

Treasury ALM decision brief

Prasanna K | 19 October 2026 | Synthetic nominal USD benefit portfolio

Decision

Take the development-selected covariance hedge forward as the supported rate-risk candidate against the duration benchmark. Pair that decision with explicit longevity and liquidity limits. Its historical RMSE improvement does not eliminate benefit funding risk.

Evidence supporting the rate hedge

The frozen 2019-2025 final evaluation covers 84 reset one-month hypothetical hedge experiments, using a pinned revised vintage of official Fed curves. The selected covariance hedge's surplus RMSE is 6.50 bp of initial liability PV, versus 15.87 bp for a 5/20-year duration match: 59.03% lower. The paired six-month block 95% interval for the difference is [-12.34, -6.02] bp. Selection used only 2015-2018 development outcomes; covariance uses 2000-2014 training data with fixed 25% diagonal shrinkage. No final-period retuning occurred.

The key-rate comparator has RMSE 7.68 bp; no separate statistical superiority claim against it is made. These are synthetic fully funded zero-bond hedge experiments, not executable returns, trading profits or a continuous strategy.

The larger risks the hedge leaves behind

The 30 September 2026 case has 1,000 synthetic lives across four age/sex cohorts and USD 12,000 annual survivor benefits. SSA 2023 period mortality gives liability PV USD 119.38 million, duration 8.47 years and DV01 USD 101,157.93 per 1 bp. Fixed initial asset faces are used in all stresses.

Decision exposure	Observed model result	Interpretation
Parallel 200 bp rate fall	Covariance surplus -USD 0.351 million	The rate hedge controls this declared stress, but has residual mismatch
Mortality force multiplied by 0.8	Liability +USD 6.946 million; +5.82%	Equal funding and rate hedging do not offset imposed longevity sensitivity
2% liquidation haircut, base mortality/cash	Covariance year 10 net surplus -USD 0.705 million	Cash-flow mismatch and forced sales create a funding cost
Same haircut case, key-rate hedge	Year 10 net surplus -USD 0.641 million	The method with lower rate RMSE need not have the lowest liquidity cost

The longevity multiplier, haircut and deterministic reinvestment paths are assumptions. No calibrated probability, capital requirement or actual default is estimated. All 108 runoff scenarios pay benefits to within USD 0.01; a negative year-ten surplus means residual assets are below residual liability, not that benefits necessarily went unpaid. Nominal haircut flow sums and horizon funding stocks have different dates and must not be conflated.

Controls and review trail

The original Fed CSV is hashed. All 313 historical month-end curves and the case curve pass the unchanged 0.02 bp reconstruction rule; two other daily rows are quarantined transparently. The historical final predictions were sealed before scoring. A separate 50-digit Decimal ledger verifies 23,714 values. The seven-sheet workbook independently reconciles 22,166 values, including every current stress and runoff case. Eight scientific files reproduce exactly in a clean integrated run; the rebuilt workbook has equivalent formulas and contents. Native desktop Excel and an external independent replication are not claimed.

What would be needed for a real mandate

Actual plan benefit data and population-appropriate mortality; executable assets and costs; explicit cash buffers and sale constraints; independent governance approval and a forward monitoring policy. This portfolio research supports a disciplined ALM discussion and model review, not a live mandate.

Technical report, source ledger, workbook and reproduction receipt accompany this brief. Official sources: Federal Reserve GSW nominal curves (<https://www.federalreserve.gov/data/nominal-yield-curve.htm>) and SSA period mortality (<https://www.ssa.gov/oact/STATS/table4c6.html>).