

Monetary Policy and Uncertainty: The Communication Challenge

Michael McMahon (and many co-authors) Usual and unusual disclaimers apply: Views are mine! CCBS. June 2025

Alan Greenspan (2004)

"(...) <u>uncertainty</u> is not just a <u>pervasive feature</u> of the monetary policy landscape; it is the defining characteristic of that landscape."

- Many sources of uncertainty
- Time-varying yes; never zero!
- Mostly it is precedented
- Avoid self-gaslighting: "My to-do list will be under control in 2 weeks time..."

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Key Takeaway 1

Uncertainty abounds: The framework and communication must reflect and be maximally robust to pervasive uncertainty in policymaking.





Main Parts of My Talk



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This Talk – TB;CP

Focus on the communication aspect

- 1. Expect uncertainty it comes in many forms so design around as many as possible.
- 2. Credibility, across many dimensions, helps to retain the grip on the steering wheel.
- 3. A risk management strategy remains sensible.
- 4. Display humility.
- 5. Transparent communication of evolving narrative must be central.
- 6. Lots of communication options none perfect.
- 7. Balance the key communication trade-offs:
 - 7.1 Public Comms: Precision vs Accessibility
 - 7.2 Uncertainty: Influence today vs influence tomorrow

MP Communication

Communication Revolutions

Questions that guided central banks' communication strategies

Until 1990s

"Do we communicate this?"

1990s \rightarrow GFC \equiv 1st Revolution

"Why wouldn't we communicate this?"

Now \equiv 2nd Revolution

"How should we communicate this in a way that engages a broader cross-section of society?"

Two Important Methodological Tools

1. MARKET EVENT STUDIES WITH NON-TRADITIONAL DATA ANALYSIS



Two Important Methodological Tools

- 1. MARKET EVENT STUDIES WITH NON-TRADITIONAL DATA ANALYSIS
- 2. Experimental Approach
 - Run RCT information provision experiments
 - Experiments involve:
 - 2.1 Pre-treatment questions on knowledge
 - 2.2 Assess priors
 - 2.3 Randomly assign treatment
 - 2.4 Assess Posteriors

Perfectly natural approach in business to market research new ideas for products, instructions on products, etc...

Where are we now: Markets

Key Takeaway 2

CB Communication is a complex information bundle of not mutually exclusive signals.

1. Monetary news: CB exogenously changes (expected) short rate

Traditional view; large literature

2. Fundamental news: CB reveals private information about economy

Romer & Romer (2000); Campbell, Evans, Fisher & Justiniano (2012); Nakamura & Steinsson (2018); Jarocinski & Karadi (2020)

 Risk-premium news: CB influences amount or price of risk perceived by investors Bernanke & Kuttner (2005); Hanson & Stein (2015); Cieslak and Pang (2021); Kekre & Lenel (2022); Pflueger & Rinaldi (2022)

Not mutually exclusive

Hansen, McMahon & Tong (2018); Ahrens, Erdemlioglu, McMahon, Neely & Yang (2023); Cieslak & McMahon (2023); Cieslak, McMahon & Pang (2024)

Key Takeaway 3

Research has shown that non-expert public can be reached, but to a lesser extent than experts. Focus efforts on conceptual complexity rather than semantic complexity:

Trade off is between precision and accessibility.

Blinder:

- 2008: "It may be time to pay some attention to communication with the general public."
- 2018: "Central banks will keep trying to communicate with the general public, as they should. But for the most part, they will fail."

Challenge 1

CBs are still learning how to communicate with the wider public. There are many remaining challenges across the 3 Es: Explanation, Engagement, and Education.

Textbook vs Reality

Textbook NK communication

Some features of Standard NK Models

- Full Information
- Rational Expectations
- Commitment (even to discretion) / Fixed Reaction Function
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 - Phillips curve and 'Dynamic IS curve' in terms of output gap:

$$\hat{\pi}_t = \beta \mathbb{E}_t \hat{\pi}_{t+1} + \kappa \hat{y}_t$$
$$\hat{y}_t = \mathbb{E}_t \hat{y}_{t+1} - \sigma (\hat{r}_t - \hat{\tilde{r}}_t)$$

- Depends on 'real interest gap' $\hat{r}_t - \hat{ ilde{r}}_t$ with $\hat{r}_t = \hat{i}_t - \mathbb{E}_t \hat{\pi}_{t+1}$

Textbook NK communication

Some features of Standard NK Models

- Full Information
- Rational Expectations
- Commitment (even to discretion) / Fixed Reaction Function
- \Rightarrow Builds in a lot of communication automatically and often implicitly
 - Key is current and expected future real interest rate 'gaps':

$$\begin{split} \hat{y}_t &= -\sigma \sum_{\ell=0}^{\infty} \mathbb{E}_t \left[\hat{i}_{t+\ell} - \hat{\pi}_{t+1+\ell} - \hat{\tilde{r}}_{t+\ell} \right] \\ \hat{\pi}_t &= \kappa \sum_{\ell=0}^{\infty} \beta^{\ell} \mathbb{E}_t \hat{y}_{t+\ell} \end{split}$$

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- 2. Map data into a vector of beliefs about the state of the economy: $\Omega_t^{CB,t+h} = g_t \left(X_t^{CB} \right)$
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 - Captures two important analytical steps:
 - Evaluation
 - Projection
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- 3. Select the appropriate interest rate as a function of this state. $i_t = f_t \left(\Omega_t^{CB,t+h} \right)$
- $\Rightarrow\,$ 2. and 3. are the main source of disagreement
 - Within committees and between CB and market

SIDE NOTE: I liked the use of "Cases" language to capture (backward-looking) differences in the assessment of the world.

Communication lessons from theory

Key Takeaway 4

Many sources of uncertainty:

- Policy stance: r^{*}_t
- State of the world: Shocks hitting the system
- State of the world: The underlying dynamics
- MTM: Effect of policy
- Disagreement across policymakers

• ...

Communication lessons from theory

Key Takeaway 5

- 1. Anchoring of inflation expectations is important.
- 2. Clear communication of reaction function is vital.
- 3. Policymakers must communicate their assessment of the economic outlook, both nowcasts and forecasts, and its rationalization.
- 4. Explicit forward guidance is over-emphasised in the standard models.

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Challenge 2

How to communicate the reaction function when it is time varying?

How to communicate the assessment function without over-emphasising particular data series?

Time Variation in Policy Rule

"But it is important to recall that, while such rules were estimates of actual stances of past policy – <u>positive</u> descriptions of central bank behaviour – they have been re-interpreted as guides for what the central bank should do in all circumstances – <u>normative</u> prescriptions. Taking the past as a strict guide to the future is to assume that the nature shocks does not change and that the structure of the economy remains constant."

Mark Carney, " λ "

"However, these modifications would make the policy rule more complex and more difficult to understand. Even with many such modifications, it is difficult to see how such algebraic policy rules could be sufficiently encompassing... While the analysis of these issues can be aided by quantitative methods, it is difficult to formulate them into a precise algebraic formula. Moreover, there will be episodes where monetary policy will need to be adjusted to deal with special factors...The Fed would need more than a simple policy rule as a guide in such cases."

Taylor (1993)

Some views from the profession

- Lots of evidence of empirical changes in reaction functions
 - Before and after Volcker (Clarida et al, 2000)
 - Markov-Switching DSGE model (Bianchi and Melosi, 2013)
 - Substantial drift in estimated reaction function in a New Keynesian model (Fernandez-Villaverde and Rubio-Ramirez, 2008, 2010)

Some views from the profession



Markets Economics

Powell Hardens Hawkish Pivot Toward Half-Point Fed Rate Hikes

- Notes many officials saw need for one or more half-point moves
- Cites 'front-end loading' of policy tightening to cool economy

April 21, 2022

Uncertainty and Policy

May be optimal to vary reaction function:

- Uncertainty Brainard (1967), robust control, Cieslak et al (2023)
- Changing preferences of central bankers
- Central banks learning the structure of the economy over time
- Time variation in the persistence of shocks
- Variation in the volatility of the economy
- Mapping from CB assessment

Policymakers' Uncertainty \rightarrow Cieślak, Hansen, McMahon & Xiao (2023)

How does uncertainty affect FOMC Monetary Policy?

- Analyze impact of FOMC policymakers' higher-moment beliefs on policy stance
- Inflation PMU leads to a more hawkish response (\neq Brainard's conservatism)
 - Controls for Greenbook forecasts and FOMC member economic sentiment
- Why?
 - Policymakers pursuing a risk management approach
 - If facing tail risk about loss of credibility if they lose the nominal anchor (inflation scares).
 - Nominal rates may rise but real do not.

What Drives Surprises?
How to interpret market surprises?

Surprises:
$$\Delta_t = i_t - \mathbb{E}[i_t]$$

• In a Full Information, Rational Expectations world:

 \Rightarrow Surprise = policy shock

• In the Oracle Central Banker world:

 \Rightarrow Surprise = policy shock + information effect

• In the heretical (real) world:

 \Rightarrow Surprise = Many things including disagreement and concerns

Element(s) of surprise

• Information Effects (August 2010):

"The Committee may know something that we don't. Perhaps the upcoming Senior Loan Officer Survey has very bad news about lending standards."

• Disagreement (August 2010):

"The FOMC statement surprised us in, unfortunately, two ways.... We took two important messages from the statement: First, the staff and the Committee's forecasts have now diverged significantly from ours, with weaker growth than MA in both 2010 and 2011. Second, the question now is not how late they will tighten, but whether, when, and how they will ease. That puts us in a challenging situation. The Committee appears to have moved closer to easing, but that would not fit with our forecast, at least based on the Committee's apparent long-standing tolerance for such a grim outlook."

Element(s) of surprise

Key Takeaway 6

When the market has a belief about the correct decision - the market can perceive mistakes!

	Expected	Surprise
Disagree	"Expected mistake"	"Surprising mistake"
Agree	"Expected correct action"	"Corrective action"

Macro data also informative as it changes the view of markets about what is right!

Policy, Uncertainty and Premiums

Financial conditions are key to the MTM

 $\mathsf{CB's}\ \textit{actions}\ +\ \textit{words}\ \rightarrow\ \mathsf{long-term}\ \mathsf{rates}\ \rightarrow\ \mathsf{financial}\ \mathsf{conditions}\ \rightarrow\ \mathsf{economic}\ \mathsf{objectives}$

$$r_t^{10} = \mathbb{E}\left[\frac{\sum_{j=0}^{10} i_{t+j}^{cb}}{10}
ight] + TP_t^{10} - \pi_t^{e,10}$$

Communications and mistakes:

- 1. If signal likely to make a dovish mistake, market worry drives up TP_t^{10}
 - tightens financial conditions: initially does some of the MP work

2. If market becomes convinced:
$$\mathbb{E}\left[\frac{\sum_{j=0}^{10} i_{t+j}^{cb}}{10}\right]\downarrow$$
 and $\pi_t^{e,10}\uparrow$

3. TP_t^{10} and $\pi_t^{e,10}$ volatility makes it harder to control real rate gaps with i_t^{cb} .

Key Takeaway 7

Market perceptions of policy "mistakes" due to communication failures can raise term premia against policy intentions – broadly defined credibility matters.

In a world of disagreement, risk premium depends on:

- 1. Concern about CB's economic assessment:
 - CB reading the tea leaves incorrectly?
 - Macro data that doesn't support CB view will exacerbate these worries
- 2. Concern about CB's type:
 - Hawkish signals lower premium if market concerned about too dovish Fed, but they raise premium if market concerned about too hawkish Fed
 - Interpretation of 1987–2015 period: Forward-looking hawkish communication lowers marketperceived probability of a too-dovish mistake

The Post-Review Period: Cieslak, McMahon and Pang (2024)



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Median forecasts and Inflation tails



FOMC appeared constrained by framework + FG in 2021



- Initial building of credibility for framework and FG Sep/Dec 2020
- Diminished sensitivity to upper inflation tails
- Removing preemption weakened risk management

Note: SEP risk diffusion index: (#participants judge risk to upside of their projections) - (#participants judge risk to downside of their projections)/total # of participants; Fed's own FFR forecasts (central tendency and median).

Term premia or short-rate expectations? KW decomposition



- EH (left): 2y short-rate expectations stable through late 2021, as Fed intended
- TP (right): 10y term premia cumulatively increased up to 144bps until Jun 2022

Link yield curve movements to public perceptions of policy mistakes



Note: vertical lines mark selected major turning points

- ChatGPT: "Mistake" = 17.5% of 7784 articles
- Newspapers are ex-post reports of events that occurred
- We predict media perceptions with lagged asset prices:
 - TP comove with public perceptions of policy mistakes
 - TP decline on Fed's hawkish stance in speeches

Cumulative 10y Ultra futures yield changes on macro and Fed event days.



Key Takeaway 8

Monetary policy may be "98% talk and only 2% action" but "cost of sending the wrong message can be high" (Bernanke, 2015). With term premia involved, policymakers' "grip on the steering wheel is not as tight as it otherwise might be" (Stein, 2013). Framework and communication need to reflect uncertainty inherent in policymaking

 \Rightarrow pursue risk management strategy.

Forecasts and Forecast Errors

Building Central Bank Credibility: The Role of Forecast Performance

Overarching Question – Forecast Credibility

How does forecast performance affect the influence of central bank inflation forecasts on individual expectations?

- 1. Subjects under punish (under reward) consistently poor (excellent) performance
- 2. Timing of errors matters a lot recent performance is key.
- 3. Communication can (partially) help offset poor recent performance.

Key Takeaway 9

Credibility and effective engagement evolves endogenously; rebuilding credibility could be harder if errors reduce capacity of central bank to influence expectations. Communication can help somewhat.

Forecast Performance:



Timing of Forecast Errors:



Communication:



Communicating Uncertainty

Communicating Monetary Policy Uncertainty

- Uncertainty impacts policy:
 - *Directly* by impairing forecasts.
 - Indirectly by altering public expectations and behaviour.
 - Small but growing literature on communication of uncertainty: Petersen & Rholes (2020), Petersen & Rholes (2022), and Kostyshyna & Petersen (2024)

Key Takeaway 10

Uncertainty communication is important, but difficult. The key trade-off is likely dynamic: influence today versus influence tomorrow.

- Risk Today: Undermining forecast credibility and reducing the anchoring.
- Benefit Tomorrow: Enhancing trust and managing expectations.
- Still lots of choices: What uncertainty? When? How? To Whom?

Two part exercise: Work in Progress (including the past week!)

- A Understanding Communication: What do different media communicate?
 - Tests interpretation of uncertainty across 6 of 10 possible representations.
 - Includes both general public and technical audiences.
 - Explores understanding of: probabilities, sources of uncertainty, visual formats.
 - Mediums: fan charts, dot plots, scenarios, etc.
- B Dynamic Information Experiment: The effect of communicating uncertainty
 - Sample: 2,000 UK general public participants.
 - Three stages:
 - 0.1 Priors elicited on inflation and confidence ranges.
 - 0.2 Randomised forecast treatments (point vs. uncertainty).
 - 0.3 Forecast error revealed + updated forecasts + trust/credibility elicited.
 - Treatments vary both in format and type of uncertainty.

Part A Unconditional Media



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Uncertainty Comms

Part A Conditional Media



Part A Conditional Media



Some media are more naturally understood



Some media are more naturally understood



Some media are more naturally understood



Uncertainty blurs the basic message somewhat for the public



Uncertainty blurs the basic message somewhat for the public



Uncertainty communication more mixed: How much uncertainty in this chart?



Uncertainty communication more mixed: How much uncertainty in this chart?



Uncertainty communication more mixed: Probability communicated?



Uncertainty communication more mixed: Probability within Range


Uncertainty communication more mixed: Probability communicated?



What do conditional charts convey?



Long fans don't deceive about longer-term probability - need to teach!

'Inflations outcomes in forecast year 3 are [XXXX] than those in forecast year 1'



Summary of the Findings on the Key Characteristics

- 1. Is the medium 'understood'? (Liked?)
 - Public Point best, then fan, dot and scenario. Not huge fans of speedometer.
 - Experts Like familiar, HATE the Speedometer
- 2. Does the medium communicate expectation?
 - Public Do pretty well, conditionals more difficult
 - Experts Yes to all
- 3. Does the medium communicate uncertainty?
 - Public Fans, Box-and-Whisker and Speedometer do well; conditionals more difficult (can confuse).
 - Experts Understand uncertainty better, but relative ranking similar.

Scenario together with uncertainty is helpful.

Opportunity 1

Don't condemn the fan chart to the historical dustbin. But definitely use it more carefully. Narrative is key: IR text communicates risk beyond statistical measures (HMT, 2019).

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Narrative

Macro's Paradigm: Frisch-Slutsky



- Traditional view: different expectations from different information (shocks)
- Newer Idea: Stories/narratives better than statistics

Emerging Focus on Mental Models and Narratives

- McMahon, Rholes and Rickards (2025) explore differences, and teachability, of:
 - 1. Assessment
 - 2. Monetary Reaction
 - 3. Monetary Transmission
- Information could still be factors in the mental model differences of course!
- Understanding of the policy functions are key to efficacy of MP but existing view is that people neither understand:
 - How interest rates work (*transmission*)
 - How the central bank sets interest rates (reaction)
- Lack of understanding is associated with less trust in the CB
 - "Lack of legitimacy" is a major threat to CB independence.

Contributions

Our contributions

- 1. Significant Variation in Household Mental Models:
 - 1.1 Add to evidence on heterogeneity in mental models
 - 1.2 Demand shocks less-well understood than supply shocks
 - 1.3 CB reaction function understood quite well in theory
 - 1.4 Understanding of transmission function nuanced very strong link to economic activity. No clear link to inflation or unemployment.
- 2. Central Bank Education / Communication Treatments Work:
 - 2.1 Education treatments shift mental models where understanding is low.
 - 2.2 The effect is lasting.
- 3. Credibility
 - 3.1 Strong link between understanding and credibility (!causality pending!)

Transmission Function: Correct by Treatment



Transmission function: Correct response proportion Priors shaded. Posteriors full. Follow-ups incrementally darker. 20-week follow-up darkest





Specific question

Scenario: Unexpected rise in inflation and decline in unemployment... inflation has risen unexpectedly from 2 to 4% and the unemployment rate has declined from 5 to 4%. We would like you to provide a forecast for how the Federal Reserve would set interest rates...

1. Pre-Intervention measures

1.1 Subjects predict policy response to hypothetical shocks that change key economic indicators 1.2 Ask subjects to read a Fed summary statement and guess whether/ how Fed changed policy

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2. Post-Intervention Measurement

• Participants solve new hypothetical (and real world) problem.

Reaction Function Response



Information received since the Federal Open Market Committee met in December indicates that the labor market has continued to strengthen and that economic activity has continued to expand at a moderate pace. Job gains remained solid and the unemployment rate stayed near its recent low. Household spending has continued to rise moderately while business fixed investment has remained soft. Measures of consumer and business sentiment have improved of late. Inflation increased in recent quarters but is still below the Committee's 2 percent longer-run objective.

Consistent with its statutory mandate, the Committee seeks to foster maximum employment and price stability...[FILL IN THE OPTION].

Drinkall, McMahon, Rholes & Rickards (2025)



How well can AI do the job?

Type	Method	Overall	Α	В	\mathbf{C}
Baselines	Human Expert	81.25	90.63	81.25	90.63
	Random	16.67	33.33	33.33	33.33
LLMs	GPT-4	$\bar{75.00}^{-7}$	$\overline{84.38}$	$\overline{75.0}^{-}$	87.5
	FOMC-RoBERTa	53.13	65.63	56.25	71.88
	FOMC-RoBERTa NG Text	34.38	46.88	43.75	53.13
Ranking Methods	RoBERTa Ranking	56.25	71.88	$\overline{59.38}$	$\bar{78.13}$
	NarrativeGraph	18.75	34.38	31.25	31.25

New paper tries to understand why real-world detection of FOMC reaction function is poor:

- Is this driven by the style of the FOMC statement?
- Does the ECB / BoE / RBA approach do better?

Opportunity 2

ON-GOING: Avoid hiding behind the numbers assuming they speak for themselves. (Markets know them already and Households don't interpret them structurally.)

Focus on core narrative and be open to the possibility of alternative narratives (cases & scenarios).

Narrative within the Monetary Policy Infrastructure



Challenge 3

The media is the key channel for getting through to the wider public. But this comes at a cost in terms of understanding of decisions and perceptions of the bank (Rickards (2023) and Gardt, Angino, Mee & Glöckler (2021)).

Opportunity 3

Need more work on the role of the media.

Our Responses Suggest Highly Sophisticated Journalists



Our Responses Suggest Highly Sophisticated Journalists



Some thoughts from my previous role:

- It is important that your narrative is out there for people who seek it:
 - Challenge is engagement
- Foster relationships with key journalists:
 - No more: "Keep the Press out of the Bank, and the Bank out of the Press".
- Journalists have dynamic reputational concerns too.
- If they don't like something that is done for the right reasons, explain/clarify anything that is unclear.
- Humility: "Data is the final adjudicator in narrative debates"

Wrapping up

Challenge 4

How does a central bank communicate a forecast best?

- Internal consistency and the underlying interest rate path?
- Does the public interpret interest rate forecasts differently?

Challenge 5

What role for collective vs individual forecasts?

 Role of individual speeches in FOMC comms is increasingly shown to be important – is it as forecast signals?

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Appendix Material

My research that underlies this talk I

- "Uncertainty and Time-varying Monetary Policy" with Munday
- "Policymakers' Uncertainty" with Cieslak, Hansen and Xiao
- "The central bank crystal ball: Temporal information in monetary policy communication" with Byrne, Goodhead and Parle

My research that underlies this talk II

- "Tough talk: The Fed and the risk premium" with Cieslak
- "Did I make myself clear? the Fed and the Market in the post-2020 framework period" with Cieslak and Pang
- "Element(s) of Surprise" with Munday
- "Getting through: communicating complex information" with Naylor
- "Building Central Bank Credibility: The Role of Forecast Performance" with Rholes
- "Teach, don't give? Mental models, understanding and communication" with Rholes and Rickards.

My research that underlies this talk III

- "Anchors aweigh?: The effect of communicating forecast uncertainty" with Naylor, Rholes and Rickards.
- "The long-run information effect of central bank communication" with Hansen and Tong.
- "The Tyranny of Numbers" with Drinkall, Rholes and Rickards.

What About Central Bank Credibility?



Components of Credibility (Blinder, 2000):

- Q1: Fights Inflation, Q2: Clear, Transparent Comms, Q3: Actions Benefit Economy
- Q4: Keeps Inflation Low, Q5: Follows Clear Policy Rule

On-going Credibility Experiment

- Our control is *not* a true control for credibility
- Importantly we see dynamic effects even once learn only "functions"
 - \Rightarrow Central Bankers like heart surgeons?



- On-going experiment adds a genuine control for credibility to see the impact on various dimensions including information acquisition
 - D'Acunto and Weber (2025)