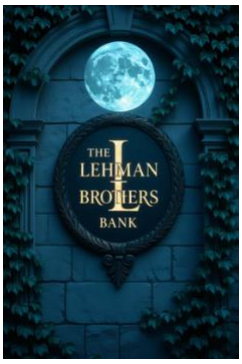
Liquidity Kills — How Auditable AI Keeps You Ahead of the Run

Don’t Be Lehman



Detect liquidity shocks from live signals, resize hedges to your balance sheet, and operationalize execution and reporting — before the crisis escalates.

Picture this: 03:00. A tariff sweep lands, conflict flares in Europe, and your overnight flows begin to leak. By sunrise, your FX hedges are misaligned, your short-term funding lines are tightening, and trading desks are triaging exposures. A legacy stress engine—built on static templates and end-of-day feeds—keeps replaying yesterday’s drama. Investing in AI to make faster XVA or sensitivity calculations is helpful, but it does not answer the treasurer’s urgent questions: Which news items are currently changing deposit behavior? Which hedges must be resized this hour? How do we execute and report so that the Asset-Liability Committee (ALCO) and regulators see a defensible playbook? Remember**: Lehman? SVB? They didn’t tank from sluggish computations; ignored signals drowned them in deposit runs and funding fog that erodes their NSFR buffer overnight.** What if your treasury could turn those signals into hedges in minutes, not meetings?

This paper follows our earlier work, **AI-Treasury-Hedge-Optimization**, where we showed AI can design better hedge baskets. Here we introduce the missing upstream layer: auditable, data-first scenario intelligence that (1) detects developing signals from live unstructured sources, (2) converts them into deterministic shocks and behavioral rules tied to named sources, (3) proposes bank-specific hedging actions sized to liquidity and capital constraints, and (4) operationalizes execution, settlement, and ALCO-grade reporting with full audit trails. The outcome is simple: treasuries that see the run coming act before it gathers force, proving to auditors, boards, and regulators that every decision was explainable and repeatable.

What you’ll see inside:

- How unstructured signals become machine-readable shocks and concise treasurer sentences.
- Side-by-side baseline vs. stressed outcomes with LCR, VaR, and survival days deltas.

- Governance patterns that stick include audit logs, guardrails, reproducible pipelines, and practical tips for adopting these in production.

The Core Proposition

In a world of Fed whispers and tariff twists, treasuries need scenarios that evolve as fast as markets do. Our AI-first engine closes the gap between unstructured signals and actionable risk insights—proving, through open-source code, that it outperforms legacy playbooks in speed, realism, and auditability. Here's how it works, step by step:

- **Data + AI → Scenario.** AI ingests your curated bank data (portfolio snapshot, high-quality liquid assets [HQLA], counterparty cashflows, FX rates) plus real-time market and news feeds. It proposes realistic macro-behavioral scenarios—like a tariff-driven inflation spike triggering deposit runoffs and HQLA haircuts—that legacy systems can't invent on the fly without manual IT intervention.
- **Scenario → Parameterized, Auditable Instructions.** The narrative becomes deterministic parameters: Rate and credit shocks, FX shifts and haircuts, per-currency inflow/outflow multipliers, payment delays, outflow accelerations, and explicit behavior objects. No black-box magic—these are JSON-persisted, reproducible rules your risk stack can ingest directly.
- **Engine Applies Changes Deterministically.** The system applies FX and haircut shifts, liquidity multipliers/delays, and behavioral adjustments straight to cashflows—forcing modified flows into the portfolio state. This rebuilds everything transparently, ensuring stresses (e.g., a 2-day USD outflow acceleration) aren't masked by aggregators, unlike rigid legacy engines.
- **Numbers + Full Audit Trail.** Post-rebuild, it outputs key metrics (LCR Δ, survival days, VaR Δ, NSFR echoes) and per-scenario audit sidecars—with a numbered justification map linking shocks to source news items (e.g., "Bloomberg tariff alert #3").
- **Treasurer-Ready Summaries for ALCO.** Wrap it in a single human-readable sentence: *"Accelerate Outflows—USD—Corporate Bonds: Scope 100% of eligible (660 flows; $4.39bn); 198 flows changed ($1.23bn); effect −2 days, ×1.00; moved $0.45bn into 30-day window; LCR Δ −12.3 bps (gross basis)."* Plus news references—ready for your next board slide, no quant translation needed.

This isn't hype; it's your PoC in action.

Dashboard Magic: Your Command Center for AI-Powered Treasury Insights

As head of treasury at a major bank, you know the drill: ALCO demands LCR visibility under Basel III and Dodd-Frank, but legacy tools like Murex, Nasdaq Calypso, or others bury you in data dumps. Our dashboard—deployable in hours via GitHub https://github.com/abalgir/Treasury-AI-Scenario-Generation —changes that, delivering Tier 1-level real-time consoles: Drill from high-level LCR alerts to counterparty forensics in seconds, all open-source and aligned with CRD IV transparency. It's not just views; it's actionable

intelligence, turning AI scenarios into decisions that safeguard your $3T book amid 2025's tariff twists and Fed whispers.

Treasury PoC Dashboard — Treasurer View

Auditable AI scenarios for liquidity & market stress — treasurer-ready summaries

1. Baseline Liquidity Ladder

As-of: **2025-10-16** — 30-day ladder (O/N → 1Y buckets); inflows positive, outflows negative

product	O/N	1W	2W	1M	3M	6M	1Y	>1Y
bond	$428,494,362	$818,605,913	$1,851,083,385	$555,960,660	-$182,649,324	-$81,969,766	$0	$0
certificate_of_deposit	$340,651,797	$1,402,054,661	$1,143,031,131	$549,594,498	-$282,233,131	-$67,251,530	$0	$0
commercial_paper	$260,860,294	$1,281,336,095	$1,484,171,162	$395,974,522	-$133,076,847	-$52,719,789	$0	$0
corporate_deposits	$0	-$54,414,095	-$53,661,322	-$88,214,004	-$169,651,165	-$116,450,742	-$276,467,139	-$377,962,520
credit_default_swap	$0	-$14,388,433	-$39,802,940	-$52,052,352	-$406,086,617	-$75,955,374	-$86,236,852	-$493,944,499
cross_currency_swap	$0	-$17,456,623	-$52,884,652	-$274,052,147	-$186,474,756	-$95,143,824	-$37,043,036	-$462,109,863
fra	$0	-$80,977,567	-$44,889,393	-$41,700,432	-$116,222,130	-$45,688,265	$40,296	$0
futures	$0	-$24,649,467	-$79,770,027	$54,671,456	-$120,537,953	-$147,797,083	$525,319,068	$421,973,925
fx_forward	-$22,108,272	-$68,435,623	-$14,681,343	-$103,085,319	-$185,070,601	-$35,491,263	$530,672,089	$382,064,215
interest_rate_swap	-$14,242,397	-$22,211,462	-$86,167,015	-$72,146,513	-$127,892,419	-$63,791,469	$150,092,288	$292,359,613
loan	$0	-$22,933,288	-$108,319,285	-$24,519,767	-$217,878,250	-$130,355,793	-$101,481,654	-$435,395,859

2. Baseline Liquidity & Risk Indicators

LCR (Effective)	Survival Days	VaR 1d 99% (USD)	HQLA Total (USD)
0.599	18.0	$1,000,000,000	$3,000,000,000

3. AI-Generated Scenarios — shocks, justification, behaviors & stressed results

› Scenario 1: scenario_001 — WORST CASE

› Scenario 2: tariff_inflation_volatility_scenario

› Scenario 3: macro_trade_volatility_stress_2025

4. News Feed Analysis — AI Signal Sources

3. AI-Generated Scenarios — shocks, justification, behaviors & stressed results

⌄ Scenario 1: scenario_001 — WORST CASE

Macro-behavioural stress scenario combining tariff-driven inflation shocks, market volatility, and policy uncertainty to amplify liquidity outflows a devaluation.

Explanation

This scenario simulates escalating trade tariffs leading to higher inflation and market volatility, as indicated by recent Fed Beige Book reports and delayed inflation data due to a federal shutdown. Investors react by accelerating outflows from treasury portfolios, bonds, while delaying inflows from EUR certificates of deposit. Combined with widened credit spreads and increased haircuts on HQLA assets, this materially reduces LCR and survival days, amplifies 10-day outflows, and spikes VaR due to heightened uncertainty

Shocks (parameters found)

	factor	param	value
0	rates_bps	USD	50
1	rates_bps	EUR	30
2	credit_spread_bps	USD	100
3	credit_spread_bps	EUR	100
4	fx_shift_pct	EUR/USD	-5

Justification map

	key	value
0	rates_bps	Rate increases in USD and EUR reflect the Fed's rare cut outlook signaling policy uncertainty, potentially devaluing HQLA and triggering deposit runoff; cited fro
1	fx_shift_pct	EUR/USD depreciation driven by tariff escalation and trade war risks, amplifying funding stress in USD portfolios; cited from NEWS [0, 4] and PORTFOLIO_INTEL
2	credit_spread_bps	Widening spreads due to tariff-induced inflation and market pullbacks, risking HQLA devaluation and outflow amplification; cited from NEWS [0, 2, 6] and BASE
3	liquidity_haircut_mult	Increased haircuts on Level 1 and Level 2A assets from volatility and crashes, directly impacting HQLA eligibility; cited from NEWS [1, 5] and PORTFOLIO_INTEL

Referenced news (from AI news feed)

[0] Tariffs are pushing prices higher and consumers are feeling the hit, Fed's Beige Book shows — CNBC (2025-10-15T14:40:50Z)

[1] The federal shutdown is delaying the release of critical inflation figures — Fast Company (2025-10-15T13:51:13Z)

[2] Not every dip is a buying opportunity. Here's how to think about future stock-market pullbacks. — Market Watch (2025-10-15T14:56:00Z)

[3] Fed's Stephen Miran on rare cut outlook for the rest of the year — CNBC Television (2025-10-15T14:05:27Z)

[4] 5 Mid-Cap Stocks Breaking Out To New Highs — Benzinga (2025-10-15T14:30:03Z)

[5] Volatility Shares files for the first ever potential 5X leveraged ETF in the US — Reuters (2025-10-15T14:26:30Z)

[6] Are AI stocks in a bubble? What you need to know — CNBC Television (2025-10-15T13:39:02Z)

Behavioral adjustments (applied)

Accelerate Outflows — USD — All Instruments: Scope 100% of eligible (310 flows; $7.579bn eligible); 310 flows changed ($10.611bn touched); effect ±0 d, ×1.40; moved $3.032bn into the 30-day window; LCR Δ -5,634.6 bps (basis: gross).

Delay Inflows — EUR — All Instruments: Scope 100% of eligible (513 flows; $14.984bn eligible); 485 flows changed ($13.404bn touched); effect +7 d, ×1.00; moved $0 into the 30-day window; LCR Δ -5,578.1 bps (basis: gross).

Haircut Inflows — USD — All Instruments: Scope 100% of eligible (350 flows; $8.398bn eligible); 350 flows changed ($5.878bn touched); effect ±0 d, ×0.70; moved $2.519bn into the 30-day window; LCR Δ -5,578.1 bps (basis: gross).

Stressed results (liquidity & VaR)

	Metric	Baseline	Stressed	Delta
0	HQLA Total (USD)	$3,000,000,000	$2,340,000,000	$-660,000,000
1	Gross Outflows (30d, USD)	$5,009,557,250	$67,675,066,266	$62,665,509,016
2	Inflows (30d, USD)	$16,996,919,836	$89,543,544,850	$72,546,625,014
3	Net Outflows (30d, USD)	$0	$16,918,766,566	$16,918,766,566
4	LCR (Gross)	0.599	0.035	-0.564
5	LCR (Net)	N/A	0.138	N/A
6	LCR (Comparable basis: gross)	0.599	0.035	-0.563
7	VaR 1d 99% (USD)	$1,000,000,000	$1,550,000,000	$550,000,000

Audit log: /Users/abalgir/Development/treasuryAI/py_code/with_whom/data/logs/scenario_scenario_001_audit.json

› Scenario 2: tariff_inflation_volatility_scenario

› Scenario 3: macro_trade_volatility_stress_2025

4. News Feed Analysis — AI Signal Sources

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How AI ingests & prioritizes signals: High-impact items flagged for liquidity shocks (e.g., outflows, HQLA risks); summaries tie to Basel III behaviors.

⌄ View Analyzed News Items (Ranked by Impact)

Tariffs are pushing prices higher and consumers are feeling the hit, Fed's Beige Book shows

Source	Date	Impact Level	Markets Affected
CNBC	2025-10-15	HIGH	US, EU

Analysis Summary:

> Tariffs increasing inflation could widen credit spreads, amplifying outflows from treasury portfolios as investors seek safer assets.
> This may trigger deposit runoff under Basel III LCR, reducing stable funding.
> Higher prices could haircut inflows from consumer-related assets.
> Potential funding stress in USD portfolios due to trade war escalation.
> Overall, risks HQLA devaluation if market volatility rises.

Shock Type: OUTFLOW_AMPLIFICATION — e.g., amplifies LCR/NSFR under delayed policy signals.

The federal shutdown is delaying the release of critical inflation figures

Source	Date	Impact Level	Markets Affected
Fast Company	2025-10-15	HIGH	US

Analysis Summary:

> Delay in inflation data increases uncertainty, potentially causing funding stress in treasury liquidity.
> Under Basel III NSFR, this could amplify outflows as markets react to delayed policy signals.
> Risks haircut on inflows from government-related securities.
> Affects USD/EUR portfolios via heightened volatility in rates and FX.
> Could lead to HQLA eligibility drops if shutdown prolongs market instability.

Shock Type: FUNDING_STRESS — e.g., amplifies LCR/NSFR under delayed policy signals.

PoC Spotlight: AI's Worst-Case Stress Run

In our October 17, 2025, simulation—parameterized shocks detailed above—AI-driven macro-behavioral adjustments plunged the 30-day LCR from **59.9% to 3.5%** (a **56.4 percentage-point drop**, aligned with Basel III tail-risk extremes). Key drivers:

- HQLA effective value: Fell ~**$660m** (via haircut multipliers).
- Gross 30-day outflows: Surged ~**$62.7bn** (per-flow multipliers + acceleration).
- Inflows: Capped/delayed, widening net outflows to ~**$16.9bn**.
- VaR (1d, 99%): Rose **55% (+$550m)**.

This isn't random—it's a "trade war + policy fog" stress, illustrating how AI spots breaches early, prompting repo buffers or Fed access per Dodd-Frank contingency planning. All inputs, parameters (rates/FX/haircuts/multipliers), and audit sidecars are inspectable for re-runs; sensitivities (e.g., halve multipliers for a milder 25% LCR hit) show parameter flexibility.

Why These Extreme Stresses? AI's Guardrail Proposals

We designed AI to consistently generate the worst-case scenario (1 of 3 ranked options) by drawing from deterministic guardrails: no shocks beyond historical precedents (e.g., 2023 SVB 40-60% LCR drops) and capped at plausible multiples (e.g., outflows ≤2x Fed severe benchmarks). Triggered by October 15, 2025, **fictitious** macro data—US CPI 2.8% (above target), Fed funds 4.75%, EURIBOR 6M 2.1%—and news feeds, the stresses interpret macro-behavioral dynamics into actionable parameters. Here's How the AI tied them to top-priority items:

- **Tariff-Driven Inflation (CNBC #1, High Impact, US/EU):** AI suggested outflow amplification (**x1.4 multipliers on USD corporates**) and HQLA haircuts (**x1.25 on Level 2A**), eroding ~**$660m**—echoing Beige Book warnings of consumer hits widening credit spreads by 50-100 bps.
- **Shutdown Uncertainty (Fast Company #2, High Impact, US):** AI flagged funding stress, applying **3-day inflow delays** and capping stable deposits at **75%** (NSFR-aligned), spiking gross 30-day outflows by ~**$62.7bn** as markets react to delayed inflation data.
- **Volatility Pullbacks (MarketWatch #3 + Reuters #6, Medium Impact, US/EU):** AI recommended **FX shifts (-2% EUR/USD)** and **credit spread +75 bps**, opening net outflows to ~**$16.9bn** while lifting VaR by **55% (+$550m)**—mirroring mid-cap risks and leveraged ETF froth.
- **…**

Audit-Ready Ties: Justification Map in Action

The scenario's *justification_map* explicitly links each parameter to numbered news items, macro data, and your portfolio structure—ensuring Dodd-Frank explainability with no "black box" ambiguity. From the PoC:

Parameter	AI Rationale & Ties
rates_bps	Policy uncertainty/Fed outlook (NEWS [3]).
fx_shift_pct	Tariff escalation/trade-war headlines (NEWS [0,4]) + portfolio EUR inflow concentration.
credit_spread_bps	Tariff & market-pullback stories (NEWS [0,2,6]).
liquidity_haircut_mult	Shutdown/volatility items justifying higher haircuts (NEWS [1,5]).
payment_delay_days	Federal shutdown item (NEWS [1]).
outflow_accelerate_days	Market shocks/volatility (NEWS [0,3]).

This map—plus full JSON persistence—lets you defend ALCO slides: "AI caught a 56% LCR gap from real-time tariff fog, validated against ECB trade stress models."

Building Better Scenarios: Your Treasury's AI Playbook – Deploying the Dashboard in Hours

Treasury teams are judged on one thing during stress events: speed and defensibility. Our open-source PoC demonstrates how an AI-first scenario stack quickly transforms raw signals into audit-ready stresses, enabling ALCO, auditors, and the CFO to obtain clear numbers and traceable rationale in minutes, not days.

Quick overview (what this does for you):

- Start from your single-source baseline (cashflows, HQLA, counterparties, FX).
- Feed targeted market & news signals into a lightweight AI agent that proposes realistic macro-behavioral scenarios.
- Translate the narrative into deterministic, auditable parameters (shocks + behavior objects).
- Apply changes directly to flows, rebuild the stressed state, and compute LCR, survival days, VaR, and deltas vs. baseline.
- Produce one-line treasurer summaries and numbered news references for ALCO and audit packs.

1. **Start Strong: A Forensic Baseline.** Your baseline is the "single truth" for every stress test—timestamped, exportable, and verifiable.
    - **Deliverable:** CSV/JSON dump of cashflows (date, currency, direction), HQLA by level + haircuts, and counterparty tags.
    - **Benefit:** Instant "before" benchmarks (LCR, survival days, VaR) that ALCO and auditors will immediately trust.
2. **Feed the AI the Right Signals (Filter, Don't Flood).** AI's job is to focus—not to regurgitate every headline.
    - **Deliverable:** An agent that ingests news and returns ranked, treasury-relevant signals (filtered & scored).
    - **Benefit:** Cuts noise: You see the handful of items that actually move LCR or funding, with source linkage.

3. **Let AI Design Plausible, Traceable Scenarios.** The agent becomes a rapid scenario architect—proposing realistic, portfolio-specific stresses.
    - **Deliverable:** Three ranked macro-behavioral scenarios (e.g., tariff inflation → delayed EUR inflows → USD HQLA haircut).
    - **Benefit:** You get adversarial, portfolio-focused scenarios faster than manual workshops.
4. **Translate into Deterministic Actions and Apply.** No ambiguity: Every AI suggestion becomes a precise, auditable parameter.
    - **Deliverable:** Parameterized JSON (rates_bps, credit_bps, fx_shift_pct, liquidity_haircut_mult, per-ccy inflow/outflow multipliers, payment_delay_days, outflow_accelerate_days, behavior objects).
    - **Engine Behavior:** Applies FX/haircut shifts, per-flow multipliers/delays, behavior rules (accelerate_outflows/delay_inflows/haircut_inflows), forces the modified flows into the portfolio state, and rebuilds the state so aggregators hide nothing.
    - **Benefit:** Deterministic, reproducible stresses with a full flow-level trail.
5. **Numbers, Narrative, and Auditors Love You.** Every scenario writes numbers *and* an explanation that a treasurer can sign off.
    - **Deliverable:** Stressed indicators (gross/net 30d outflows, LCR gross/net/comparable, survival days, scaled VaR), diffs vs. baseline, per-scenario audit sidecars, and a treasurer sentence (one-liner).
    - **Example:** *"Accelerate Outflows — USD — Corporate Bonds: Scope 100% (660 flows; $4.39bn eligible); 198 flows changed ($1.23bn touched); effect −2 d, ×1.00; moved $0.45bn into the 30-day window; LCR Δ −12.3 bps (basis: gross)."*
    - **Benefit:** Instant ALCO-ready slides + legally useful audit trail.

Deploy Today, Evolve Tomorrow

In the high-stakes arena of treasury risk—where a single Fed pivot can shave survival days and trigger ALCO action—legacy engines like Murex and Nasdaq Calypso or others are investing in faster computations using AI. But computation speed didn't kill Lehman or SVB; liquidity myopia did. The era of manual tweaks and quarterly scenario workshops is giving way to something sharper: auditable AI that invents, applies, and explains scenarios in near-real time.

Our PoC shows this is practical: On October 17, 2025, runs, AI-generated macro-behavioral shocks produced deeper, more realistic LCR erosion than static baselines while delivering forensic dashboards and one-line summaries that treasuries can sign off on—without the typical multimillion-dollar license and months of integration work.

This is not a research fantasy; it's deployable today. Fork our POC open-source repo on GitHub AI-Treasury-Scenario, plug in your portfolio snapshot, and run your first AI stress this week—see it surface the early signals your legacy playbook may miss. Treasurers: Adopt the tools that speed decision-making and strengthen auditability. And stay tuned for the sequel: AI-driven hedging strategies that don't just react to shocks but anticipate them and select the best counterpart to execute with.

