

In-Class Assignment TR1: The Settlement Tax

Context. A US retail broker clears \$1B of daily equity volume on a T+2 settlement cycle (cash and securities move 2 business days after the trade). The risk-free overnight money-market rate is 4.00% p.a. (≈ 365 days). In parallel, a tokenised-bond platform offers *atomic* T+0 Delivery-vs-Payment (DvP), where cash and the token leg settle in the same block (seconds).

Q1. Compute the *annual* cost of capital tied up in T+2 settlement for a firm that clears \$1B/day. Assume working days only; treat the 2-day float as a constant \$-amount on the balance sheet.

Solution. Average balance locked = $\$1\text{B}/\text{day} \times 2 \text{ days} = \2B . Annual cost of capital = $\$2\text{B} \times 4\% = \$80\text{M}/\text{year}$, net of any repo/rehypothecation recovery. This is the “settlement tax” — a dead-weight drag that would drop to zero under atomic T+0. Over US cash equities ($\approx \$500\text{B}$ daily volume), the industry-wide tax is on the order of \$40B/year at 4% rates.

Q2. Recompute the same firm’s annual cost of capital under atomic T+0 DvP (assume settlement takes 10 seconds and funds sit in a non-interest-bearing wallet during that window).

Solution. Average balance locked = $\$1\text{B} \times (10\text{s}/86,400\text{s}) \approx \$115,740$. Annual cost of capital = $\$115,740 \times 4\% \approx \$4,630/\text{year}$. Savings vs T+2: $\$80\text{M} - \$4.6\text{k} \approx \$80\text{M}$, i.e. a **99.99%** reduction in the settlement tax. In practice SEC moved US equities T+2 \rightarrow T+1 in May 2024, capturing $\approx 50\%$ of the available saving without blockchain; atomic DvP captures the rest.

Q3. Name *one* reason banks have not yet adopted T+0 for all products, despite the \$80M savings.

Solution. Acceptable: (i) **Liquidity netting benefit:** under T+2, a dealer’s buys and sells across the day net down before settlement, so the firm only needs to fund the *net* position (often $< 5\%$ of gross); under T+0 each trade settles gross, requiring $\approx 20\times$ more intra-day liquidity. This is the DTCC/CSD argument against full T+0. (ii) **Operational asymmetry:** securities live on-chain but cash legs (Fed wire, SEPA) still run on batch rails with cut-off times. (iii) **Fails-risk concentration:** T+0 eliminates the 2-day grace period for operational errors, so a single mis-settled trade triggers an immediate buy-in. (iv) **FX settlement risk:** cross-currency trades need a CLS-like guarantor — only emerging on-chain.