility

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Research overview

Understanding how monetary policymakers' use **communication** (speeches + press releases) to:

- respond to their **political principals**
- create **credibility**

Developed vs. Developing

Monetary policymakers:

- **Developed**: tend to have **established** credibility and autonomy and may be using communication to **protect** it.
- **Developing**: **trying to establish** these qualities.

Monetary policymaking in developed economies (US)

- What do monetary policymakers **consider stressful**?
  - Poor performance in mandated areas?
  - Poor performance in something else (e.g. housing)?
- What **non-policy tools** do they use to **respond** to this stress?
  - Reaching out to important interest groups?
  - What they talk about?

Monetary policymaking in developing economies (India)

- How is monetary policy **communication credibility** created?
- What impact do central bank governor **appointments** have on communication credibility?

Issues (1)

Data (i.e. text) ***availability****. Limited series of easily machine readable texts.*

Issues (2)

Integrating disparate types *of information, including multiple estimated quantities.*

Issues (3)

*Identifying **state changes** in complex data.*

Issues (4)

*Needing to **define a priori** features of the underlying quantities.*

Issues (5)

Showing *results from models where* ***topic proportions*** *are* ***dependent variables****.*

Data availability (US Federal Reserve Project)

All ($>$ 1100) Fed governor **speeches** from June 1996 through present are easily accessible.

Government Printing Office has House and Senate **transcripts** from 2001-2012 accessible. **Filled in** with Committee websites, so:

- House: 188 transcripts from May 1997-2012
- Senate: 144 transcripts from 2001-2012

Data availability (US Federal Reserve Project)

Effectively, our data is limited to the late 1990s through (about) the present.

Greatly **limits the generalisability** of our findings as this is a very particular period of US monetary policy-making.

More work needs to be done **creating corpora** of legislative and monetary policy-making transcripts.

Should be **easily and freely accessible** to improve **scientific efficiency**.

Data Availability (Resere Bank of India Project)

All **speeches** made by central bank governors and deputy governors 930 documents (1990 to present).

All **press releases** (1990 to present).

All **news articles** mentioning the Reserve Bank of India and/or its officials ~14000 documents (2000 to present; five leading Indian English newspapers).

Again, limited to a **specific and particular period of time**.

Integrating disparate types of information (US)

- Speeches (topic modelling),
- Scrutiny (change point analysis of Congressional hearings),
- Speech locations (Congressional donor?)
- Macroeconomic (e.g. inflation, Case-Schiller housing price index)

Ballooning **researchers degrees** of freedom.

Difficult to fully document in one article, but are each **publishable on their own?**

Integrating disparate types of information (India)

Aim to compare **sentiments** in monetary policy communication with sentiments in corresponding news articles.

Key assumption: the **difference** between measures from these two sources will give us an indication of how credible the RBI's communication is.

- Can examine changes over time.

Is this a **valid indicator**?

Identifying state changes

Posit that there are different "**scrutiny states**" (e.g. low, high).

Each month or congressional hearing is not independent. But there is some underling scrutiny state that spans months.

Currently we use **multi-variate change point analysis** (Matteson and James 2014).

Change point identification + interpretation -> variable with values: [*low*, *high*]

Prior experience of change point + text analysis?

How **valid** is this? What type of **robustness checks** could we conduct?

Defining features a priori

Non-parametric change point methods (e.g. Matteson and James 2014) require **minimum state lengths** to be determined a priori.

Topic modelling with Latent Dirichlet Allocation requires a priori specification of **number of topics**.

Attempts to justify assumptions

Guided by **substantive prior knowledge** + what we **learn from the data**.

- **Rule of thumb for change point**: aim for the smallest substantively meaningful minimum size to avoid arbitrarily ignoring shorter clusters.
- **Rule of thumb for topic modelling**: smallest number of topics without overlap.

Change Point in House Hearings

Topic proportions from Fed Speeches

Defining features a priori

Nonetheless **reviewers seem to be skeptical** of methods where features of the data need to be defined a priori.

How to overcome this skepticism?

Showing results from regressions with proportion dependent variables

Topic proportion data is in [0, 1] or (more likely) [0, 1).

Zero-Inflated Beta Regression (e.g Ospina and Ferrari 2010) is useful in this context.

- Utilises a **mixed discrete-continuous** distribution
  - Bernoulli distribution used for the discrete component, e.g. $\Pr(y = 0)$.
  - Beta distribution used for the continuous component, e.g. $0 < y < 1$

Showing results from Zero-Inflated Beta Regression

Beta regression and Zero-One inflated Beta regression gives **results** that many audiences find very **confusing**.

Coefficient signs for the discrete and continuous parts have **opposite interpretations**.

- Positive coefficient in continuous part indicates **topic is spoken about more**.
- Positive coefficient in discrete part indicates higher probability of **not discussing a topic at all**.

Predicting Fed topics in speeches

Predicting Fed topics in speeches

Suggestions and comments very welcome.

References

Matteson, David S, and Nicholas A James. 2014. "A Nonparametric Approach for Multiple Change Point Analysis of Multivariate Data." *Journal of the American Statistical Association* 109 (505): 334–45.

Ospina, Raydonal, and Silvia LP Ferrari. 2010. "Inflated Beta Distributions." *Statistical Papers* 51 (1): 111–26.