Financial Conditions Guidance: The Recruitment Effect

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Economic Crises

Monetary policy transmits through financial conditions

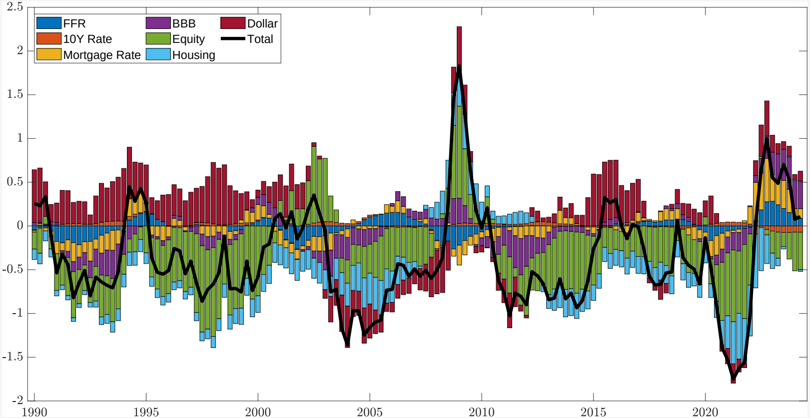
Chair Powell on Policy Transmission (2022)

"Our policy decisions affect financial conditions immediately... Then, changes in financial conditions begin to affect economic activity within a few months."

Keynes (1936)

"...there are not many people who will alter their way of living because the rate of interest has fallen from 5% to 4% (...) Perhaps the most important influence (...) depends on the effect of these changes on the appreciation or depreciation in the prices of securities"

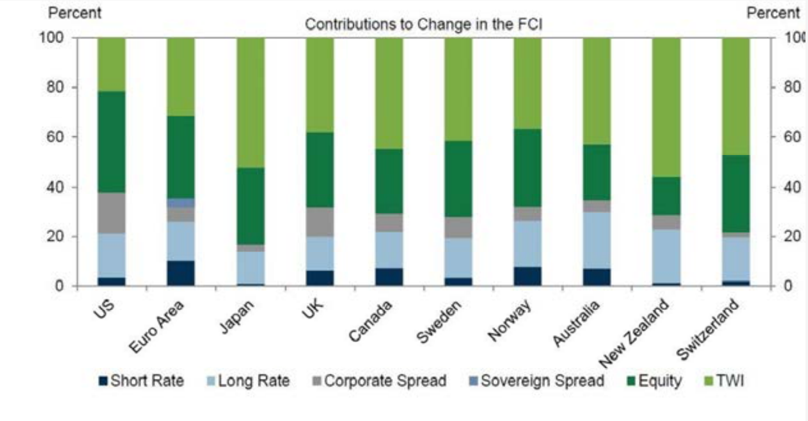
FCIs weight interest rates and asset prices according to their **impact on aggregate demand**.



Source: Ajello et al. (2024). FCI-G measure for the U.S.

FCI Composition (G10)

Equity and FX dominate FCI **fluctuations**, because they are much more volatile than rates and spreads (Weight $\times$ Volatility).



Source: Goldman Sachs Global Investment Research

“Noise” Drives Asset Prices

Finance: Asset prices are affected by noise due to limits to arbitrage

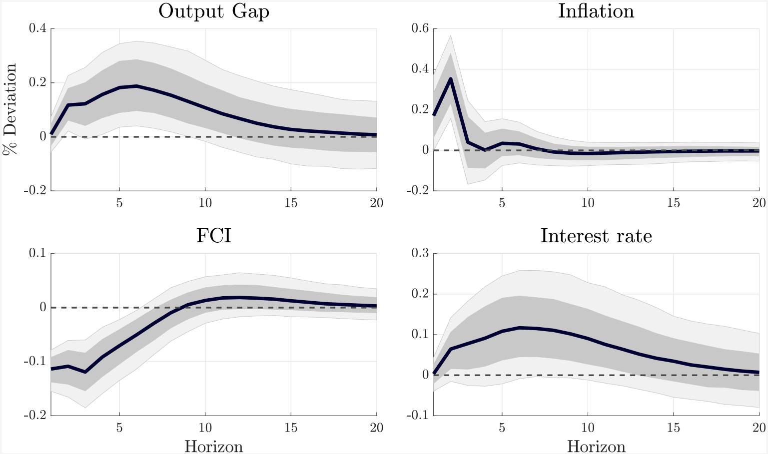
- Asset prices move with **non-fundamental noise** because arbitrageurs face **risk and constraints**
- **Financial noise**: non-fundamental asset demand or supply
- **Limits to arbitrage**: risks & constraints of sophisticated investors

Evidence: noisy flows move markets

- Gabaix & Koijen (2021): noisy flows have large and persistent effects on the stock market
- Similar literature for FX: Evans & Lyons (2002), Love & Payne (2008)

“Noise” Drives Business Cycles

Caballero, Caravello, and Simšek (2025): Use GK instrument to identify **macro** effects of FCI shocks



The Central Question

How should monetary policy be designed and communicated once we recognize that its main transmission channel is a noisy set of financial markets?

- Central banks **cannot control** financial conditions on their own
- Effective stabilization requires **cooperation of market participants**

Main Message: The Recruitment Effect

When the central bank communicates (and commits to) a soft target for financial conditions, it "recruits" market participants to lean against noise-driven fluctuations.

Key features:

- Target depends only on **macro fundamentals**, not on financial variables directly
- Creates a **virtuous cycle**: lower volatility $\Rightarrow$ stronger arbitrage $\Rightarrow$ lower volatility
- Strengthens the **transmission mechanism** of monetary policy, with possibly lower interest rate volatility

Note: This lecture is about *monetary policy*, not market interventions

Presentation Roadmap

1. Motivation: FCIs, noise, and propagation (done)
2. Simple model: FCI targeting and recruitment
3. Communication: FCI guidance and scenario communication
4. Measurement: The FCI* benchmark

2. Simple Model

FCI Targeting and the Recruitment Effect

New Keynesian economy with noisy financial conditions. Assume ≈ 1; all variables in logs; fully sticky prices; single asset p (financial conditions in price rather than yield)

Potential output: random walk

$$y_t^* = y_{t-1}^* + z_t, \psi \quad z_t \sim N(0, \sigma_z^2)$$

Output depends on financial conditions

$$\boxed{y_t = p_t + \delta_t; \quad p_t \neq p_t^* = y_t^* - \delta_t}, \psi$$

Financial conditions: asset pricing with limits to arbitrage

$$\boxed{p_t = E_t[p_{t+1}] - \left(r_t^f + \tfrac{1}{2}\sigma_p^2\right) + \mu_t \frac{\sigma_p^2}{\quad}}, \quad \mu_t \sim N(0, \sigma_\mu^2)$$

μ_t: noise trader demand $\quad \sigma_p^2/\alpha\psi$ price impact of noise (endogenous to mp)

Central bank minimizes:

$$L_t = \tilde{y}_t^2 + \frac{1}{\theta\psi}\left(r_t^f - E_{t-1}[r_t^f]\right)^2 + \tilde{}\,E_t[L_{t+1}]$$

where $\tilde{y}_t = y_t - y_t^*$ is the output gap.

- $1/\theta\psi > 0$: weight on **interest rate smoothing** (gradualism)
- Trade-off: stabilize output gap vs. avoid excessive rate volatility

Key friction: Central bank cannot perfectly stabilize financial conditions without generating excessive interest rate volatility.

Discretionary Policy

Under discretion, the central bank follows a Taylor-type rule:

$$r_t^f = E_{t-1}[r_t^f] + \theta \tilde{y}_t$$

Substituting into the FCI equation and solving forward:

$$p_t = \underbrace{y^*_{t-1} + z_t - \delta_t}_{p_t^*} + \frac{1}{1+\theta\psi}\left(\delta_t + \mu_t \frac{\sigma_p^2}{}\right) = y^*_{t-1} + \underbrace{\left(z_t - \frac{\theta\psi}{1+\theta\psi}\delta_t\right)}_{\text{macro}} + \underbrace{\frac{1}{1+\theta\psi}\mu_t \frac{\sigma_p^2}{}}_{\text{noise}}$$

Equilibrium FCI volatility satisfies a **fixed-point equation**:

$$\sigma_p^2 = \sigma^2_{macro} + \nu_\mu \left(\frac{\sigma_p^2}{}\right)^2 ; \quad \nu_\mu \equiv \frac{\sigma_\mu^2}{(1+\theta)^2}$$

Volatility feedback: Higher $\sigma_p^2 \Rightarrow$ larger price impact $(\sigma_p^2/\alpha\psi) \Rightarrow$ more noise in $p_t \Rightarrow$ higher $\sigma_p^2 \ldots$

FCI targeting: Central bank announces target $\bar{p}_{t+1}$ for next period's FCI.

Modified operational loss function:

$$L_t^{FCI} = \tilde{y}_t^2 + \frac{1}{\theta}\left(r_t^f - E_{t-1}[r_t^f]\right)^2 + \frac{}{\theta\psi}(p_t - \bar{p}_t)^2 + \tilde{}\, E_t\left[L_{t+1}^{FCI}\right]$$

Three key points:

1. True objective unchanged—Central bank does not intrinsically care about FCI stability.
2. Commitment is **soft**: targets revised as fundamentals change.
3. Optimal target: $\bar{p}_t = E_{t-1}[p_t^*]$, where $p_t^* = y_t^* - \delta_t$ (closes output gap).

Target depends on macro fundamentals only—not on where Central bank thinks asset prices are going based on noise.

FCI Targeting: The Recruitment Effect

Modified policy rule: $r_t^f = E_{t-1}[r_t^f] + \theta \tilde{y}_t + \left(p_t - E_{t-1}[p_t^*]\right)$

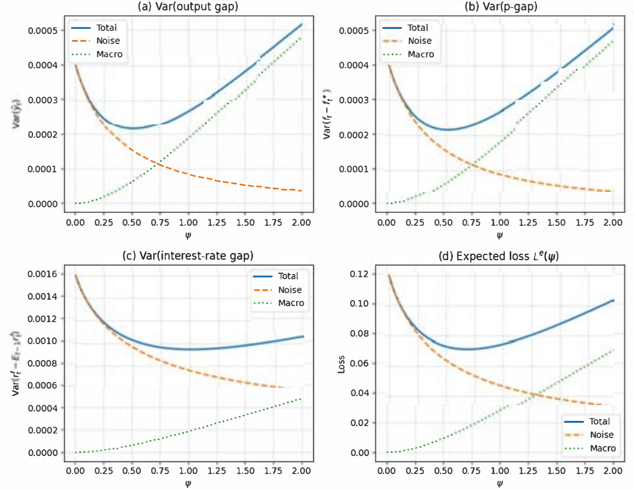
$$p_t = y_{t-1}^* + \underbrace{\left(\frac{1+\theta}{1+\theta\psi} z_t - \frac{\theta\psi}{1+\theta\psi}\delta_t\right)}_{\text{macro}} + \underbrace{\frac{1}{1+\theta\psi}\mu_t \frac{\sigma_p^2}{}}_{\text{noise}}$$

$$\sigma_p^2(\;) = \sigma_{macro}^2(\;) + \nu_\mu(\;)\left(\frac{\sigma_p^2}{}\right)^2; \quad \sigma'_{macro} < 0, \nu'_\mu < 0.$$

Recruitment Effect:

1. Central bank commits to lean against unexpected FCI changes $\Rightarrow$ lower σ_p^2
2. Lower σ_p^2 $\Rightarrow$ smaller price impact $\Rightarrow$ arbitrageurs face less risk
3. $\Rightarrow$ Arbitrageurs trade more aggressively against noise (“recruited”)
4. $\Rightarrow$ Volatility falls further $\Rightarrow$ **virtuous cycle**

FCI Targeting: Numerical Results



As increases: FCI variance ↓, output gap loss ↓, interest rate variance ↓.
Most reduction comes from the **noise component** (dashed orange).

Semi-Structural Policy Counterfactuals: Setup

We extend policy counterfactual methods by McKay and Wolf (2023); Caravello, McKay, and Wolf (2024)

1. Start with a VAR estimated under the prevailing policy rule
2. Add **policy shock impulse responses to fit alternative rule** ex ante

Restrictions: Linearity + Policy works via current or expected rates

Our model features a nonlinearity: **volatility reducing feedback**. We add:

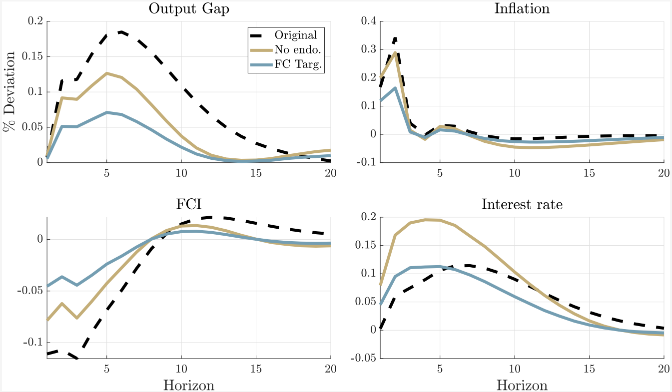
3. Scale noise shock IRF with $\frac{\tilde{\sigma}_r^2}{\sigma_r^2}$ where $\tilde{\sigma}_r^2$ is solved as in the model

Impulse Response Counterfactual: Noise Has Smaller Impact

Consider policies that minimize an objective with one-period lag:

$$\mathcal{L} = \sum_{t=0}^{\infty} \ {}^{t} \left[\pi_t^2 + \tilde{y}_t^2 + \lambda_{\Delta i}(i_t - i_{t-1})^2 + \ (\overline{FCI}_t - FCI_t)^2\right] \Bigg($$

Counterfactual impulse response with optimal FCI targeting $\ ^*$ **(blue)**



Section 3
Communication

FCI vs rates communication

Communication model: three objects, three information assumptions

Output and the FCI target

$$y_t = m + p_t + \delta_t$$

$$\bar{p}_t^* \equiv y_t^* - m,\psi \qquad p_t^* = \bar{p}_t^* - \delta_t.\psi$$

- p_t: financial condition.
- δ_t: persistent demand component.
- p_t^*: full-information FCI target.

Shock structure

$$\delta_0 = 0,\psi \qquad \delta_1 \sim N(0,\psi\sigma^2),\psi$$

$$\delta_t = \delta_1,\psi \qquad t \geq 1,\psi$$

$$y_t^* = y_{t-1}^* + a_t,\psi$$

$$a_t \sim N(0,\psi\sigma_a^2),\psi$$

$$\mu_t \sim N(0,\psi\sigma_\mu^2).\psi$$

Information timing: productivity shocks a_t are observed through y_t^*; financial-noise shocks μ_t are observed at the begining of period-t; the demand component δ_1 is observed at the begining of period 2.

Timing and information at the policy-relevant date

Date 0: communication

The Fed sends $\mathcal{M}_0$; the market forms a posterior over the Fed's date-1 target assessment.

Date 1: before pricing/policy

- Everyone observes y_1^*, hence a_1 and $\bar{p}_1^*$.
- Everyone observes financial noise μ_1.
- Neither the Fed nor the market observes δ_1.
- Scenario extension: everyone observes public statistic x_1.

Date 2 onward

- δ_1 is revealed to everyone.
- The continuation target is common knowledge:

$$p_t^* = \bar{p}_t^* - \delta_1,\psi \qquad t \geq 2.\psi$$

- Date-1 disagreement is about the Fed's target assessment before δ_1 is revealed.

The announcement matters because assets are priced before the latent demand component is revealed and Fed's beliefs affect the policy rate.

Fed assessment and market uncertainty

Fed target

$$\Delta^F \equiv E_{0,F}[\delta_1 \mid \mathcal{C}_0^F]$$

$$p_1^{*,F} = \bar{p}_1^* - \Delta^F$$

The Fed's assessment of latent demand determines the financial condition it wants at date 1.

Market prior

$$\Delta^F \overset{A}{\sim} N(0, \sigma_\Delta^2), \qquad \delta_1 \perp \Delta^F . \psi$$

$$\Delta^M \equiv E_{0,A}[\Delta^F \mid \mathcal{M}_0]$$

The message $\mathcal{M}_0$ changes the market's posterior mean and variance of the Fed's target.

The communication ranking is driven by how much $\mathcal{M}_0$ reduces $\text{Var}_{0,A}(\Delta^F \mid \mathcal{M}_0)$.

Continuation value and irreducible risk

At date 1, the market still does not observe δ_1, but it observes y_1^* and therefore knows $\bar{p}_1^* = y_1^* - m$.

Continuation mean

$$p_2^* = \bar{p}_2^* - \delta_1$$

$$E_{1,A}[\delta_1 \mid \mathcal{M}_0, y_1^*, \mu_1] = 0$$

$$E_{1,A}[\bar{p}_2^* \mid y_1^*] = \bar{p}_1^*$$

$$E_{1,A}[p_2] = \bar{p}_1^*$$

Continuation risk

$$\widetilde{\sigma}^2 \equiv \mathrm{Var}_{1,A}(p_2 \mid \mathcal{I}_1^A)$$

$$\boxed{\widetilde{\sigma}^2 = \bar{\sigma}^2 + \omega^2}$$

The variance includes permanent financial payoff risk $\bar{\sigma}^2$ (due to productivity and noise shocks) and unresolved demand uncertainty ω^2.

Date-1 equilibrium

Pricing and policy

$$p_1 = \rho\psi + \bar{p}_1^* - \left(i_1 + \tfrac{1}{2}\widetilde{\sigma}^2\right) + \widetilde{\sigma}^2 \mu_1$$

$$i_1 = \hat{i}_1^A + \theta\psi\left(p_1 - p_1^{*,F}\right), \qquad \hat{i}_1^A \equiv E_{0,A}[i_1 \mid \mathcal{M}_0].$$

$$\boxed{\hat{i}_1^A = \rho\psi - \tfrac{1}{2}\widetilde{\sigma}^2 + \Delta^M} \qquad \boxed{p_1 = p_1^{*,F} + \frac{\widetilde{\sigma}^2 \mu_1 + \Delta^F - \Delta^M}{1 + \theta\psi}}$$

Expected rates respond to the market's posterior mean Δ^M (about Fed's belief); realized financial conditions also reflect the Fed's belief Δ^F and realized financial noise μ_1.

Why communication matters: date-0 variance of date-1 FCs

Since $\bar{p}_1^* = \bar{p}_0^* + a_1$, substituting the date-1 equilibrium into the market's date-0 distribution gives

$$p_1 - E_{0,A}[p_1 \mid \mathcal{M}_0] = a_1 - \frac{\theta}{1+\theta\psi}(\Delta^F - \Delta^M) + \frac{\widetilde{\sigma}^2}{1+\theta\psi}\mu_1.$$

$$\boxed{\sigma_1^2 = \sigma_a^2 + \left(\frac{\theta\psi}{1+\theta\psi}\right)^2 \mathrm{Var}_{0,A}(\Delta^F \mid \mathcal{M}_0) + \left(\frac{\widetilde{\sigma}^2}{1+\theta\psi}\right)^2 \sigma_\mu^2}$$

Communication works through the middle term: residual uncertainty about the Fed's target wedge Δ^F.

Message in FCI space

$$\mathcal{M}_0^{FCI} : \qquad p_1^{*,F} = \bar{p}_1^* - \Delta^F$$

$$\Rightarrow \qquad \Delta^M = \Delta^F, \psi \qquad \mathrm{Var}_{0,A}(\Delta^F \mid \mathcal{M}_0^{FCI}) = 0.\psi$$

$$\boxed{\sigma^2_{1,FCI}\psi = \sigma^2_a\psi + \left(\frac{\widetilde{\sigma}^2}{1+\theta\psi}\right)^2 \sigma^2_\mu}$$

Direct FCI communication removes the target-uncertainty component of financial-condition risk.

Rate communication: the rate is an equilibrium object

A date-0 rate announcement has to translate the intended date-1 financial condition into a policy rate before the date-1 financial-noise realization is publicly observed.

$$m_1^F \equiv E_{0,F}[\mu_1 \mid \mathcal{C}_0^F], \qquad m_1^F \overset{A}{\sim} N(0,\sigma_m^2).$$

Lost-in-translation risk

$$i_1^{ann} = \rho - \tfrac{1}{2}\widetilde{\sigma}^2 + \Delta^F + \widetilde{\sigma}^2 m_1^F$$

$$s^R \equiv i_1^{ann} - \left(\rho - \tfrac{1}{2}\widetilde{\sigma}^2\right) = \Delta^F + \widetilde{\sigma}^2 m_1^F$$

The realized date-1 condition responds to actual μ_1; m_1^F matters because it contaminates the date-0 rate signal about Δ^F.

Rate communication leaves residual target uncertainty

With Gaussian priors,

$$\Delta^F \overset{A}{\sim} N(0, \sigma_\Delta^2), \psi \qquad m_1^F \overset{A}{\sim} N(0, \sigma_m^2), \psi \qquad s^R = \Delta^F + \widetilde{\sigma}^2 m_1^F.$$

$$E_{0,A}[\Delta^F \mid s^R] = \frac{\sigma_\Delta^2}{\sigma_\Delta^2 + \widetilde{\sigma}^4 \sigma_m^2} s^R \qquad \mathrm{Var}_{0,A}(\Delta^F \mid s^R) = \sigma_\Delta^2 \frac{\widetilde{\sigma}^4 \sigma_m^2}{\sigma_\Delta^2 + \widetilde{\sigma}^4 \sigma_m^2}$$

$$\boxed{\sigma_{1,R}^2 = \sigma_a^2 + \left(\frac{\theta\psi}{1+\theta\psi}\right)^2 \sigma_\Delta^2 \frac{\widetilde{\sigma}^4 \sigma_m^2}{\sigma_\Delta^2 + \widetilde{\sigma}^4 \sigma_m^2} + \left(\frac{\widetilde{\sigma}^2}{1+\theta\psi}\right)^2 \sigma_\mu^2}$$

Communication ranking

Main result: FCI guidance removes the translation wedge

$$\sigma^2_{1,FCI} \leq \sigma^2_{1,R}$$

$$\sigma^2_{1,R} - \sigma^2_{1,FCI} = \left(\frac{\theta\psi}{1+\theta\psi}\right)^2 \mathrm{Var}_{0,A}(\Delta^F \mid \mathcal{M}^R_0) \geq 0.\psi$$

Direct FCI message

- Reveals the Fed's target wedge directly.
- Eliminates residual target uncertainty.

Rate message

- Reveals a contaminated equilibrium object.
- Leaves residual uncertainty unless the Fed's noise assessment is known.

Section 4

FCI*

The neutral benchmark for financial conditions

FCI-G index: How is it constructed?

- Consider seven macro asset prices or rates denoted by j. Then:

$$FCI_t = \sum_j FCI_t^j$$

where

$$FCI_t^j = \sum_{\ell=0}^{T-1} \underbrace{-\Delta p_{t-\ell}^j}_{\text{price change } \ell \text{ quarters ago}} \times \underbrace{\omega_\ell^j}_{\text{impact on \textbf{output growth next year}}}$$

- Calculate weights via impulse responses to unanticipated shocks to p^j
- Consider $T = 12$ quarters (three years) to incorporate lagged effects
- Sign and units: $FCI = 1$ means asset price changes will **reduce** output growth by 1pp

FCI maps to the model and disciplines output gaps

Model mapping

Inertial IS curve

$$y_t = \eta y_{t-1} + (1-\eta)(m + p_{t-1}) + \delta_t . \psi$$

Taking first differences and iterating:

$$\Delta y_{t+1} = -a(\eta) FCI_t + \sum_{\ell=0}^{\infty} \eta^{\ell} \psi \Delta \delta_{t+1-\ell} , \psi$$

$$FCI_t = -(1-\eta^4) \sum_{\ell=0}^{\infty} \eta^{\ell} \psi \Delta p_{t-\ell} . \psi$$

$$a(\eta) = \frac{1}{1 + \eta \psi + \eta^2 + \eta^3} . \psi$$

Neutral benchmark

Define FCI_t^* as the financial condition consistent with output at potential. Let

$$\widetilde{y}_t = y_t - y_t^* . \psi$$

Then the model implies

$$\underbrace{\widetilde{y}_t - \widetilde{y}_{t-1}}_{\text{output-gap change}} = -a(\eta) \underbrace{(FCI_{t-1} - FCI_{t-1}^*)}_{\text{FCI gap}} .$$

Thus the FCI gap is the financial-conditions analog of $r_t - r_t^*$ in a standard IS equation.

Estimation strategy: invert output-gap dynamics to infer $FCI_t - FCI_t^*$, and hence FCI_t^*.

FCI* is driven by macro

Define FCI^* as the FCI ensuring $E_t[y_{t+1}] = E_t[y^n_{t+1}]$, where potential output follows Laubach-Williams:

$$y^n_{t+1} = y^n_t + g_t + \epsilon^{y^n}_{t+1},\psi \qquad g_{t+1} = g_t + \epsilon^{g}_{t+1}$$

This gives:

$$FCI^*_t = a(\eta)^{-1} \quad -g_t - \epsilon^{y^n}_t + (E_t[\delta_{t+1}] - E_{t-1}[\delta_t]) + \eta\psi\left[\sum_{\ell=0}^{\infty} (\eta\psi)^{\ell} \Delta\delta_{t-\ell}\right])$$

- Supply growth and level shocks loosen FCI* to raise spending in line with supply
- Demand shocks (past and present) tighten FCI* to keep spending aligned with supply
- **Everything is macro—no financial terms appear**

r* is driven by financial shocks as well as macro

- What is the r^* that implements p^* and FCI^*?
- Need to specify how p_t depends on r_t, expected cash flows, risk premia, etc. Under more assumptions:

$$r_t^* = \rho\psi + g + \frac{\eta\psi}{1-\eta\psi}\left(\epsilon_t^{\delta} - \epsilon_t^{y^n}\right) + \frac{}{1-\eta\psi} s_t - \frac{1}{2}\overline{rp}$$

- s_t captures “sentiment”: excess optimism or pessimism about future supply (cash flows)
- Unlike FCI*, r* *does* depend on sentiment shocks and the risk premium

We adapt Laubach & Williams to estimate FCI*

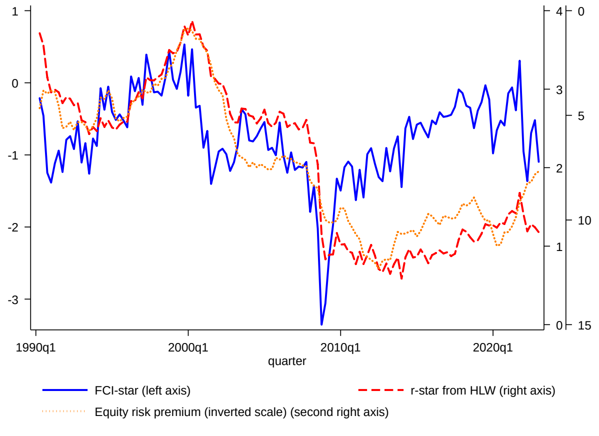
- Observation equations follow the model and LW (with i.i.d. shocks)

$$\begin{aligned} \tilde{y}_t &= \tilde{y}_{t-1} - a(\eta)(FCI_{t-1} - FCI^*_{t-1}) + \epsilon_{\tilde{y},t} \\ \pi_t &= b_\pi \pi_{t-1} + (1 - b_\pi)\pi_{t-2:4} + b_y \tilde{y}_{t-1} + \epsilon_{\pi,t} \end{aligned}$$

- Law of motion for hidden state FCI^*_t as described before
- Processes for hidden states y^n_t, g_t as described before and δ_t follows AR(1)
- Covid-19 adjustments for $y^n_{t,\text{COVID-19-adj.}}$ mostly following LW
- Few calibrated parameters (for comparison with LW). Rest estimated with ML over 1990Q2–2024Q4

A key finding: IS curve fits better with FCI than with interest rates ⇒ more stable FCI^* estimates

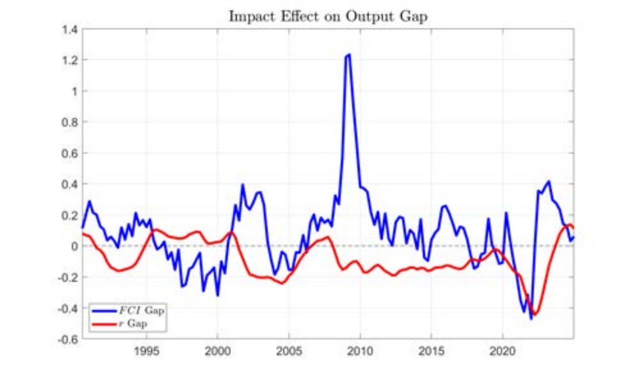
FCI* is not correlated with risk premium; r* is



	Dependent variable	
	*FCI**	r^*
ERP	0.017	-0.292^{***}
	(0.016)	(0.011)
Output Gap	0.17^{***}	0.028
	(0.026)	(0.018)
R^2	0.347	0.883
Obs.	132	132

ERP: equity risk premium (Duarte & Rosa, 2015). Output gap: CBO. Sample: 1990Q2–2023Q1.

FCI gaps provide useful guidance on the effective policy stance



- Post-GFC: Tight FCI despite low rates—policy was not as loose as rates suggested
- 2022: FCI gaps capture tightening early (asset prices moved ahead of rates)
- 2023–24: FCI gaps capture loosening from stock boom despite high rates

FCI* as the financial-conditions analog of r*

The website

Public estimates and updates:

`https://fcistar.org/`

Website output:

- FCI-G and estimated FCI^*.
- Financial-conditions gap: $FCI_t - FCI_t^*$.
- Output-gap estimate implied by the framework.
- Downloadable CSV and backend code.

Message

Central banks already use r^* as a benchmark for the policy-rate stance.

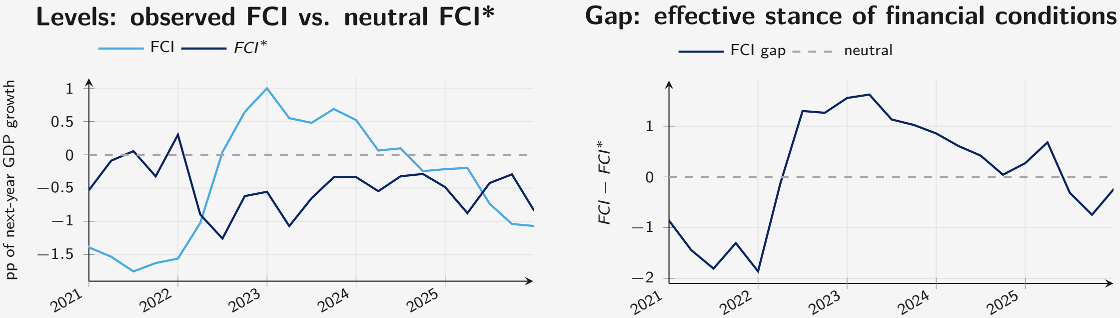
But policy works through **financial conditions**, not the short rate alone.

FCI^* is the neutral level of the FCI consistent with output at potential.

Estimated from output gaps, inflation, and FCI gaps using a Laubach-Williams-style state-space model.

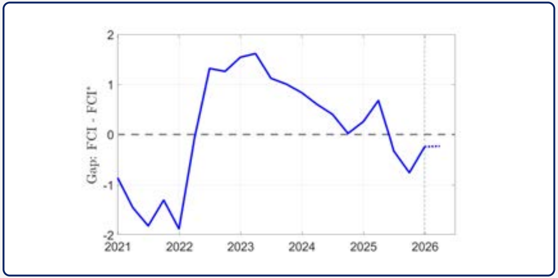
Source: Caballero, Caravello, and Simsek, *FCI-star*; website data updated 2026-04-26, sample through 2025Q4.

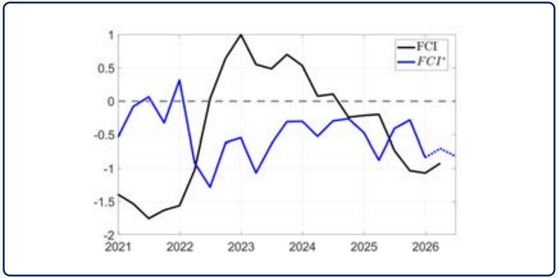
The communication object: the FCI gap



Interpretation. Positive gap: financial conditions are tighter than neutral. Negative gap: financial conditions are looser than neutral. FCI guidance should anchor the expected path of this gap.

What about today?





Sources: For 2026Q1, GDP is from the BEA advance estimate and core PCE inflation from official FRED releases. For 2026Q2, GDP growth uses the Blue Chip Fed consensus and quarterly core PCE inflation uses the Cleveland Fed Inflation Nowcasting model.

- **Last measured gap:** -0.22, equivalent to roughly a 10% equity correction if equities alone were to close it.
- **Since then:** FCI^* has fallen by about 0.12—growth forecasts have softened while inflation feeds into FCI* more gradually. But FCI-G (April) has loosened by 0.12 as well... so we are still a bit loose.

Communicating in FC space addresses both:

- **Reduces lost-in-translation risk** — no longer requires markets to translate intended rates into intended FCI
- **Clarity recruits markets to offset noise** — so the Fed bears a smaller stabilization burden