28th Annual Conference of the Central Bank of Chile: The Centennial
Monetary Policy, Financial Markets, and Challenges Ahead

Risk Management in Monetary Policy:
Review with Asset Pricing Implications

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Joint with Stephen Hansen (UCL) and Hao Pang (UT Dallas)

This paper builds on

- *"Common shocks in stocks and bonds"* with H. Pang
- *"Policymakers' uncertainty"* with S. Hansen, M. McMahon, and S. Xiao
- *"Tough talk: The Fed and the risk premium"* with M. McMahon
- *"Did I make myself clear? The Fed and the market under the 2020 monetary policy framework"* with M. McMahon and H. Pang

Motivation

- The Fed has been credited with remarkable price stability over last several decades
  - Recently interrupted by post-Covid inflation surge, overall navigated well

- *What aspects of Fed's decision-making and communication contributed to desirable outcomes?*

FOMC's risk-management approach

↓

Policy stance = Action + *Tilt*

↓

Communication

↓

Financial conditions

- Sparse literature…

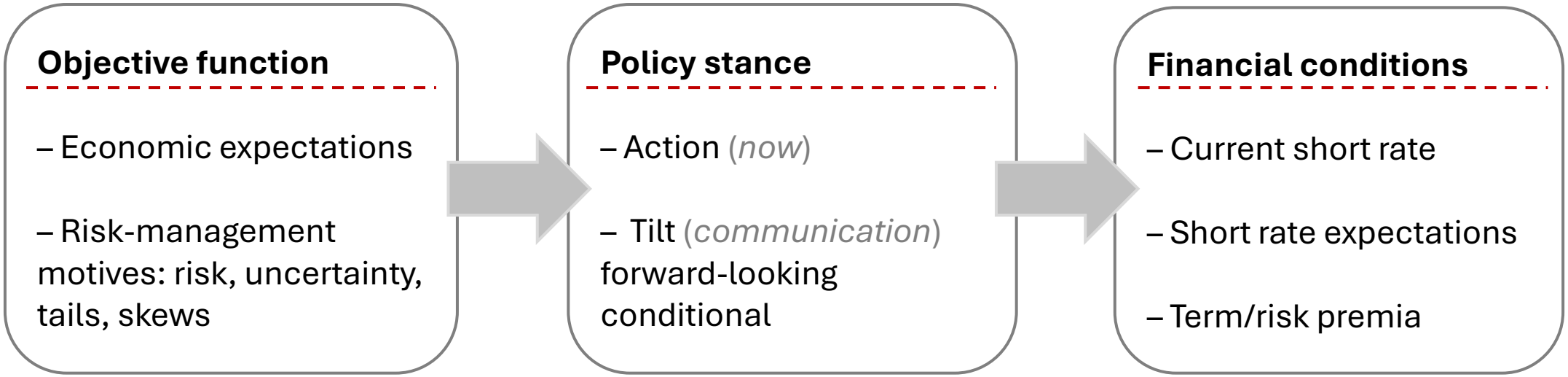
What does risk management actually mean?

- *"…emphasizes understanding as much as possible the many sources of risk and uncertainty that policymakers face, quantifying those risks when possible, and assessing the costs associated with each of the risks."*
  – Greenspan (2004)
- *"It entails thinking about what could go wrong with the forecast and then judging if policy should be adjusted from the baseline (…) in light of the alternative scenarios. This evaluation considers whether the costs from missing our dual mandate objectives are balanced across these alternatives. If not, we may want to adjust policy as insurance against bad outcomes. (…) It also is useful in communicating to the public that we are aware of the risks and are unlikely to be caught off guard should they materialize."*
  – Evans (2019)
- *"[M]onetary policy is 98 percent talk and only two percent action. The ability to shape market expectations of future policy through public statements is one of the most powerful tools the Fed has. The downside for policymakers, of course, is that the cost of sending the wrong message can be high."*
  – Bernanke (2015)

This talk: Risk management via “verbal scenarios”

- FOMC policy stance in language reveals policy ***tilts*** ≠ current action
- *Tilts* are forward-looking, conditional policy paths → **communication**
- *Tilts* reflect FOMC concerns about tail risks beyond first-moment forecasts: **balance of risk** assessments ≠ certainty equivalent policy rules
- Communication of policy scenarios via *tilts* affects **term premia in long rates** beyond expected short rates

Agenda



Adjust policy stance to risks via tilt → Communicate readiness to act if needed → Credibility and better management of expectations → Stability of financial conditions → Progress toward Fed's objectives

Risk management in policy rules

- Fed determines policy stance r_t, $\min_{r_t} E[L(\pi_t, y_t)]$, given standard preferences

$$L(\pi_t, y_t) = (\pi_t(r_t) - \pi^*)^2 + \lambda(y_t(r_t) - y^*)^2$$

- Expected losses

$$E[L(\pi_t, y_t)] = (\bar{\Pi}_t(r_t) - \pi^*)^2 + V_{\pi,t}(r_t) + \lambda(\bar{Y}_t(r_t) - y^*)^2 + \lambda V_{y,t}(r_t)$$

- Certainty equivalence (CE) → Taylor rule

$$E[L(\pi_t, y_t)] = (\bar{\Pi}_t(r_t) - \pi^*)^2 + \underbrace{V_{\pi,t}(r_t)}_{V'_{\pi,t}(r_t)=0} + \lambda(\bar{Y}_t(r_t) - y^*)^2 + \lambda \underbrace{V_{y,t}(r_t)}_{V'_{y,t}(r_t)=0}$$

- Risk management

$$E[L(\pi_t, y_t)] = (\bar{\Pi}_t(r_t) - \pi^*)^2 + \underbrace{V_{\pi,t}(r_t)}_{V'_{\pi,t}(r_t)\neq 0} + \lambda(\bar{Y}_t(r_t) - y^*)^2 + \lambda \underbrace{V_{y,t}(r_t)}_{V'_{y,t}(r_t)\neq 0}$$

Risk management in policy rules

$$E[L(\pi_t, y_t)] = (\bar{\Pi}_t(r_t) - \pi^*)^2 + \underbrace{V_{\pi,t}(r_t)}_{V'_{\pi,t}(r_t)\neq 0} + \lambda(\bar{Y}_t(r_t) - y^*)^2 + \lambda \underbrace{V_{y,t}(r_t)}_{V'_{y,t}(r_t)\neq 0}$$

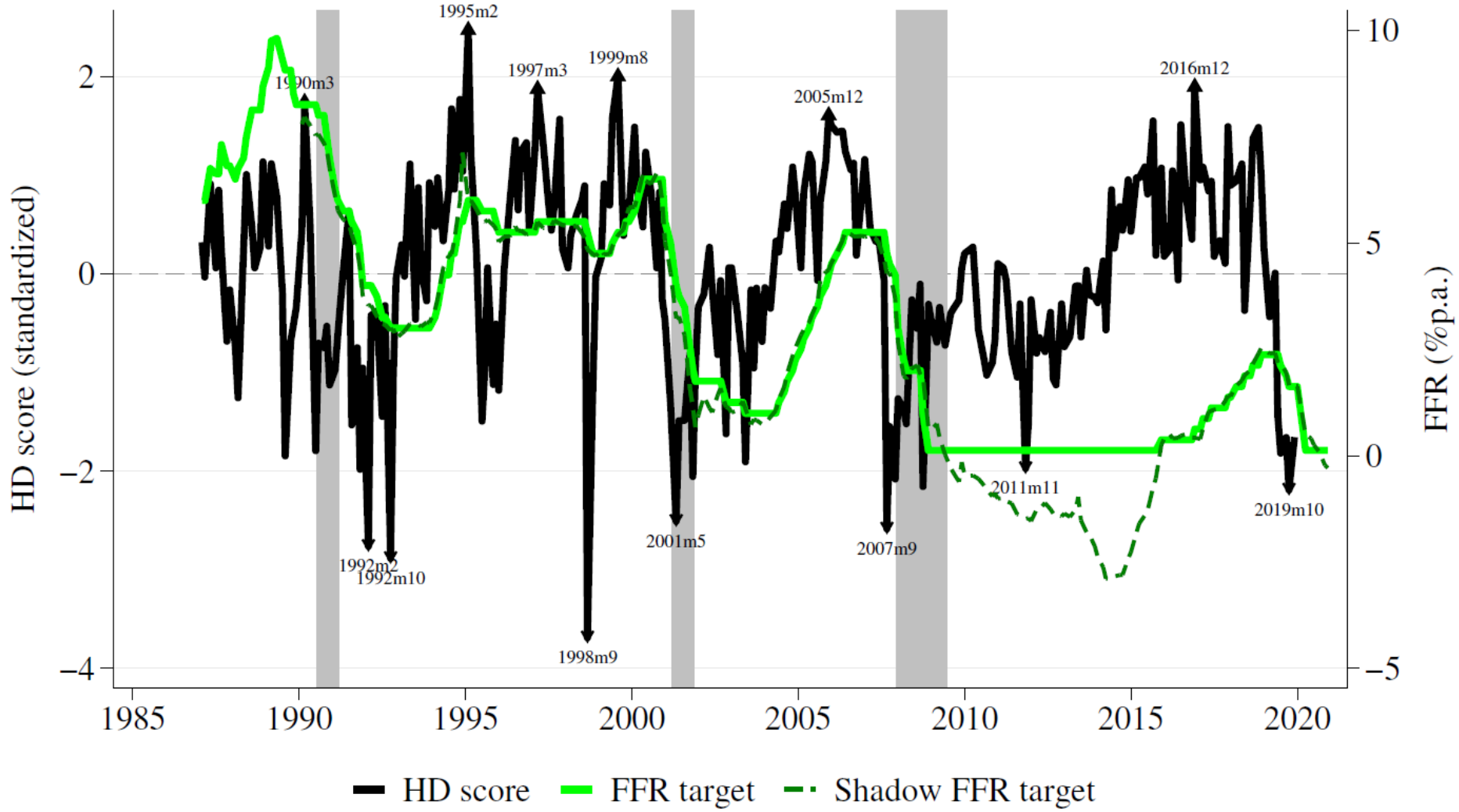
$V'(r) \neq 0$: Policy impact on risks

- View that Fed can affect risks / tail probabilities
  - Upper inflation tail; prevent disanchoring [Goodfriend, 1993]
  - Low growth tail; prevent hitting ZLB constraint [Evans et al, 2019]
- Policy stance responds to risk *beyond* any effect of risk on first moments $\bar{\pi}_t, \bar{y}_t$
  - Departure from CE even under symmetric objective
- Other situations where risks affect policy stance directly
  - Asymmetric objectives: policy bias depends on uncertainty [shortfalls and FAIT 2020]
  - Parameter uncertainty, robust preferences

Policy stance in FOMC language: Tilt

FOMC stance in language: HD score

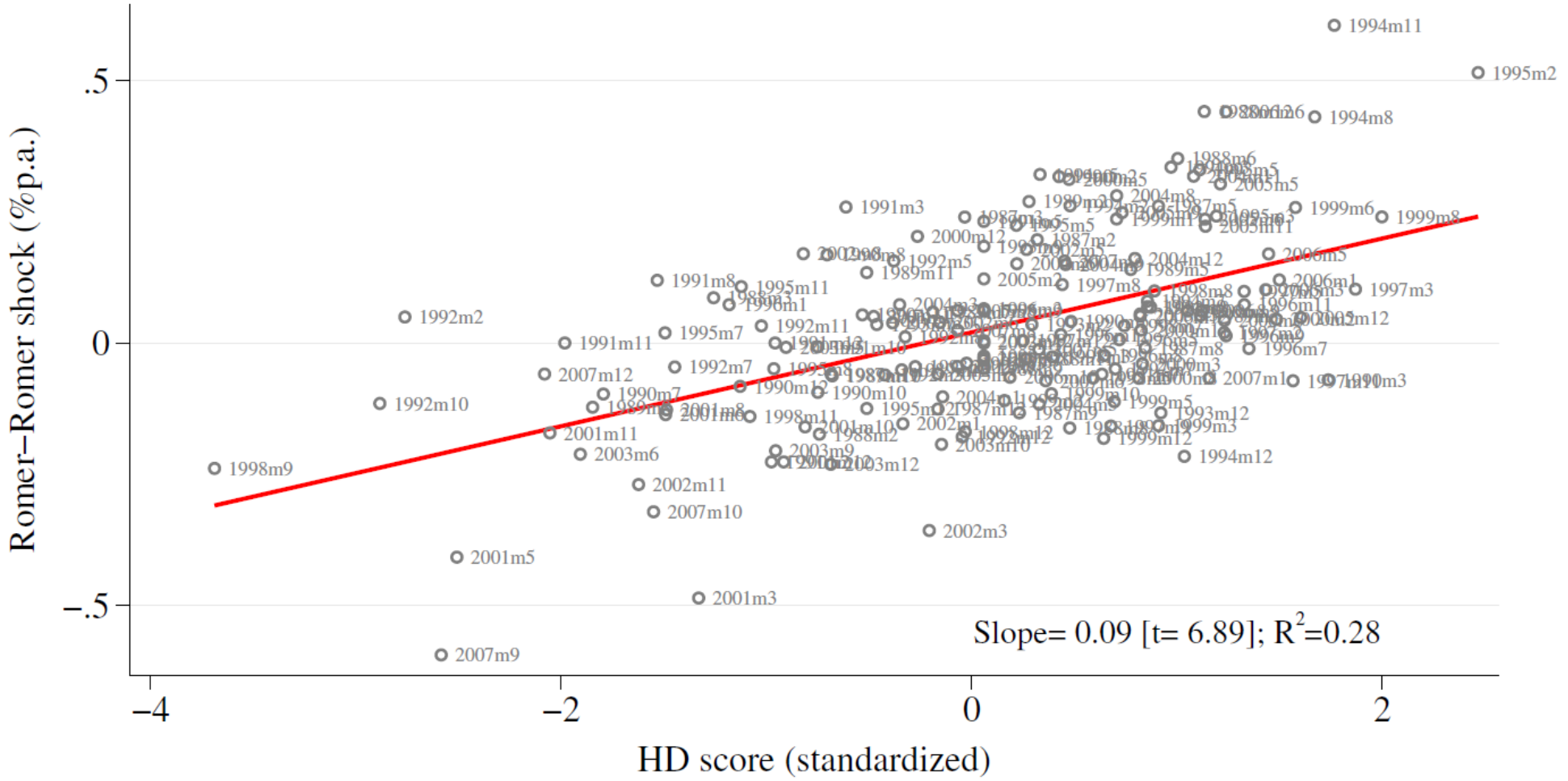
FOMC members' language in policy round of FOMC transcripts, 1987-2019



Adapted from Cieslak, Hansen, McMahon and Xiao (2024)

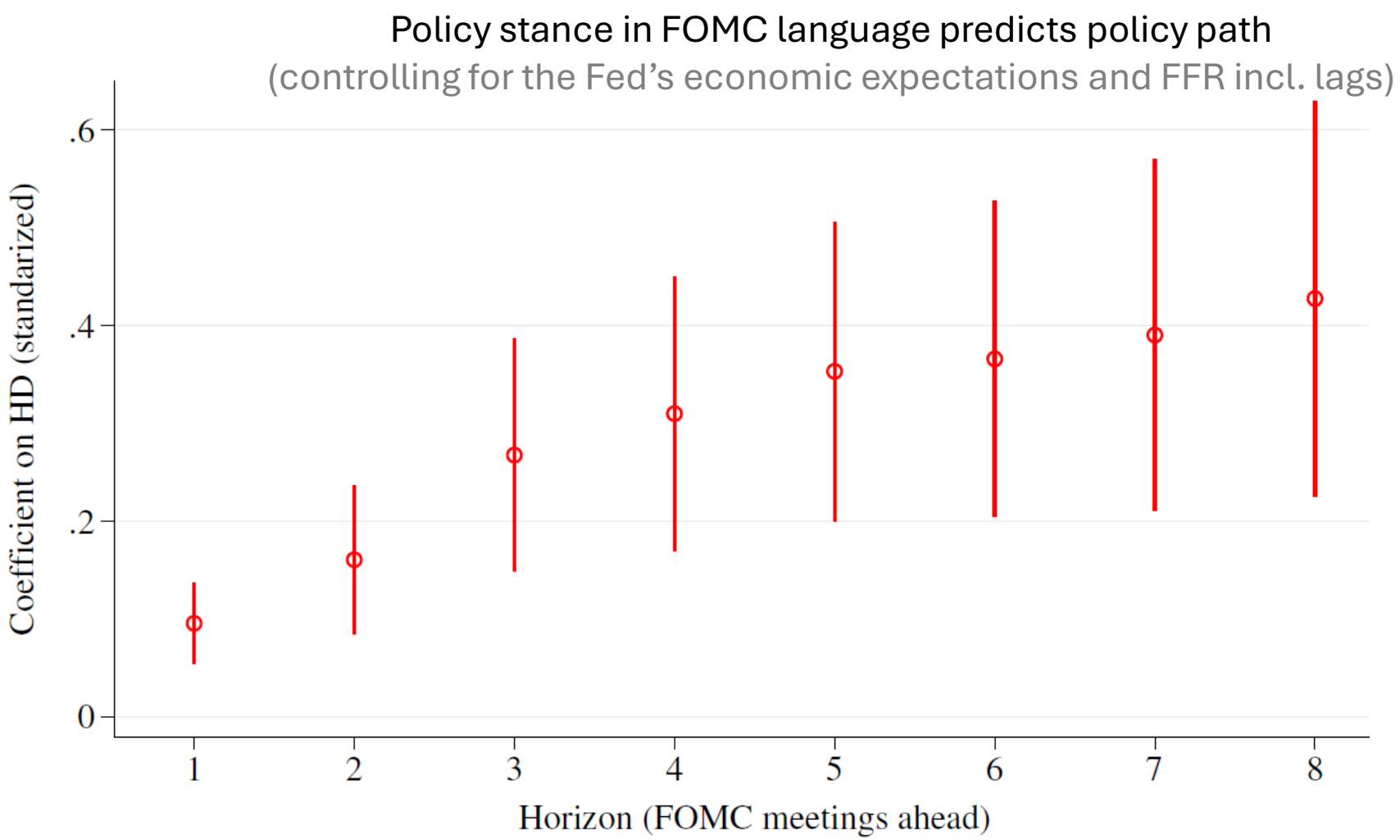
Policy stance in FOMC language vs. Romer-Romer shocks

Policy stance in FOMC language predicts RR shocks: deviations from forward-looking policy rule



- Magnitude: 1σ increase in HD score predicts ~**9bps** tighter policy at this meeting
- Large effect relative to 18 bps stdev of RR shocks

FOMC stance in language vs. future policy path



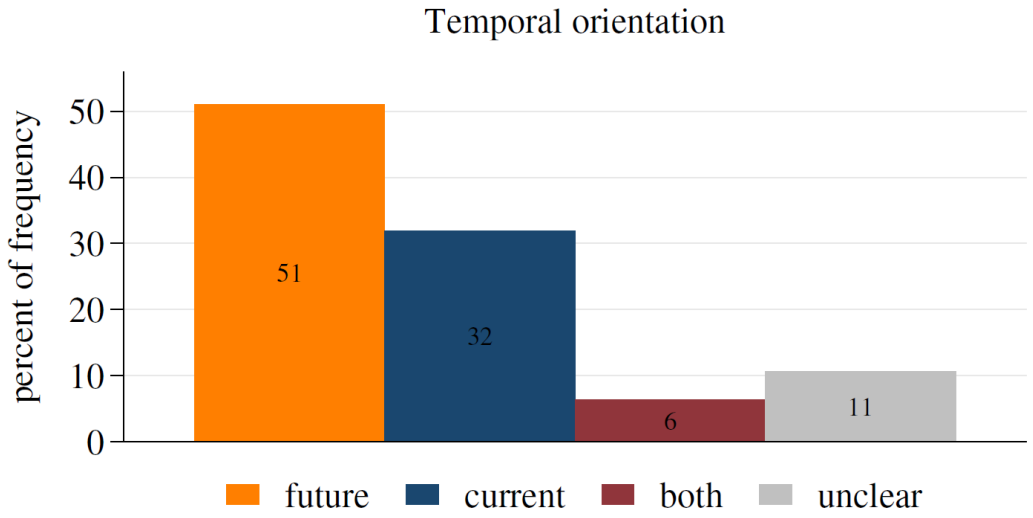
- Magnitude: 1σ increase in HD score predicts ~**40 bps** higher policy rate 8 meetings ahead
- Large effect corresponding to ~20% of volatility of annual FFR changes

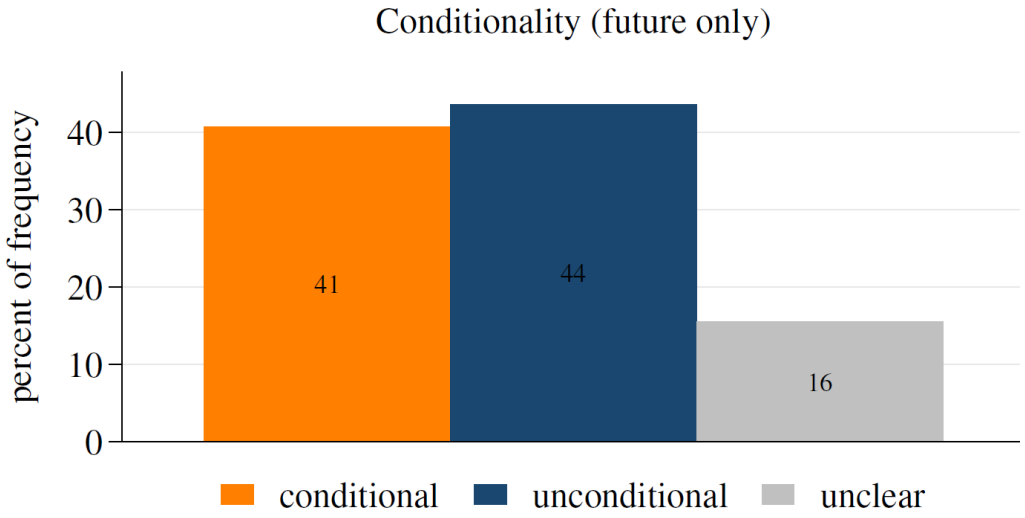
Is the FOMC meeting language merely a ritual dance?

"So was the FOMC meeting merely a ritual dance? **No.** *I came to see* ***policy decisions as often evolving over at least a couple of meetings****. The seeds were sown at one meeting and harvested at the next. [The discussion] could change my mind, even if it could not change my vote at that meeting. (…) I was often* ***positioning*** *myself, and my peers,* ***for the next meeting****."*

– L. Meyer (2004)

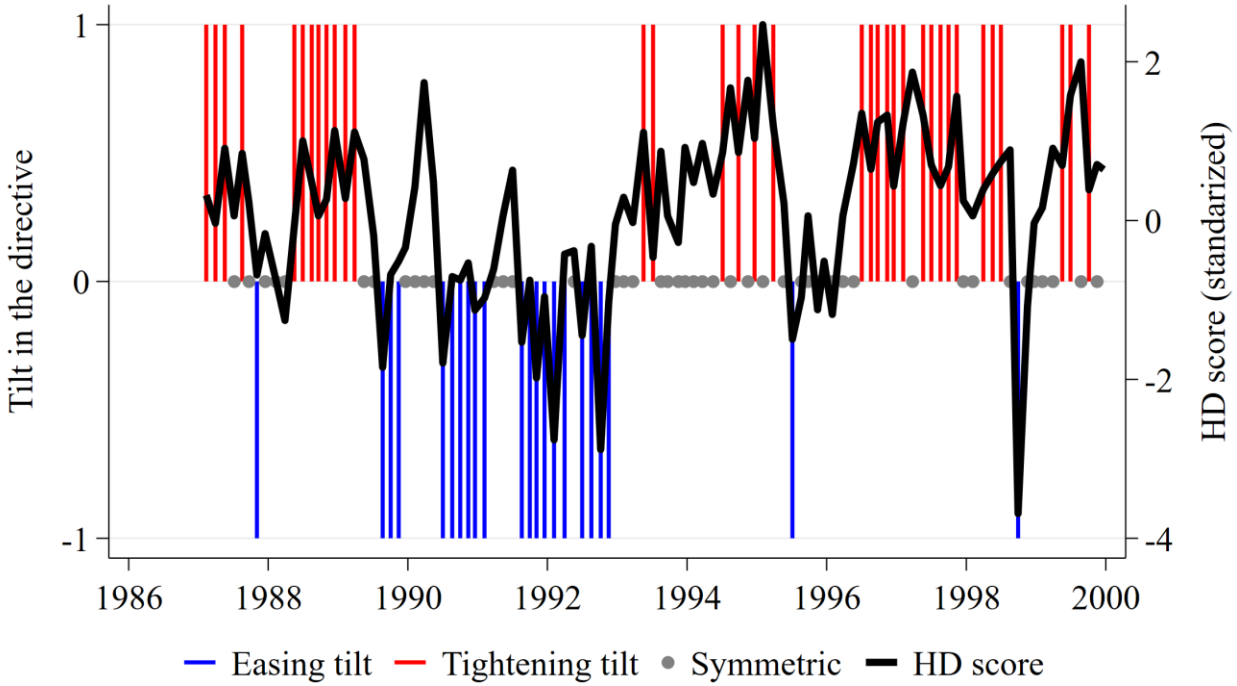
- FOMC policy-round language is forward-looking and conditional
  - Future-oriented statements account for 51% all policy sentences
  - Among future-oriented statements, 41% involve conditionalities





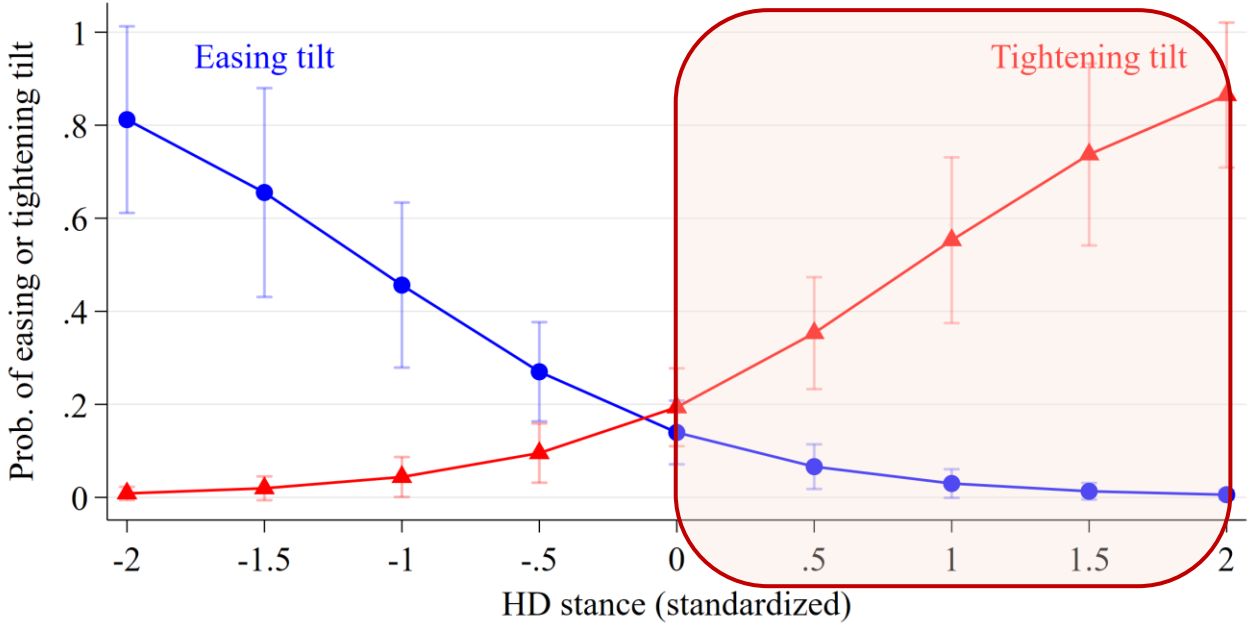
FOMC stance in language as policy instrument: Tilt

FOMC language vs. actual policy tilt (1987-1999)



Predicting tilt with FOMC language

(controlling for the Fed's economic expectations and FFR incl. lags)



- Explicit policy tilt in FOMC directive until 1999 (later: balance of risk, without explicit tilt)
- Valuable for market participants: Source of leaks pre-1994
- Magnitude: Probability of tightening tilt increases ~**33pp** (from 20% to 53%) for 1σ tighter HD score in FOMC language

Inferring tilt from language with LLM

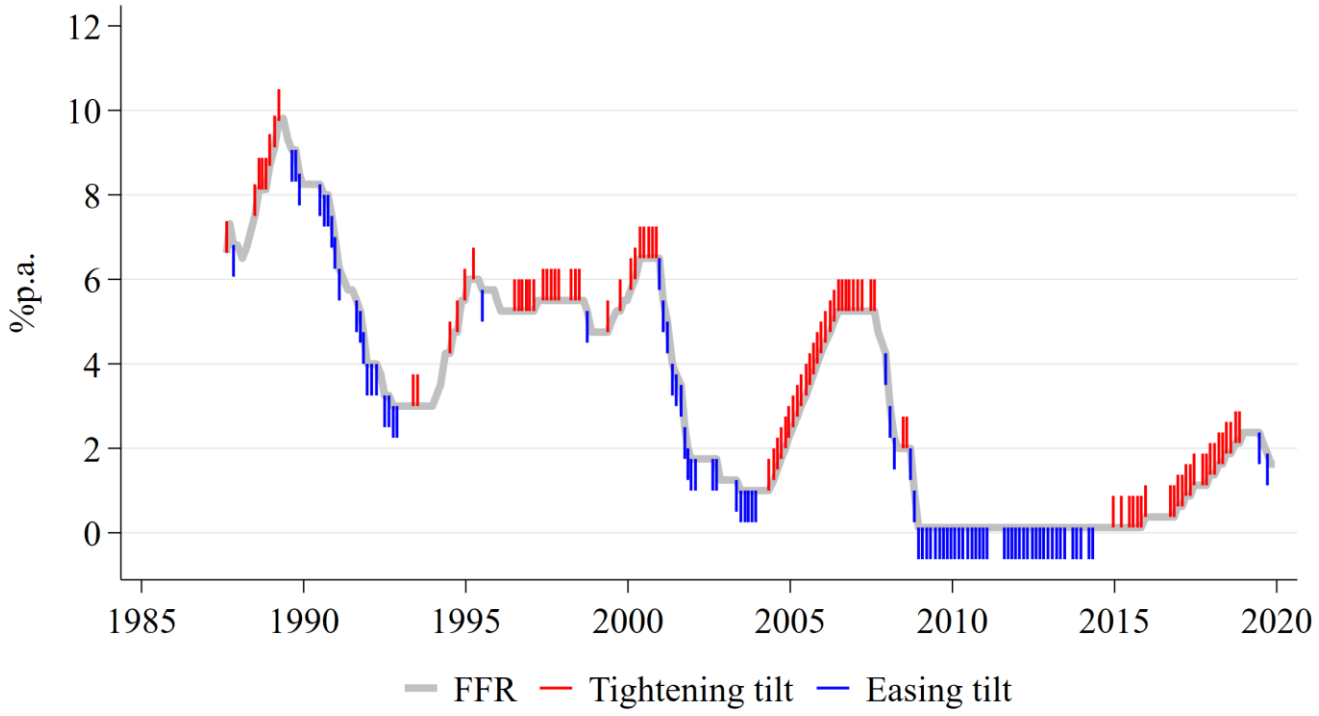
- Policy tilt explicitly available in FOMC directive until 1999 → Use LLM to extend the sample
- Infer action and tilt from FOMC language in transcripts
  - Current action

    [discrete: easing, tightening, unchanged]
  - Any forward-looking or conditional policy that FOMC could implement in future

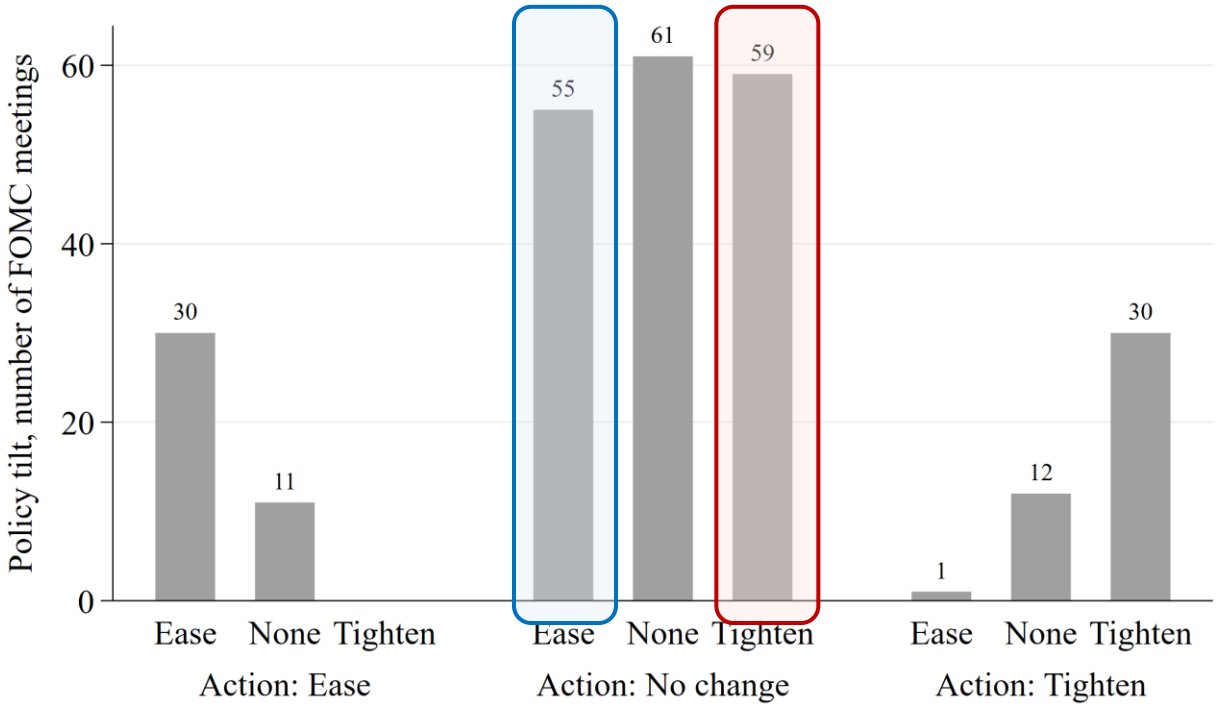
    [discrete: tightening, easing, neutral, none]

Tilt as part of FOMC's toolkit

Tilts from language (LLM) vs. current policy rate



Tilt conditional on current action



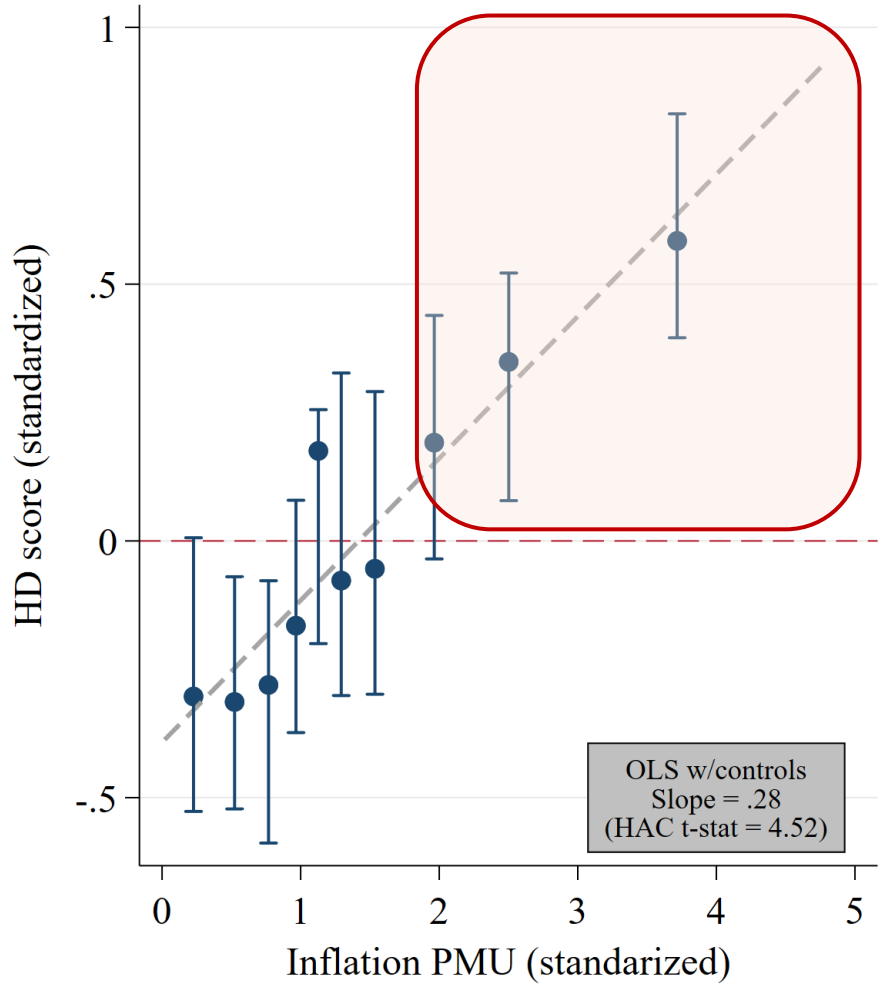
- Tilt is policy instrument beyond policy rate/action → key component in Fed's communication
- Signal to market that policymakers entertain *alternative policy paths*
- 65% of meetings with asymmetric tilt are when FOMC *did not change* its current policy

Why to tilt?
Risk management considerations

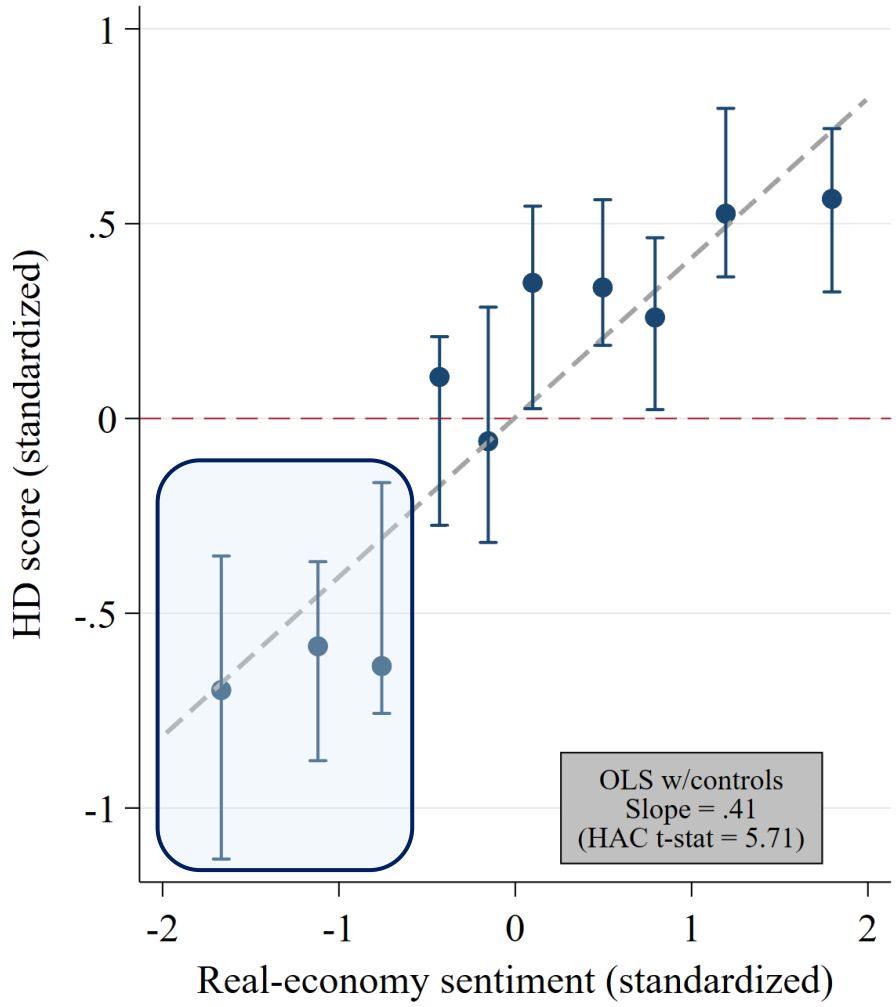
Why to tilt? FOMC's risk and uncertainty perceptions

Inflation risk perceptions → FOMC stance

(controlling for Fed's economic expectations)



Real growth risk perceptions → FOMC stance



- Policy stance driven by FOMC's uncertainty (PMU) about inflation and skews in growth distribution

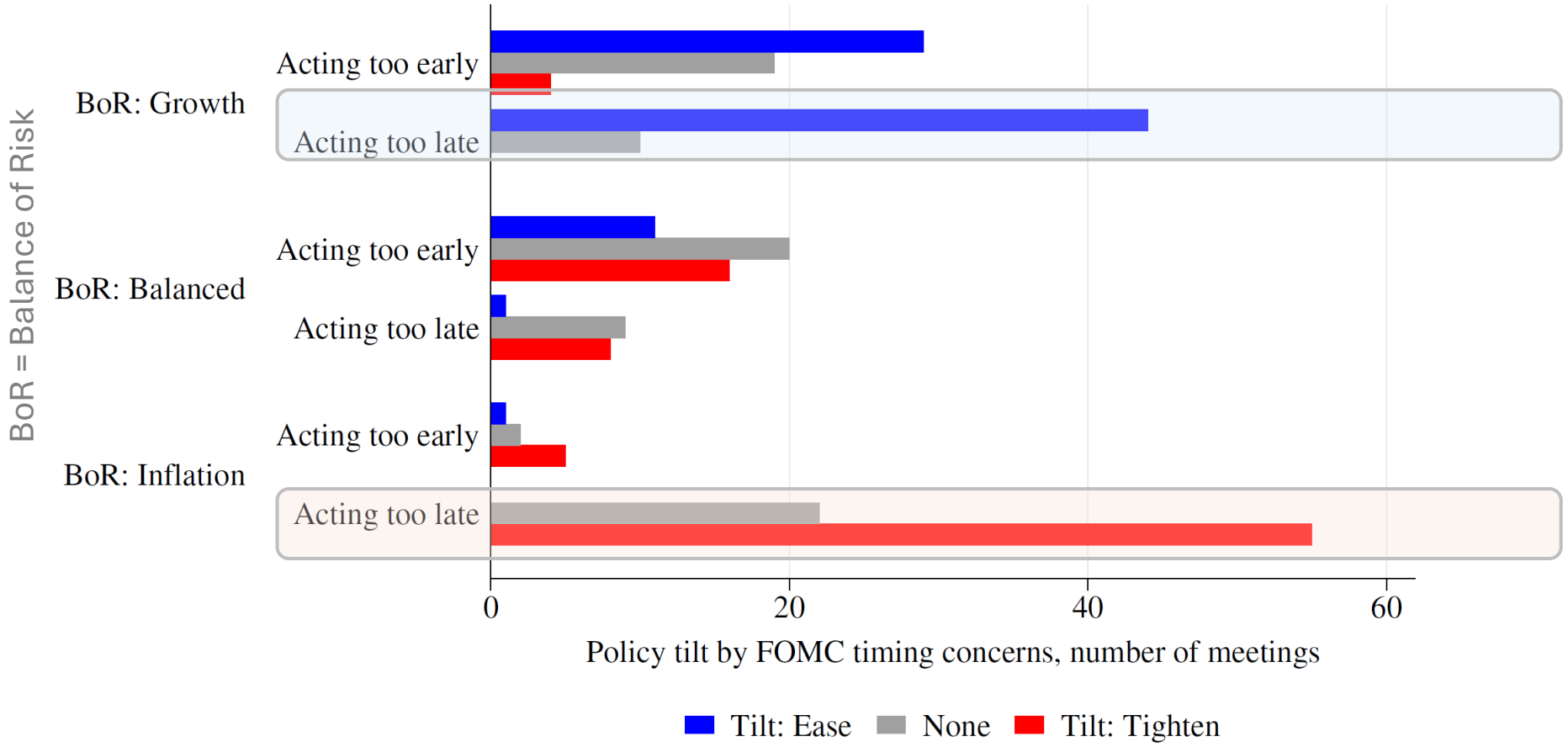
Why to tilt? FOMC's risk and uncertainty perceptions

Dependent variable: Policy tilt (+1,0,-1), LLM, 1987-2019

		$TiltLLM_t$					
		(1)	(2)	(3)	(4)	(5)	(6)
BoR: Balance of Risk (+1, 0, -1)	$BoRLLM_t$	0.68***	0.60***	0.58***			
		(11.15)	(7.58)	(7.96)			
Current action (+1, 0, -1)	$ActionLLM_t$		0.22*	0.017			
			(1.67)	(0.13)			
Stance in FOMC language	HD_t				0.42***		
					(7.09)		
FOMC perceived inflation uncertainty	$InfPMU_t$					0.32***	0.27***
						(4.26)	(4.38)
FOMC perceived growth skews	$EcoSent_t$					0.30***	0.16**
						(4.25)	(2.46)
Expected inflation deviation from trend	$F_t(\pi_4) - \tau_t$			0.49***	0.31***		0.48***
				(5.66)	(3.08)		(3.89)
	Controls	No	No	Yes	Yes	No	Yes
	$\bar{R}^2$	0.49	0.51	0.62	0.50	0.40	0.51
	N	259	259	259	259	259	259

- Tilt reflects policy stance induced by BoR assessment, beyond current action
- Current actions also reflect BoR (e.g. "preemptive strike"), but the primary effect is via tilt

Mistakes avoidance behind risk management and tilt



- Central motive behind risk management approach: Avoid costly policy mistakes
- Policy *timing* as key concern: FOMC neither wants to "fall behind the curve" nor to withdraw policy accommodation too soon

Risk-management motives drive dissent in voice

- Dissent in voice ≠ current action, by construction

- Certainty-equivalence view

  Members' different expectations of economic conditions → different rate preferences

- Risk-management view

  Members' different assessments of need to adjust policy to counteract future risks → different rate preferences

- Analysis of argument for voiced hawkish dissents supports risk-management view
- Above 90% of arguments have some risk management component

Implications for financial conditions

Communication and financial conditions

Statement on Longer-Run Goals and Monetary Policy Strategy

"The Federal Open Market Committee (FOMC) is firmly committed to fulfilling its statutory mandate from the Congress of promoting maximum employment, stable prices, and moderate long-term interest rates. The Committee seeks to explain its monetary policy decisions to the public as clearly as possible. Such clarity facilitates well-informed decisionmaking by households and businesses, reduces economic and financial uncertainty, increases the effectiveness of monetary policy, and enhances transparency and accountability…"

- Fed's *actions* + **words** → long-term rates → financial conditions→ economic objectives
- Long-term rates = short-rate expectations + **term premia**

What is monetary policy surprise as perceived by market?

- Monetary policy surprise as *market-perceived* policy "error"

"*It should be interpreted as a random, transitory* ***deviation*** *from the "usual" conduct of monetary* ***policy as anticipated by the public****, due to a change in the policymaker's preferences, a response to an unusual unanticipated event, or, simply, an* ***error in the implementation of monetary policy****."* – Gali (2015)

- Communication "mistake"

"(…) monetary policy is 98 percent talk and only two percent action. (…) *The downside for policymakers, of course, is that* ***the cost of sending the wrong message can be high****."* – Bernanke (2015)

- Risk management via communication to assuage market concerns about Fed intentions

(…) thinking about what could go wrong with the forecast and then judging if policy should be adjusted from the baseline (…) in light of the alternative scenarios. (…) It also is useful in ***communicating to the public that we are aware of the risks and are unlikely to be caught off guard should they materialize****."* – Evans (2019)

Fed-induced news in asset prices

- Lots of evidence that Fed affects asset prices beyond short-rate shocks

- Expectations (forward guidance)

$$\frac{\partial E_t(r_{t+h})}{\partial \text{Fed}_t} \neq 0$$

- Uncertainty

$$\frac{\partial \sigma_{\text{Economy},t}}{\partial \text{Fed}_t} \neq 0 \quad or \quad \frac{\partial \sigma_{\text{Fed},t}}{\partial \text{Fed}_t} \neq 0$$

Tilt can work via both channels

- Information effect

$$\frac{\partial E_t(\text{Macro} \perp \text{Policy})}{\partial \text{Fed}_t} \neq 0$$

Uncertainty channels

$\frac{\partial \sigma_{\text{Economy},t}}{\partial \text{Fed}_t} \neq 0$ (economic uncertainty) $\frac{\partial \sigma_{\text{Fed},t}}{\partial \text{Fed}_t} \neq 0$ (Fed-induced uncertainty)

- NK-inspired illustration
  - Monetary shock $\boldsymbol{\epsilon_t}$ and demand shock $\boldsymbol{d_t}$
  - Policy rule: $r_t = \boldsymbol{\phi_t'} X_t + \epsilon_t$ and ϕ_t can depend on uncertainty, tail risks
- Output gap uncertainty → risk premium

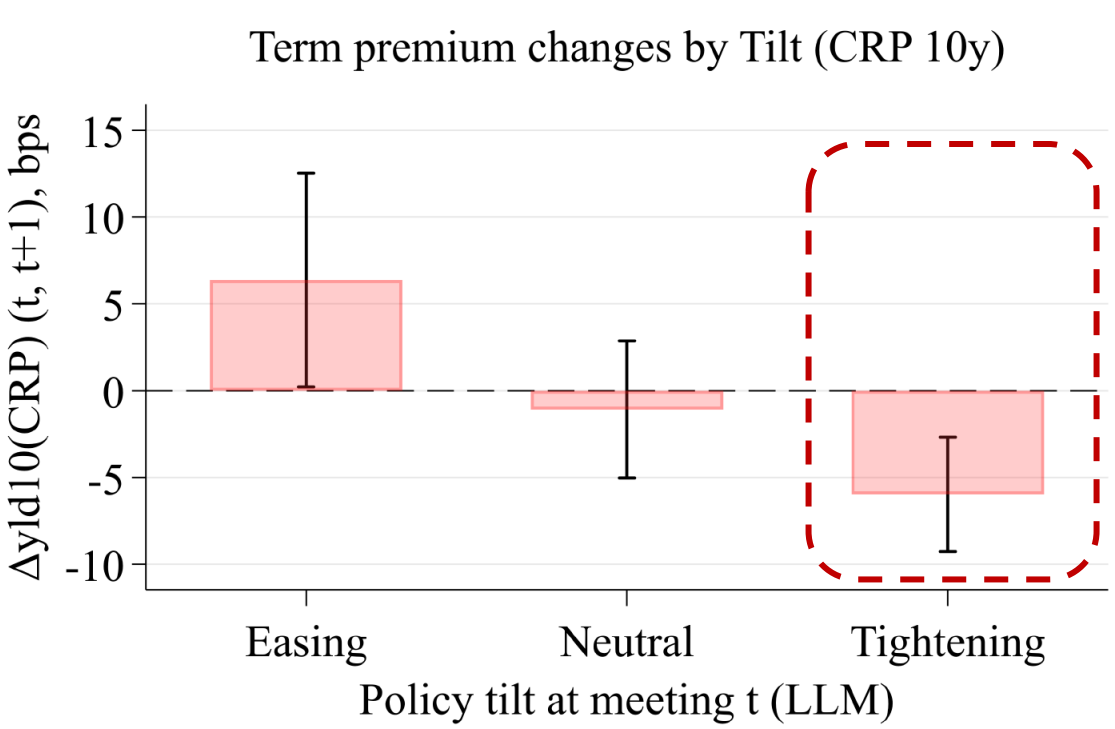
$$\text{Var}_t(x_{t+1}) = \frac{\sigma^2_{d,t}}{f(\boldsymbol{\phi_t}, \dots)} + \frac{\boldsymbol{\sigma^2_{\epsilon,t}}}{g(\phi_t, \dots)}$$

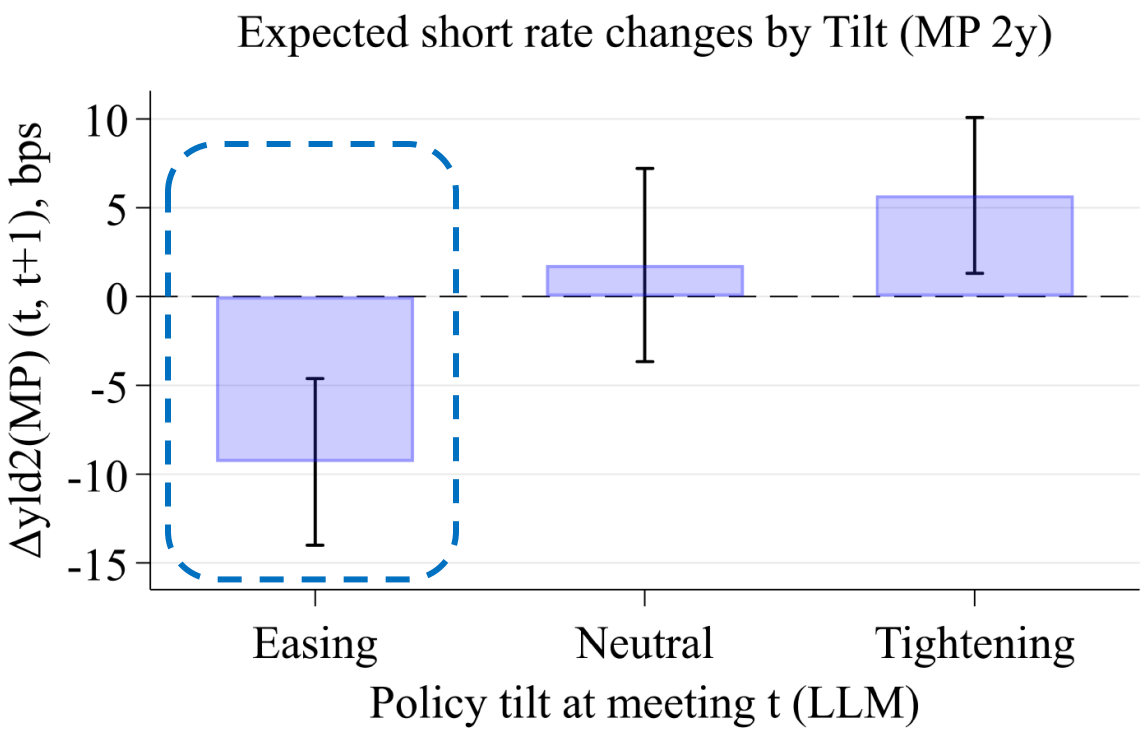
(1) Reaction function coef ϕ_t:
- Activism $\phi \uparrow$ *dampens* exogenous uncertainty $\sigma^2_{d,t}$
  - Bianchi, Ludvigson, Ma

(2) Fed-induced uncertainty $\sigma^2_{\epsilon,t}$:
- Fed vs. market disagreements
  - Caballero, Simsek
- Probability of policy errors
  - Cieslak, McMahon

- In principle, *tilt* can **(1)** help markets learn about reaction function and **(2)** align Fed-markets beliefs (model appendix)

Communication via tilt steers rate expectations and premia





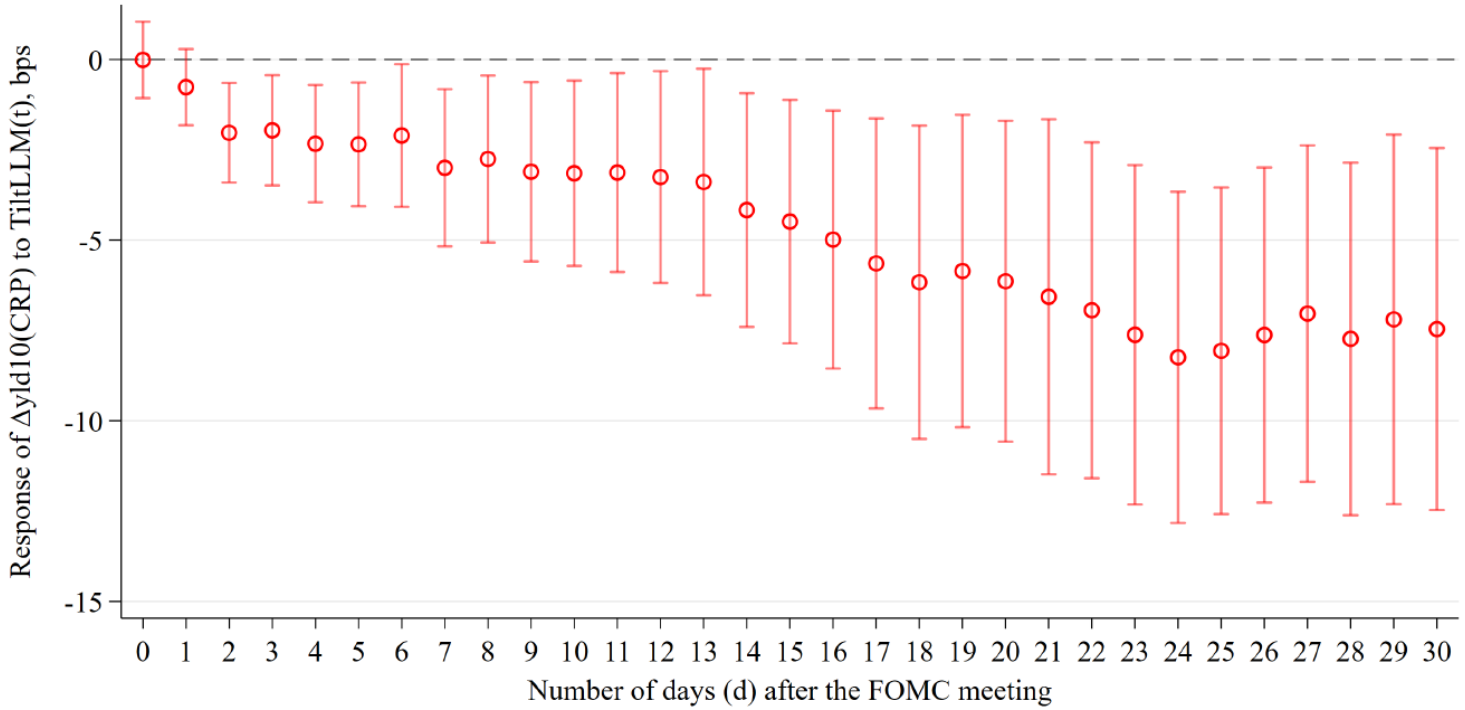
- Term premium ***declines*** following tightening tilt (***); increases following easing tilt (*)
- Term premium does not change when stance is neutral

- Short-rate expectations also react to tilt
- Relatively more under easing tilt

- By communicating that *different-from-current policy* can be implemented, *if needed*, the Fed can assuage markets concerns about policy intentions (market-perceived "mistakes") → premia

Ongoing intermeeting communication

$$\underbrace{\Delta\text{Term Premium}_{t,t+h}}_{\text{Intermeeting } \Delta \text{ Term Premium (10y) due to Fed-driven uncertainty}} = \alpha_h + \beta_h \underbrace{\text{Fed stance in language(Tilt)}_t}_{\text{Current action, macro expectations, market variables}} + \text{Controls}_t + u_{t,t+1}$$



- Communicating tighter stance via tilt: ↓ term premia (stocks ↑)
- Intermeeting: speeches, minutes, …

(Cieslak, McMahon; Cieslak, McMahon, Pang)

- Magnitude: Term premium ↓ by **22%** of intermeeting yield volatility when FOMC shifts from neutral to tightening tilt

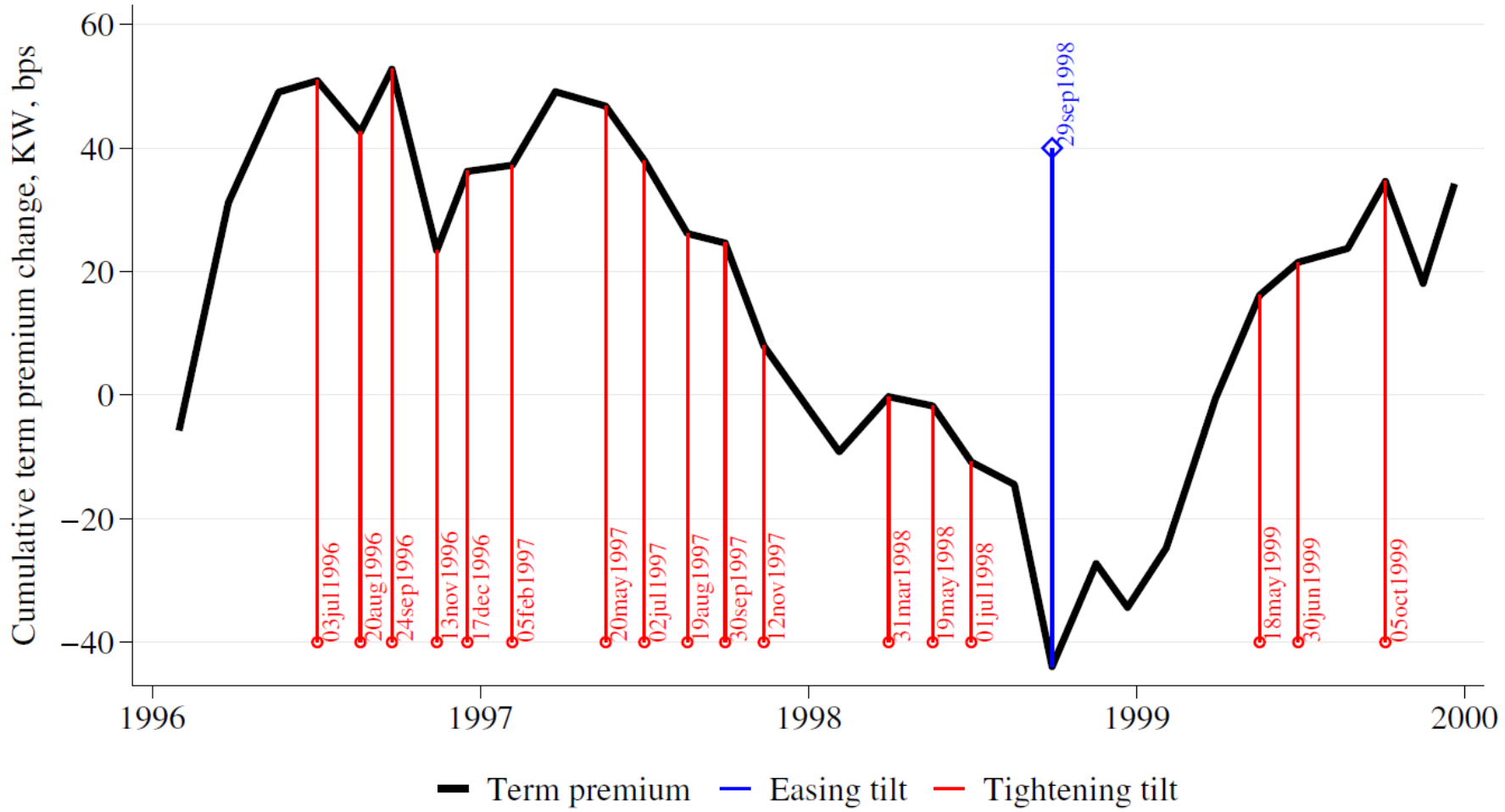
Successes and challenges

- Given Fed's goal to keep long-term interest moderate and stable, above results are evidence of Fed's success
- Using tilts to signal willingness to tighten, if needed, allowed Fed to maintain easy financial conditions

- But communication via tilts is challenging and "*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]

→ **Two examples from history**

Greenspan “productivity miracle,” 1996–99



- Policy rate remained nearly unchanged (except one +25 bps hike in Mar 1997)
- Keeping rates steady during 1997–98, absent communication via tilts, would have resulted in higher term premia and tighter financial conditions

Post-Covid 2020 Fed framework, 2020–23

- A*symmetric* shortfalls/FAIT 2020 framework: Easing tilt
- Confusion about Fed's reaction function contributed to higher term premia, undermining easy conditions Fed sought
- Shift to tightening tilt 2021H2+ and 2022 tightening helped offset premia increases due to adverse macro news

Lessons

- **The Fed has pursued risk-management through "verbal policy scenarios" for decades**

- Policy tilts reflect FOMC's risk assessments
  - Long-standing tool, in addition to actions
  - Central element of Fed's communication

- Communication via tilt can address market concerns, reduce uncertainty, and risk premia
  - 1987~2015 and now: Fed actively managed upper tail inflation risks via communication
  - Signaling readiness to tighten, if needed, supported easy financial conditions via long-term rates

- Risk management-based communication – that acknowledges risks and explains Fed's reaction should they materialize – remains a sensible strategy