

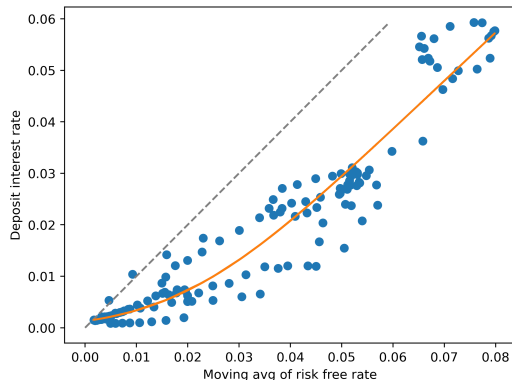
Bye Bye Beta: Deposit Duration with Fixed Spreads

Robert Rogers

Discussion by Xu Lu

FIFI Conference 2026

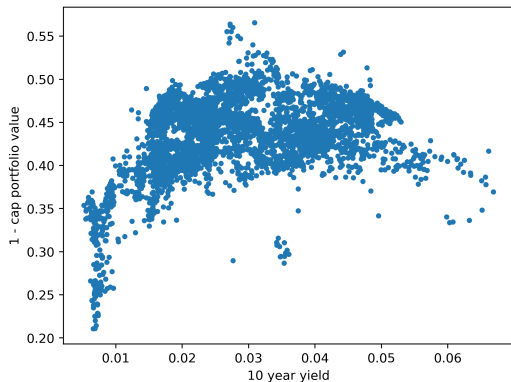
Takeaways: #1 a fixed spread, not a fixed beta



$$r^d \simeq \max\{\rho - \delta, 0\}$$

- **Fixed spread:** $\hat{\delta} = 2.2$ pp; long-run pass-through close to 1 at high rates.
- **Delayed adjustment:** $\hat{\gamma}_{\text{adj}} = 0.79$ quarterly; one-year beta about 0.4.
- **Fit:** five-year out-of-sample $R^2 = 0.95$ versus 0.85 for a linear model.

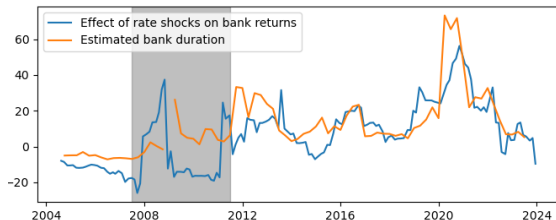
#2 Deposit franchise value is hump-shaped in rates



$$V^{DF} = 1 - PV(r^d)$$

- **Valuation:** replicate per-dollar deposit interest payments with traded interest-rate caps.
- **Magnitude:** \$0.43 of average franchise value per permanent dollar of interest-paying deposits.
- **Nonlinearity:** value peaks around a 2–3% 10-year yield, then declines on both sides.

#3 Duration predicts bank returns; value hedges can increase run losses



FOMC return validation

- Predicted sensitivity $\times$ rate surprise: **1.17** (0.31), excluding the financial crisis.
- With market-return controls: **0.61** (0.16).
- About **10%** of announcement-day bank-return variance explained without market-return controls.

Overview

A compelling empirical approach on a central question in banking! Main comments:

1. Does the magnitude of negative duration survive **endogenous** deposit turnover and replacement?
2. Does **equity-implied residual duration** matter for validating bank stock responses?
3. Is the **increase in long duration assets** hedging or deposit growth driven?
4. How does fixed spread compare with flexible nonlinear pass-through?
5. How much negative duration comes from (assumptions about) the distant future?

And one extension: connect depositor inattention, optimal bank pricing, and finite deposit survival to derive an independent measure of franchise duration.

#1 Is negative duration robust to deposit turnover?

- ▶ **What is priced here:** a permanent deposit notional.
- ▶ **Missing:** the cap portfolio replicates **per-dollar** rate payments r_t^d , not necessarily the bank's total payments $D_t r_t^d$ when quantities respond to rates.
- ▶ Endogenous deposit survival and replacement could change the magnitude of franchise duration, even if the negative sign survives.

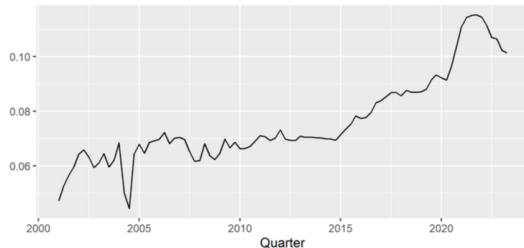
Possible solution: recalculate Figure 9 with empirically measured runoff and replacement inflows; ask how much of the size and sign of duration survives.

#2 Does equity calibration drive the return validation?

- ▶ **Construction:** each quarter, the residual cash flow c_t is chosen to match bank market capitalization; assuming it is a perpetuity then determines its duration.
- ▶ **Magnitude:** a normalized 1 pp negative rate shock in 2020 implies up to -75% bank equity value under the baseline, versus -25% with zero residual duration.
- ▶ **Within-date validation:** **0.125** with date fixed effects, or **0.119** with bank controls—far below the unit coefficient.

Possible solution: can independently estimated deposit exposures predict returns without imposing equity implied residual duration?

#3 Did banks buy long-duration securities to hedge deposits?



Securities with > 15-year contractual maturity / assets.

- ▶ Long-duration holdings rose from about 9% of assets in 2019 to above **11%** in 2021.
- ▶ Interpretation is long assets can hedge banks' *negative deposit franchise duration* at low rates.
- ▶ Alternative: large deposit inflows w/ limited lending opportunities also push banks into securities.

The same purchases can arise from a duration hedge or from having more deposits to invest – how to distinguish hedging from deposit driven purchases?

How to distinguish hedging from deposit-driven purchases?

One possibility: compare banks with similar new deposits but different pre-existing franchise duration:

Bank A

Same deposit inflow

Smaller negative franchise duration

? smaller addition to asset duration

Bank B

Same deposit inflow

Larger negative franchise duration

? larger addition to asset duration

If B adds more duration than A for a similar funding shock, that supports active hedging.

A dynamic retention foundation for Rogers' spreads and duration

(bases on Lu–Wu '26)

- ▶ **Existing foundation:** Appendix A derives approximately fixed spreads from optimal bank pricing and discrete depositor choice with lagged rate perceptions.
- ▶ What this adds: empirically supported deposit demand function + independent estimates of deposit franchise exposure.
- ▶ depositors review accounts infrequently; an existing cohort decays at a spread-dependent hazard:

$$\frac{\dot{M}_t}{M_t} = - \underbrace{\tau^{-1}}_{\text{inverse attention time}} \underbrace{P(x)}_{\text{hazard index}}, \quad x \equiv \rho - r, \quad P(x) = a + \left(\frac{x}{b}\right)^\kappa, \quad a > 0, \kappa > 1.$$

- ▶ **Bank** optimally prices this initial stock, taking ρ and effective discount rate d as given:

$$V_0 = \int_0^\infty e^{-dt} (\rho - r) M_t dt = \frac{x}{d + \tau^{-1} P(x)} M_0.$$

The simple baseline considers runoff of an existing deposit cohort, replacement inflows are not yet included.

Optimal retention pricing can generate a fixed spread

Bank chooses $x \equiv \rho - r \in [0, \rho]$ to maximize V_0 . Define $\lambda(x) = P(x)/\tau$.

$$\underbrace{d + \lambda(x)}_{\text{marginal gain}} - \underbrace{x\lambda'(x)}_{\text{retention cost}} = 0 \implies \boxed{\delta(d, \tau) = b \left(\frac{a + \tau d}{\kappa - 1} \right)^{1/\kappa}}$$

Corner ($\rho \leq \delta$)

$$r^* = 0, \quad x^* = \rho$$

Interior ($\rho > \delta$)

$$r^* = \rho - \delta, \quad x^* = \delta$$

Deposit rate pinned at zero.

Finite deposit lives can generate a hump—with discounting effect

$$v^*(\rho) = \frac{x^*(\rho)}{d(\rho) + \lambda(x^*(\rho))}, \quad \lambda(x) = P(x)/\tau.$$

Two regimes for franchise duration:

Corner ($r^* = 0$): $x^* = \rho$.

$$\frac{dv^*}{d\rho} = \frac{d + \lambda(\rho) - \rho[d' + \lambda'(\rho)]}{[d + \lambda(\rho)]^2}.$$

Positive sufficiently near $\rho = 0$.

Interior ($r^* > 0$): envelope theorem.

$$\frac{dv^*}{d\rho} = -\frac{x^* d'(\rho)}{[d + \lambda(x^*)]^2}.$$

Declining branch requires $d'(\rho) > 0$.

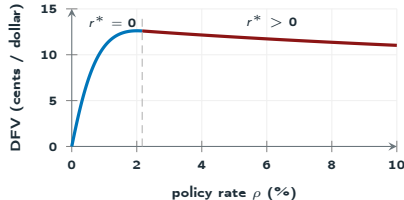


Illustration: $d(\rho) = 0.055 + 0.35\rho$.

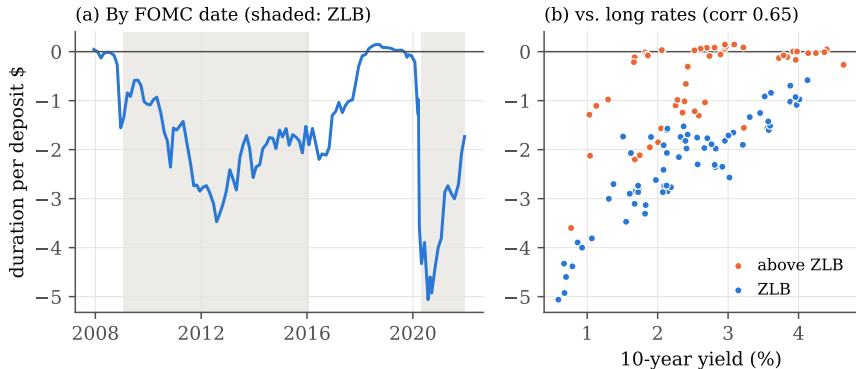
Finite-survival illustration: deposit-franchise duration

- ▶ Based on Lu–Wu (2026): bank-specific deposits run off at $\lambda_b(x) = \tau_b^{-1}P(x)$.
- ▶ **Valuation:** revalue the initial-cohort cash flows on FOMC dates using the GSW Treasury forward curve; **do not fit franchise value to bank equity.**

Illustrative franchise sensitivity	2009–15	2020–21
Duration per \$1 of deposits	−1.9	−3.8
Equity-scaled effect of a 1 pp rate cut	−7%	−22%

Finite turnover does not eliminate negative franchise duration.

Negative duration is most pronounced when long rates are low



Independent deposit-exposure test: sensitivity to the curve shock

Prediction: $\hat{R}_{bt}^{DF} = \Delta DFV_{bt} / MC_{b,t-1}$; only the denominator uses market cap.

Bank/date fixed effects and asset-exposure/balance-sheet controls; 540 public BHCs, 122 FOMC dates

Curve shock entering ΔDFV	Coefficient (s.e.)	Approx. 95% CI
Near-term change (≤ 2 years)	1.42 (0.55)	[0.34, 2.50]
Path projected from HF surprise	0.86 (0.40)	[0.08, 1.64]

- ▶ First two estimates are positive and reject zero; neither rejects one.
- ▶ Depositor-based exposure estimates avoid calibrating the franchise numerator to the bank's equity price, *but are not complete equity return predictions.*

#4 A fixed spread or flexible nonlinear pass-through?

- ▶ **Strong fit against simple linear models:** $\hat{\delta} = 2.2$ pp, and five-year holdout $R^2 = 0.95$ versus 0.85 for linear levels – but what about flexible non-linear models?
- ▶ **Question:** is the *fixed spread* identified, or do persistence and the zero-rate kink explain the fit? (e.g., in Lu-Wu 2026)
- ▶ Maybe compare flexible nonlinear pass-through and distributed lags estimated before 2020 and evaluated during 2022–23.

#5 How much negative duration comes from (assumptions about) the distant future?

When rates are near zero banks pay almost nothing on deposits today, but expect positive interest payments when rates normalize. Recall

$$V^{DF} = 1 - \underbrace{PV(\{r_t^d\}_{t \geq 0})}_{\text{replicated using interest-rate caps}}$$

- Observed: Market quotes of LIBOR caps, with maturities up to 30 years.
- **Assumed:** LIBOR implied volatilities are applied to Treasury rates; option values beyond 30 years are extrapolated.
- Potentially useful: decompose the dollar interest rate sensitivity by payment horizon. (say up to 10 years, 10-30 years, and the rest)
→ how much of the large negative duration in 2020 comes from traded maturities vs from the extrapolated.

A compelling valuation approach—and three directions forward

1. **Pricing:** an exceptionally clear non-linear empirical rule, with a discrete-choice microfoundation in Appendix A.
2. **Quantity and valuation:** traded caps price a permanent-dollar deposit-payment schedule.
3. **Validation:** bank returns move with estimated exposure, most clearly in the aggregate time series.

I learned a lot from the paper. Thank you!

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