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Strategic Management of Interest Rate Risk in Financial Institutions

Why Modern Treasury Professionals Need a New Approach to Interest Rate Risk

by Clive Corcoran

Executive Summary

Maturity transformation lies at the core of commercial banking, inherently exposing financial institutions to interest rate volatility with potential adverse liquidity implications. Fluctuations in the macroeconomic environment directly impact net interest margins, balance sheet valuations, and systemic liquidity. Traditional risk measurement techniques, such as book-value gap analysis, increasingly fall short in capturing complex risk vectors like optionality, basis risk, and non-parallel yield curve shifts.

This paper provides a rigorous institutional framework for identifying, quantifying, and mitigating structural interest rate risk using duration modelling, and derivative overlays including Interest Rate Swaps and SOFR and SONIA futures.

Taxonomy of Interest Rate Risk

Financial institutions must closely monitor and effectively manage several distinct primary sources of interest rate risk:

- **Maturity Mismatch (Gap Risk)**: The risk of income loss arising from structural timing differences in the maturity and re-pricing of bank assets, liabilities, and off-balance sheet positions.
- **Asset Valuation Deterioration:** Beyond immediate income statement impacts, fixed-income instruments lose market value when interest rates rise, forcing capital losses if assets are liquidated in the secondary market prior to maturity.
- **Run-off Risk**: The unexpected loss of core deposits driven by systemic risk concerns or interest rate-related macroeconomic shocks.
- **Basis Risk:** The risk emerging when assets and liabilities are priced against non-correlated benchmark rates (e.g., the historical disconnect between LIBOR and risk-free/base rates during systemic crises).
- **Hedging Risk:** The exposure resulting from structural or operational misalignments between a hedging derivative and the price behavior of the underlying instrument.
- **Optionality Risk:** The asymmetrical payoff risk embedded in products, such as mortgages with prepayment rights, where borrowers refinance during declining rate environments, leaving institutions with lower-yielding re-investment exposure.

THE MACROECONOMIC CONTEXT & YIELD CURVE ANALYTICS

Unorthodox Monetary Policy and Normalization

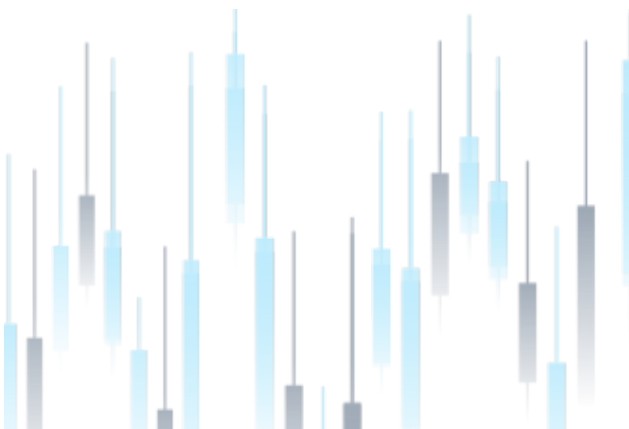
In the decades following the 2007–2008 Global Financial Crisis (GFC), developed market central banks enacted unprecedented monetary interventions, depressing short-term policy rates near zero and deploying massive asset purchase programs to flatten long-term yields. This structural distortion incentivized a systemic "reach for yield" across global capital allocations.

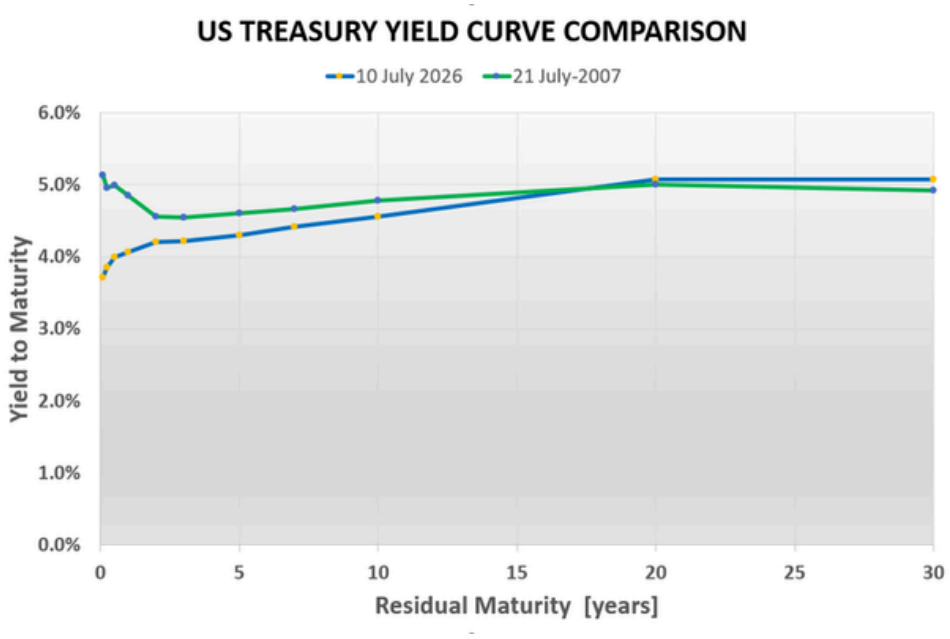
Subsequent macroeconomic shifts—most notably the post-pandemic inflationary spike starting in 2022—forced aggressive monetary tightening, driving short-term rates rapidly toward the 5% threshold. This transition highlights why risk managers must move away from static historical assumptions and prepare for the severe balance sheet consequences that accompany monetary policy normalization.

Yield Curve Inversion as a Predictive Indicator

The term structure of interest rates typically exhibits an upward slope, reflecting the necessary risk premium required by long-term investors to offset duration uncertainty. Under Arbitrage Pricing Theory, an inverted yield curve—where short-term yields exceed long-term yields—signifies a severe structural shift. Market participants accept lower long-term yields when anticipating a significant economic deceleration or a low-inflation, recessionary environment.

Historically, the New York Federal Reserve recognizes yield curve inversion as an accurate indicator for predicting recessions two to six quarters ahead. Notably, the deep inversions observed in the 10-year minus 2-year US Treasury spread (T10Y2Y) during 2023 and 2024—reaching depths of minus 100 basis points—demonstrate severe macroeconomic imbalances preceding broader economic realignments.

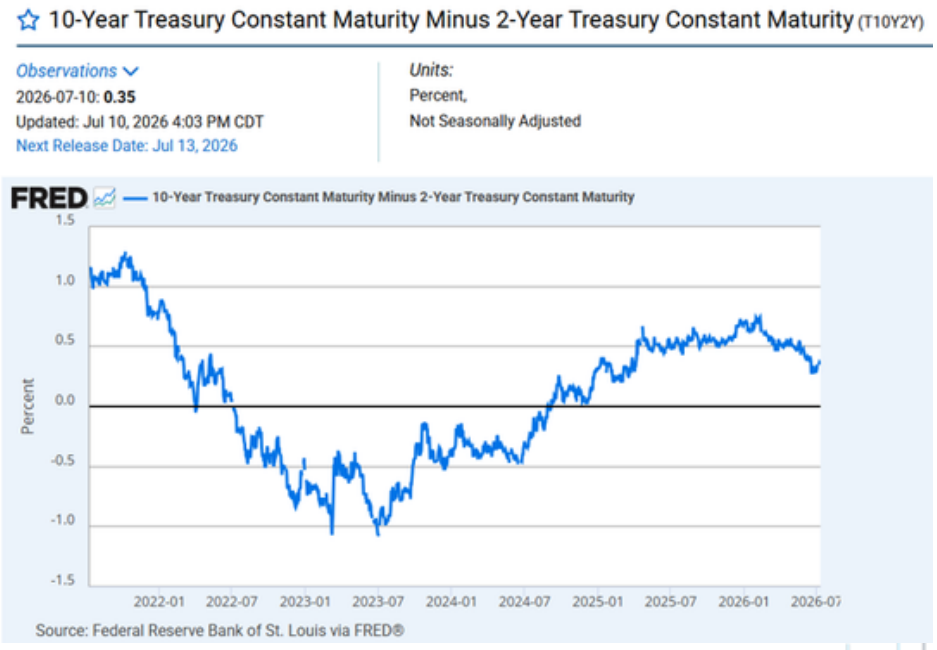




The graphic above shows the US Treasury yield curve for two dates - July 21, 2007 and July 10, 2026. In July 2007, when short term yields (i.e. one-year) were approximately 5% there was a decrease in yields as far out as the 20-year maturity. Within 14 months of the 2007 inversion the financial crisis had begun, which was followed by a signification recession.

The graphic below shows one very useful way of monitoring inversion as it is based on the spread between the yield on a 10-year US Treasury note and a 2-year note.

As can be seen during 2023 and 2024 the spread is in negative territory indicating that the yield on the 2-year note is above that of the 10-year note. In fact, during the first half of 2023 the 10-2 spread reached down to minus 100 basis points which is the most inversion that has been observed.



METHODOLOGICAL FRAMEWORKS FOR RISK MEASUREMENT

Traditional Re-Pricing Gap Analysis

For institutions managing straightforward balance sheets, Asset/Liability Management (ALM) often begins with static Gap Analysis. This framework allocates assets and liabilities into predetermined "time buckets" based on their residual maturity or re-pricing frequencies.

The net impact on Net Interest Income under a uniform interest rate shock is modelled as follows:

$$\Delta Net\ Interest\ Income\ (NII) = \Delta i * Rate\ Sensitive\ Assets\ (RSA) - \Delta i * Rate\ Sensitive\ Liabailities\ (RSL) = GAP\ \Delta i$$

To calculate the changes to Net Interest Income – making the simpifying assumption that the delta values can be applied uniformly across all of the assets and liablities – we can exemplify the monetary impact by plugging in some actual values to the equation

Case Example

Suppose that RSA is $50 million and RSL is $40 million and the change in interest rates is from 4% to 5% then ΔI = 0.01 and the ΔNII is$50m * 0.01 - $40m *0.01 which is equal to $10m * 0.01 or $100,000. In this case where the gap is positive the interest in rates leads to an increase in Net Interest Income. It can be easily seen that if the gap was negative an increase in interest rates would be negative for NII.

Structural Weaknesses of Book-Value Re-Pricing Models

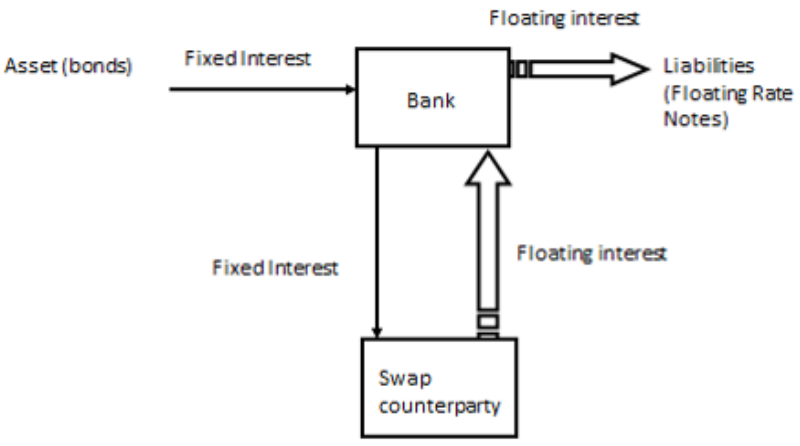
While operationally simple, traditional gap analysis possesses critical flaws that can obscure severe systemic risks:

- **Omission of Mark-to-Market (MTM) Dynamics:** It relies on historical cost/book-value accounting rather than current market values, failing to capture immediate valuation changes in trading portfolios.
- **Intra-Bucket Distribution Neglect:** It assumes all positions within a designated time bucket mature or re-price uniformly at the exact same moment.
- **Embedded Optionality Failure:** It cannot accurately model non-linear cash flow disruptions, such as sudden spikes in mortgage prepayments when market rates drop.
- **Exclusion of Off-Balance Sheet Cash Flows:** It neglects the daily margin and MTM cash flows generated by hedging derivatives (e.g., futures contracts).

DERIVATIVE MITIGATION & HEDGING STRATEGIES

Interest Rate Swaps (IRS)

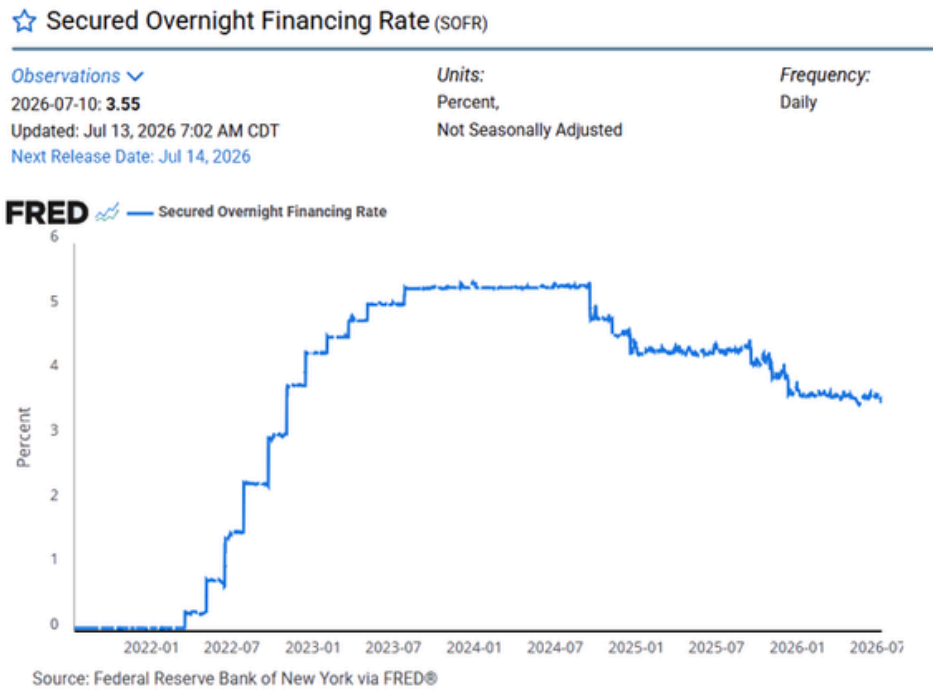
Interest Rate Swaps serve as a primary tool for neutralizing structural asset/liability mismatches. A typical commercial bank vulnerability involves funding long-term, fixed-rate assets (e.g., sovereign or corporate bonds) with short-term, variable rate money-market instruments or floating-rate notes. If benchmark rates rise, funding costs escalate while asset returns remain fixed, compressing net interest margins.



By executing a fixed-for-floating interest rate swap, the institution matches its variable liabilities with variable swap inflows, effectively transforming its fixed-rate returns into floating-rate streams aligned with its cost of capital. Risk managers must exercise caution when utilizing complex derivative structures (such as embedded caps or floors); if underlying benchmarks decline unexpectedly, these protective structures can cap returns and introduce new risk profiles.

SOFR Futures Markets

For short-term cash management and precise dynamic adjustments, institutions look to the liquid Secured Overnight Financing Rate (SOFR) futures market. Based on the overnight repo rate in the New York money market, SOFR is highly responsive to Federal Reserve monetary policy.



In essence a 3-month SOFR futures contract is quoted as the difference between an index value of 100 – MINUS the 3-month SOFR rate. So if 90-day SOFR is quoted at 3.5% then the equivalent SOFR futures quote should be 96.50. The notional amount for a single SOFR contract is $1 million. The SONIA futures are very similar to those for SOFR.

- One basis point (0.01%) move equates to $25.00 change in contract value.
- The minimum allowable price fluctuation, or “tick” size, is generally established at one-half of one basis point, or 0.005%.
- Based on a $1 million face-value 90-day instrument, this equates to $12.50.
- For the nearby expiring contract month, the minimum price fluctuation is set at one-quarter basis point, or 0.0025%, equating to $6.25 per contract.

The method for determining the BPV of a single SOFR futures contract is shown below:

$$BPV = \$1,000,000\ x\ \frac{90}{360}\ x\ 0.01\% = \$25.00$$

By utilizing SOFR or SONIA futures alongside interest rate swaps, modern financial institutions can accurately hedge immediate cash flow variations, protect interest-sensitive assets, and preserve capital stability across volatile macroeconomic cycles.

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