

04

*From release
architecture to public
understanding.*

Communication **as Text Data.**

Measurement, public attention, strategic disclosure,
climate translation, and understandability.

Fatih Kansoy
Central Banking · Lecture 4

Worcester College

From Release to Reception

- Measurement: make the missing middle observable.
- Architecture: ask how bundling changes attention.
- Unexpected content: isolate the first public reading.
- Public engagement: distinguish posting from exposure.

Communication becomes data only after the economic object, source, and empirical unit are fixed.

01

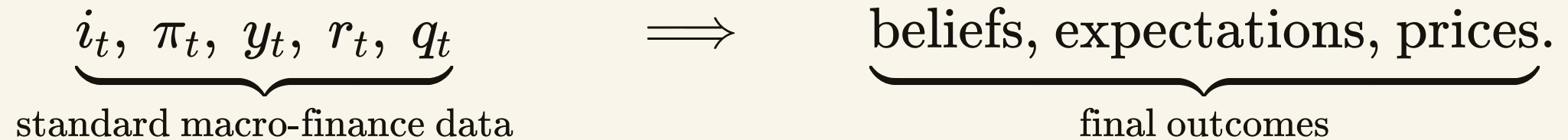
CENTRAL BANKING · LECTURE 4 · WORCESTER COLLEGE
PART 01

Measure communication.

Text and digital traces reveal the missing middle

Measure the object **Identify the mechanism** **Read the evidence**

Standard Data Miss the Middle



The empirical gap lies between the released decision and the observed outcome.

MECHANISM · READ LEFT TO RIGHT

Transmission Runs Through People

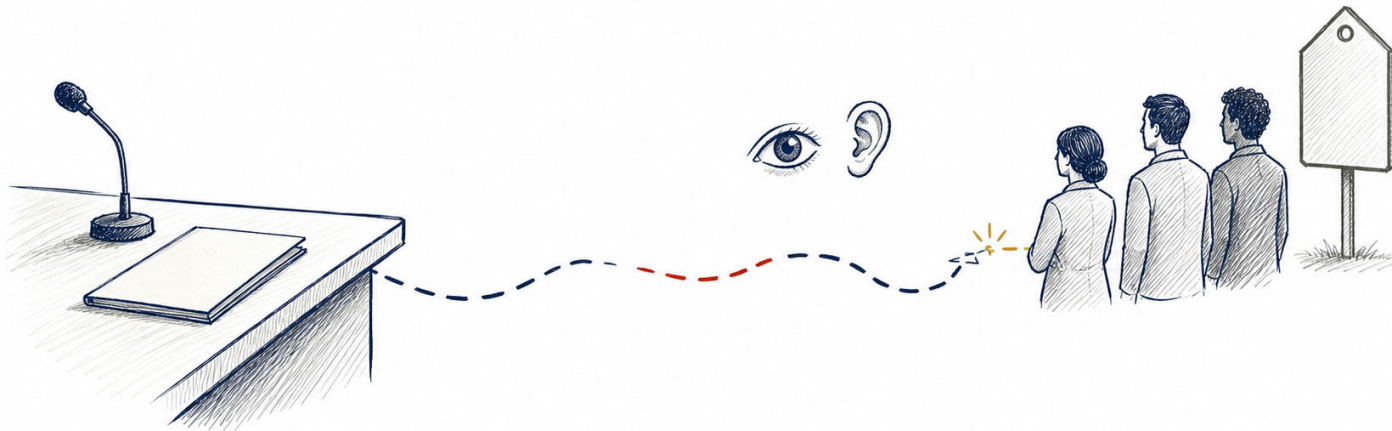
communication → attention → interpretation → belief updating.

- A message cannot update a belief if it is not noticed.
- Exposure does not guarantee a shared interpretation.
- Text and digital traces make parts of this information environment observable.

Communication data measure the mechanism that endpoint data leave hidden.

CONCEPTUAL ILLUSTRATION · NOT EMPIRICAL EVIDENCE

Attention and Interpretation Fill the Gap



TEACHING POINT

Reach is not impact: attention and interpretation sit between publication and outcomes.

Use the next slides for the documentary evidence.

Communication Expands the Information Set

$$\mathcal{I}_t = \mathcal{I}_t^{macro} \cup \mathcal{I}_t^{market} \cup \mathcal{I}_t^{communication} \cup \mathcal{I}_t^{public}.$$

$$\mathcal{I}_t^{macro}, \quad \mathcal{I}_t^{market}.$$

$$\mathcal{I}_t^{communication}, \quad \mathcal{I}_t^{public}.$$

A policy message matters only after it enters an audience's information set.

ECONOMIC OBJECT · DEFINE BEFORE ESTIMATING

Text Extends Policy Measurement

Object	Standard data	Text or digital data
Policy decision	yes	yes
Public attention	rarely	yes
Public interpretation	rarely	yes
Disclosure choices	rarely	yes
Institutional admissibility	rarely	yes
Asset-price response	yes	yes

The added value is access to reception, selection, and admissibility—not another policy-rate series.

Match the Corpus to the Behaviour

Source type	Examples	Economic object
Policy and official text	statements, minutes, speeches, transcripts, fiscal reports	priorities, guidance, disclosure
Firm disclosures	earnings calls, annual reports, filings, presentations	expectations, risk, investment plans
News and media	newspapers, newswires, analyst reports, blogs	information flow, sentiment, uncertainty
Social and public text	Twitter/X, Reddit, survey comments, reviews	interpretation, disagreement, beliefs
Attention traces	Google Trends, Wikipedia views, web traffic	search and reference behaviour

Availability is not validity: source choice follows the economic object.

ECONOMIC OBJECT · DEFINE BEFORE ESTIMATING

Rules Turn Sources into Variables

$$\text{raw source } s_i \xrightarrow{\hat{\phi}} \hat{x}_i \xrightarrow{\text{econometric design}} Y_i.$$

Unstructured material becomes evidence only through an explicit measurement rule.

INTERPRETIVE BOUNDARY

Sources Reveal Different Stages

Source	Measured object
Search or page views	attention and information acquisition
Official posts	engagement with public communication
Public text	interpretation, beliefs, disagreement
Institutional text	disclosure, omission, policy priorities

No single source measures attention, interpretation, and disclosure at once.

ECONOMIC OBJECT · DEFINE BEFORE ESTIMATING

One Document, Many Measurements

Measurement	Variable	Question
Tone	hawkish/dovish score	how restrictive is the communication?
Topic	inflation, labour, risk	what is the discussion about?
Surprise	residualised tone	what was not predictable before release?
Coverage	statement–transcript gap	what was omitted from the focal release?
Linkage	mandate category	how does an issue become policy-relevant?

The same minutes become a different variable when the research question changes.

ECONOMIC OBJECT · DEFINE BEFORE ESTIMATING

The document is not the variable

document $\neq$ variable.

Start with the quantity to be measured; only then select the text method.

ECONOMIC OBJECT · DEFINE BEFORE ESTIMATING

Auditable Measurement Has a Workflow

source → cleaned corpus → measurement rule
→ structured variable → econometric design.

Measurement is not preprocessing; it is an explicit empirical stage.

INTERPRETIVE BOUNDARY

Each Stage Has Its Own Failure

Stage	What happens
Source	collect posts, speeches, minutes, transcripts, searches, or views
Cleaning	remove retweets, bots, false matches, duplicates, and missing metadata
Measurement	classify tone, topic, interpretation, linkage, or omitted content
Aggregation	move to event, meeting, institution-year, or release-window units
Validation	compare human labels, test placebos, and propagate uncertainty

A credible variable records how raw material changed at every stage.

Three questions organise the empirical cases

communication → measured variable → economic mechanism.

Research question	Observed source	Economic object
Who pays attention?	searches, page views, public and official posts	attention and engagement
How is the message interpreted?	public text around announcements	direction, disagreement, narrative
What becomes part of the record?	statements, minutes, transcripts, speeches	disclosure and admissibility

The lecture moves from reception to interpretation and then to institutional selection.

02

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PART 02

Architecture **shapes attention.**

One richer event can still create fewer opportunities to notice

Measure the object **Identify the mechanism** **Read the evidence**

INSTITUTIONAL CHANGE · AUGUST 2015

Warsh Replaced Sequence with Bundle

BEFORE

Several release dates

Decision → forecast report + press
conference → minutes + vote

Several smaller attention waves

AFTER

One full-release bundle

Decision + minutes + vote + forecast +
press conference

One larger focal occasion

The reform changed release architecture, not the existence of policy information.

ECONOMIC MECHANISM · TWO MARGINS MOVE AT ONCE

Bundling Moves Two Attention Margins

INTENSIVE MARGIN**A richer event**

More content arrives together, raising salience on the bundled day.

Attention per event ↑

EXTENSIVE MARGIN**Fewer occasions**

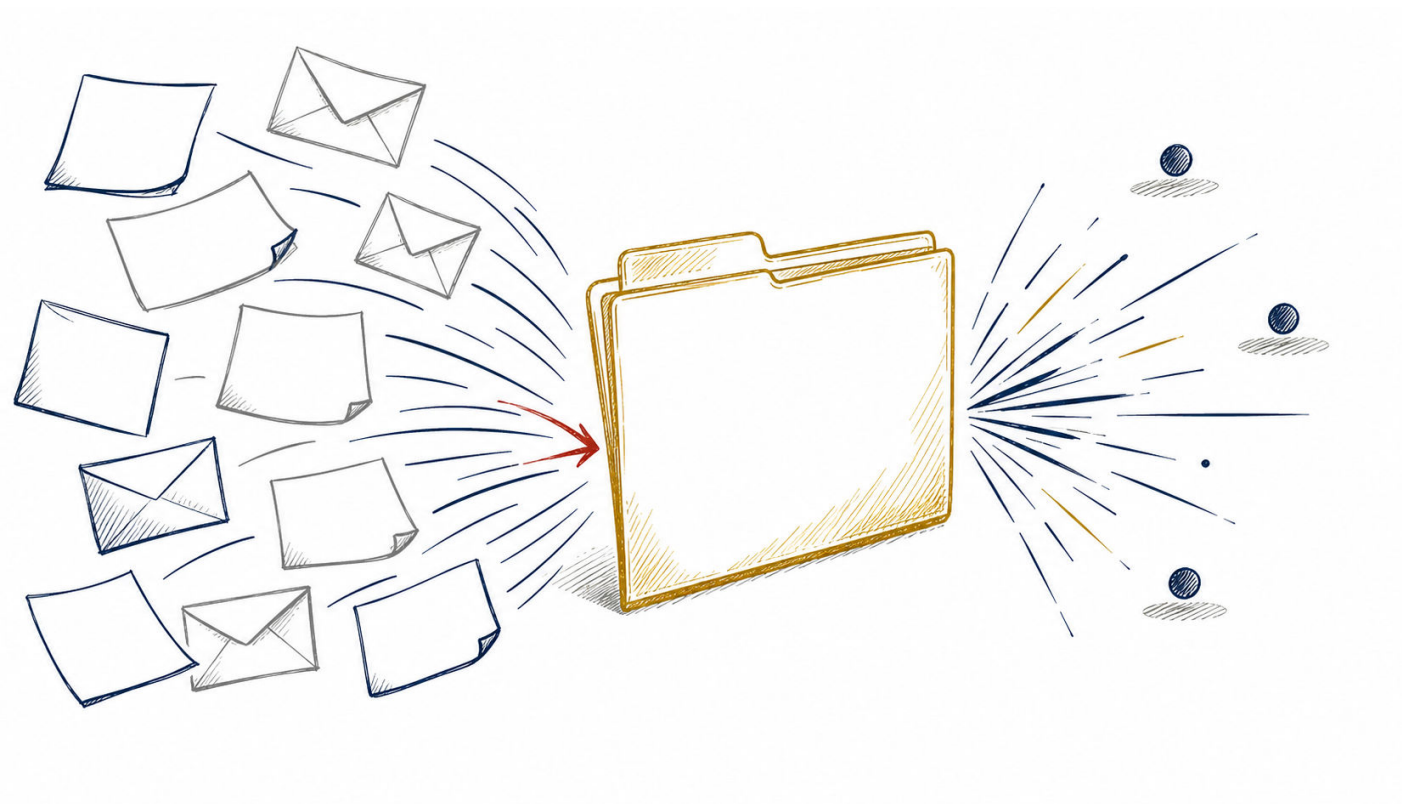
One forecast-round opportunity disappears after bundling.

Attention occasions ↓

A larger event can coexist with less attention over the whole forecast round.

CONCEPTUAL ILLUSTRATION · NOT EMPIRICAL EVIDENCE

A Bigger Release Can Mean Less Attention



TEACHING POINT

Bundling raises attention per event but removes an attention occasion.

Use the next slides for the documentary evidence.

INTERACTIVE QUESTION · WHICH ATTENTION MARGIN DOMINATES?

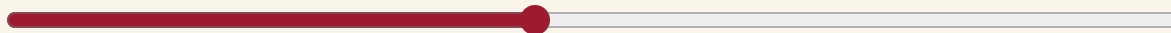
Net Attention: Gain Minus Lost Occasion

$$\Delta A_q = \text{salience gain} - \text{lost occasion}$$

Bundled-day salience gain 70



Attention from removed occasion 45



NET ATTENTION ·
HYPOTHETICAL UNITS

+25



The actual sign must come from the event and forecast-round evidence.

Communication architecture determines both the size and number of attention triggers.

INTERPRETIVE BOUNDARY

Three Traces, Three Attention Behaviours

Trace	Series	Behaviour measured
Twitter/X	log unique users posting original BoE/MPC tweets	real-time public discussion
Google Trends	UK index for BoE, interest rates, and inflation	active information acquisition
Wikipedia	log views for BoE and monetary-policy pages	reference and background checking

The outcome is revealed attention: discussion, search, and reference behaviour.

Abnormal Attention Uses a Baseline

$$\underbrace{A_{e,p}}_{\text{abnormal attention}} = \underbrace{Y_{t(e),p}}_{\text{event-day activity}} - \underbrace{\bar{Y}_{e,p}^{base}}_{\text{matched baseline}} .$$

The design explains an event spike, not raw platform volume.

Match Weekdays; Exclude Nearby Events

Object	Construction
Event activity $Y_{t(e),p}$	log users, search index, or log page views on the event date
Baseline $\bar{Y}_{e,p}^{base}$	same-platform mean on matching non-event weekdays in the prior 30 days
Exclusion	remove days near other MPC events from the baseline
Outcome	event-specific abnormal attention $A_{e,p}$

Matching the attention environment separates an announcement spike from ordinary weekly rhythms.

INTERPRETIVE BOUNDARY

Event and Round Analyses Differ

Unit	Pre-reform	Post-reform
Event	decision day or Inflation Report day	full-release day or standard meeting
Forecast round	decision day plus Inflation Report day	one full-release day

- Event level: is the bundled day more salient?
- Forecast round: does one bundled day replace attention from two occasions?

The unit of analysis determines whether the intensive or extensive margin is visible.

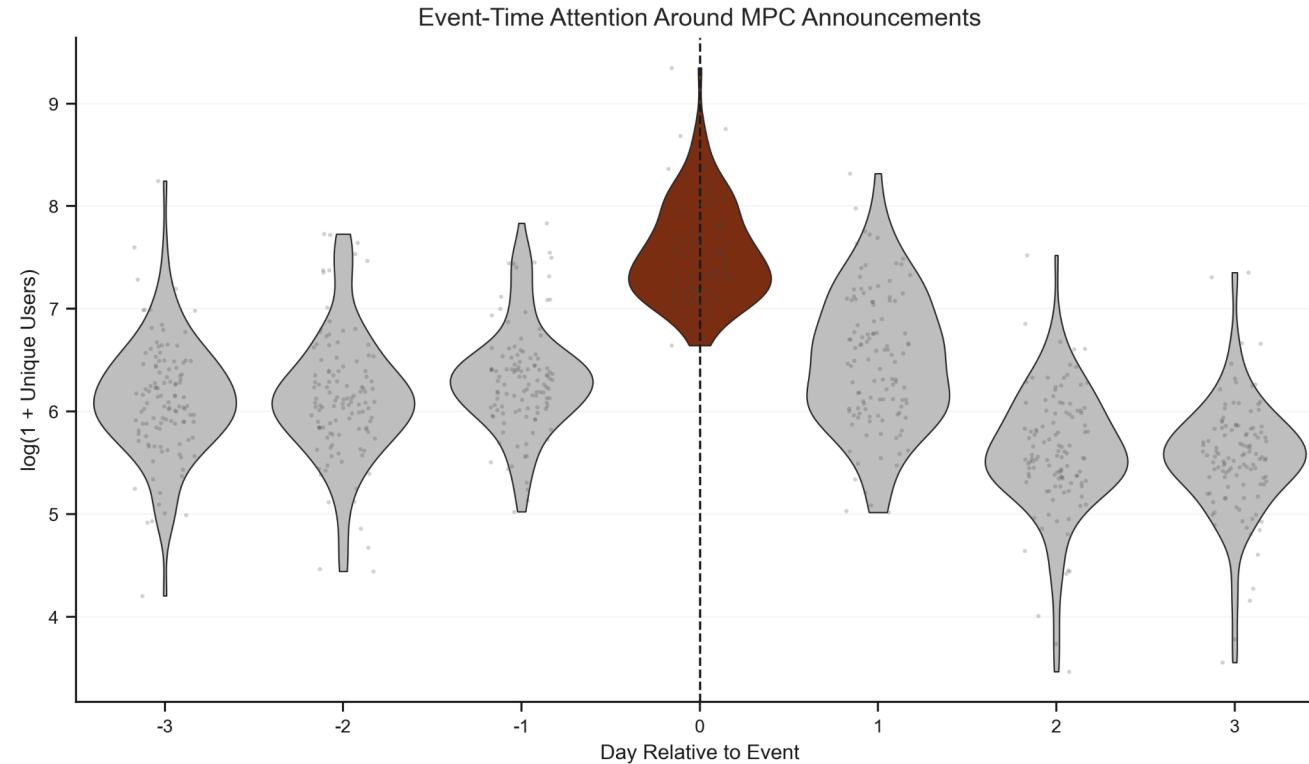
Quarterly Attention Sums Event Spikes

$$CumLogAtt_q = \sum_{e \in \mathcal{E}_q} A_{e,TW}.$$

Digital traces let the researcher count attention by event before aggregating it.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

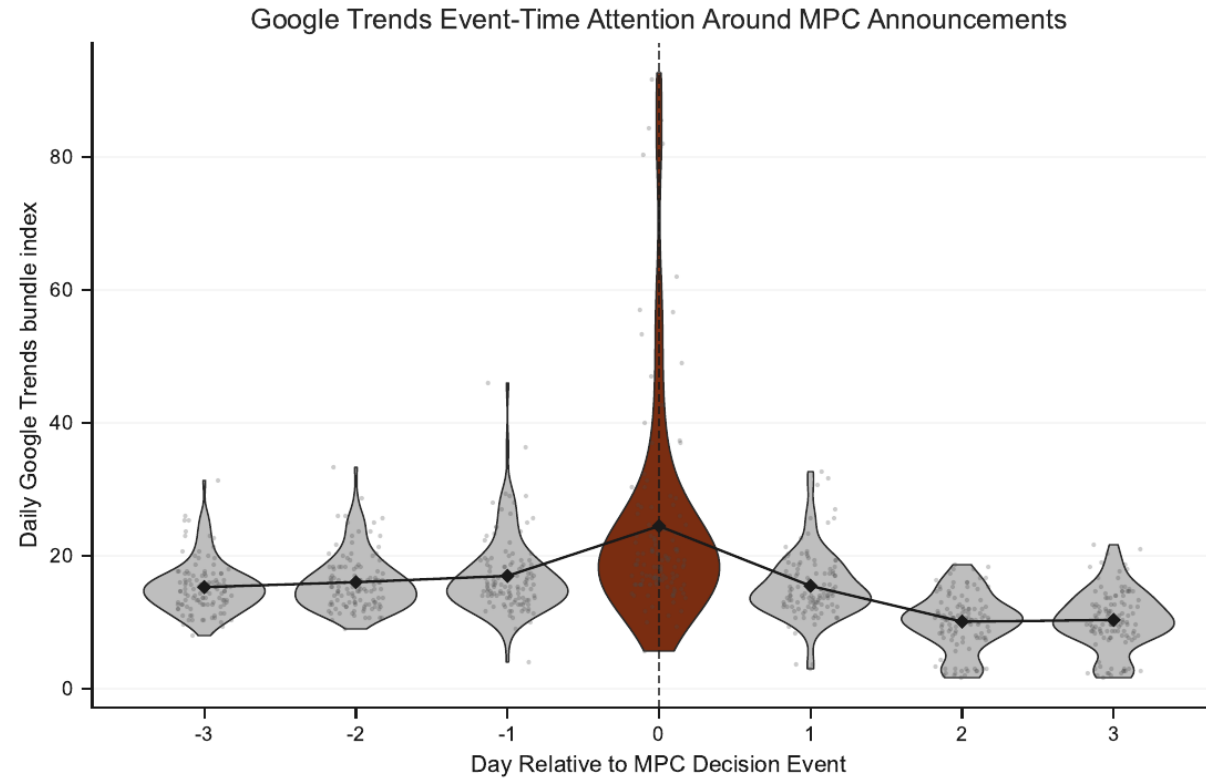
Twitter Peaks on Decision Day



Across $h = -3, \dots, +3$, event-day log unique users spike and attention decays sharply after the decision.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

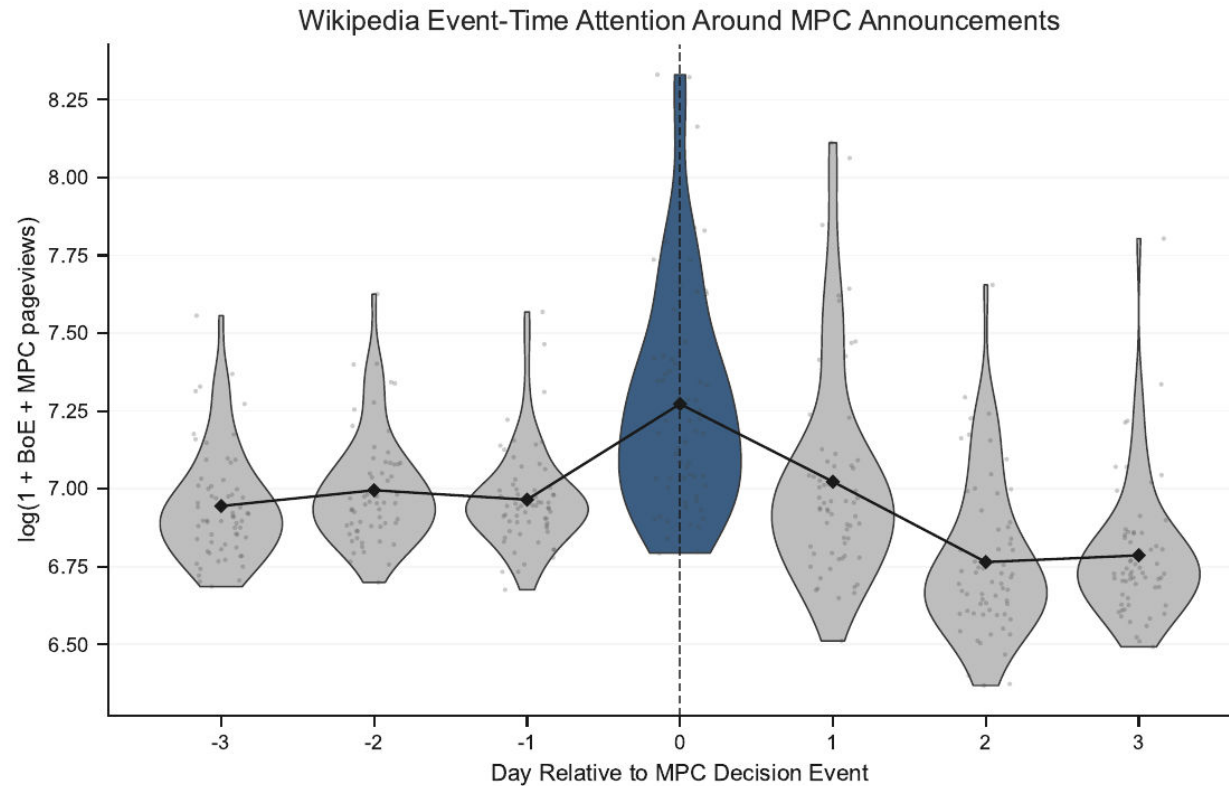
Google Search Peaks on Decision Day



The event-day distribution shifts upward relative to adjacent days, consistent with active information acquisition around MPC announcements.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

Wikipedia Views Peak on Decision Day

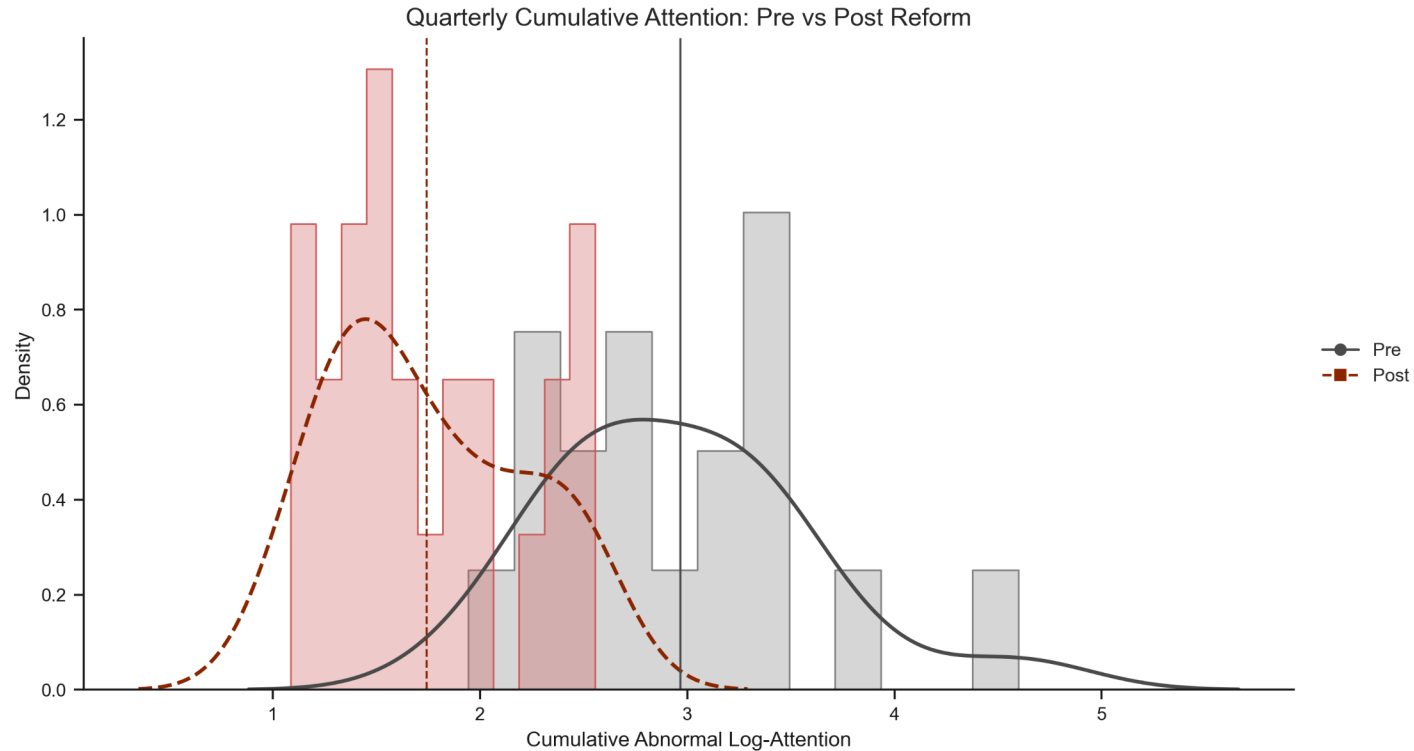


Reference and background-checking activity rises on the MPC event day and recedes afterward.

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DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

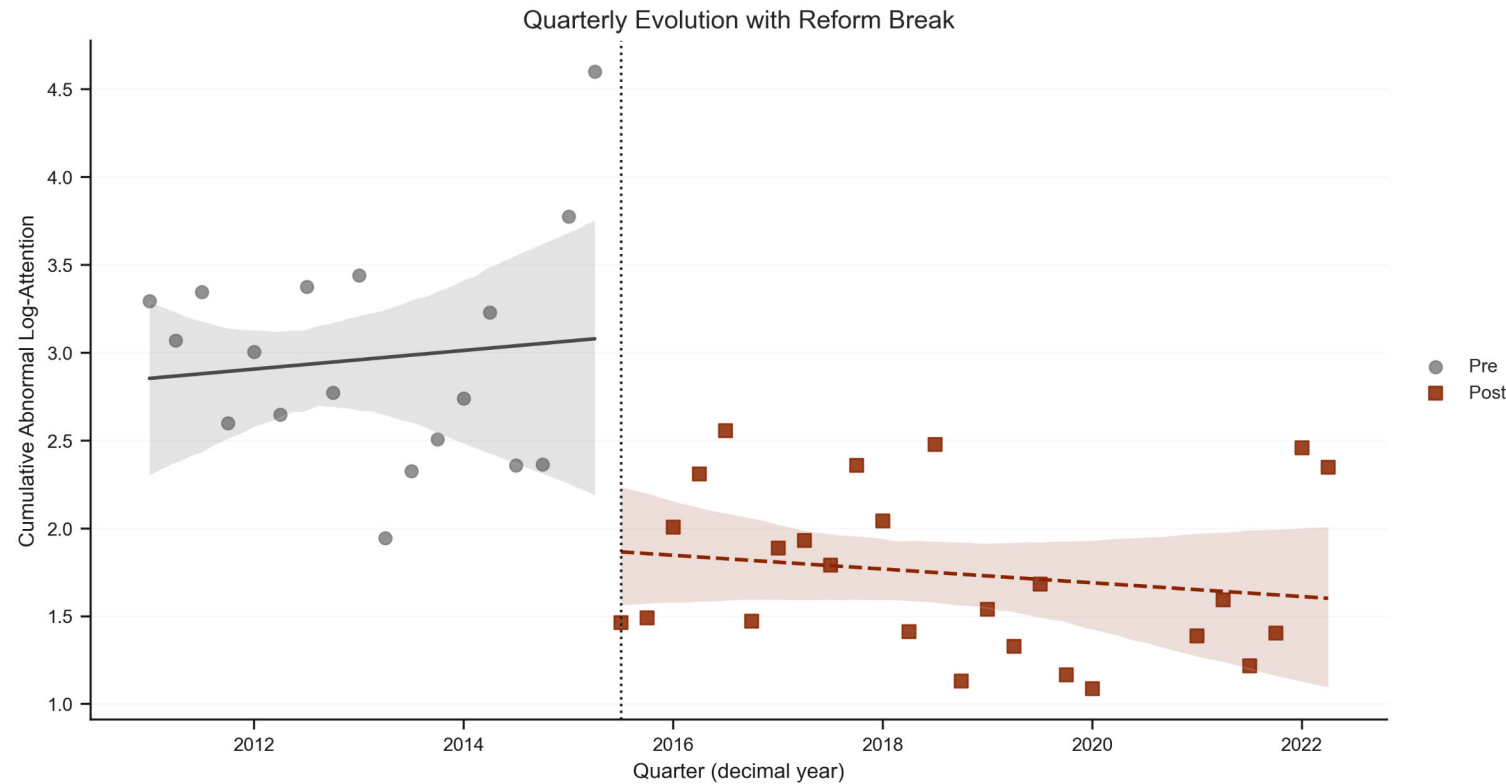
Quarterly Twitter Attention Shifts Left



Pre: $N = 18$, mean 2.966, s.d. 0.631. Post: $N = 25$, mean 1.742, s.d. 0.466; the post mean is below the pre minimum 1.945.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

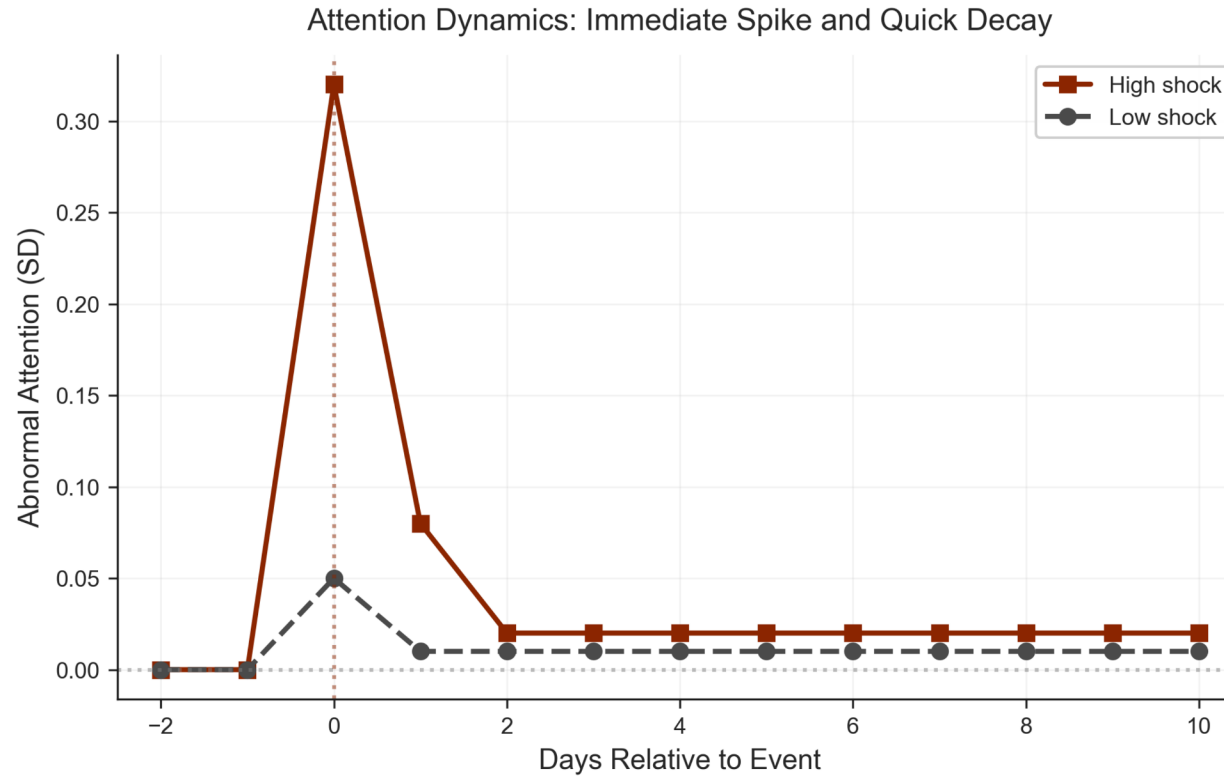
The Reform Shifts Levels, Not Trends



Separate OLS trends and 95% bands show no statistically significant within-regime trend; the pattern is consistent with a break at implementation.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

Surprises Raise Visibility, Not Persistence



High shock means absolute UKMPD surprise above the sample median. Across 117 MPC events, the larger impact response still decays rapidly.

EMPIRICAL RESULT · COMPARISON AND SCOPE

Bundling Raises Salience, Lowers Attention

more attention per event $\nRightarrow$ more attention over the round.

Object	Finding	Interpretation
Single event	full-release days attract more discussion and search	the remaining event is more salient
Forecast round	cumulative Twitter attention falls about 41%	the lost second occasion dominates

Communication design changes both salience and the number of opportunities to notice.

Super Thursday creates an attention trade-off

one larger public occasion versus two separate attention triggers.

01
Event salience

02
Round exposure

A bigger event-day spike does not replace repeated exposure.

MECHANISM · TWO DESIGN MARGINS

Architecture Changes Topics and Timing

COMMUNICATION
architecture

=

TOPIC COMPOSITION
what is bundled

+

TIMING
how often attention is
triggered

Composition: richer releases carry more forecast and outlook discussion.

Timing: bundling creates a sharper event but removes a separate occasion.

The communication technology changes both content per event and the number of attention opportunities.

INTERPRETIVE BOUNDARY

Attention is not belief or understanding

attention trace $\neq$ beliefs $\neq$ understanding.

Limit**Interpretation**

Selected users

Twitter/X is a trace, not the whole public

Normalised searches

Google Trends measures relative search intensity

Bundled reform

timing, minutes, and event frequency changed together

The credible claim is narrower: architecture changes exposure opportunities.

03

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PART 03

Unexpected words **shift readings.**

Interpretation can move without approval

Measure the object Identify the mechanism Read the evidence

Measure the First Directional Reading

BoE communication bundle → attentive-public interpretation
→ possible wider diffusion.

Object	Design choice
Setting	scheduled post-2015 MPC bundles
Public text	BoE-related Twitter/X discourse around release
Window	post-release discourse relative to the pre-release baseline
Target	directional interpretation, not volume or generic sentiment

The outcome is the first public reading—not representative household beliefs.

INTERPRETIVE BOUNDARY

Classify Direction, Not Sentiment

$$\hat{L}_i^{direction} \in \{\text{hawkish, dovish, neither}\}.$$

A positive or negative emotional tone is not automatically hawkish or dovish.

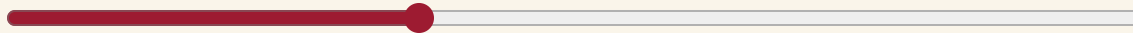
INTERACTIVE MEASUREMENT · DIRECTION, NOT VOLUME

PHI Nets Hawkish and Dovish Readings

$$\text{PHI} = \frac{N^{\text{hawk}} - N^{\text{dove}}}{N^{\text{all}}}$$

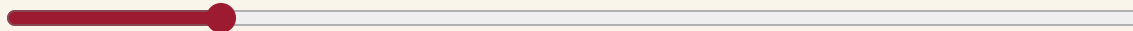
Hawkish readings

36



Dovish readings

18



PHI · ALL READINGS FIXED AT 100

+0.18

Neutral or non-directional posts remain in the denominator.

The index measures the direction of the public reading, not its volume.

Measure the Post-Release PHI Change

$$\Delta\text{PHI}_m = \text{PHI}_{m,0-24h} - \text{PHI}_{m,\text{pre}48h}.$$

A meeting-level change is more informative than the raw post-release index.

EMPIRICAL RESULT · COMPARISON AND SCOPE

Unexpected Tone Removes Predictability

$$\text{Tone}_m^{BoE} = \alpha + \Pi' I_m + \theta_{qoy} + u_m, \quad \text{UnexpectedTone}_m = \hat{u}_m.$$

Term	Meaning
Tone_m^{BoE}	hawk–dove tone of the minutes
I_m	pre-release OIS expectations, rate surprise, macro data, gilt and FX moves
UnexpectedTone_m	tone not predicted by that information set

Residualised tone is the text analogue of a policy surprise.

REDUCED-FORM TRANSMISSION TEST · HOLD THE RATE SURPRISE APART

Separate Language from Rate Surprises

$$\Delta\text{PHI}_m = \beta_0 + \beta_1 \text{UnexpectedTone}_m + \beta_2 \text{RateSurprise}_m + \beta'W_m + \theta_{qoy} + \varepsilon_m$$

 β_1

Language channel

Does an unexpected statement reading move the public reading?

 β_2

Rate-surprise channel

Separates the conventional policy surprise from language.

The coefficient is reduced-form: unexpected content may combine language with private central-bank information.

MEASUREMENT BOUNDARY · DIRECTION IS NOT EVALUATION

A hawkish reading can be supportive or critical

INTERPRETATION

“The Bank sounds hawkish.”

Direction: hawkish, dovish, or neither.

EVALUATION

“That stance is right—or a mistake.”

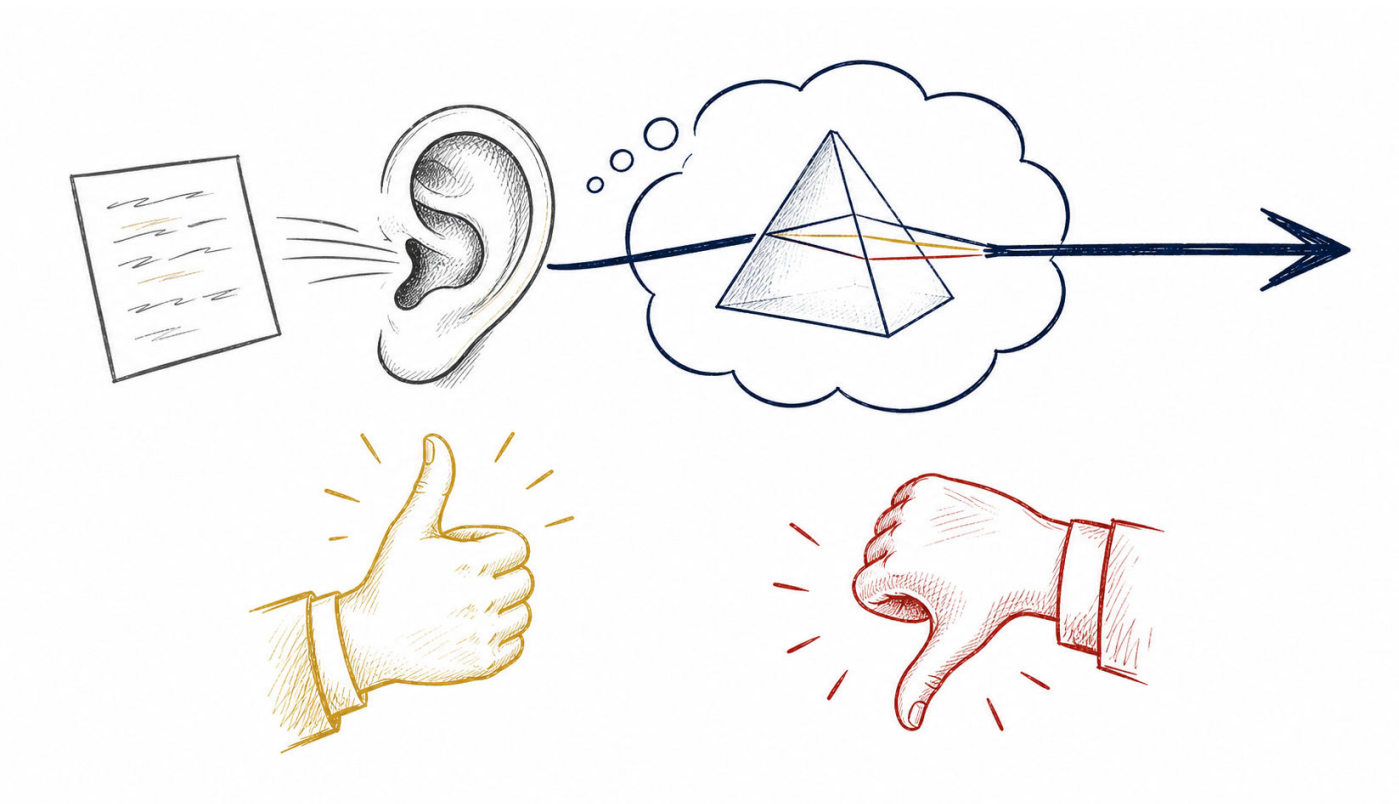
Approval: supportive, critical, or neither.

$$Approval_{m,w} = \frac{N_{m,w}^{support} - N_{m,w}^{critical}}{N_{m,w}^{all}}$$

Persuasion requires approval to move, not only the directional reading.

CONCEPTUAL ILLUSTRATION · NOT EMPIRICAL EVIDENCE

Direction Does Not Determine Approval

**TEACHING POINT**

Hawkish versus dovish is a reading; support versus criticism is an evaluation.

Use the next slides for the documentary evidence.

Interpretation Moves Within Six Hours

$$\Delta \text{PHI}_m^{a-b} = \text{PHI}_{m,a-b} - \text{PHI}_{m,pre48h}.$$

Window

Interpretation

0–6h	immediate reading before a full news cycle
6–24h	same-day reading after media and social circulation
24–48h	whether the interpretation survives into the next day

The evidence is an attention burst, not a persistent shift in discussion.

Topic Shares Show What Travels

$$Share_{m,w}^k = \frac{N_{m,w}^k}{N_{m,w}^{all}}, \quad \Delta Share_m^k = Share_{m,post}^k - Share_{m,pre48h}^k.$$

Inflation is the clearest topic response: concrete price language travels more readily than technical policy language.

INTERPRETIVE BOUNDARY

Hawkish Content Shifts Interpretation

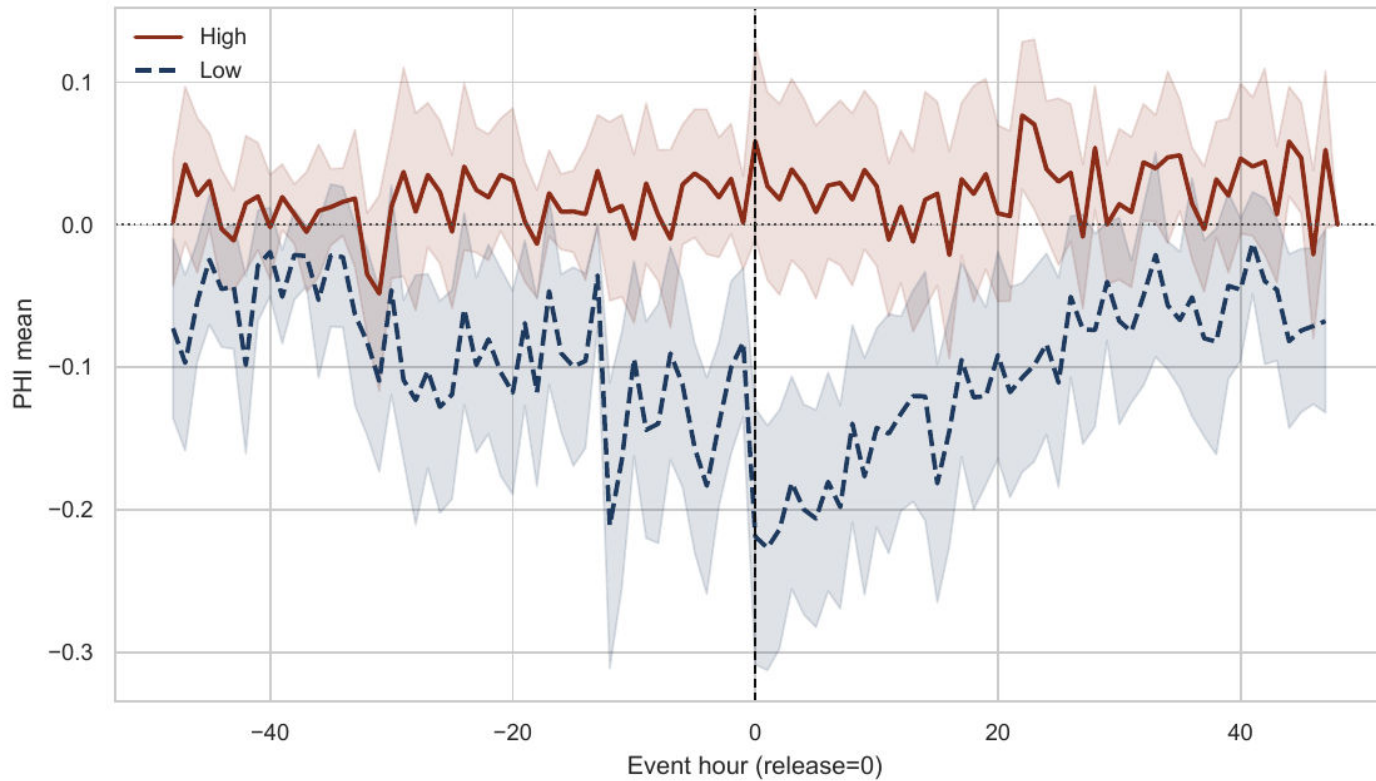
interpretive channel operates but persuasive channel is not detected.

Margin	Finding
Interpretation	Δ PHI rises over 0–24 hours
Timing	strongest in the first six hours; fades by 48 hours
Approval	no comparable movement in support for the Bank
Topics	inflation discussion is the clearest supporting response

The design studies public reading—not representative beliefs or trust.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

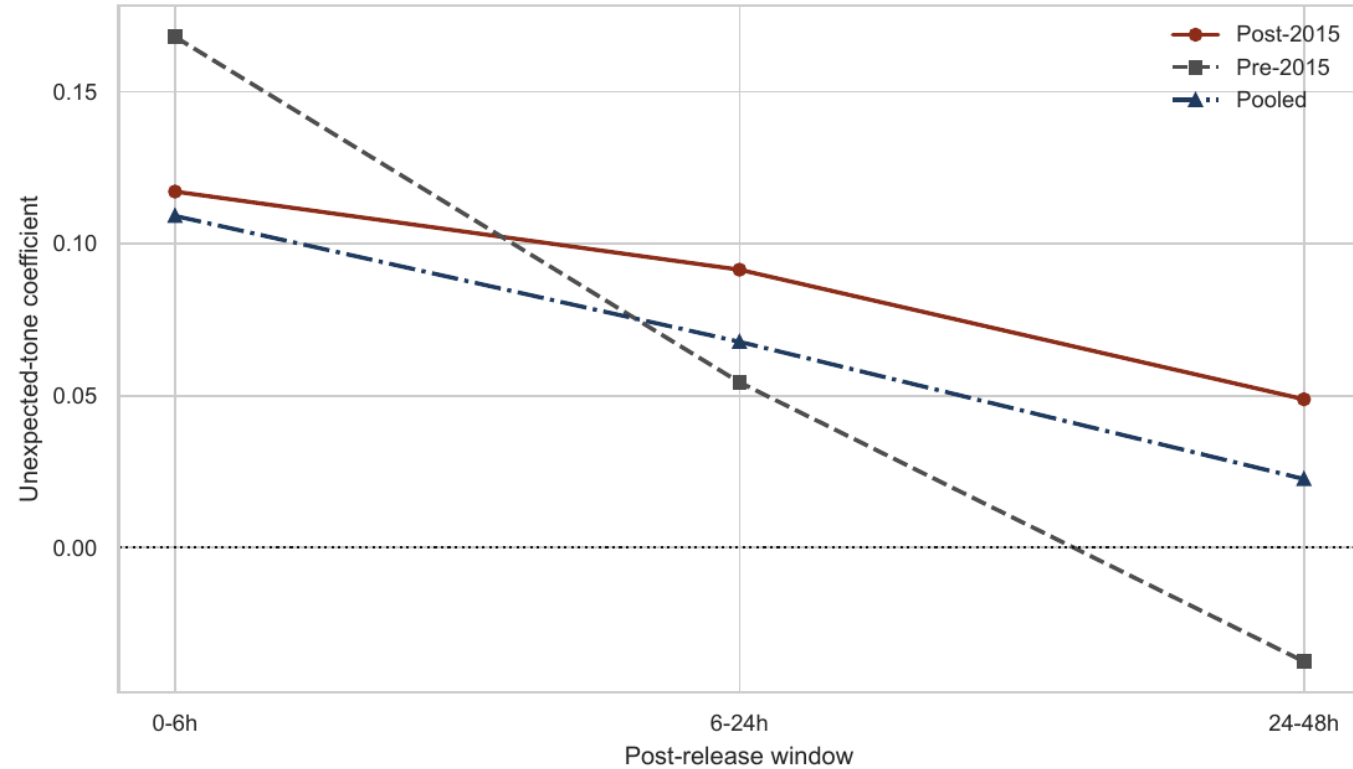
Tone Groups Diverge at Release



The distance opens sharply at the release and then gradually closes.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

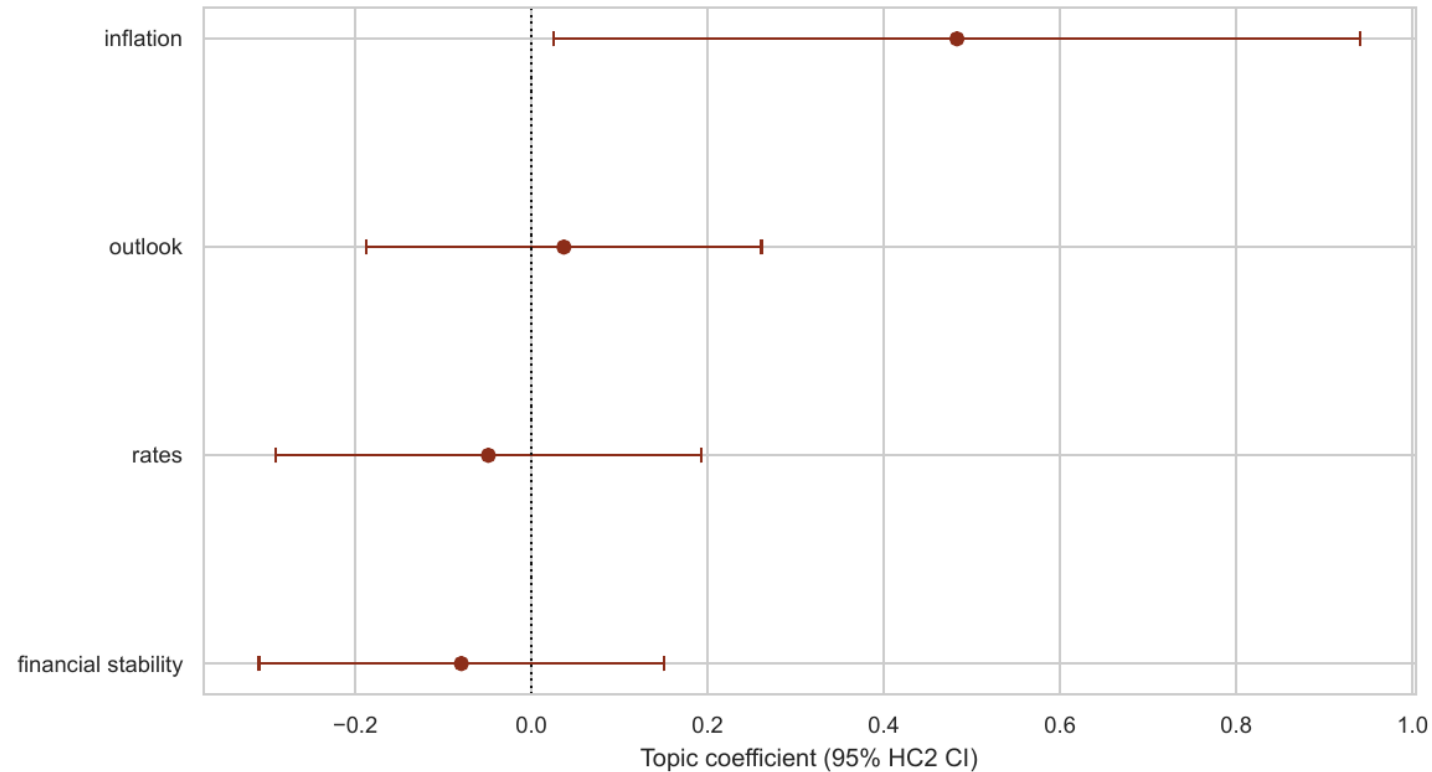
Bundling Sharpens the Same-Day Response



The post-2015 bundled sample shows a clearer interpretation response immediately after release, with attenuation across later windows.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

Inflation Travels Most Clearly



The public does not absorb every component equally. Price and cost-of-living language is the most direct bridge to everyday experience.

04

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PART 04

Publication is not exposure.

Official posts compete for voluntary attention

Measure the object Identify the mechanism Read the evidence

CONCEPTUAL ILLUSTRATION · NOT EMPIRICAL EVIDENCE

Publication does not guarantee exposure



TEACHING POINT

A public document cannot change beliefs unless the audience encounters it.

Use the next slides for the documentary evidence.

Exposure Starts with Encounter

conditional on the Bank posting, which messages attract interaction?

Object	Measurement
Source	complete official @bankofengland record, July 2011–July 2022
Unit	individual official tweet
Outcome	likes, retweets, replies, and quote tweets
Covariates	format, timing, reply/original mode, readability, length

Exposure is a prior margin: a message must win attention before it can inform or persuade.

Compare Counts in Similar Environments

$$\mathbb{E}[Y_i \mid X_i] = \exp(X_i' \beta), \quad Y_i = Likes_i + Retweets_i + Replies_i + Quotes_i.$$

Comparison

Purpose

All tweets	raw feature–engagement association
Same broad period	absorb follower growth and slow platform changes
Same week, day, hour	compare more similar attention environments

These are conditional associations. The Bank chooses format and timing; neither is randomly assigned.

Design Margins Predict Engagement

Margin	Finding	Reading
Visual format	photo and video posts attract much more interaction	presentation helps the message compete in the feed
Policy timing	MPC-day posts attract more engagement	policy is already salient
Macro state	the MPC-day premium rises in the high-inflation period	public attention is state-dependent

The largest engagement margins come from format, timing, and context—not tiny wording changes.

INTERPRETIVE BOUNDARY · VISIBLE INTERACTION IS ONLY ONE GATE

Reach, Dialogue, Readability Differ

Reach

Original posts broadcast widely.

Dialogue

Replies serve conversation, not raw reach.

Readability

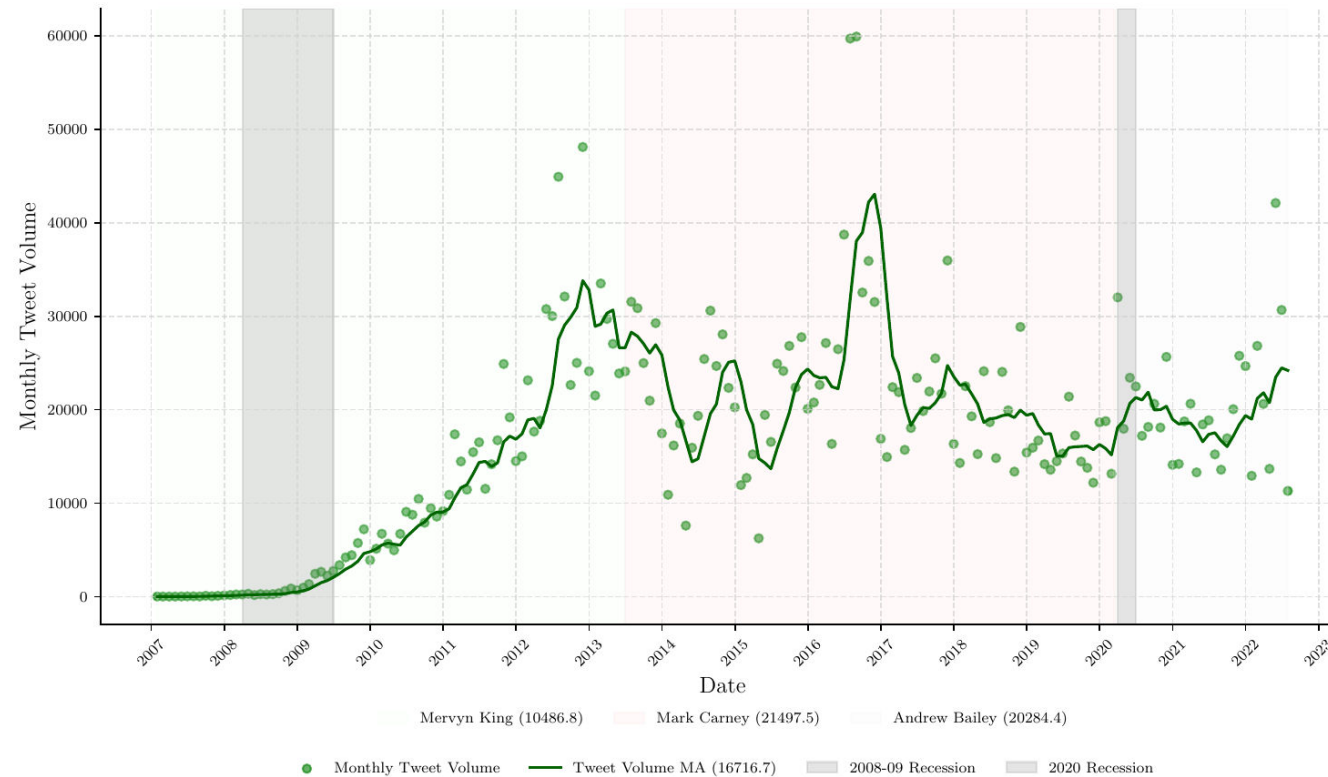
Easier syntax is associated with interaction.

Engagement ≠ comprehension ≠ trust ≠ approval

Engagement is not comprehension, trust, approval, or expectation updating.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

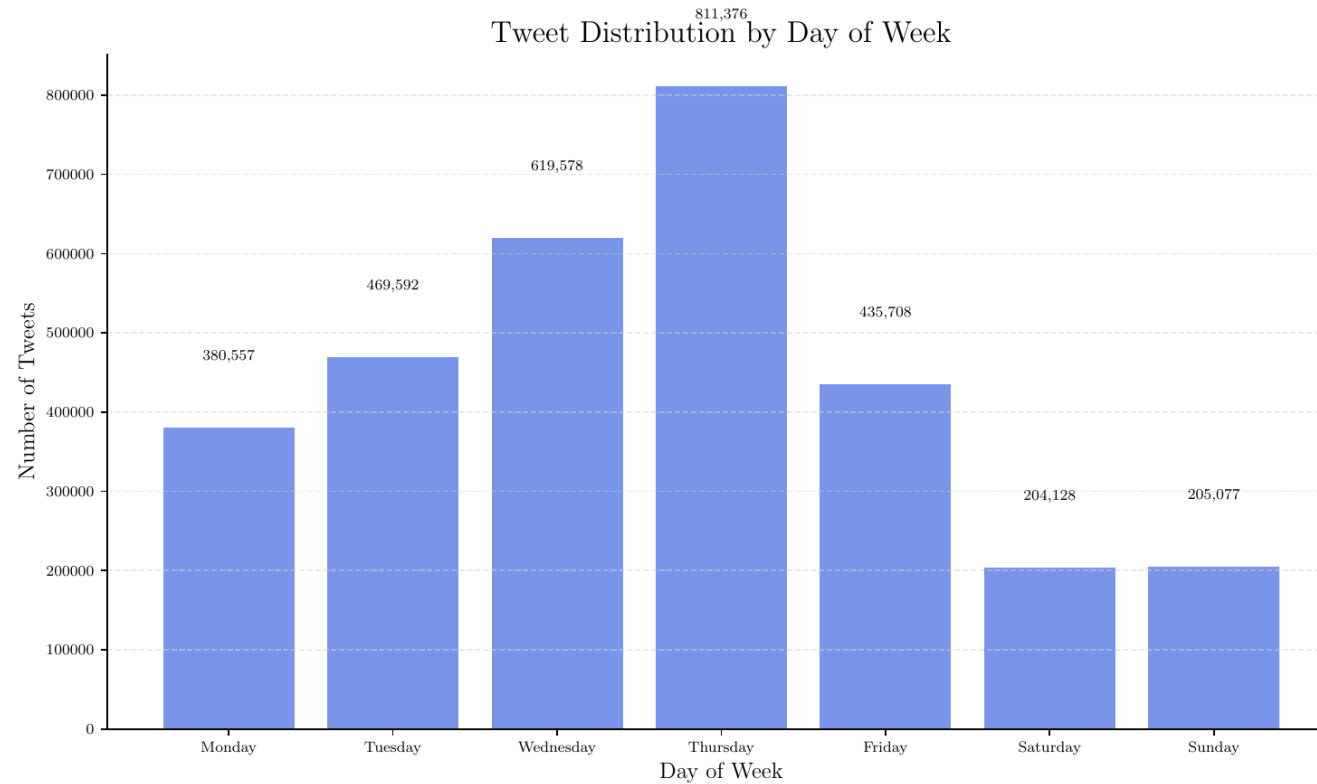
Posting Rises Across Regimes



Monthly volume trends upward, with visible changes around governorship, the pandemic, and platform-resolution milestones.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

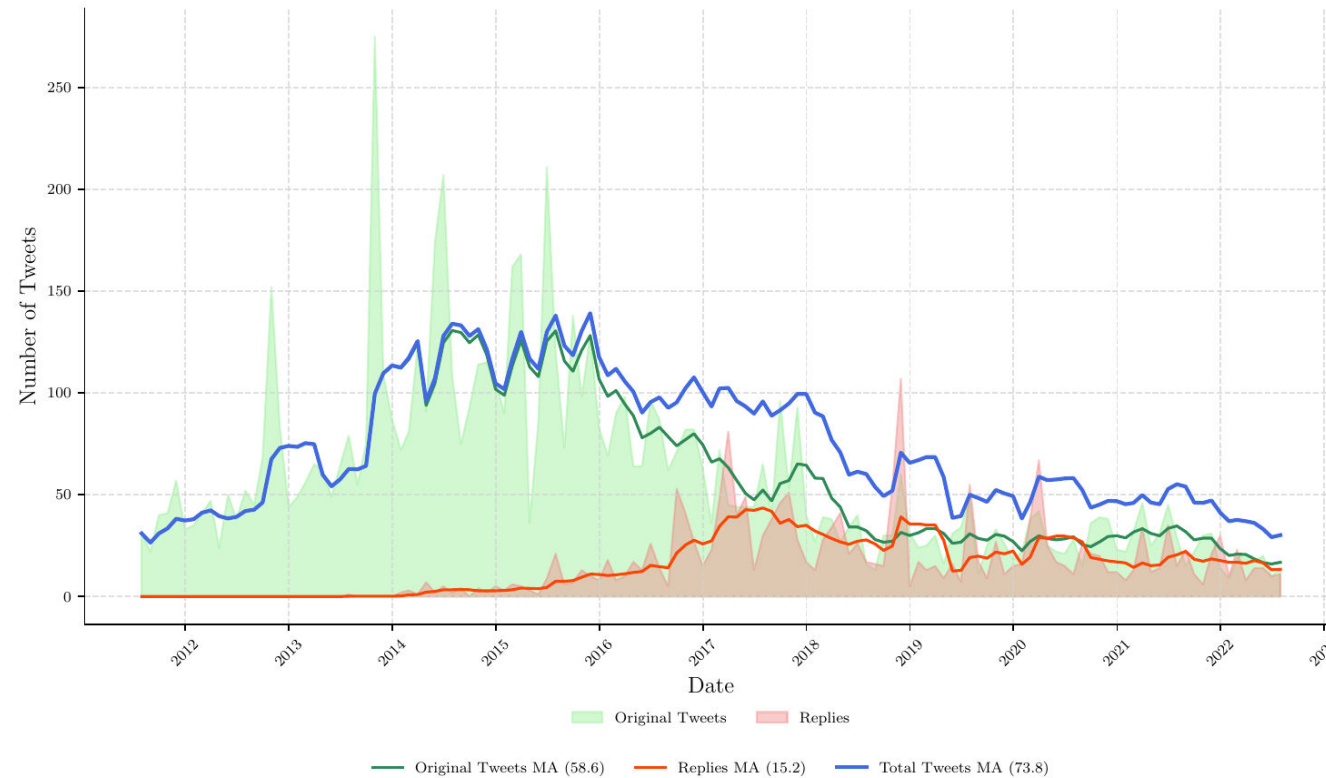
Thursday Has the Most Posts



The weekday distribution is uneven: Thursday has the largest count, while weekend posting is sparse.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

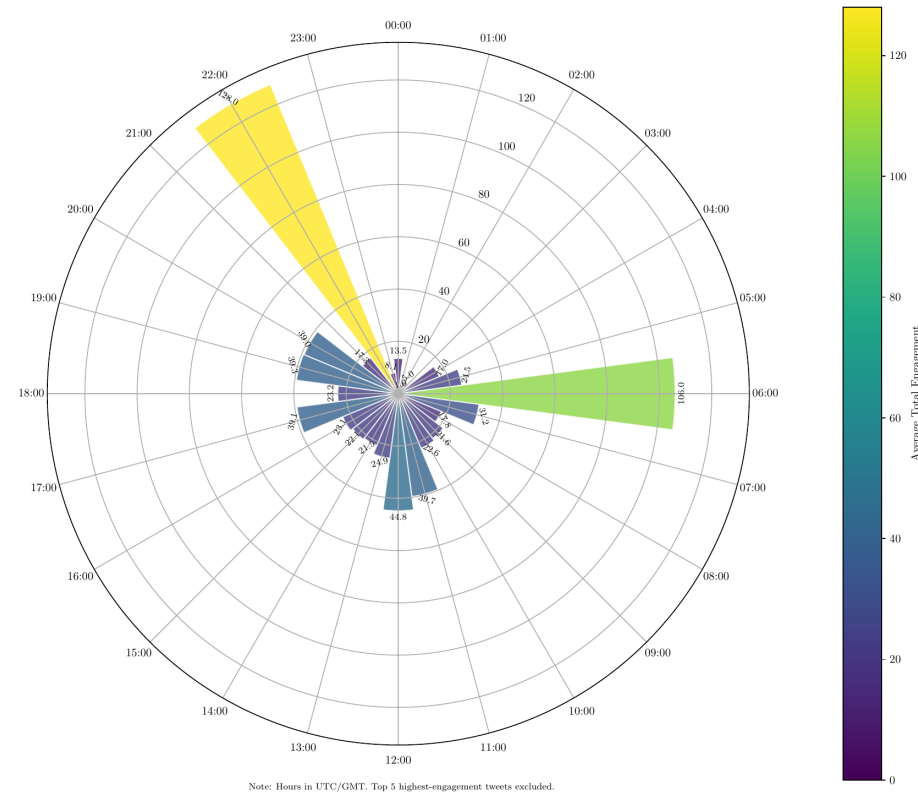
Original Posts Dominate; Replies Grow



Original posts remain the principal mode; replies become a more visible part of the account's output in later years.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

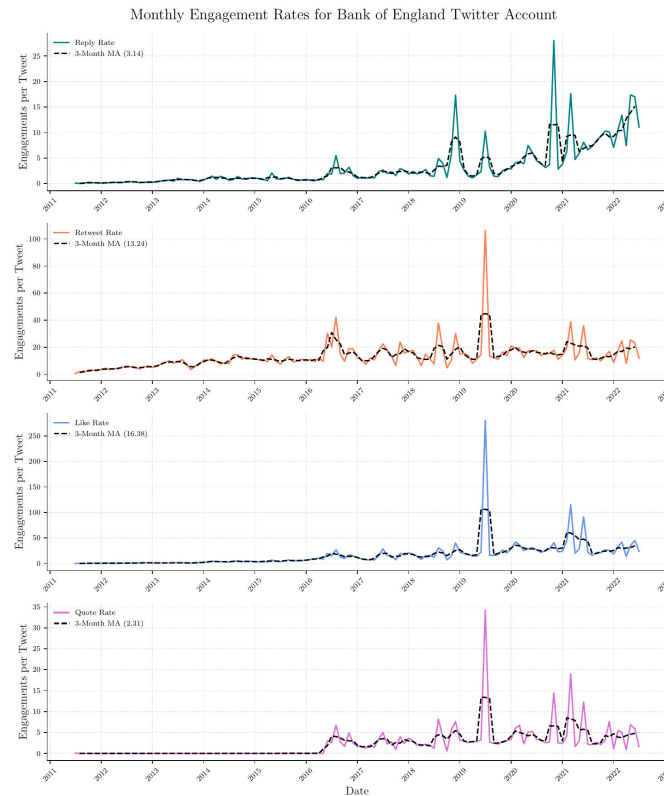
Posting Hour Shapes Engagement



The hour profile is highly uneven, consistent with a changing attention environment across the day.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

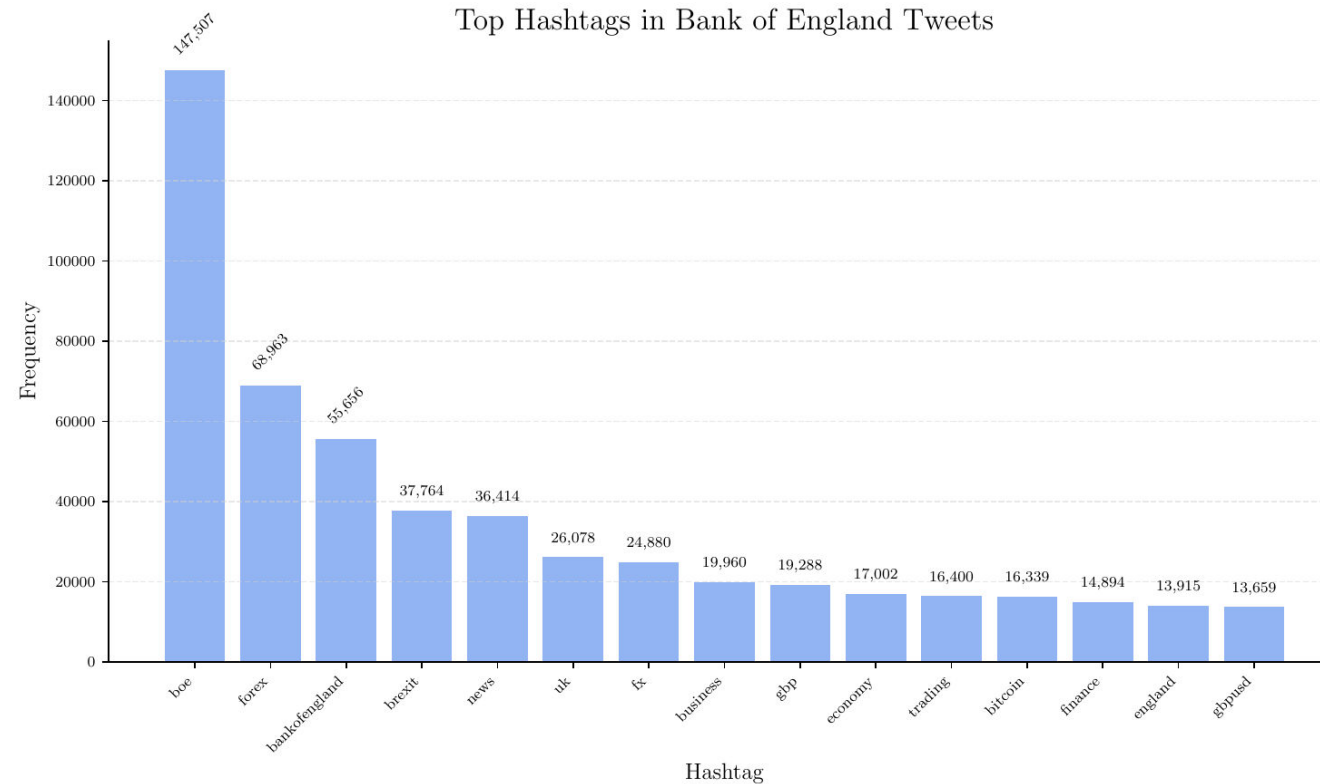
Engagement Rates Are Volatile



Likes, retweets, replies, and quotes do not move in lockstep; aggregate engagement can conceal which interaction margin changed.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

Hashtags Use a Narrow Vocabulary



#BoE is dominant, followed by a much smaller group of recurring campaign, institutional, and topical tags.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

Public Language Centres on Rates



Bank, England, rate, UK, and inflation anchor the vocabulary, alongside people, work, money, policy, and economy.

05

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PART 05

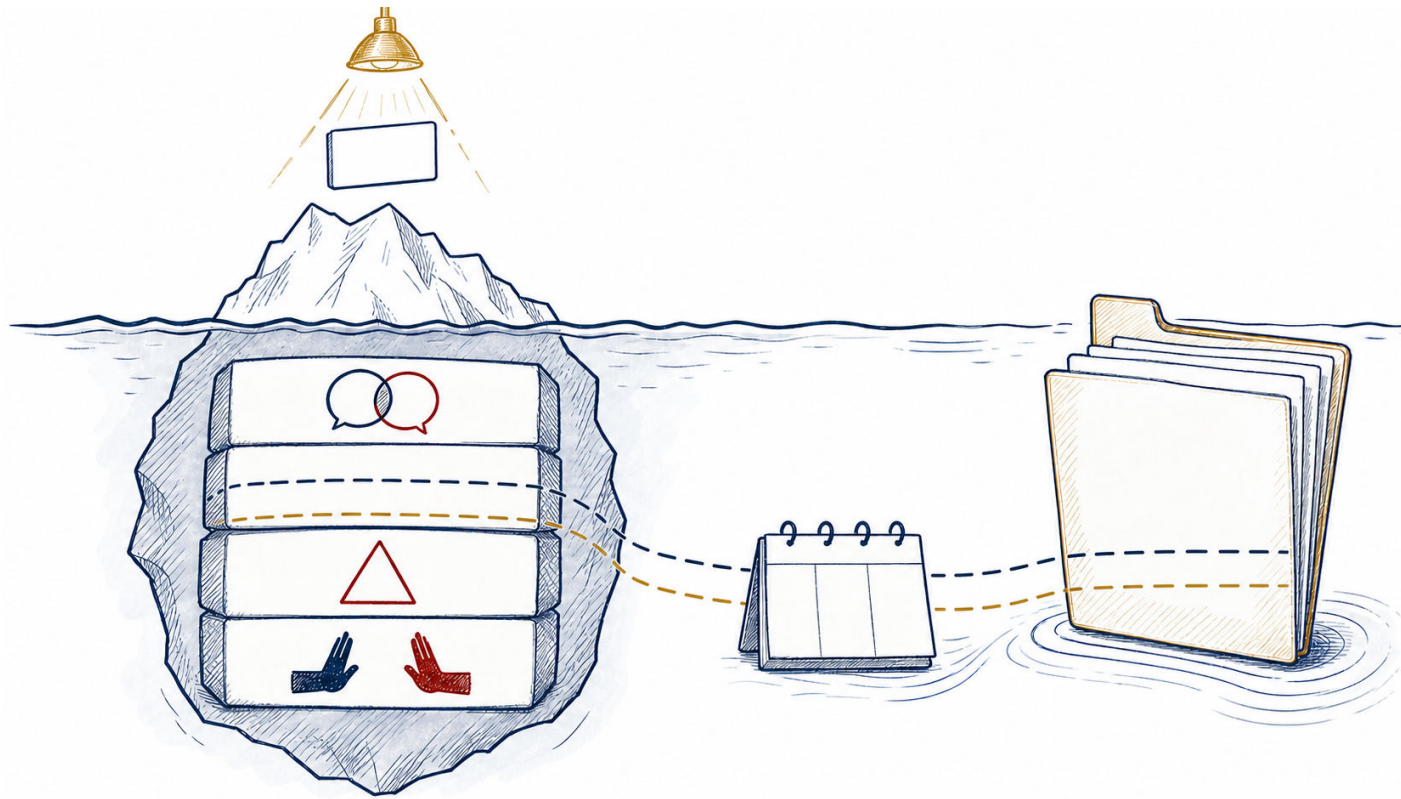
Disclosure unfolds in stages.

A statement is focal; minutes reveal what the focal text compressed

Measure the object Identify the mechanism Read the evidence

CONCEPTUAL ILLUSTRATION · NOT EMPIRICAL EVIDENCE

Minutes Restore Compressed Content



TEACHING POINT

Minutes restore context that the focal statement leaves compressed.

Use the next slides for the documentary evidence.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

Minutes Are the Second Public Layer



$$\mathcal{I}_t^{public} = \{\text{statement}_t, \text{minutes}_t, \dots\}.$$

The statement announces the decision. The minutes later disclose the discussion, alternatives, risks, and views of voting and non-voting participants.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

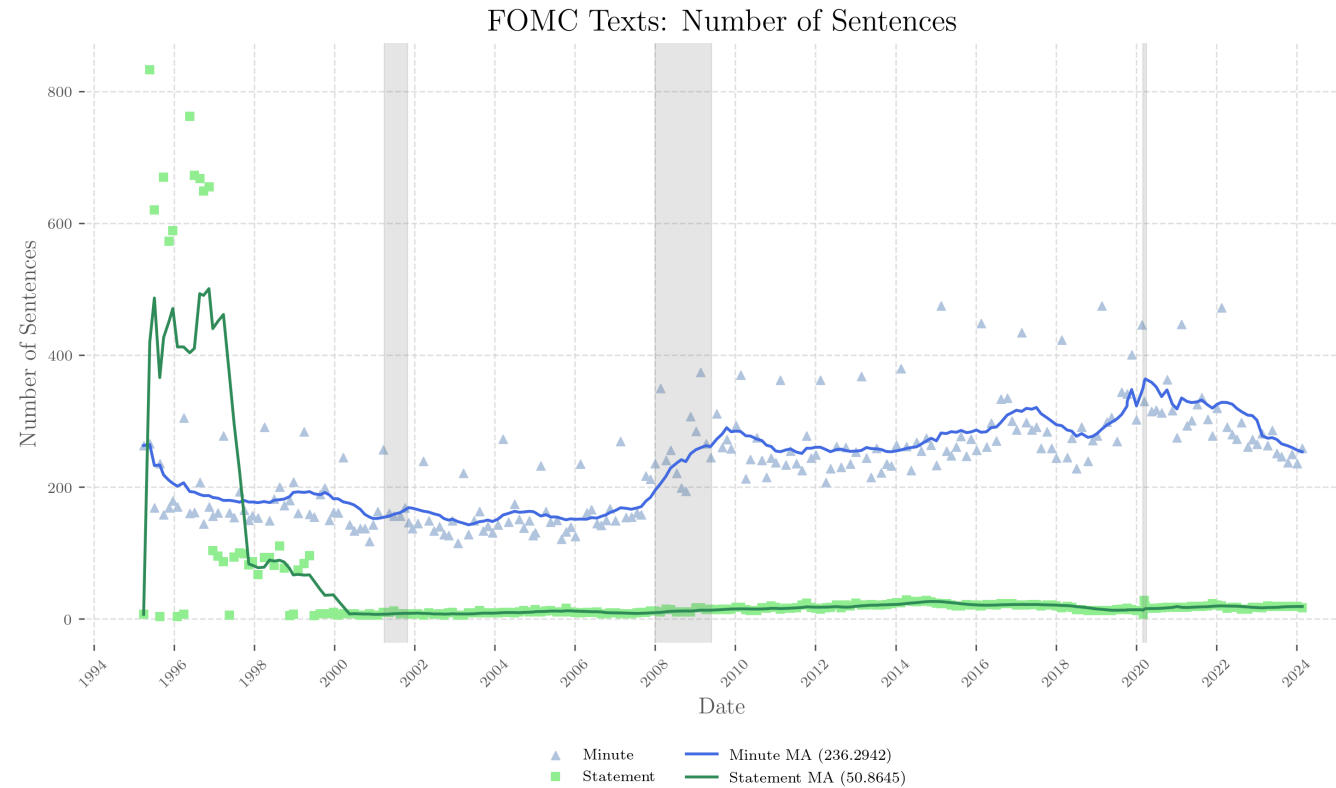
One Meeting, Several Public Records



Read the release sequence as a disclosure architecture—not as repeated copies of one message.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

Minutes Greatly Expand the Word Count

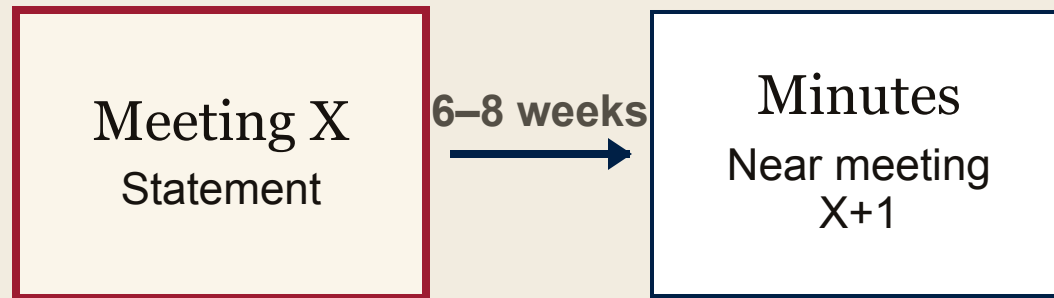


Length creates room for nuance, but also raises the cost of finding the policy-relevant sentence.

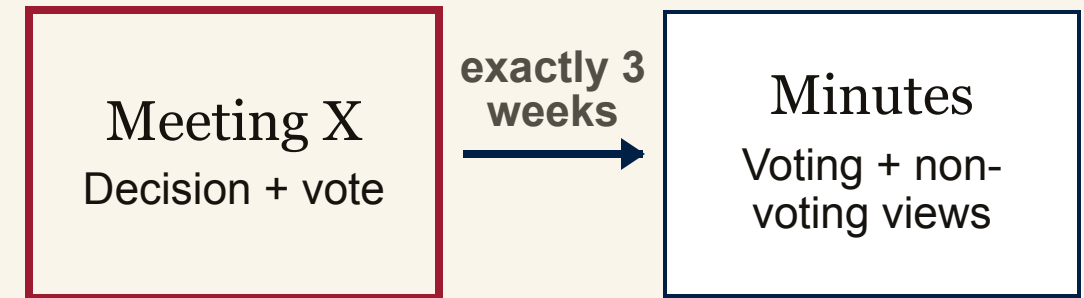
RELEASE ARCHITECTURE · BEFORE AND AFTER 2004

The release lag changed after 2004

Before 2005



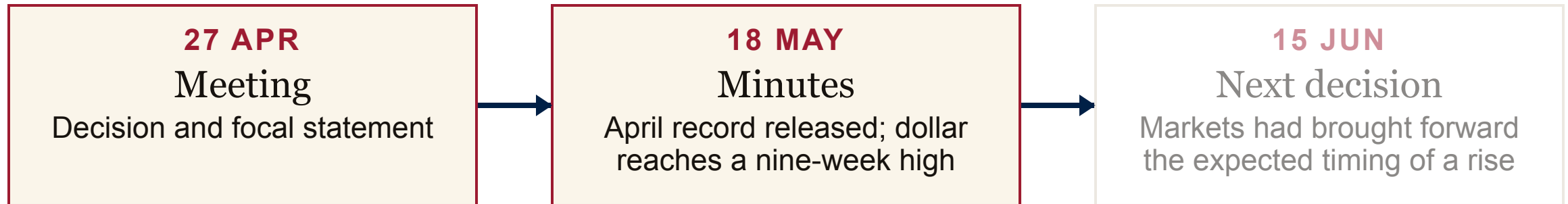
After 2004



The shorter lag increases timeliness, but minutes remain a separate information release.

CASE EVIDENCE · A DELAYED DOCUMENT CHANGED THE EXPECTED PATH

April Minutes Shifted the June Outlook



A delayed document can revise the expected path of future policy.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

The press read the minutes as a June warning

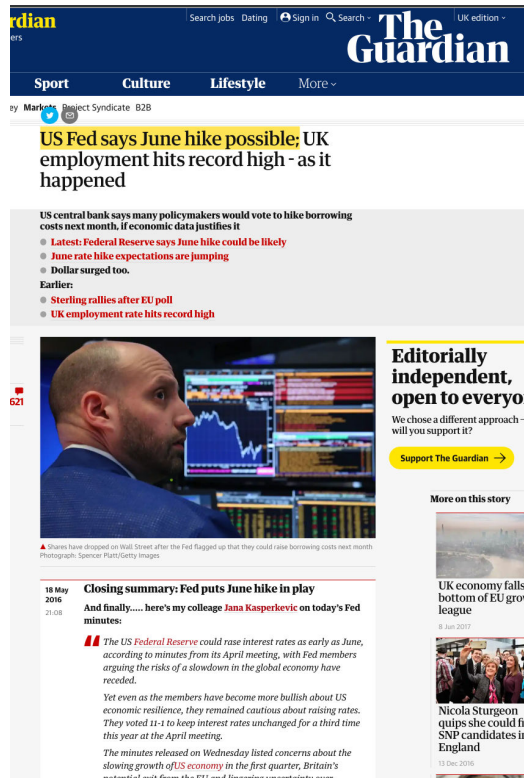


The Fed's message was read as: pay attention; a June increase was being considered seriously.

The press transformed a long release into a focal policy-path signal.

CASE EVIDENCE · THE GUARDIAN

Press Outlets Shared the June Signal



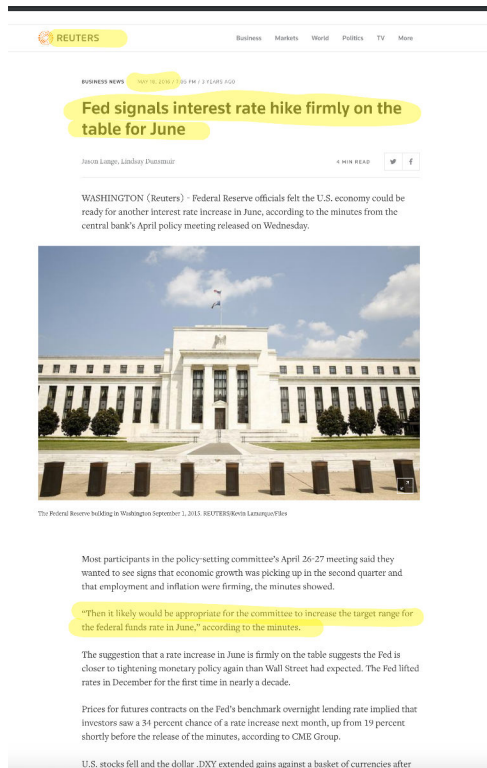
A June rise was possible.

A long document was compressed into one forward-policy proposition.

Media compression amplified a common reading of the minutes.

CASE EVIDENCE · REUTERS

Reuters carried the same June signal



A June move was firmly on the table.

A long document was compressed into one forward-policy proposition.

Media compression amplified a common reading of the minutes.

INTERPRETIVE BOUNDARY

June Did Not Validate the Forecast

minutes signal $\longrightarrow$ earlier expected tightening $\nRightarrow$ June rate increase.

What the episode shows

lagged minutes can contain path-relevant information and change positions

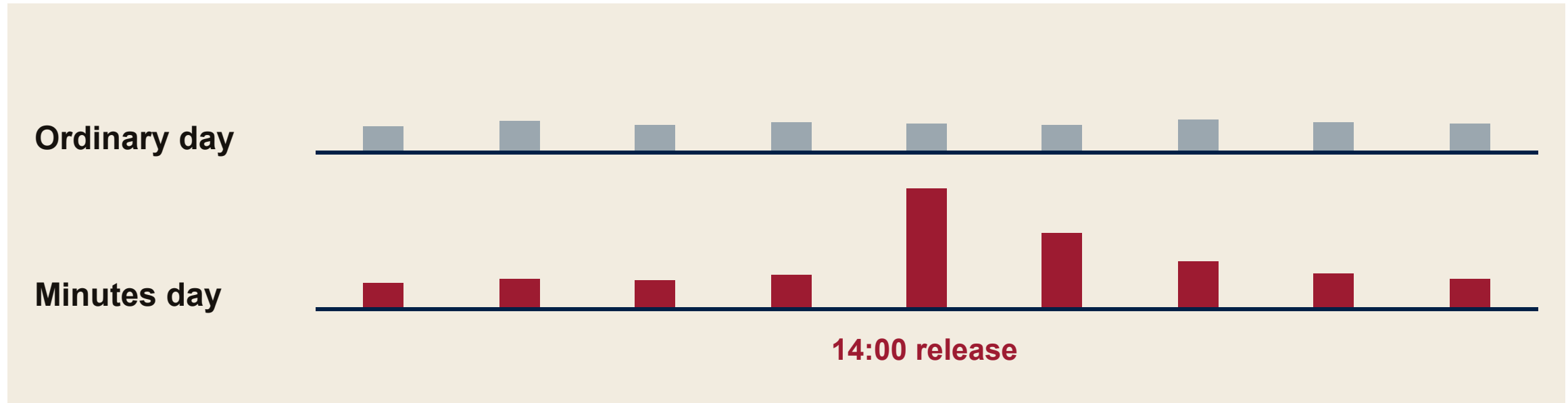
What it does not show

that the May 2016 reaction was typical across all minutes releases

On 15 June, the Fed did not raise the target rate and reaffirmed the prevailing range.

MEASUREMENT · COMPARE RELEASE TIME WITH AN ORDINARY AFTERNOON

Measure Ten-Minute Volatility



$$SD(r) = \sqrt{\frac{\sum_{t=1}^T (r_t - \bar{r})^2}{T - 1}}$$

Ask whether volatility rises exactly when the minutes arrive.

day4_05_strategic.tex · line 224 · D4-F062 · schematic, not source point estimates

COUNTERFACTUAL INTRADAY VARIABILITY · STANDARD DEVIATION

Baseline: Ordinary Afternoons

EUR/USD

.04%

S&P 500

.14%

10-year yield

.04 bps

3-month yield

.71 bps

This is the normal 13:00–16:00 volatility benchmark—not an announcement effect.

MINUTES AFTERNOONS · STANDARD DEVIATION

Minutes Days Modestly Shift Volatility

EUR/USD

.06%

S&P 500

.15%

10-year yield

.05 bps

3-month yield

.48 bps

Minutes create an event, but an unconditional SD comparison is not identification.

STATEMENT AFTERNOONS · STANDARD DEVIATION

Statements Have the Most Volatility

EUR/USD

.11%

S&P 500

.23%

10-year yield

.10 bps

3-month yield

1.44 bps

The immediate focal release is most volatile; later minutes can still contain path news.

EMPIRICAL RESULT · COMPARISON AND SCOPE

Regress Returns on Target and Path

$$\Delta r_{x,d,\tau} = \alpha + \beta_1 TS_{d,\tau} + \beta_2 PS_{d,\tau} + \varepsilon_{x,d,\tau}.$$

Object	Meaning
--------	---------

$\Delta r_{x,d,\tau}$	return of asset x in the ten-minute interval at release time τ on announcement day d
-----------------------	---

$TS_{d,\tau}$	target surprise
---------------	-----------------

$PS_{d,\tau}$	path surprise
---------------	---------------

$\varepsilon_{x,d,\tau}$	residual return
--------------------------	-----------------

MINUTES RESPONSE TO THE PATH SURPRISE · COEFFICIENT

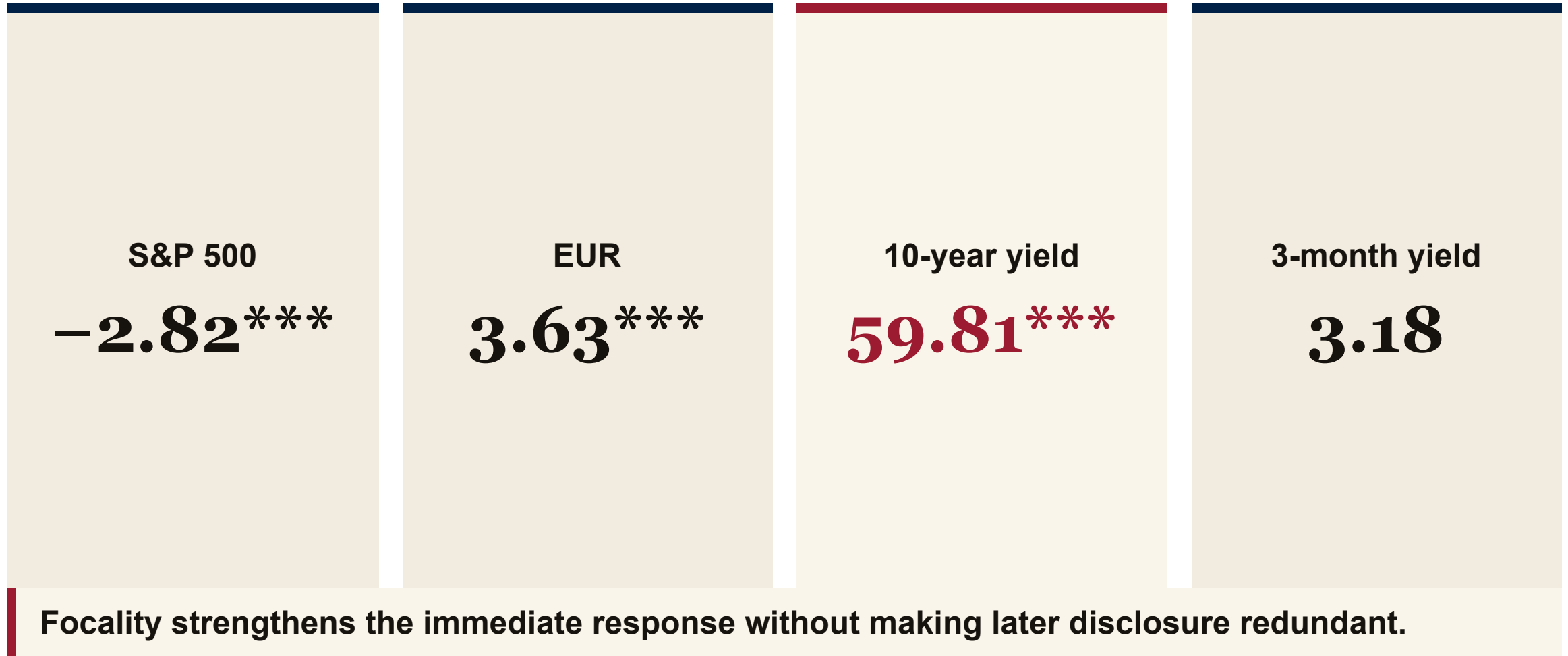
Minutes Load Most on the Path Factor



The path coefficient is the recurring statistically significant minutes-day signal.

STATEMENT RESPONSE TO THE PATH SURPRISE · COEFFICIENT

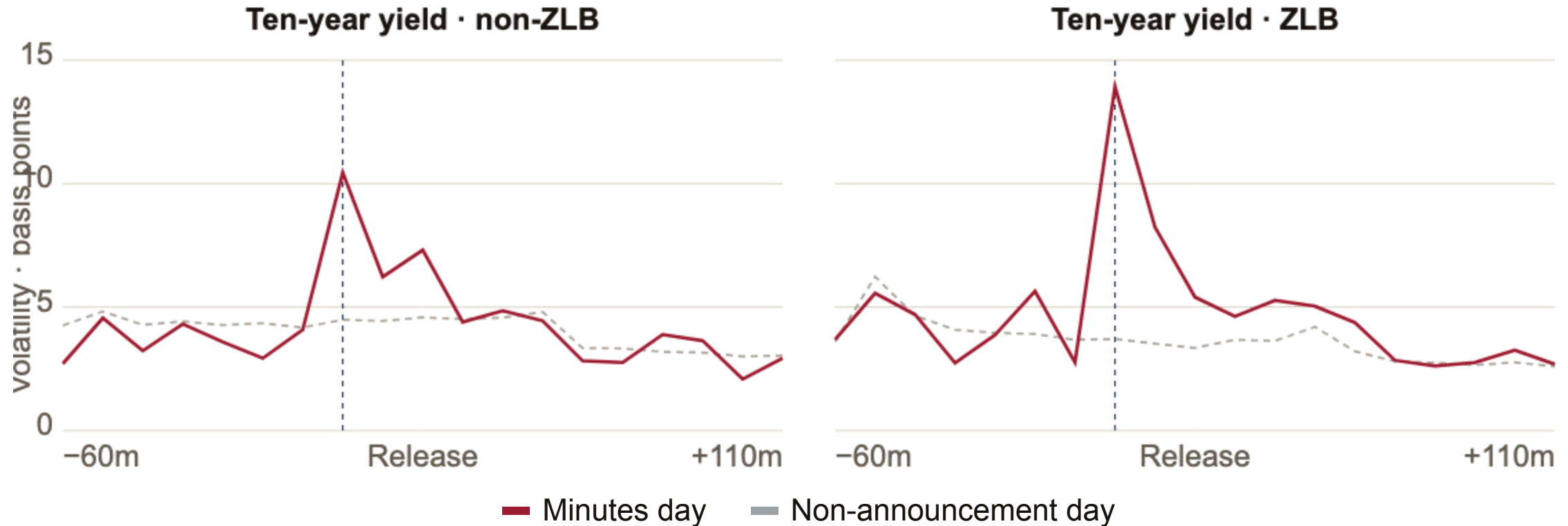
Statements Trigger Stronger Reactions



Focality strengthens the immediate response without making later disclosure redundant.

SOURCE VALUES · 19 TEN-MINUTE OBSERVATIONS IN EACH SERIES

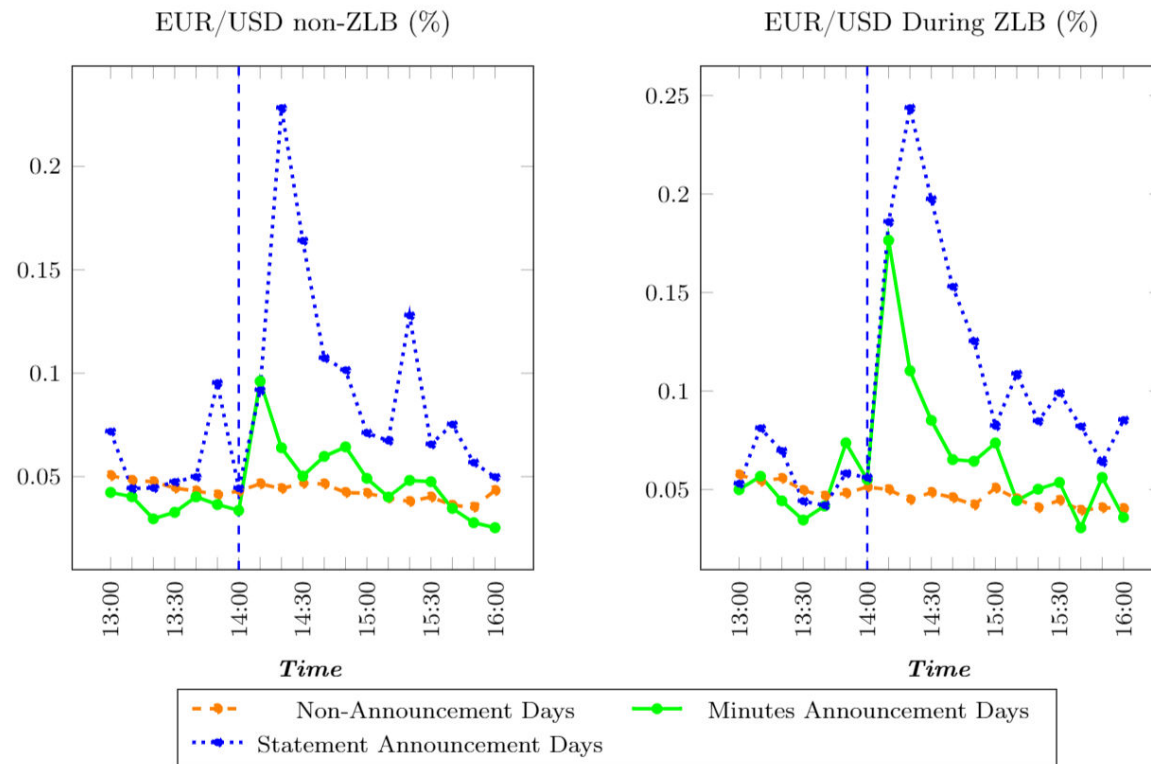
At the ZLB, Minutes Raise Yield Volatility



The source comparison describes roughly $2\times$ versus $5\times$ release-day volatility.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

ZLB Dollar-Path News Was Salient



QE $\longrightarrow$ larger Fed balance sheet
 $\longrightarrow$ greater USD-news sensitivity.

During the ZLB, the source describes a roughly fourfold balance-sheet expansion and a depreciating, globally influential dollar.

NON-ZLB RESPONSE TO THE MINUTES PATH SURPRISE · COEFFICIENT

Minutes Path News Matters Beyond the ZLB

S&P 500

−.95***

EUR

.78**

10-year yield

12.87**

3-month yield

8.09

Path news matters outside the constrained-rate regime as well.

ZLB RESPONSE TO THE MINUTES PATH SURPRISE · COEFFICIENT

ZLB Responses Shift to EUR and 10Y

S&P 500

−.61

EUR

2.53***

10-year yield

31.33***

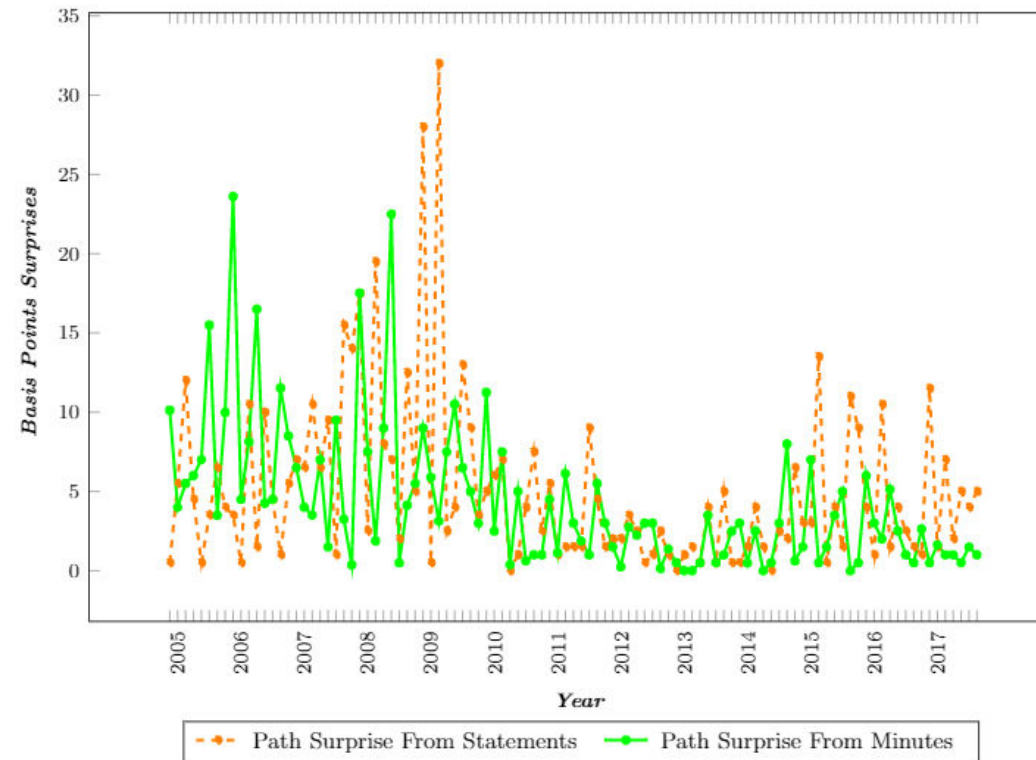
3-month yield

−1.16

When the current rate is constrained, news about the future path becomes more valuable.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

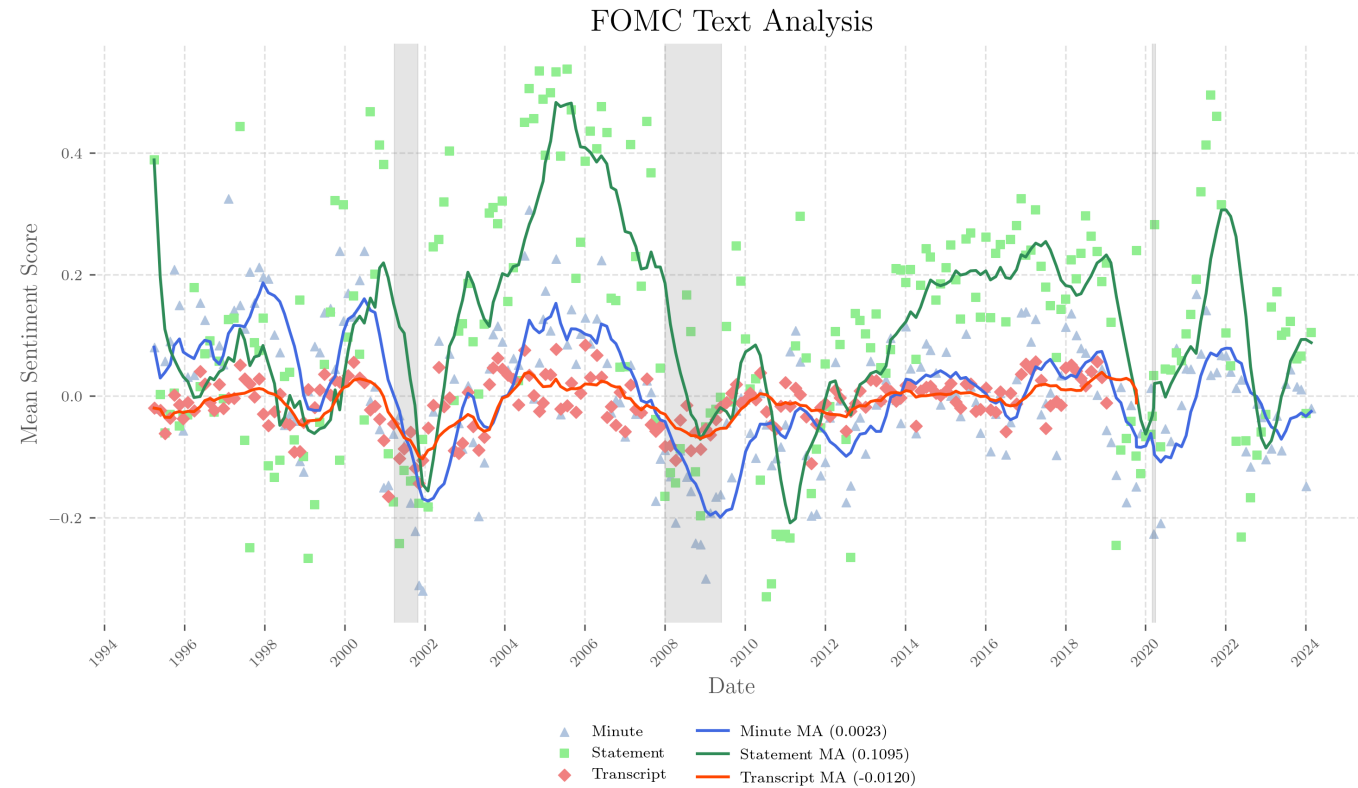
At the ZLB: less surprise, more reaction



The size of the measured surprise and the size of the market response need not move together.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

Minutes and Statements Differ in Tone



Document tone is another dimension along which the delayed and focal releases can diverge.

One Meeting Leaves Three Records

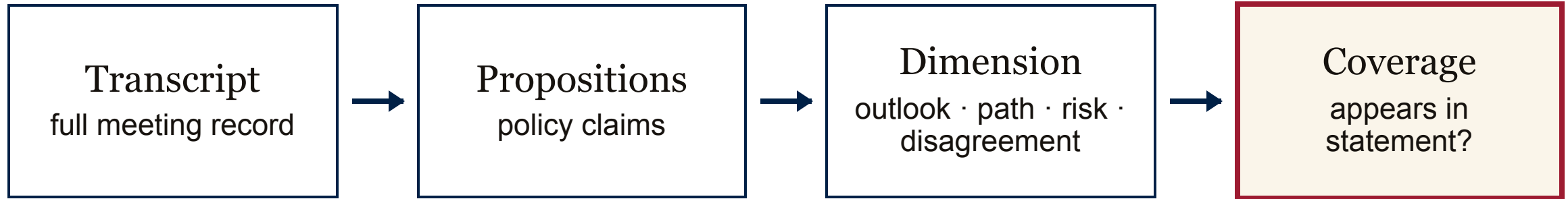
same meeting

{ statement: immediate, short, highly focal,
minutes: delayed, longer, less focal,
transcript: delayed archival benchmark.

Layer	Research use	Communication margin
Statement	focal public signal	selection into the short message
Minutes	later public disclosure	partial restoration of omitted content
Transcript	archival benchmark	meeting-level proposition set

MEASUREMENT · TRANSCRIPT-ANCHORED OMISSION

Measure what the statement leaves out



$$g_t^k = 1 - \frac{N_t^{k,\text{covered}}}{N_t^{k,\text{all}}}$$

0 means full coverage; **1** means complete omission.

day4_05_strategic.tex · line 589 · D4-F072

ECONOMIC OBJECT · DEFINE BEFORE ESTIMATING

Measure Omission by Policy Dimension

Dimension k	What the transcript propositions describe
OUTLOOK	current conditions and the expected macroeconomic outlook
PATH	expected future policy path and policy inclination
RISK	risks, uncertainty, and contingencies around the outlook
DISAGREEMENT	conflicting views, reservations, and alternatives

A single document-level word count cannot reveal selective compression.

Statements omit disagreement most heavily

$$g^{DISAGREEMENT} > g^{RISK} > g^{PATH} > g^{OUTLOOK}.$$

Dimension	Mean gap	Reading
OUTLOOK	.658	most covered
PATH	.713	selectively compressed
RISK	.782	frequently omitted
DISAGREEMENT	.852	most omitted

Later Channels Close Half the Gap

$$\bar{g}^{statement} = .745 \quad \longrightarrow \quad \bar{g}^{statement+minutes} = .334.$$

Selective compression is not permanent secrecy. It is staged disclosure across channels with different timing and focality.

EMPIRICAL RESULT · COMPARISON AND SCOPE

Omitted Outlook Predicts Repricing

minutes repricing $\leftarrow$ omitted outlook/path $\times$ intermeeting activity news.

Outcome**Source result**

Treasury and real yields

respond to the interaction

Equities and breakevens

no corresponding robust response

Content dimensions

outlook and path survive controls

The evidence is reduced-form: omitted content may correlate with unobserved meeting information.

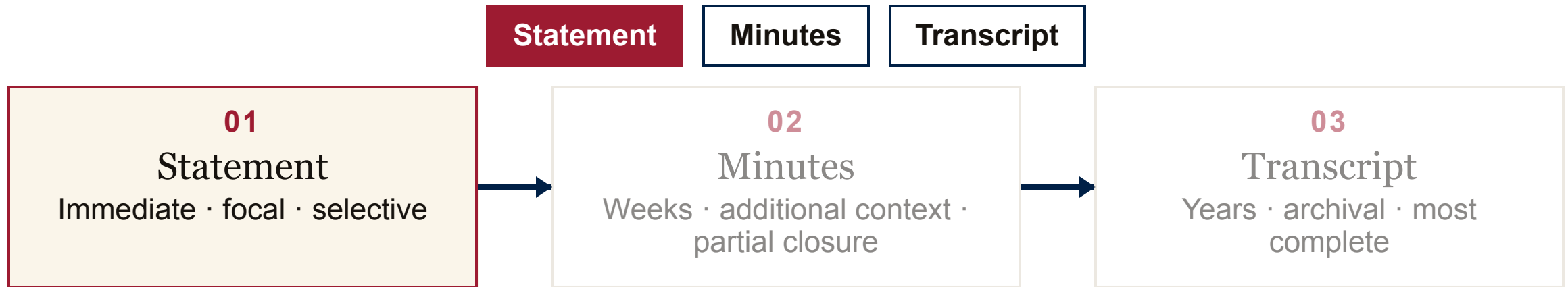
Interact Outlook Gaps with Activity News

$$Y_t = \alpha + \beta (g_t^{OUT} \times z_t^y) + \gamma_1 g_t^{OUT} + \gamma_2 z_t^y + \varepsilon_t.$$

$\beta > 0$ means that activity news receives a larger market response when more meeting outlook content was left out of the statement.

INTERACTIVE TIMELINE · ONE MEETING, THREE RECORDS

The communication record closes in stages

**SELECTED LAYER**

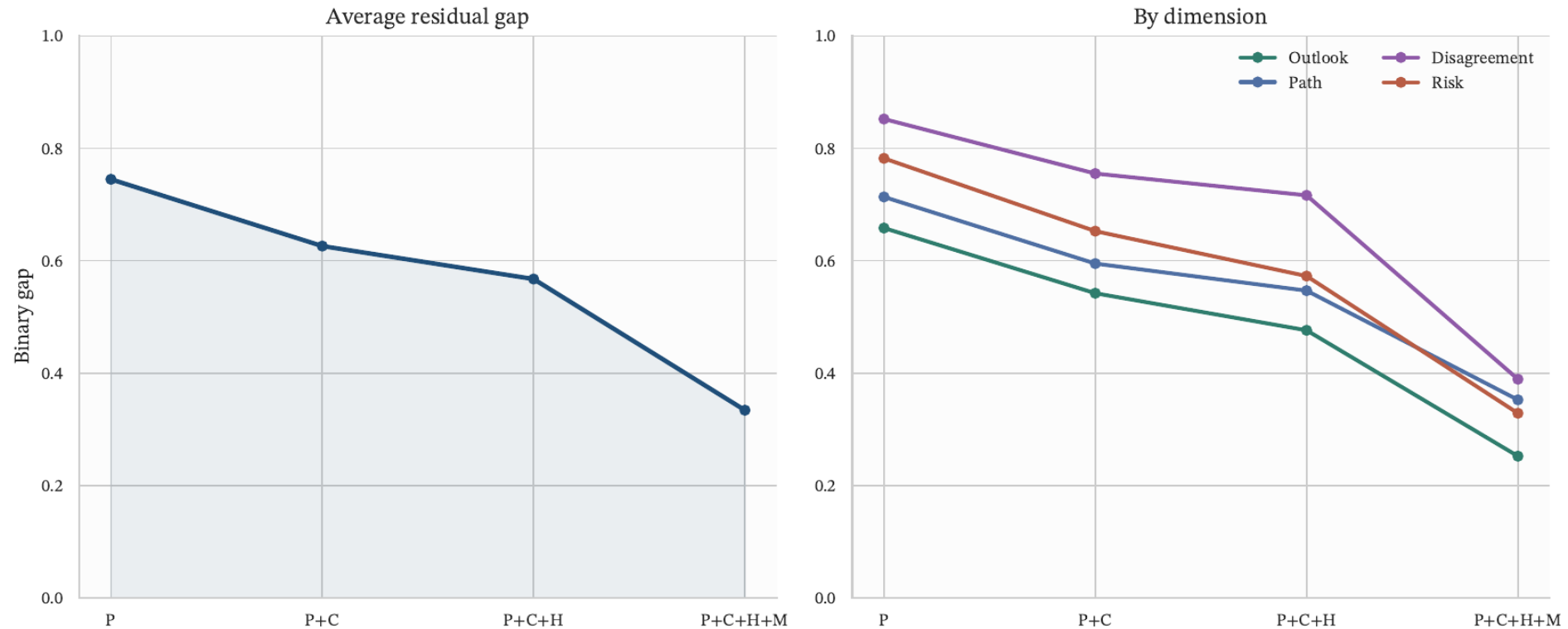
The statement optimises focality.

Its brevity makes the message salient, but selection means that discussion, risks, paths, and disagreement may remain outside the focal text.

P is the focal public statement; adding channels C , H , and M progressively reduces the residual binary gap.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

Observed disclosure gap closure



P is the focal public statement; adding channels *C*, *H*, and *M* progressively reduces the residual binary gap.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

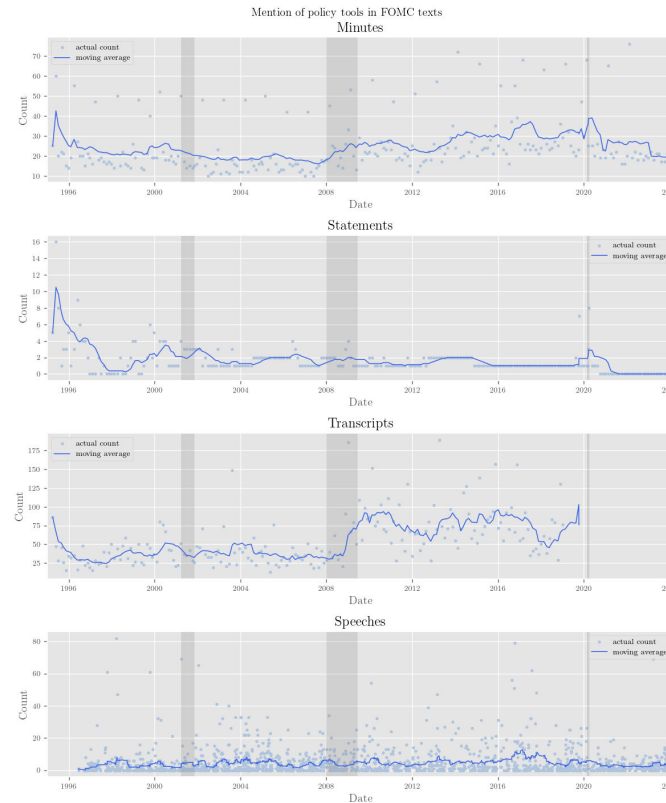
Policy Tools Carry Different Language



Counting a tool mention misses whether it is framed as active, contingent, constrained, or merely discussed.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

Frequency Is Only the First Layer



Frequency locates attention; context determines the policy meaning of that attention.

06

CENTRAL BANKING · LECTURE 4 · WORCESTER COLLEGE
PART 06

Climate enters the mandate.

Public salience and rate-setting deliberation are different communication layers

Measure the object

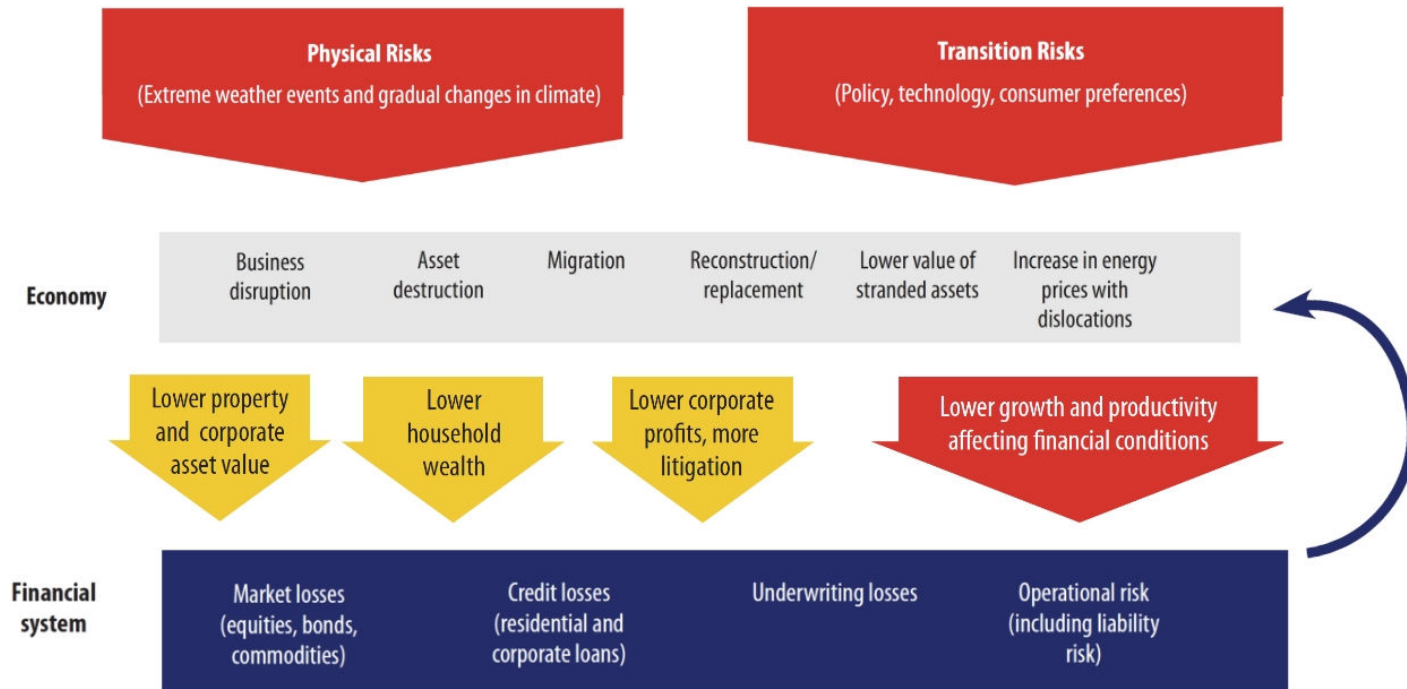
Identify the mechanism

Read the evidence

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

Climate Risk Reaches Several Channels

Two channels, but many potential impacts.

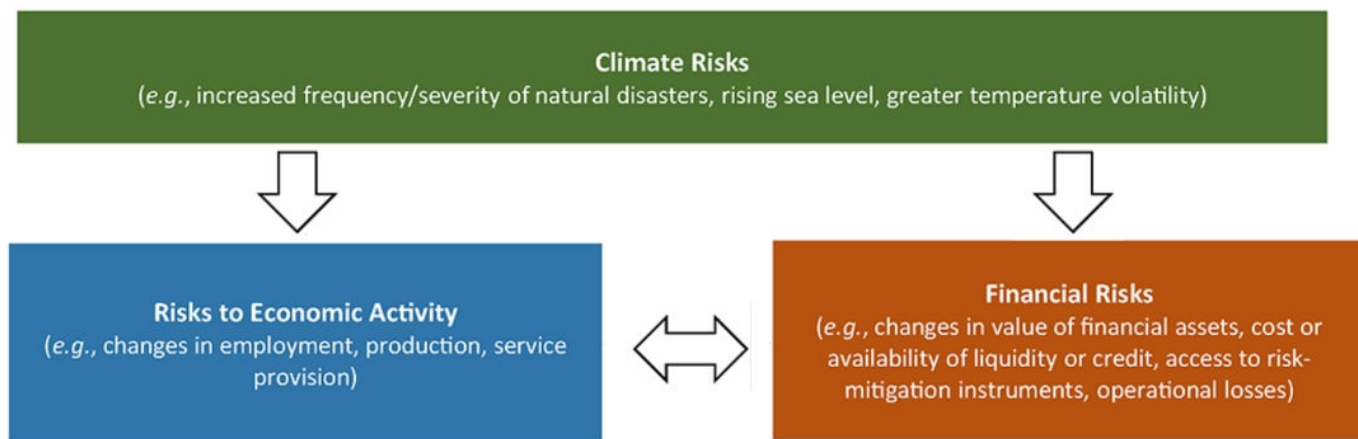


Physical and transition shocks can affect prices, output, financial institutions, and the transmission mechanism.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

Risk Varies by Horizon and Severity

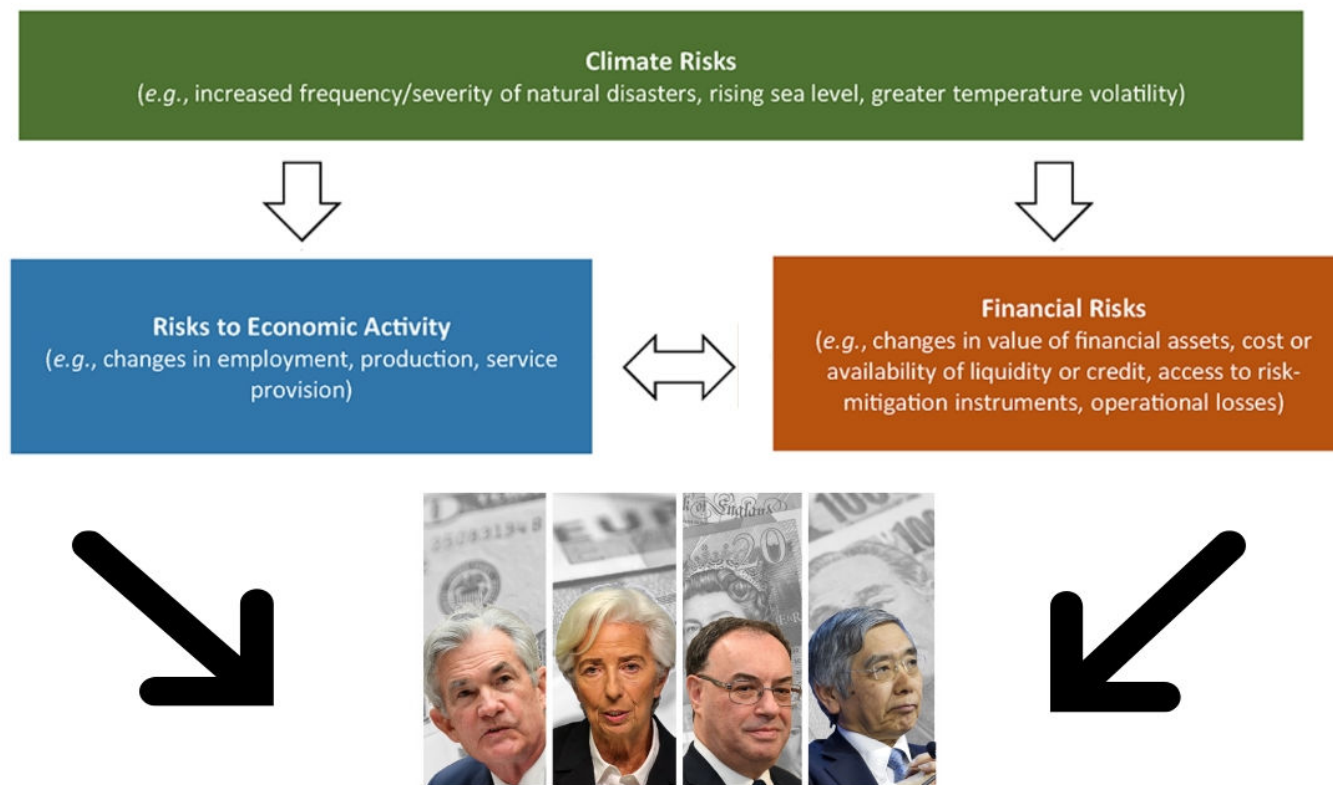
	Climate Risks	Economic Risks	Financial Risks	Financial Stability Risks
Real Estate	Rising sea levels, frequency of storm surges	Increased inundation of coastal parcels	Decreased value of coastal real estate	Abrupt repricing of mortgage lending markets
Insurance	More frequent and severe hurricanes, wildfires, etc.	Greater disruption to local economic activity	Pressure for higher rates, lower supply of insurance and reinsurance	Greater uninsured losses, spillover effects



A long horizon does not remove a risk from the central-bank problem; it changes how the risk is monitored and translated.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

Climate Shocks Can Threaten Stability



Asset repricing, collateral losses, credit exposures, and insurance gaps can move the issue inside a conventional stability mandate.

POLICY DESIGN · ALLOCATION ENTERS THROUGH RELATIVE FINANCING CONDITIONS

Climate Tools Mix Support and Penalty

BROWN-PENALISING

Raise relative cost

Example: coal-firm exclusion from the Norwegian sovereign wealth fund.

GREEN-SUPPORTING

Improve relative funding

Examples: BoJ climate loans, Bangladesh Bank green credit, ECB tilting.

Instrument choice exposes the boundary between risk management and allocation.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

One Mandate Faces Many Demands

Too many jobs to do...

- Economic Growth / Full Employment
- Financial Stability
- Banking Supervision and Regulation
- Dealing with Pandemic
- Micro & Macroprudential Policies
- Inequality
-
-
- and
- Climate crisis



The answer cannot be read from the issue's importance alone. It depends on the price-stability, financial-stability, supervisory, and operational mandates of the institution.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

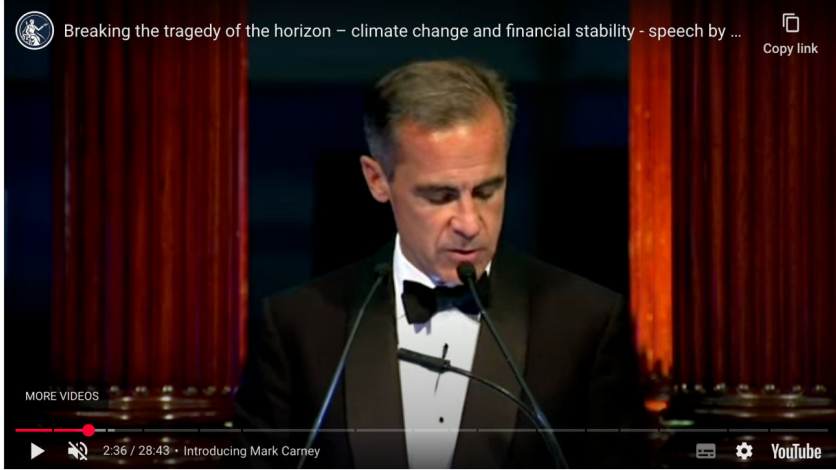
Carney Made Climate a Policy Signal

Bank of England Topics ▾ About ▾ News and publications ▾ Museum Contact Search the Bank of England

Published on 29 September 2015

Download speech >

Breaking the tragedy of the horizon – climate change and financial stability - speech by ... Copy link



Mark Carney >

Former Governor, Bank of England from 2013 to 2020

Convert this page to PDF

The speech connected climate change to financial stability and to the mismatch between long-horizon risks and shorter institutional decision horizons.

Public Salience Can Precede Policy

2015 public speech $\nRightarrow$ immediate climate language in the MPC record.

Evidence	Count	Reading
MPC transcripts, 2015–2017	29	more than 400,000 words
Climate references	0	absent from the sampled internal record
Brexit references	449	present in 22 meetings

An issue may be salient before it enters monetary-policy deliberation.

Speech and Records Form the Corpus

Dimension	Speeches	Policy records
Collected	37,814	3,602
Usable	37,814	3,593
Institutions	136	26
Period	1986–2025	1995–2024
Languages	predominantly English	14

The two channels differ in scale, purpose, and institutional coverage.

Keywords Overstate Climate Evidence

Measure	Speeches	Policy records
Climate candidates	4,857	500
Verified documents	3,266	88
Verified excerpts	12,582	148
False-positive rate	32.8%	82.4%
Common-sample mention	5.5%	2.4%
Common-sample word share	.565%	.079%

Verification matters most in the policy record.

Policy Seriousness Has Three Layers

public issue → monetary-policy record → policy-relevant language.

01 Speeches

02 Official records

Mention is an entry condition; mandate linkage is the substantive test.

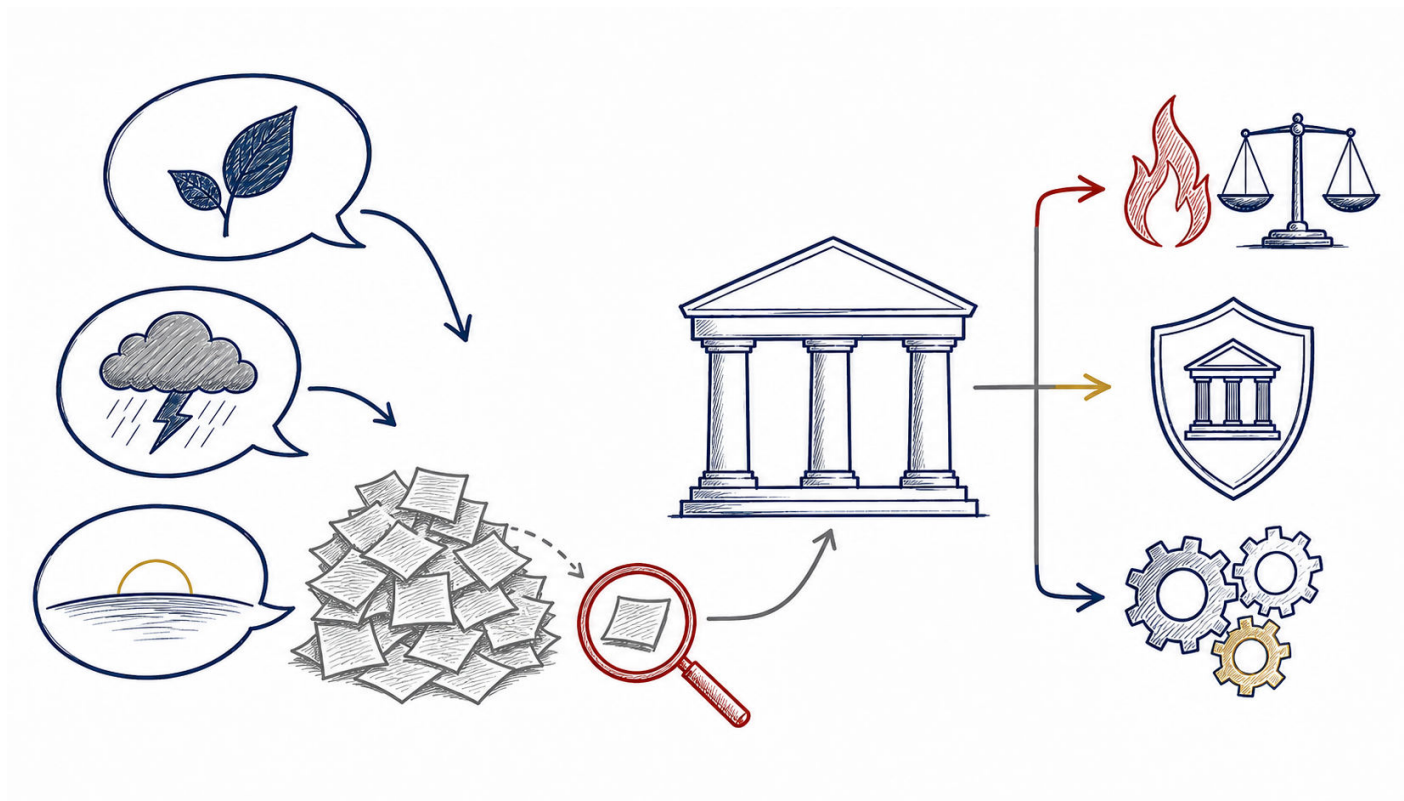
Keyword Searches Create False Positives

$\{\text{oil, gas, coal, energy}\} \not\equiv \{\text{climate context}\}.$

A dictionary can find candidates; it cannot determine the policy meaning.

CONCEPTUAL ILLUSTRATION · NOT EMPIRICAL EVIDENCE

Context-Verified Mentions Pass the Gate

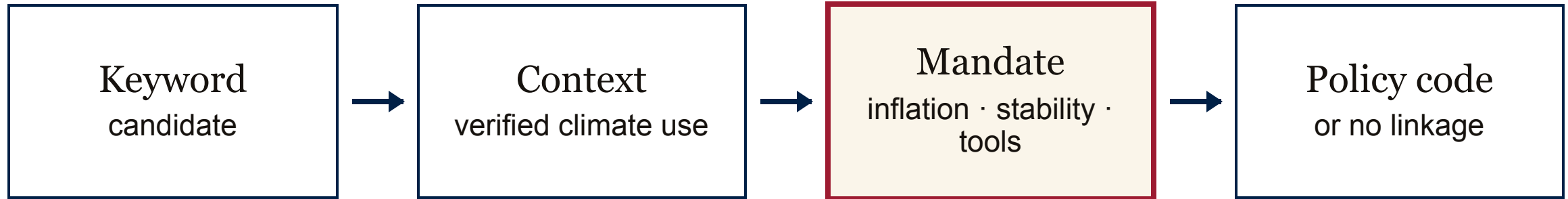
**TEACHING POINT**

A keyword enters the evidence set only after context and mandate verification.

Use the next slides for the documentary evidence.

MEASUREMENT · KEYWORDS ARE CANDIDATES, NOT EVIDENCE

Verification Creates Mandate Evidence



88

verified policy-record documents

148

verified excerpts

Only context-verified, mandate-linked language counts as policy evidence.

Climate Enters Records Slowly

Finding	Evidence
Lower official-record incidence	5.5% of speeches versus 2.4% of records
Institutional non-entry	half of the 26 common institutions never mention climate in the policy record
Long translation delay	median speech-to-record lag: 18 years
Benchmark contrast	geopolitics maps quickly; climate slowly and selectively; digitalisation mostly outside rate setting

Public discussion and official policy reasoning are not interchangeable corpora.

TRANSLATION · THE RECORD USES A NARROWER POLICY VOCABULARY

Language Narrows Toward the Mandate

PUBLIC SPEECH

Broad issue language

Climate risk · transition · sustainable finance · long-horizon responsibility

POLICY RECORD

Mandate-specific vocabulary

Inflation · supply shocks · stability · collateral · asset purchases · supervision

broad issue language → mandate-specific vocabulary

Translation, not repetition, is the evidence of policy entry.

EMPIRICAL RESULT · COMPARISON AND SCOPE

Mandate Linkage Rises in Official Records

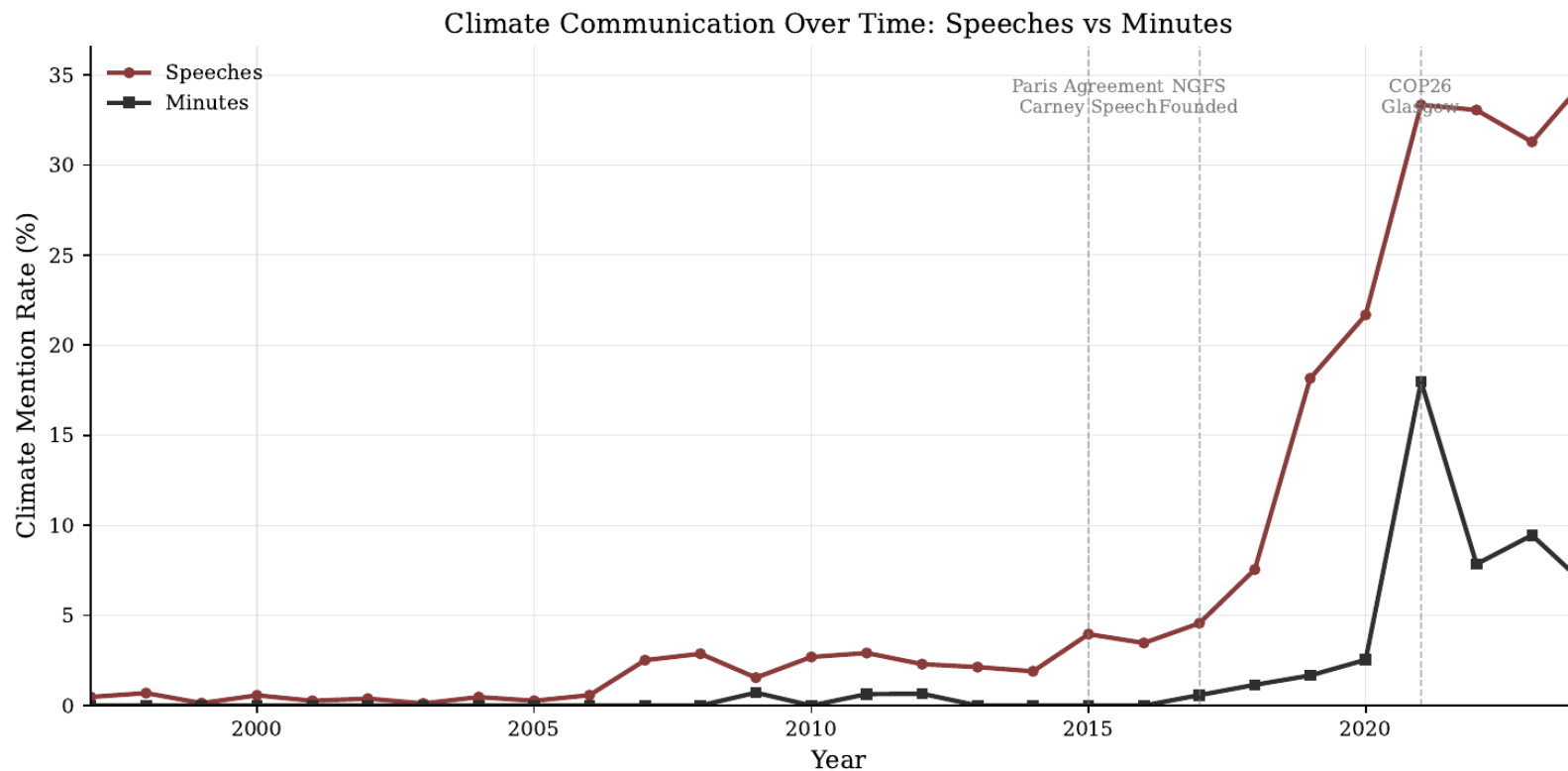
policy seriousness $\approx$ appearance in mandate-relevant language.

Climate excerpt code	Speeches	Policy records
No mandate linkage	72.2%	33.8%
Inflation linkage	6.3%	33.1%
Operational linkage	4.5%	25.7%

This operational definition measures translation into the mandate; it does not prove that policy is optimal or sufficient.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

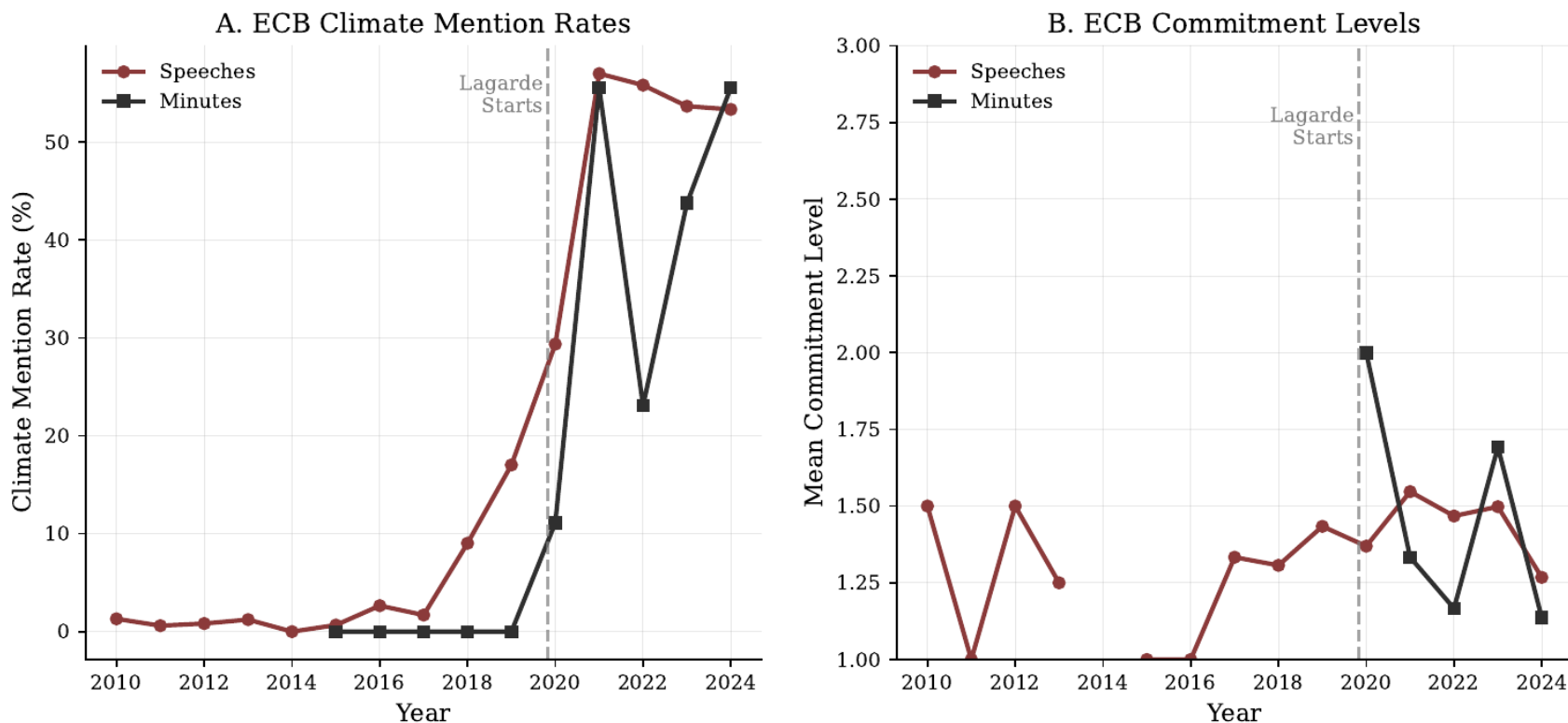
Climate Timing Differs Across Channels



Public speech typically moves first; official policy records follow with a slower and smaller response.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

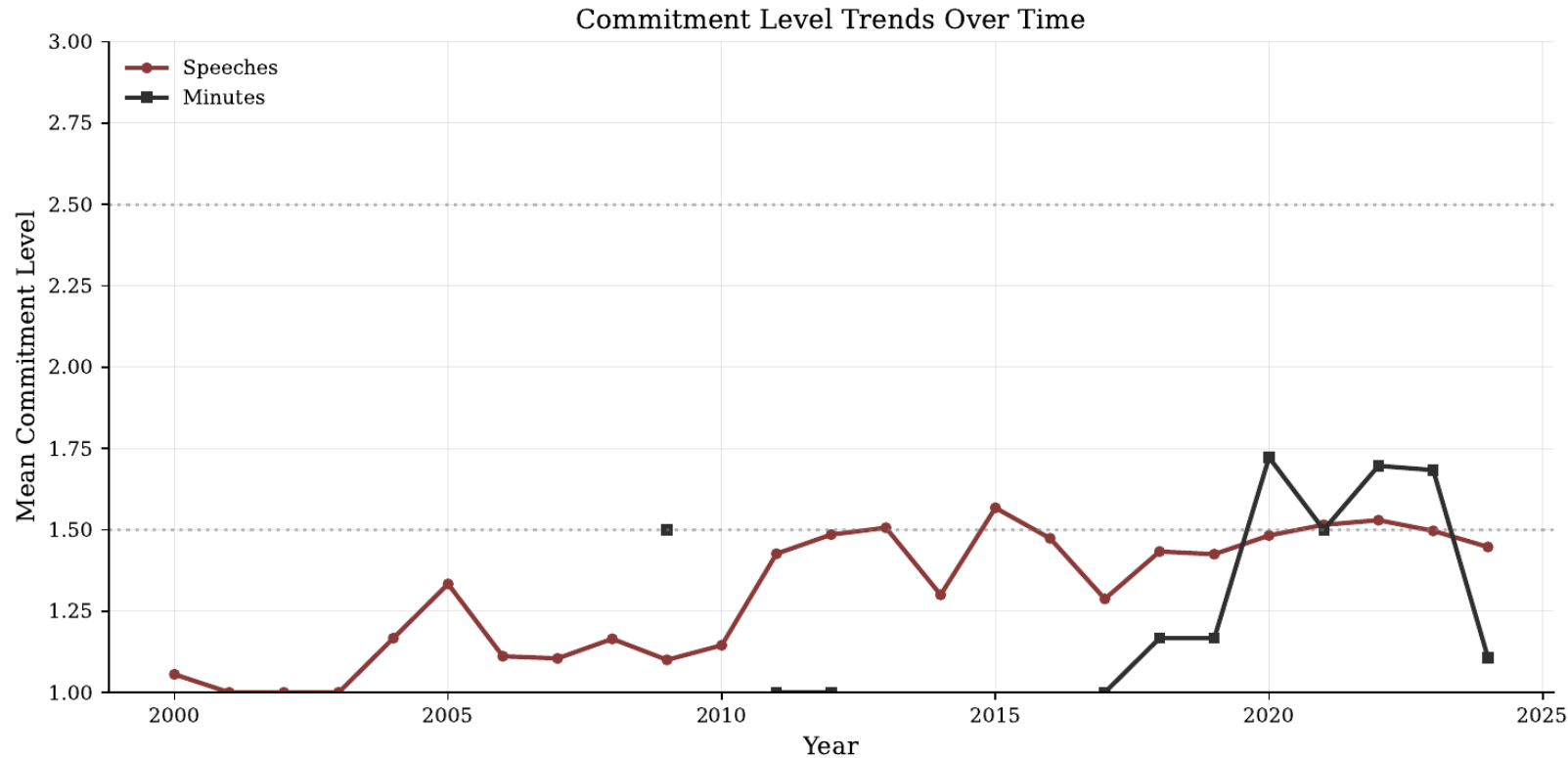
Leadership Shifts Climate Communication



The source figure isolates a visible change around Lagarde's ECB presidency; leadership is one possible accelerator of public signalling.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

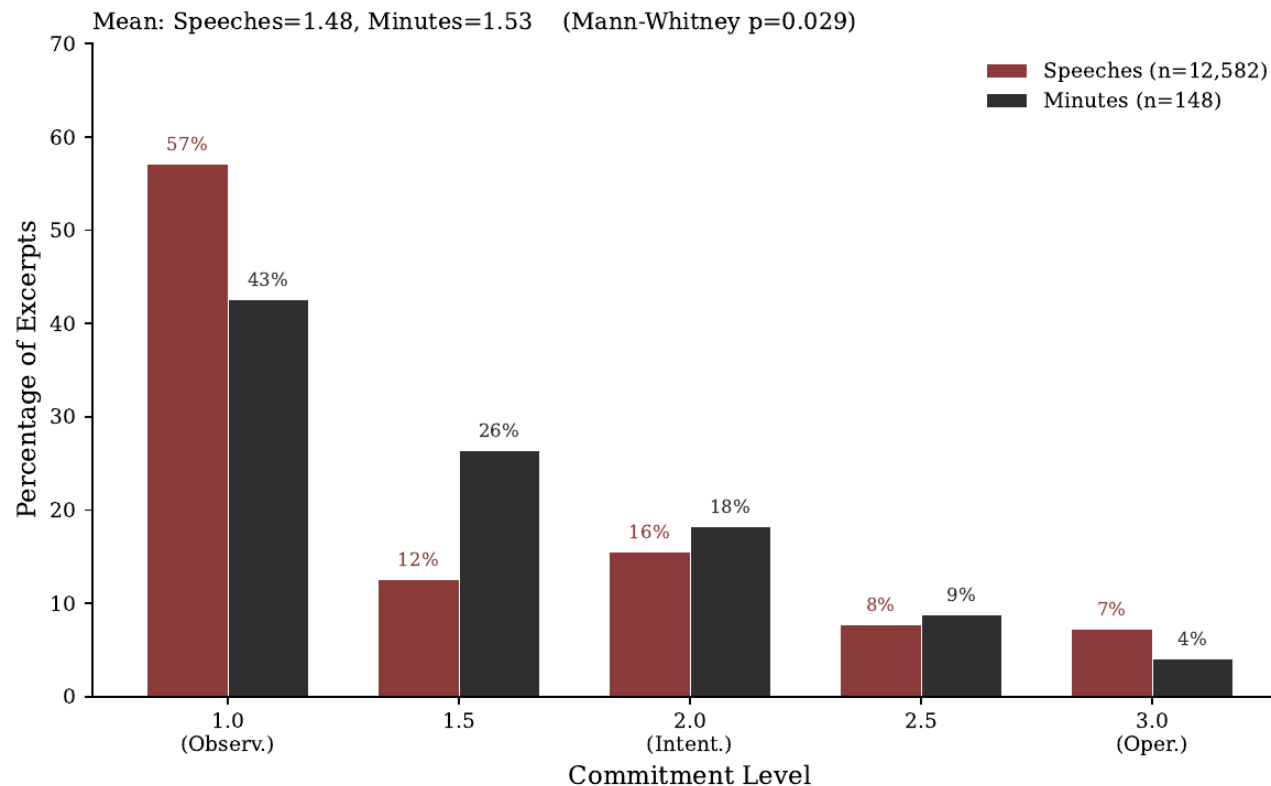
Commitment language evolves over time



The content question is not only whether climate appears, but how strongly the institution commits itself when it appears.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

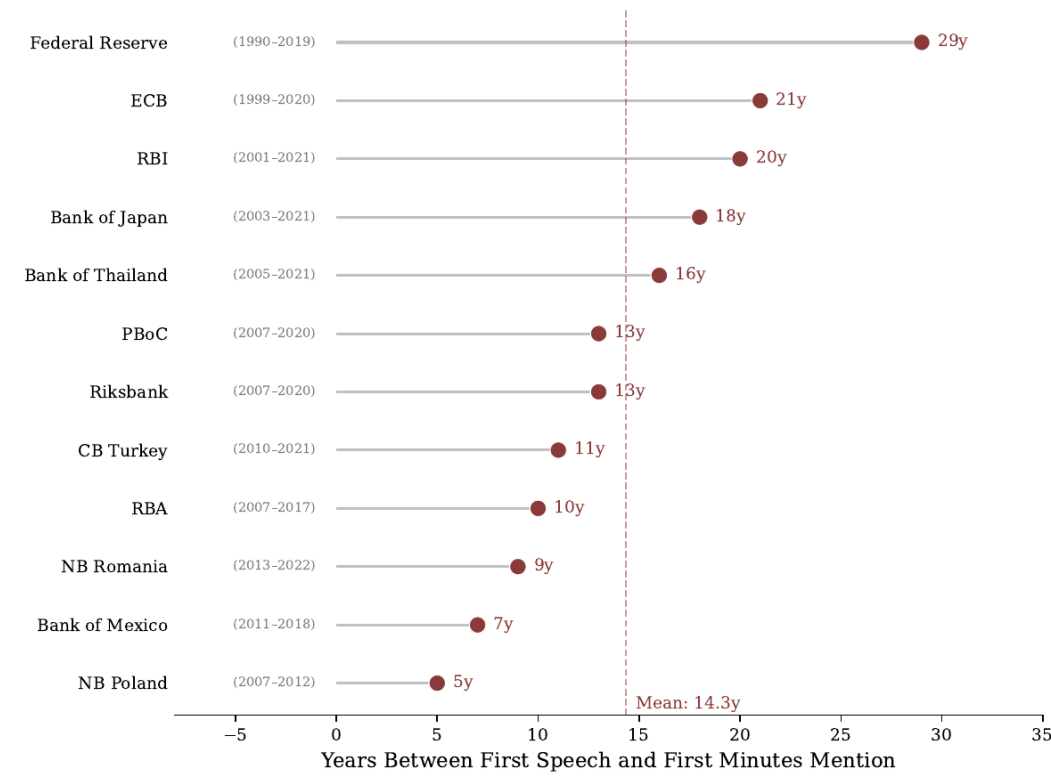
Commitment Is Stronger in Records



Mean commitment: speeches 1.48, minutes 1.53; Mann–Whitney $p = .029$.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

Official Climate Mentions Lag Speeches



The mean speech-to-record lag is 14.3 years; the source chart shows especially long delays for institutions such as the Fed and ECB.

07

CENTRAL BANKING · LECTURE 4 · WORCESTER COLLEGE
PART 07

Understanding **is a constraint.**

Flesch–Kincaid measures sentence and word difficulty—not comprehension

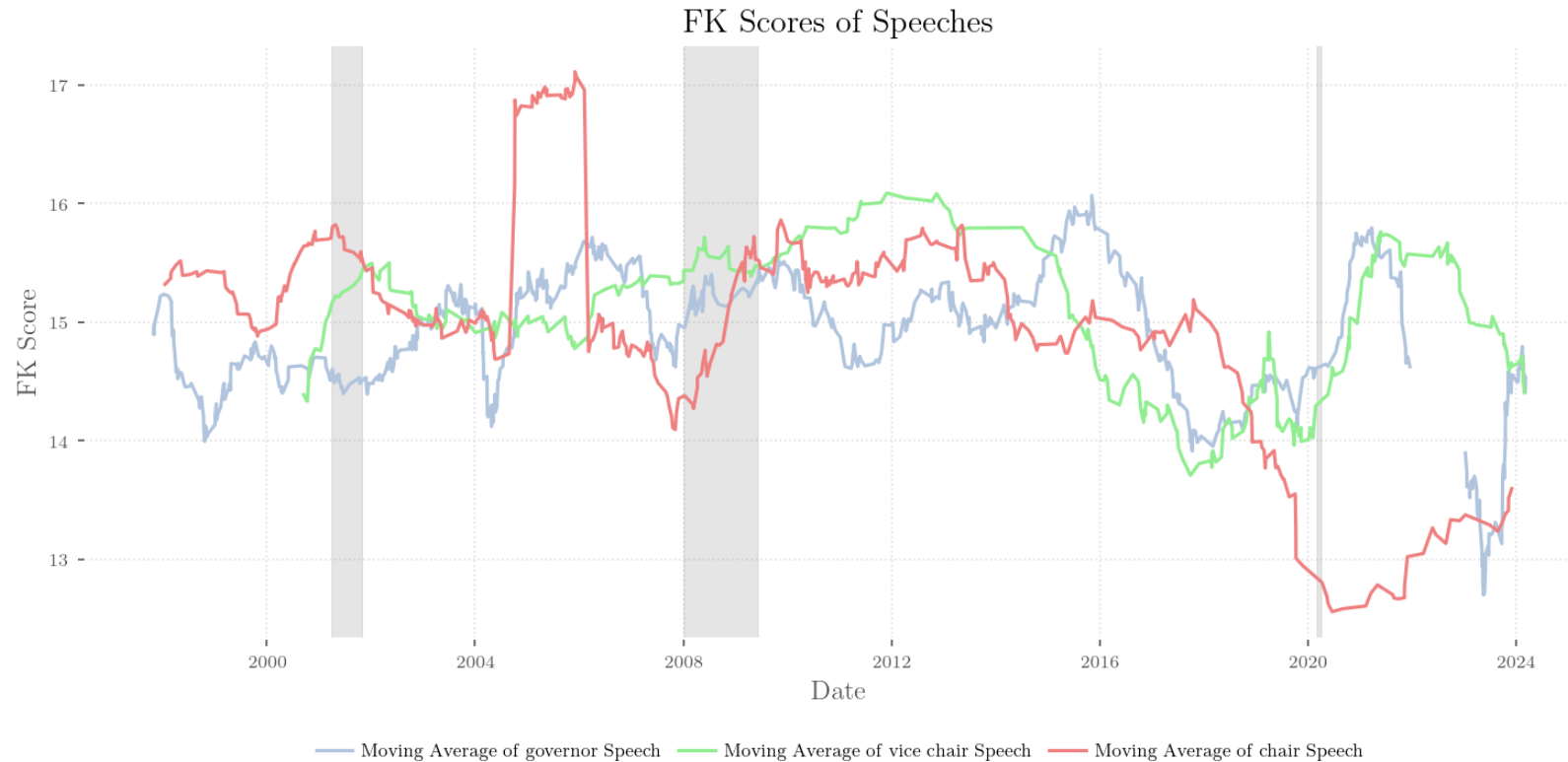
Measure the object

Identify the mechanism

Read the evidence

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

FOMC speech readability varies over time



The source chart tracks Flesch–Kincaid grade level across FOMC speeches; a higher score indicates more years of schooling implied by the text's sentence and syllable structure.

day4_07_readability.tex · line 10 · D4-F098

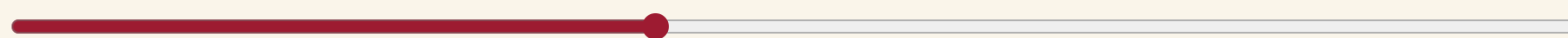
INTERACTIVE DIAGNOSTIC · WHAT CHANGES THE SCORE?

Grade Level Is a Mechanical Statistic

$$FK = 0.39 \left(\frac{\text{words}}{\text{sentences}} \right) + 11.8 \left(\frac{\text{syllables}}{\text{words}} \right) - 15.59$$

Words per sentence

22



Syllables per word

1.55

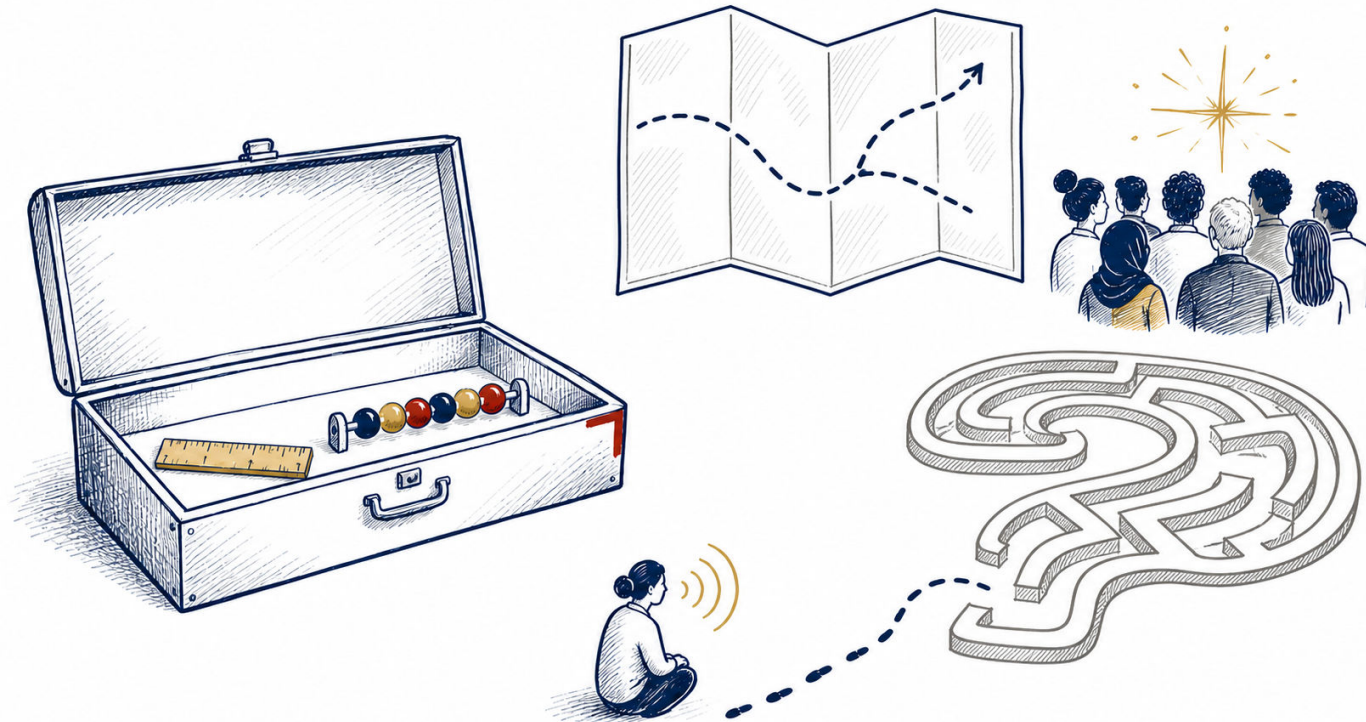
**MECHANICAL
GRADE-
LEVEL
SCORE****11.3**

The score does not observe policy logic, prior knowledge, audience fit, or actual

Readable syntax helps, but readability is not understanding.

CONCEPTUAL ILLUSTRATION · NOT EMPIRICAL EVIDENCE

Readability Is a Tool, Not Understanding



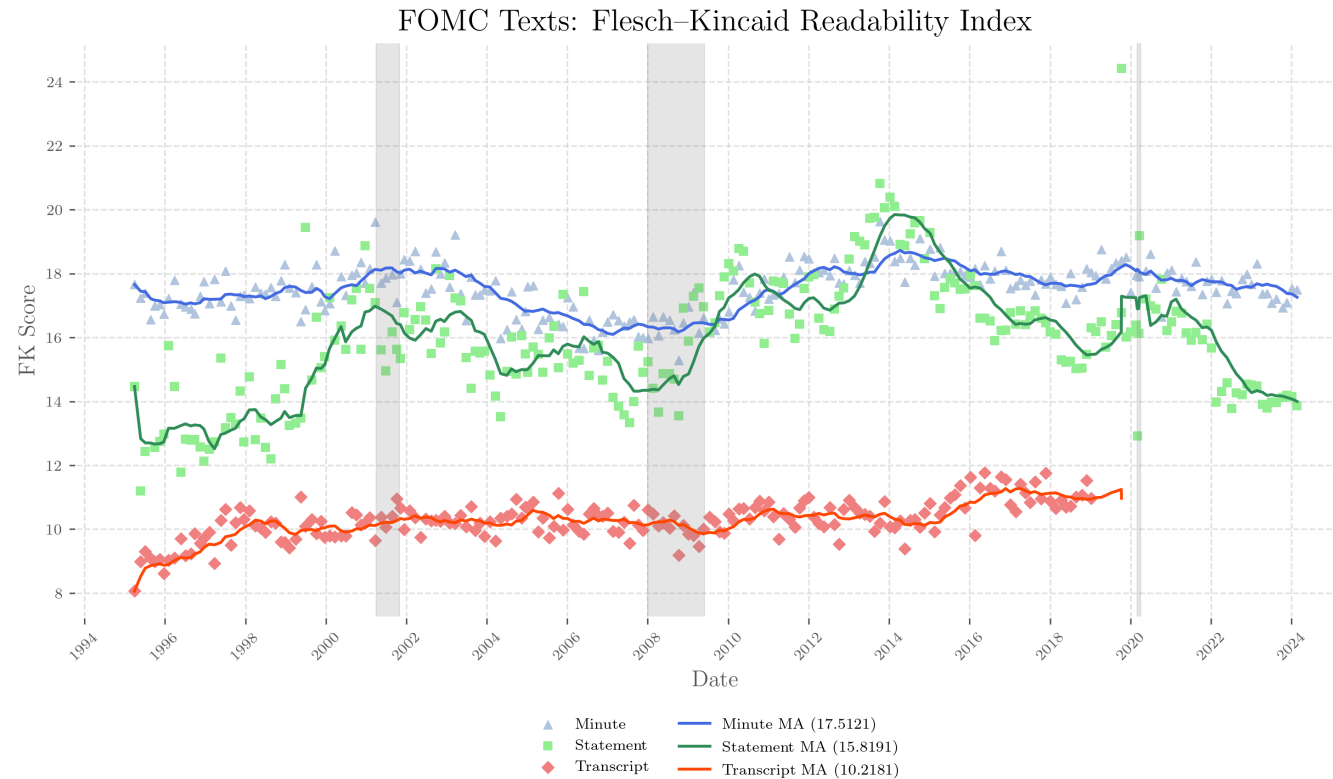
TEACHING POINT

A lower grade-level score does not establish comprehension.

Use the next slides for the documentary evidence.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

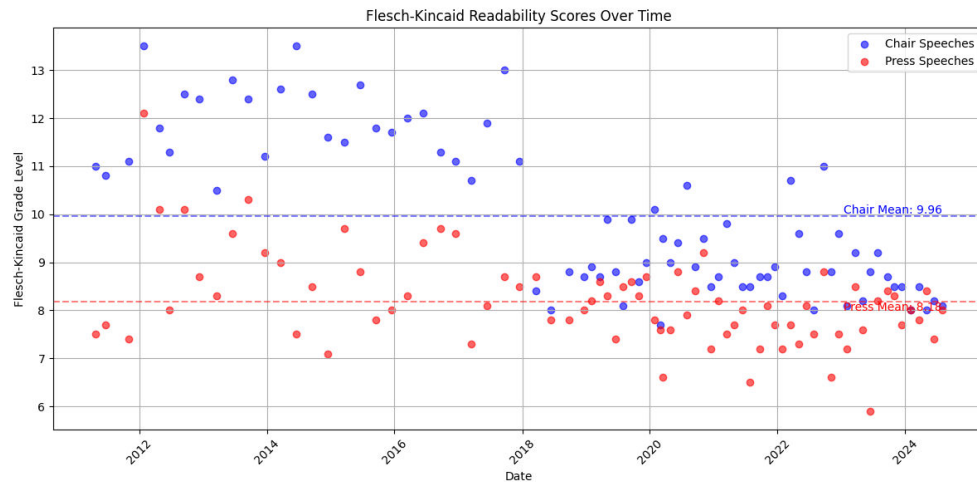
Document Type Changes Reading Burden



A statement, minutes, transcript, and speech perform different institutional jobs; comparing their grade levels should preserve that functional difference.

DOCUMENTARY EVIDENCE · SOURCE-PRESERVING FIGURE

Communicator and Channel Both Matter



Chair communication and press-mediated communication are selected and edited under different constraints, so a grade-level gap is descriptive rather than causal.

The press transformed a long release into a focal policy-path signal.

INTERPRETIVE BOUNDARY

Use readability as a diagnostic, not a verdict

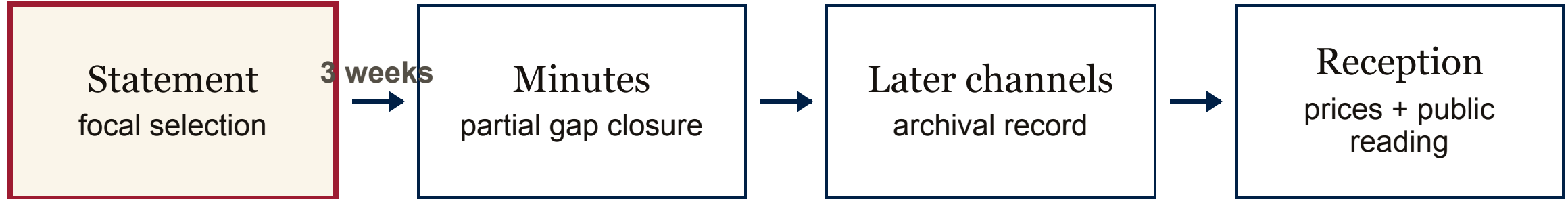
lower $FK \not\Rightarrow$ greater understanding.

Question	FK can help	FK cannot answer
Syntax	Are sentences and words mechanically demanding?	Is the policy logic conceptually clear?
Comparison	Do channels or speakers differ descriptively?	Did the channel cause understanding?
Design	Where should an editor inspect complexity?	Did households, markets, and specialists infer the same message?

The communication objective is comprehension, not merely a lower score.

SECTION SYNTHESIS · SELECTION TODAY, RESTORATION LATER

Disclosure Unfolds Across Time



Later can be new

Omission is selective

.745 → .334 after minutes

A short focal statement and a complete public record are different objectives.

SECTION SYNTHESIS · PUBLIC IMPORTANCE IS NOT YET POLICY ENTRY

Climate Policy Requires Translation



public salience → official record → inflation, stability, or operational linkage

Policy seriousness appears in mandate-relevant language, not keyword volume alone.

Three Constraints Shape Reception

attention $\neq$ understanding $\neq$ persuasion.

Constraint	Empirical object	Correct interpretation
Selection	statement gap	what the focal text omits
Translation	mandate linkage	how an issue becomes policy relevant
Readability	FK grade level	mechanical syntactic burden

Market regressions are reduced-form; text scores are descriptive; official mentions must be context-verified.

APPENDIX · REFERENCES AND PROVENANCE

Sources: FOMC disclosure and market responses

1. Board of Governors of the Federal Reserve System. Minutes of the Federal Open Market Committee: FAQ.
2. Board of Governors of the Federal Reserve System. FOMC calendars and information.
3. Kansoy, F. (2022). FOMC Minutes and Financial Markets, Warwick Economics Research Paper Series 1436.
4. Federal Reserve. Minutes of the 26–27 April 2016 meeting.

APPENDIX · REFERENCES AND PROVENANCE

Sources: contemporary press and ZLB context

1. The New York Times (19 May 2016). Federal Reserve minutes and the June-rate interpretation.
2. The Guardian (18 May 2016). US Fed says a June rise is possible.
3. Reuters (18 May 2016). June rate increase described as on the table.
4. Rajan, R. (2014). Competitive monetary easing—is it yesterday once more?

APPENDIX · REFERENCES AND PROVENANCE

Sources: climate communication and instruments

1. Carney, M. (2015). Breaking the tragedy of the horizon.
2. Kansoy, F. (2026). ``Do Central Banks Take Climate Change Seriously?" Working-paper listing: fatih.ai/research.
3. Bank of Japan; European Central Bank. Climate-response financing; climate tilting of corporate bond holdings.

APPENDIX · REFERENCES AND PROVENANCE

Asset credits and provenance

Asset group	Provenance and treatment
Strategic raster figures	copied from active ML4Z includegraphics targets; normalised losslessly to PNG; the exact min2 duplicate is stored once
Press screenshots	all three active D4-F060 placements retained; NYT, Guardian, and Reuters article addresses recorded
Climate raster figures	copied from active ML4Z targets and normalised to PNG without cropping or recolouring
Six PDF figures	strategic gap closure plus five climate results copied losslessly from active source targets
Readability figures	fk1–fk3 copied from active ML4Z targets and normalised to PNG

Flesch–Kincaid reference: Kincaid et al. (1975), Derivation of New Readability Formulas.



CENTRAL BANKING · LECTURE 4 · WORCESTER COLLEGE
APPENDIX

Complete **source tables.**

Projected slides show the coefficient that answers the question;
the complete estimates remain here.

APPENDIX · COMPLETE SOURCE TABLE

Baseline: Ordinary Afternoons

Asset	Obs.	Mean	SD	Min	Max	Skew.	Kurt.
EUR/USD (%)	63,708	0	.04	-.79	.58	.04	.04
S&P 500 (%)	98,371	0	.14	-2.42	3.66	.14	.14
10-year (bps)	89,019	0	.04	-5.6	5.5	.04	.04
3-month (bps)	41,974	0	.71	-35	30	.71	.71

day4_05_strategic.tex · line 266 · D4-F063

APPENDIX · COMPLETE SOURCE TABLE

Minutes Days Modestly Shift Volatility

Asset	Obs.	Mean	SD	Min	Max	Skew.	Kurt.
EUR/USD (%)	1,919	0	.06	-.56	.40	.06	.06
S&P 500 (%)	1,938	0	.15	-1.29	1.22	.13	.13
10-year (bps)	1,930	0	.05	-3.9	3.8	.05	.05
3-month (bps)	1,917	.01	.48	-3	6	.48	.48

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APPENDIX · COMPLETE SOURCE TABLE

Statements Have the Most Volatility

Asset	Obs.	Mean	SD	Min	Max	Skew.	Kurt.
EUR/USD (%)	2,256	0	.11	-1.08	.76	.11	.11
S&P 500 (%)	3,529	0	.23	-3.76	2.75	.23	.23
10-year (bps)	3,278	0	.10	-9.8	22.0	.10	.10
3-month (bps)	1,613	.06	1.44	-10	27	1.44	1.44

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APPENDIX · COMPLETE SOURCE TABLE

Minutes Load Most on the Path Factor

Asset	Target (SE)	Path (SE)	Constant (SE)	N	R^2
S&P 500 (%)	−1.77** (.81)	−.94*** (.22)	-.01 (.03)	103	.16
EUR (%)	1.22 (.88)	1.18*** (.36)	−.04** (.02)	103	.13
10-year (bps)	16.55 (20.74)	17.79*** (4.23)	.84 (.54)	103	.16
3-month (bps)	9.81 (8.39)	5.62 (3.26)	.29 (.27)	103	.06

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APPENDIX · COMPLETE SOURCE TABLE

Statements Trigger Stronger Reactions

Asset	Target (SE)	Path (SE)	Constant (SE)	N	R^2
S&P 500 (%)	−3.18*** (.66)	−2.82*** (.71)	.05 (.04)	103	.28
EUR (%)	.24 (.77)	3.63*** (.58)	-.00 (.02)	103	.35
10-year (bps)	18.77 (31.30)	59.81*** (18.51)	.10 (.79)	103	.15
3-month (bps)	18.83*** (4.78)	3.18 (3.72)	-.05 (.37)	103	.14

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APPENDIX · COMPLETE SOURCE TABLE

Minutes Path News Matters Beyond the ZLB

Asset	Target (SE)	Path (SE)	Constant (SE)	N	R^2
S&P 500	-1.51 (.90)	— .95*** (.27)	-.04 (.04)	46	.22
EUR	.75 (.80)	.78** (.34)	— .05* (.02)	46	.11
10-year	28.46 (21.48)	12.87** (4.89)	.10 (.81)	46	.18
3-month	13.05 (12.64)	8.09 (4.85)	.39 (.57)	46	.10

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APPENDIX · COMPLETE SOURCE TABLE

ZLB Responses Shift to EUR and 10Y

Asset	Target (SE)	Path (SE)	Constant (SE)	N	R^2
S&P 500	−8.04** (3.88)	-.61 (.41)	.02 (.04)	57	.14
EUR	1.12 (3.39)	2.53*** (.80)	-.02 (.03)	57	.16
10-year	25.82 (79.93)	31.33*** (8.52)	1.76** (.73)	57	.23
3-month	29.62 (18.82)	-1.16 (2.01)	.11 (.17)	57	.05

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END · LECTURE 4

Communication **as Data.**

Fatih Kansoy

Central Banking · Lecture 4

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