

# How central bank independence shapes monetary policy communication: A Large Language Model application

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## 1. What are the research questions ?

- Does central bank independence change the way central banks communicate monetary policy?
- Through which channels does central bank independence affect the content of monetary policy communication?

## 2. Why are the research questions interesting?

- Prior research overlooks how CBI shapes communication, focusing instead on its market effects or single events. // As communication becomes a key monetary tool, understanding CBI's influence can guide institutional reforms and improve strategy design across countries.

## 3. What is the paper's contribution?

- Unifies literatures to model how central-bank independence shapes communication via "policy-pressure" and "reputation" channels.// LLM-based textual analysis; fine-tuned model yields a new "policy- pressure" index that outperforms manual or dictionary methods.//Global sample shows independence effects are stronger in democracies and advanced economies.

## 4. What hypotheses are tested in the paper? List them explicitly.

- H1: An increase in CBI leads to a decrease in the focus on "inflationary pressures" in monetary policy communication over time.
- H2: An increase in CBI leads to an increase in the focus on "financial pressures" in monetary policy communication over time.
- H3: Changes in CBI cause changes in policy pressures, and these pressure changes are reflected in central banks' monetary policy communication.

## 5. Sample: comment on the appropriateness of the sample selection procedures.

- Drawing on 17,829 BIS-verified speeches (1997–2023) from 100 advanced or developing, democratic or autocratic central banks, cleaned via regex and matched with CBI data, the sample captures communication shifts and independence heterogeneity in one dataset.

## 6. Dependent and independent variables: comment on the appropriateness of variable definition and measurement.

- Gemini-classified monetary/financial pressure sentence shares serve as dependent variables; independence is Romelli's 0–1 legal index,  $\geq 0.05$  increase defines shocks.

## 7. Regression/prediction model specification: comment on the appropriateness of the regression/ prediction model specification.

- Staggered DID: A two-way fixed effects event study model is constructed, incorporating country fixed effects and year fixed effects, which can mitigate omitted variable bias.

IV:"Inverse distance-weighted world CBI", "neighboring countries' electoral democracy index", and "judicial independence" are used as instrumental variables. →Solving endogeneity

## 8. What difficulties arise in drawing inferences from the empirical work?

- Reputation and policy-pressure channels entangled, LLM financial-pressure boundary unclear.

## 9. Describe at least one publishable and feasible extension of this research.

- After central banks become independent, do they talk differently to different people, and does this affect people's trust in central banks?---audience heterogeneity effect

# More than words: Fed Chairs' communication during congressional Testimonies

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## 1. What are the research questions ?

- What impact does the soft information expressed through text, voice, and facial expressions in Fed Chairs' congressional testimonies have on financial markets, and do these impacts persist after the testimonies and reach magnitudes comparable to major monetary policy actions?

## 2. Why are the research questions interesting?

- Fills the gap of ignoring delivery methods in central bank communication research.//Has practical value for central banks to optimize communication and for markets to interpret signals.//The "two-day identical remarks" setting makes conclusions more reliable.

## 3. What is the paper's contribution?

- Builds multi-dimensional emotional indices and innovates to eliminate unrelated event interference.// Proves non-verbal cues voice&face have stronger market impact than text.// Finds emotional effects persist and match rate cut impacts, and monetary policy topics drive responses.

## 4. What hypotheses are tested in the paper? List them explicitly.

- H1:Fed Chair's positive emotional cues raise S&P 500 and lower VIX.
- H2:Emotional effects persist post-testimony, matching 25bps rate cut.
- H3:Market reacts more to cues during monetary policy discussions.
- H4:Market responds to Day 2's voice/face cues of identical remarks.
- H1:Congress members' emotions have similar market impact to the Chair's.

## 5. Sample: comment on the appropriateness of the sample selection procedures.

- 32 testimonies (2010 – 2017, 2 Chairs) covering multiple economic cycles. // Based on mandatory events with authoritative data sources.// Excludes abnormal/low-quality samples.

## 6. Dependent and independent variables: comment on the appropriateness of variable definition and measurement.

- Dependent variables: S&P 500/VIX/Eurodollar futures reflect core market changes.//Independent variables: Fine-tuned BERT (text), Praat-measured pitch (voice), FACS-calculated face index.// Controls: fixed effects&breaking news → avoid bias.

## 7. Regression/prediction model specification: comment on the appropriateness of the regression/ prediction model specification.

- Uses local projection for flexible high-frequency data analysis. Scenario-specific models target research goals. Uses Driscoll – Kraay SE and bootstrap to ensure reliable inference.

## 8. What difficulties arise in drawing inferences from the empirical work?

- Non-verbal cue measurement error; small sample limits generalization; hard to fully rule out omitted variables; heterogeneous cue interpretation.

## 9. Describe at least one publishable and feasible extension of this research.

- Cross-central bank comparison of non-verbal communication impacts.//Analyze whether social media amplifies or distorts the Fed Chair's soft information during testimonies, and how this affects the consistency of market responses.//Explore whether high-frequency traders and retail investors differ in their speed of capturing, way of interpreting, and trading behavior driven by the Fed Chair's soft information , and analyze the reasons for these differences.