In-Class Assignment TBM6: Trust-Stack Economics

Digital Finance – BSc Course Prof. Dr. Joerg Osterrieder

Context. You borrow $10,000 for one year against ETH collateral on a DeFi lending protocol. Decompose the all-in cost into the **four layers** of the trust stack: **(L1)** gas, **(L2)** protocol borrow rate, **(L3)** oracle fee, **(L4)** LP/pool spread. Compare to a retail bank consumer loan benchmark of ≈8% APR.

Q1. Assign *typical* 2025 values (in bps/year) to each of the four layers: L1 gas, L2 protocol borrow rate, L3 oracle fee, L4 LP/pool spread. Use realistic numbers for a $10k position on an L2 rollup.

Solution. Representative 2025 numbers (accept ±30%): **L1 gas** ≈5–20 bps (one open + one close tx on L2 rollup, amortised over 1 y on $10k); **L2 protocol** ≈400–600 bps (Aave v3 USDC variable rate, 2024–25 average); **L3 oracle** ≈1–3 bps (Chainlink subsidised, typically <$10/year on $10k position); **L4 spread** ≈10–30 bps (cost of acquiring the borrowed asset and unwinding collateral, AMM slippage). Accept any defensible range; reject zero for any layer.

Q2. Compute the *all-in* 1-year APR on the $10,000 loan using *your* numbers, and the dollar cost.

Solution. Using mid-range values: $5 + 500 + 2 + 20 = 527$ bps $= 5.27\%$ APR. Dollar cost on $10,000 = $527/year. Compare to a retail bank: 8.00% APR = $800/year — DeFi is ≈34% cheaper for a fully-collateralised loan. The dominant layer is L2 protocol (≈95% of total cost); gas and oracle fees round to zero on a one-year horizon.

Q3. Which of the four layers scales with *usage* and which is *fixed per transaction*? Explain the *composability* implication in one sentence.

Solution. Scales with usage (APR-denominated): L2 protocol (borrow utilisation drives rate); L4 spread (% of notional). **Fixed per tx:** L1 gas (flat $/tx); L3 oracle (flat subscription). **Composability implication:** the fixed costs (L1+L3) are paid *once* by the *outermost* user even if the loan is routed through 10 stacked protocols (Aave → Curve → Convex → ...), so stacking extra protocols adds only marginal APR-denominated fees, not new flat costs — the economic reason DeFi is called "money Lego."