DISCUSSION OF

"The Fed Put and Bank Risk-Taking: Evidence from the Loan Book"

by Xudong An, Jan Harren, Saket Hegde, Mete Kilic, and Rodney Ramcharan

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ECONOMY • CENTRAL BANKS

Fed Delays Interest-Rate Liftoff

Officials still expect to move this year, but express concerns about global tumult

By Jon Hilsenrath

WSJ PRO Updated Sept. 17, 2015 11:09 pm ET

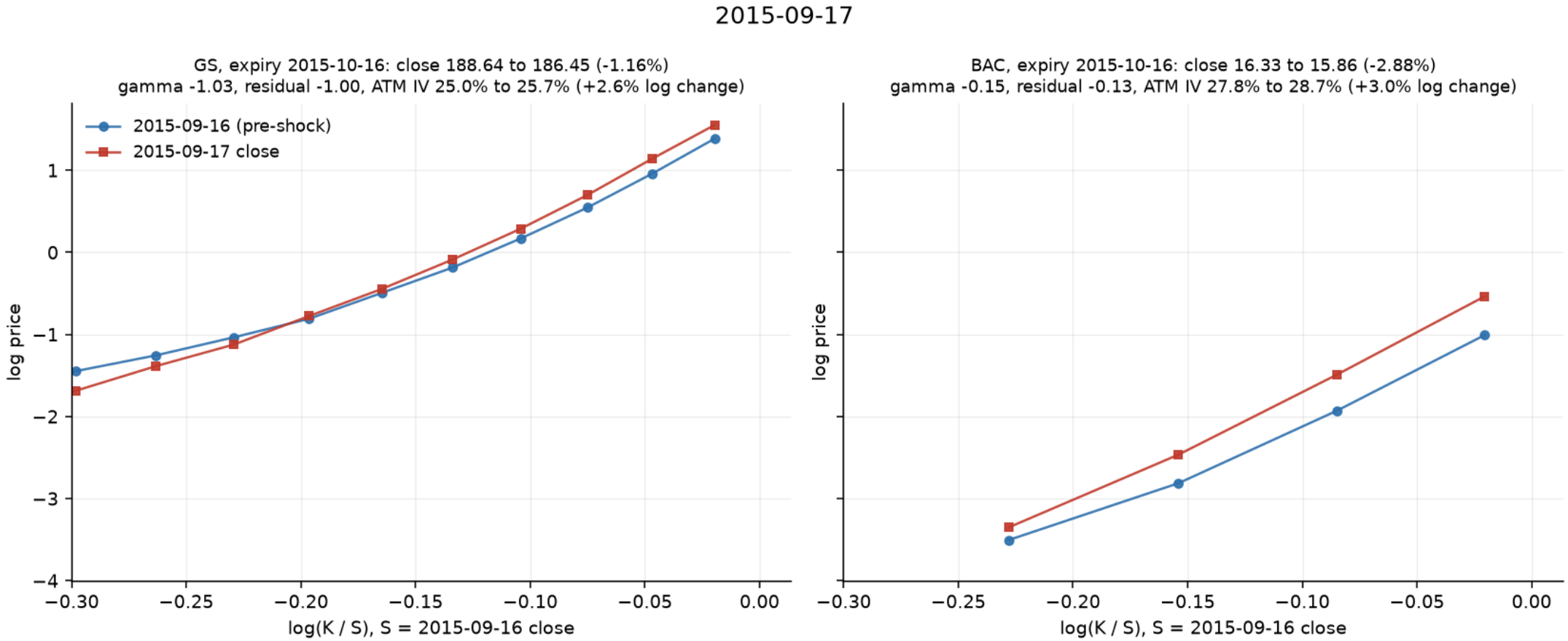
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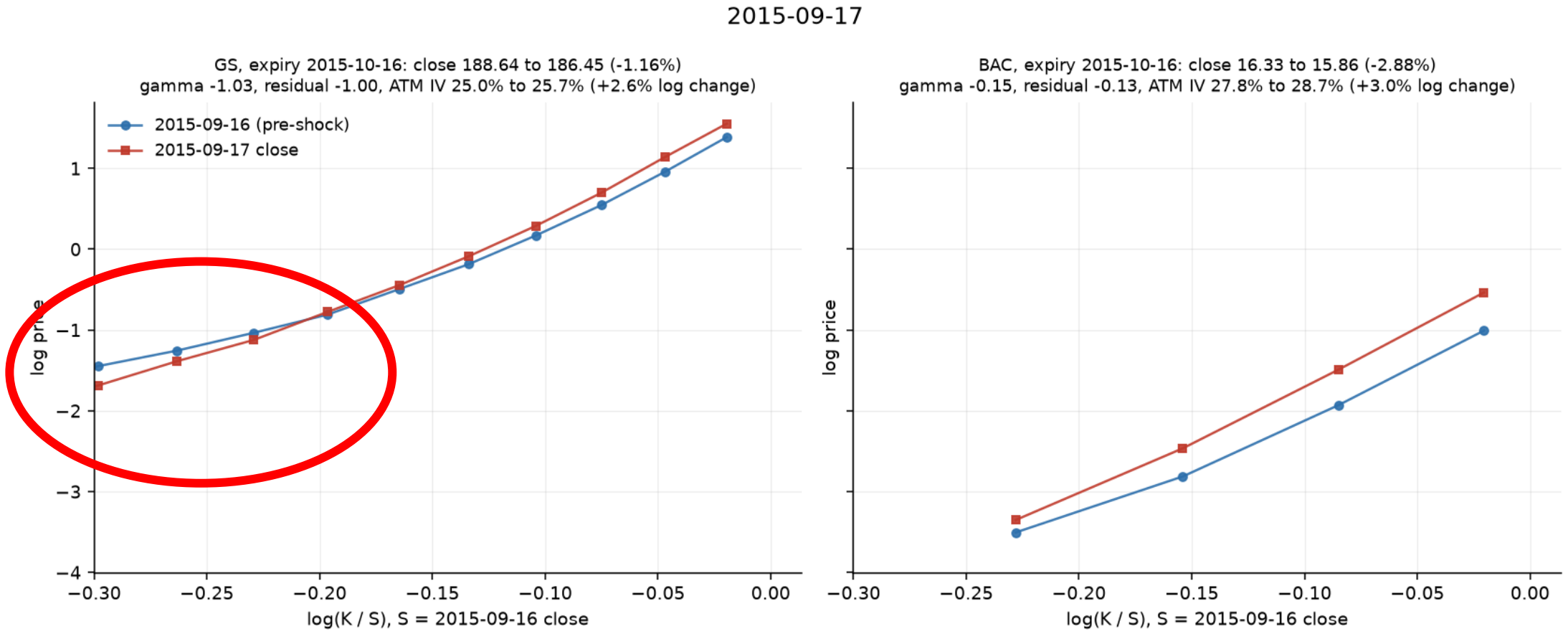
Federal Reserve Chairwoman Janet Yellen says volatility in equity markets will not influence the Fed's decision on a potential interest rate increase.

The Federal Reserve left short-term interest rates unchanged after weeks of market-churning debate, putting off a historic move to end an era of ultra-cheap credit amid worries about weak growth overseas.

Same MP Easing Shock | Different Option Chain Responses



Same MP Easing Shock | Different Option Chain Responses



Result: GS Bank USA will originate riskier loans than BofA over the subsequent month

Why?

Goal of my discussion: a structural interpretation of the findings

Timeline and bank balance sheet

t = –1

Bank starts with assets $A_{-1} = 1$ and zero-rate deposits D

t = 0

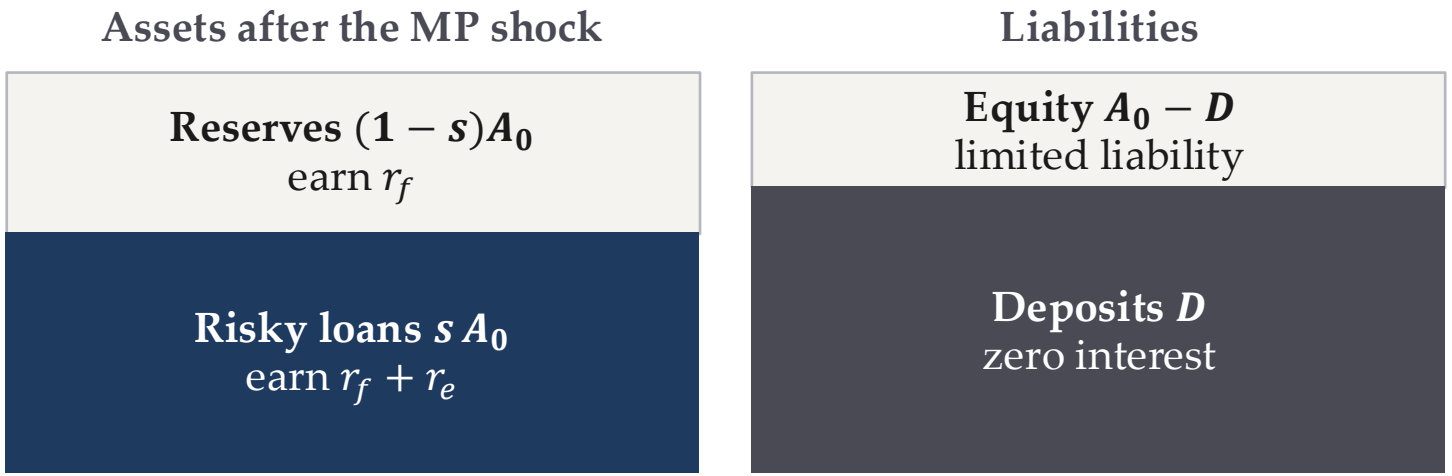
Policy shock ε
- revalues assets: $A_0 = 1 - \delta_a \, \varepsilon$;
- increases safe rate $r_f = r_{f,0} + \epsilon$
- changes distribution of excess returns $r_e \sim F$

Bank picks s

t = 1

Return r_e is realized
Div $= [A_0(1 + r_f + s\, r_e) - D]^+$

Owner gets utility $u(y + \text{Div})$



Bank's Problem

- $\max_s \left[F(r^*)\, u(Y) + \int_{r^*}^{\infty} u(y + \text{Div}\,(s, \varepsilon)\,)\, \mathrm{d}F(r; \varepsilon) \right]$
- Optimality: $0 = \int_{r^*}^{\infty} u'(y + \text{Div}(s, \epsilon)\, r\, \mathrm{d}F(r; \varepsilon) \equiv G(s^*, \varepsilon)$

- Optimal risk taking s^* is a function of monetary policy ε through many channels
  - Value of assets in place A_0, deposit rents $r_f - 0 = r_f$, **distribution of risky returns *F***
  - All vary across banks: same policy can have heterogenous effects

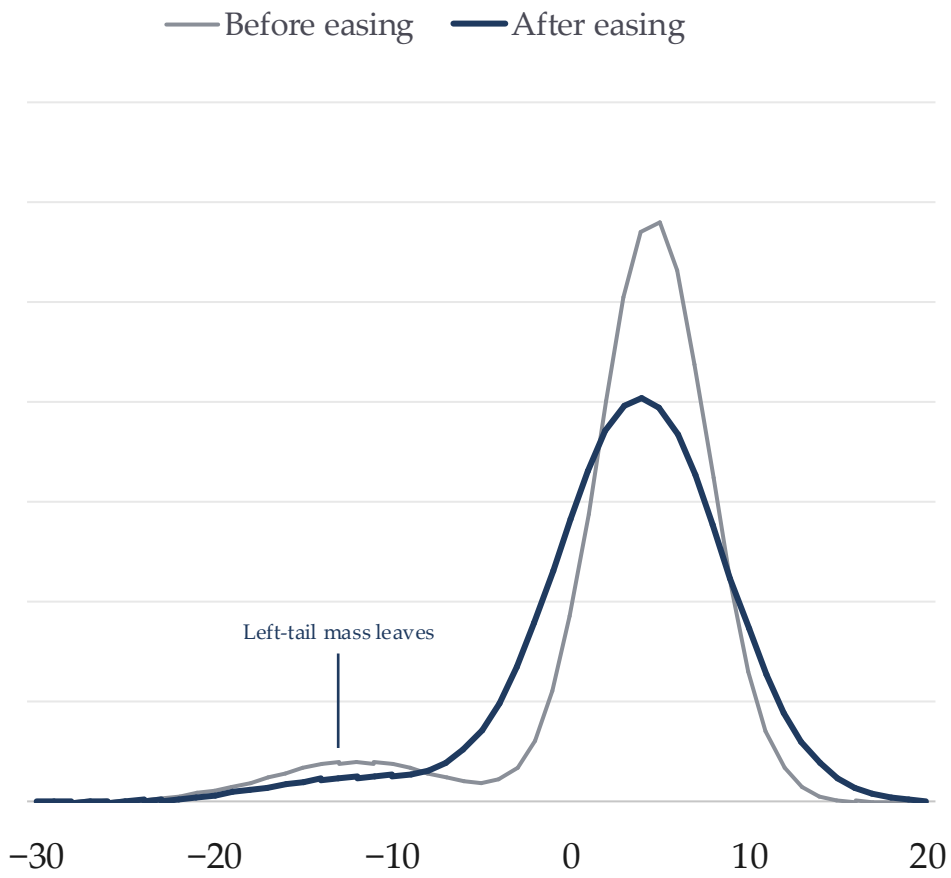
Outside the model: future risk premia

- Model ends at $t = 1$ with a terminal dividend so measure of equity risk is cash-flow only
- In the data, equity value at $t = 1$ depends on $t = 1$ risk premia, which also can be functions of ε
- Beason and Scheindorfer (2022): most of the equity premium is compensation for moderate downside risk

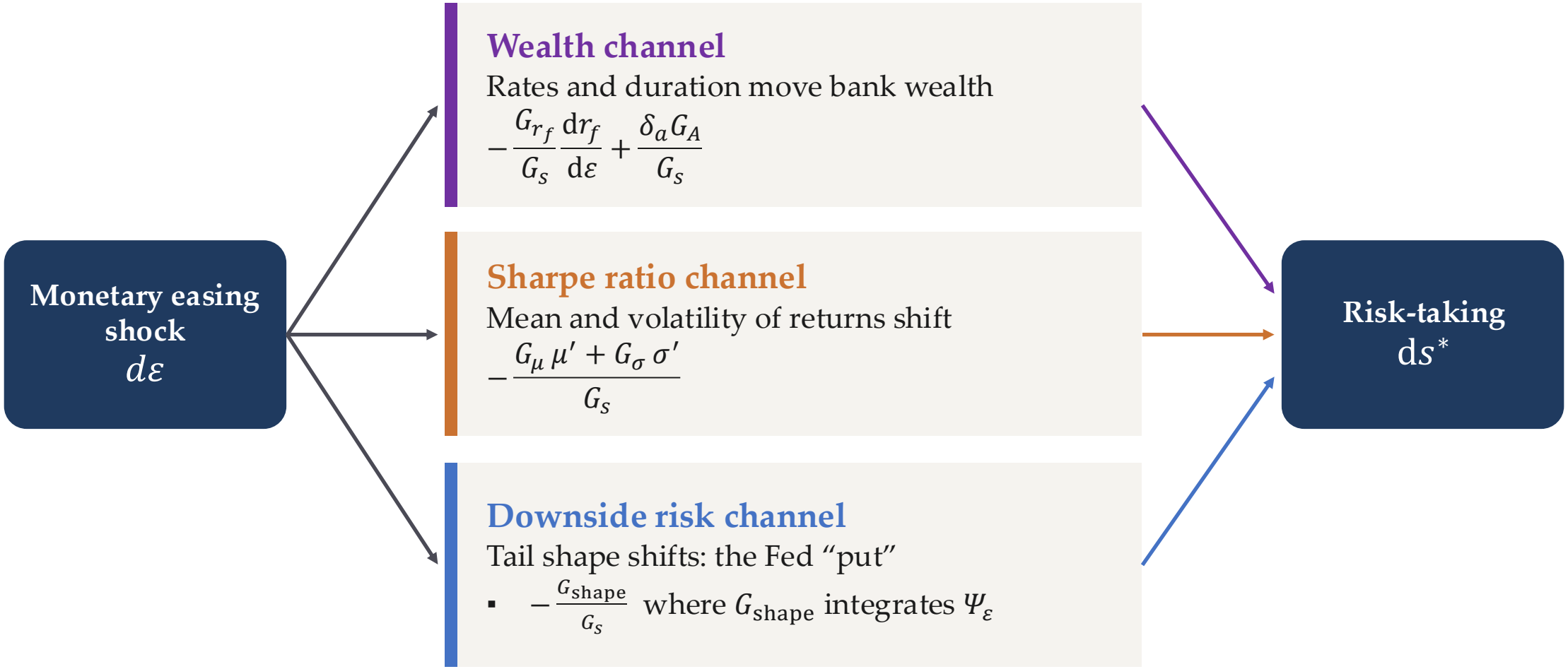
Isolating Downside Risk

- Rewrite $F(r;\varepsilon) = \Psi\left(\frac{r-\mu(\varepsilon)}{\sigma(\varepsilon)};\varepsilon\right)$
- E.g., if F is normal, then Ψ is just standard normal with no dependence on ε
- Ψ_ε represents the sensitivity of the distribution's higher-order moments to ε – the Fed "Put"

Mean & variance preserving reduction in downside risk

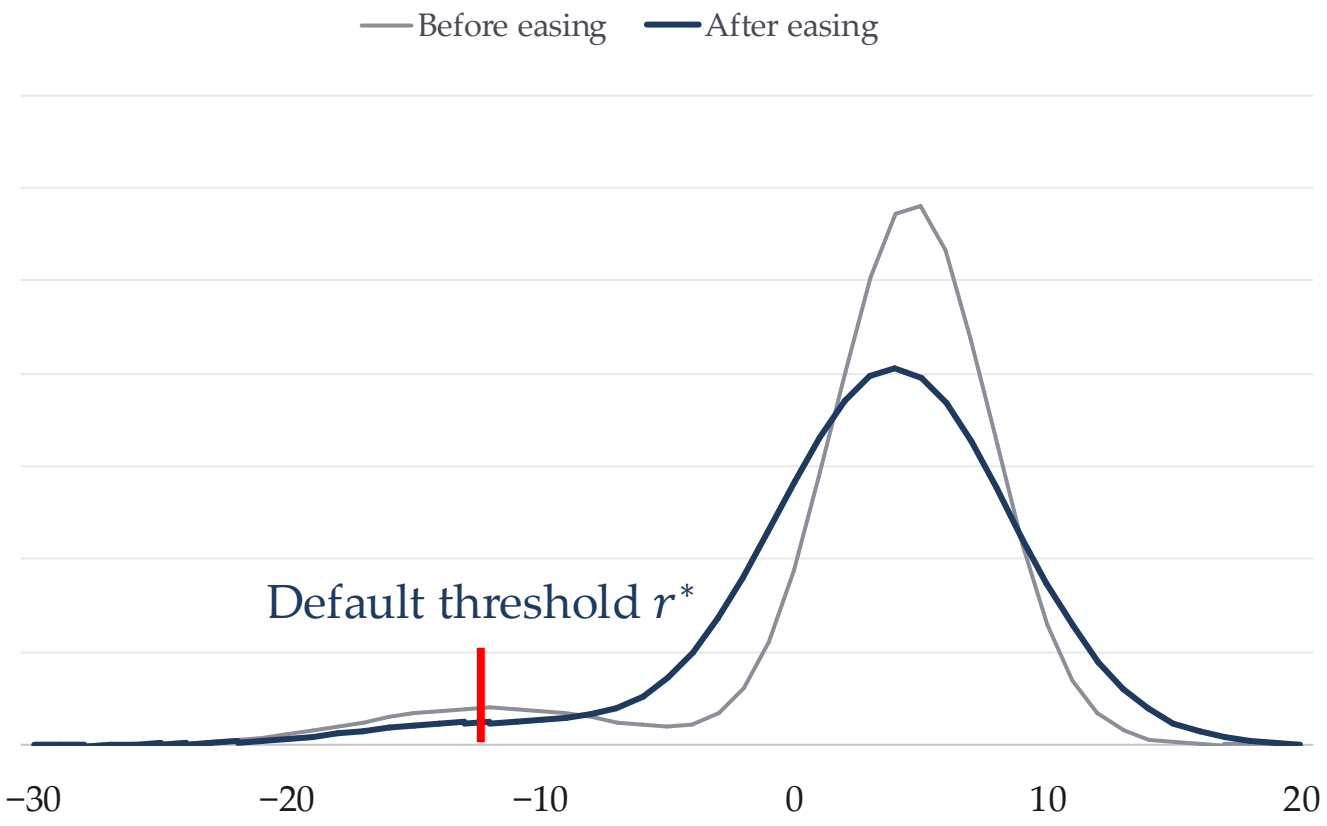


How an easing shock reaches risk-taking



When is shape effect positive? Risk aversion vs. risk shifting

Excess return density of risky projects (mean and variance fixed)



Risk aversion

$\propto \int_{r^*}^{\infty} u''(c) r \Psi_e \, dr$

Small: Ψ_ε has mean zero by construction

Risk shifting

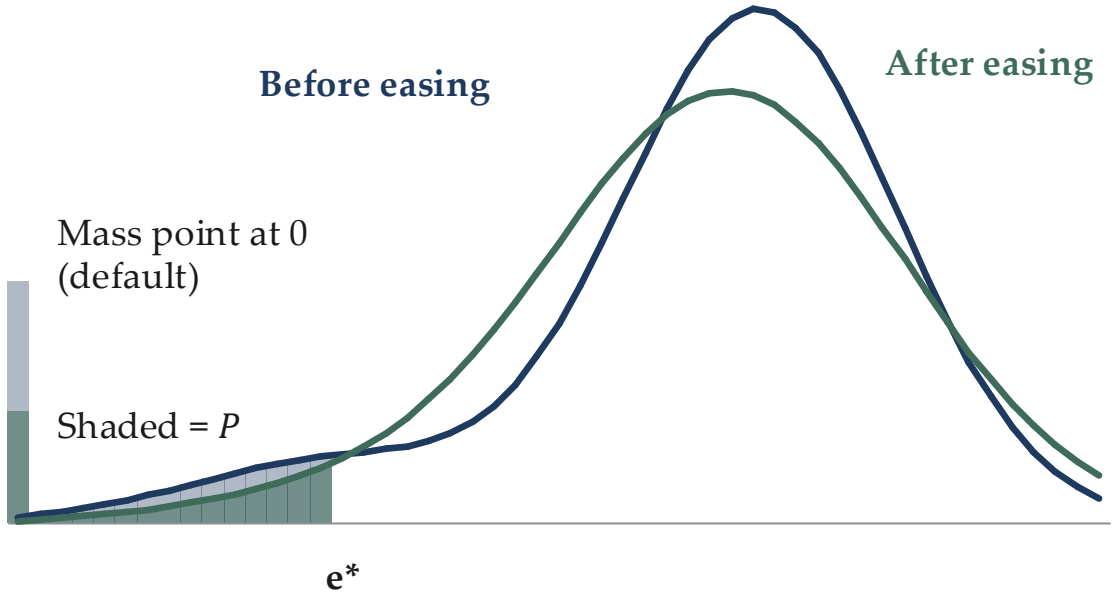
$-u'(y)\, r^*\, \Psi_\varepsilon$

Strong when default probability responds to ε ($r^* < 0$)

Model-based prior: if the data suggest risk aversion wins, it must be because default probabilities are negligible

Measurement

Risk-neutral density of next-period dividend (illustrative)



Turning to options

The structural Fed "put" Ψ_ε is not observable. Put prices reveal the risk-neutral distribution of bank equity.

The measure

Tail equity risk is the probability mass below a low strike, $0 < e^* < \mathbb{E}[\text{Div}]$:

$$P(e^*; \varepsilon) = \text{Prob}(\text{Div} < e^*)$$

In the data

Not every strike is observed; use the slope of the put-price curve, γ_{it}.

Shocks that lower P also raise s^*

Banks whose downside risk falls more lend riskier, controlling for stock and ATM put returns.

Easing lowers tail risk: $\mathrm{d}P/\mathrm{d}\varepsilon > 0$

N.B. Sensitive to clustering assumptions.

Interpretation Requires Separability

Recall that risk taking $\frac{\mathrm{d}s^*}{\mathrm{d}\varepsilon}$ consists of

Decompose $\frac{\mathrm{d}P}{\mathrm{d}\varepsilon}$ into

Wealth channel

Rates and duration move bank wealth

$$-\frac{G_{r_f}}{G_s}\frac{\mathrm{d}r_f}{\mathrm{d}\varepsilon}+\frac{\delta_a G_A}{G_s}$$

Sharpe ratio channel

Mean and volatility of returns shift

$$-\frac{G_\mu\,\mu'+G_\sigma\,\sigma'}{G_s}$$

Black-Scholes

Explained by mean and variance changes

$$P_\mu\frac{\mathrm{d}\mu}{\mathrm{d}\varepsilon}+P_\sigma\frac{\mathrm{d}\sigma}{\mathrm{d}\varepsilon}$$

Downside risk channel

Tail shape shifts: the Fed "put"

$$-\frac{G_{\text{shape}}}{G_s}$$

Downside risk

Residual

$$\frac{\mathrm{d}P^{\text{shape}}}{\mathrm{d}\varepsilon}$$

Tail risk shocks and monetary policy shocks

	FF	ED3	ED4	NS	Path	MPS	MPS$^{\perp}$
Coefficient	0.0341***	0.0259***	0.0295***	0.0329***	0.0169**	0.0254***	0.0205***
	(0.0107)	(0.0069)	(0.0079)	(0.0070)	(0.0080)	(0.0068)	(0.0072)
R^2	0.0053	0.0035	0.0044	0.0055	0.0015	0.0034	0.0022
Obs.	2,253	2,385	2,385	2,385	2,385	2,385	2,385

CAVEAT *Needs same controls as below; I checked: survives*

	(1)	(2)	(3)	(4)
Tail risk	0.063***	0.134***	0.132***	0.128***
	(0.016)	(0.030)	(0.030)	(0.031)
Diffusive risk			−0.031	
			(0.035)	
Stock returns				1.133**
				(0.470)
MPS				
ΔCDS				
High CDS				
High CDS x MPS				
Model	OLS	ologit	ologit	ologit
Fixed effects	Bank, Y-Q	Bank, Y-Q	Bank, Y-Q	Bank, Y-Q
R^2	0.061	0.025	0.025	0.025
Obs.	159,443	159,443	159,443	159,443

CAVEAT *Should be joint; probably survives*

Interpretation Requires Separability

Recall that risk taking $\frac{\mathrm{d}s^*}{\mathrm{d}\varepsilon}$ consists of

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Rates and duration move bank wealth
$$-\frac{G_{r_f}}{G_s}\frac{\mathrm{d}r_f}{\mathrm{d}\varepsilon}+\frac{\delta_a G_A}{G_s}$$

Sharpe ratio channel
Mean and volatility of returns shift
$$-\frac{G_\mu\,\mu'+G_\sigma\,\sigma'}{G_s}$$

Downside risk channel
Tail shape shifts: the Fed "put"
$$-\frac{G_{\text{shape}}}{G_s}$$

Decompose $\frac{\mathrm{d}P}{\mathrm{d}\varepsilon}$ into

Black-Scholes
Explained by mean and variance changes
$$P_\mu\frac{\mathrm{d}\mu}{\mathrm{d}\varepsilon}+P_\sigma\frac{\mathrm{d}\sigma}{\mathrm{d}\varepsilon}$$

Downside risk
Residual
$$\frac{\mathrm{d}P^{\text{shape}}}{\mathrm{d}\varepsilon}$$

$$\frac{\mathrm{d}P^{\text{shape}}}{\mathrm{d}\varepsilon}>0$$

$$\times$$

$$\left.\frac{\mathrm{d}s^*}{\mathrm{d}P}\right|_{\mu=\mu(0),\,\sigma=\sigma(0)}<0$$

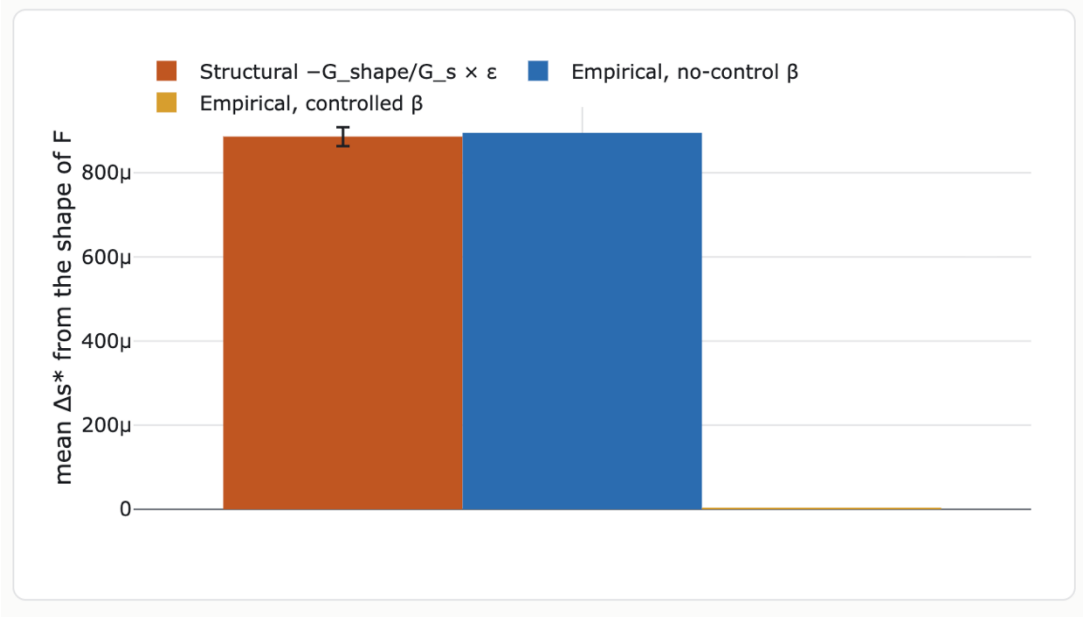
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$$\frac{\mathrm{d}s^{*,shape}}{\mathrm{d}\varepsilon}<0$$

Challenge 1: Separability and Linear Approximation

- Parametrize the model
  - Utility: CRRA with curvature 8
  - Distribution: mixture of "typical" and "crisis" normals
    - Fix parameters of the "crisis" normal
    - Let $p = p_0 + \delta_p \, \varepsilon$ parametrize its probability
    - Re-normalize parameters of good to hit mean and std dev target given p
    - Shocks to p: shocks to "shape"
- Calibrate a cross-section of banks varying in initial conditions and sensitivities δ_x to the MP shock
  - Such that risk-shifting wins (opposite result of this paper)
- Compute structural $-\frac{G_{\text{shape}}}{G_s}$ for every bank and take the average
- Compare with recovered estimates from the reduced-form regressions **in the model**

Only variation in δ_p
(response of downside risk to ε)



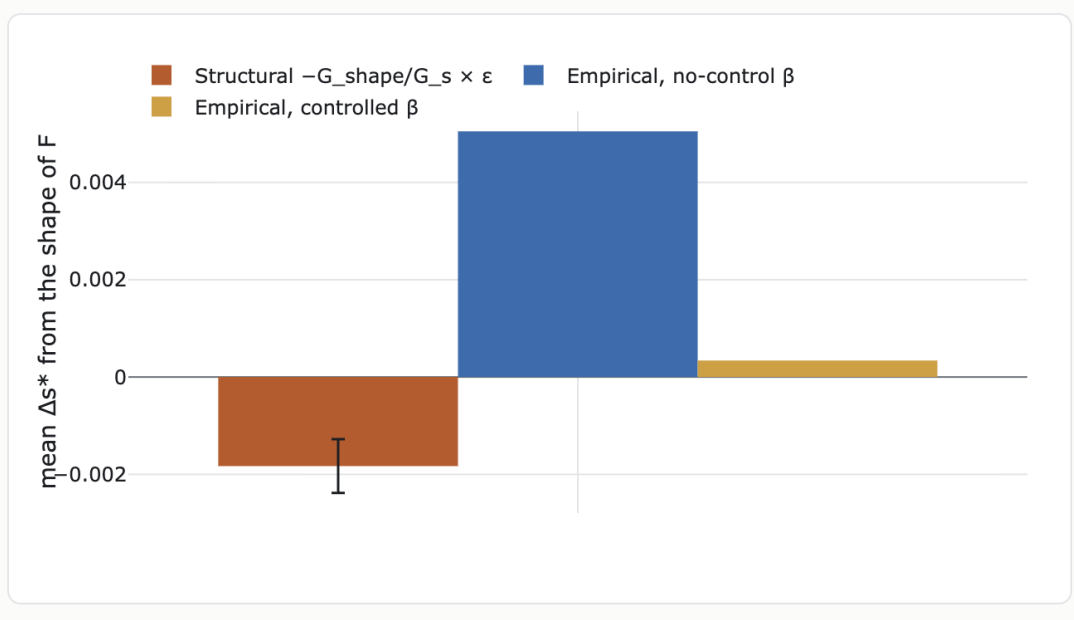
Regressions perfectly recover structural parameter

Choose your own calibration here:

Challenge 1: Separability and Linear Approximation

- Parametrize the model
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Variation in all parameters



Even with controls, regressions don't recover the sign

Choose your own calibration here:

Challenge 2: Anticipation (of bank lending, not of MP shocks)

Hidden assumption

Decomposition of P holds lending fixed at $s = s^*(0)$:

$$P_\mu \frac{\mathrm{d}\mu}{\mathrm{d}\varepsilon} + P_\sigma \frac{\mathrm{d}\sigma}{\mathrm{d}\varepsilon} + \frac{\mathrm{d}P^{\text{shape}}}{\mathrm{d}\varepsilon}$$

Relaxing it (rational expectations)

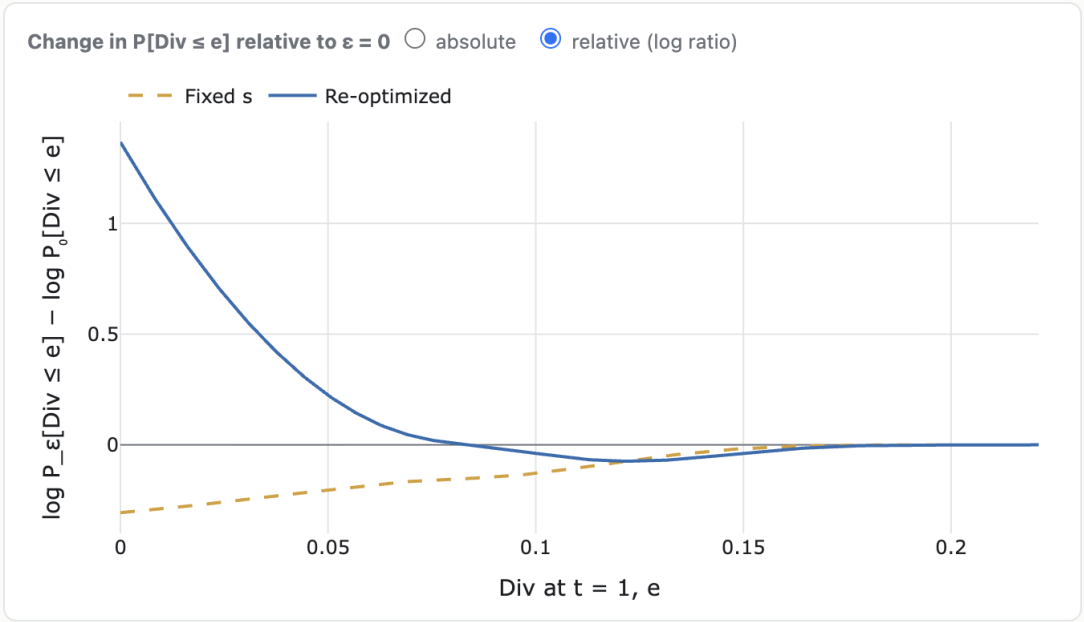
Options traders may anticipate riskier lending
This adds a term:

$$+ P_s \frac{\mathrm{d}s}{\mathrm{d}\varepsilon}$$

P_s: sensitivity of tail risk to risky share s can be large

Q: Will risk realize before option expiration?
A: Cash flows: probably not | Discount rates: maybe

Average calibration, before and after re-optimization



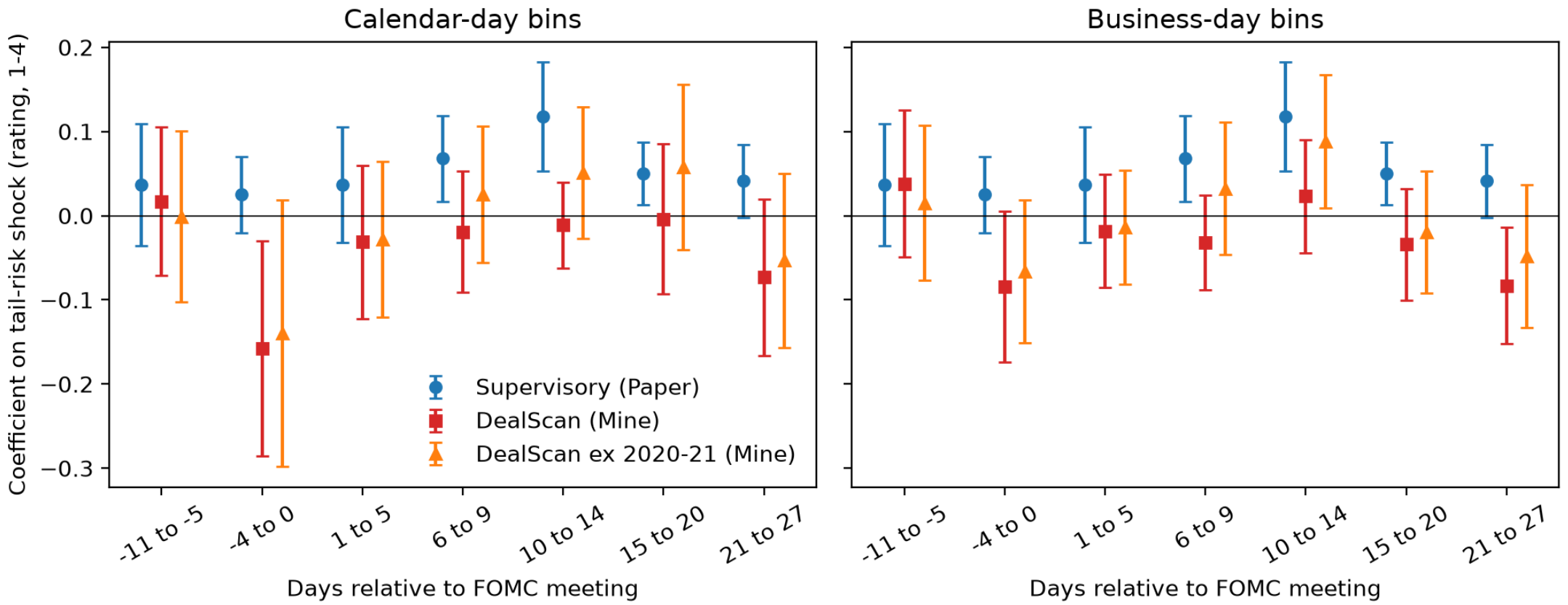
Fixed s (dashed): tail risk falls monotonically
Re-optimized (solid): tail risk comes back with a vengeance

May explain the weak response of aggregate γ to MP shocks

Flips the sign only if banks do take more risk, as the paper finds: a quantitative point.

Choose your own calibration here:

The Importance of Supervisory Data



Is it a power issue or is risk-taking using syndicated vs. non-syndicated loans different? Probably both

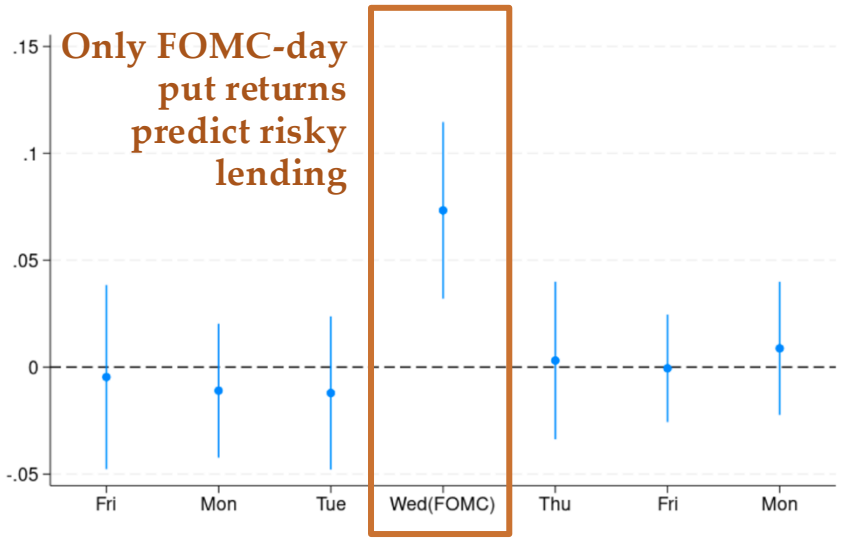
I highly recommend this paper!

Important question
How monetary policy changes bank risk-taking by influencing downside risks (the Fed "put")

Exceptional (and necessary) data
Loan-level supervisory data with internal ratings

Transparent design
The effect shows up in the FOMC week and nowhere else

Figure 5. The impact of daily tail risk shocks in the FOMC week on bank risk-taking



Open question: is it a Fed "put"? Depends where…
Equity prices: yes, though prices are themselves endogenous
Fundamental risk: not sure; answering needs a model disciplined by these findings