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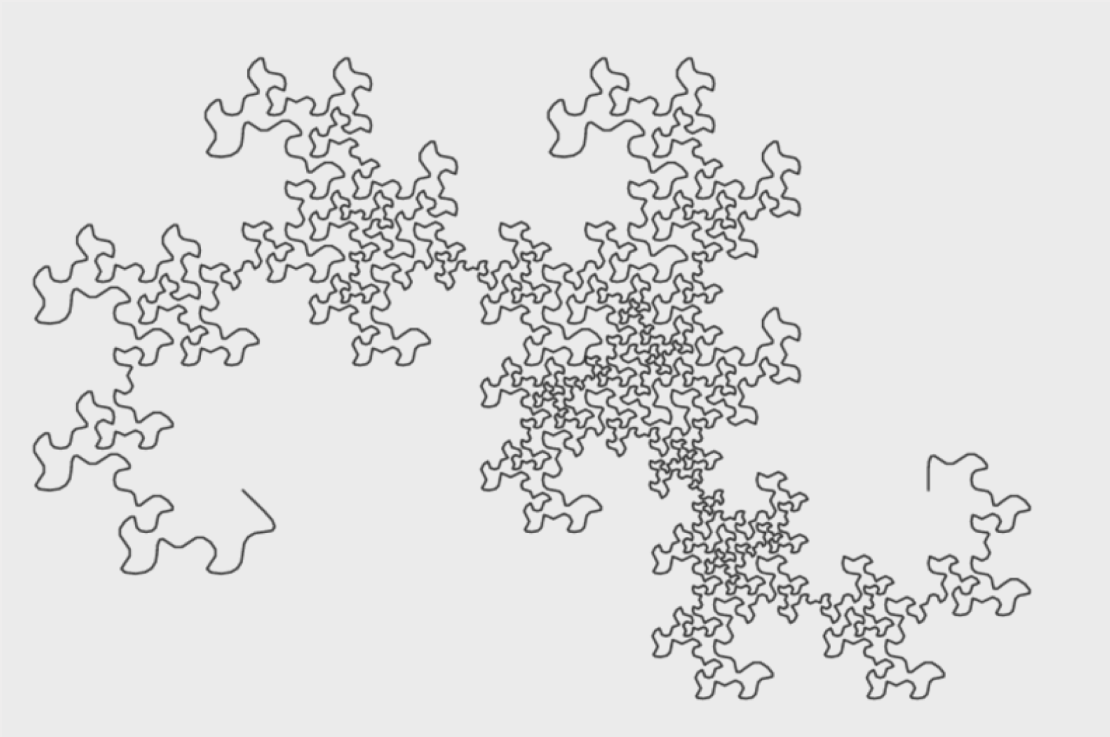
Lido v2 Liquidity Program



TL;DR

- The liquidity strategy for Lido’s stETH is under review after the reWARDS budget was capped and LDO incentives were replaced with stETH. Still, use cases exist for LSTs exit liquidity coexisting with ETH withdrawals: DeFi integrations and on-chain swaps on L1 and L2s.
- Value lost to price impact is a key metric when measuring tokenholder experience.
- Analyzing past stETH swap history, a pool of $75M would result in 99% of the trades within peg experiencing a price impact below 0.1%, with the remaining 1% suffering $1.8M of marginal value lost in total.

Problem Statement

Lido has recently reviewed its past liquidity mining program and deemed that approach as unsustainable and detrimental to Lido's governance token's stakeholders. In particular, this recent work has challenged the notion that significant liquidity sustains exchange rates and that distributing LDO helps decentralise governance. As a result, LDO expenses were stopped and incentives were reduced and paid out in stETH, the protocol's main revenue currency.

With Lido v2 deployed and the enablement of withdrawals, there is an additional path for transferring value from (w)stETH to ETH without requiring market liquidity. However, withdrawals still require 1-5 days in typical cases and even more extended periods during significant slashing events. This means that there is still a need for stETH liquidity in DEXes.

DeFi integrations and a multi-chain strategy will also reflect on liquidity requirements since native withdrawals from non-mainnet blockchains are not yet possible. The current incentives architecture entails several multisig wallets distributed across sidechains and L2s.

This document proposes an alternative to understanding trading demand and pool sizes by backtesting large (>$100k) trades that took place over 1 year between June 23rd 2022 and June 23rd 2023.

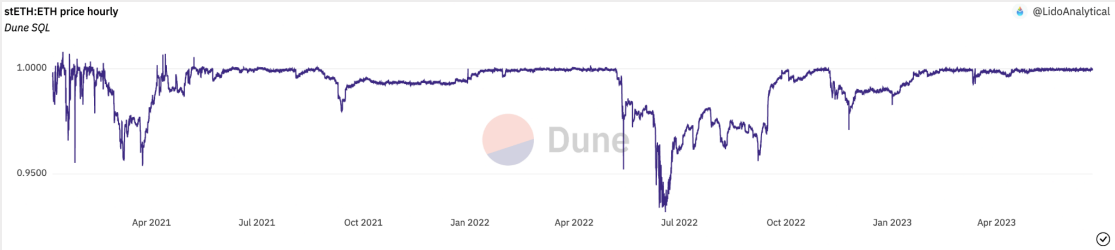
Analysis: Liquidity Depth and Price Impact

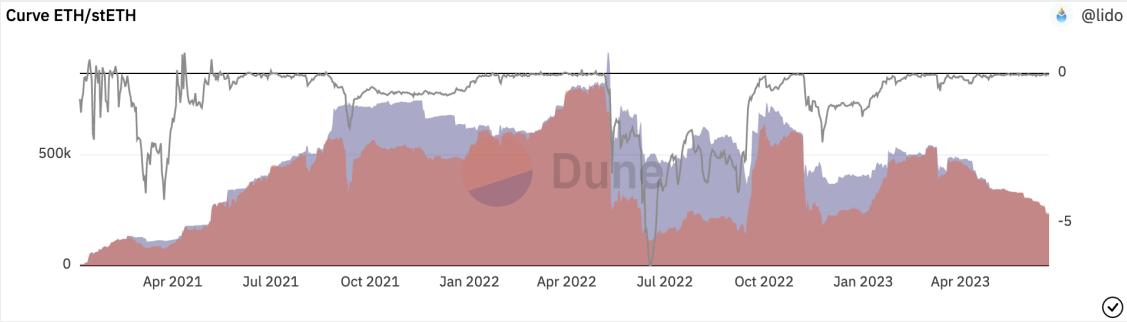
The problem of on-chain liquidity in DeFi can be analysed from multiple perspectives. Just to name a few: DeFi protocol integrations, the opportunity cost of staked ETH withdrawal delays, debt ceiling for collateral positions, risk management for large investors/whales, and expansion to new L1/L2s.

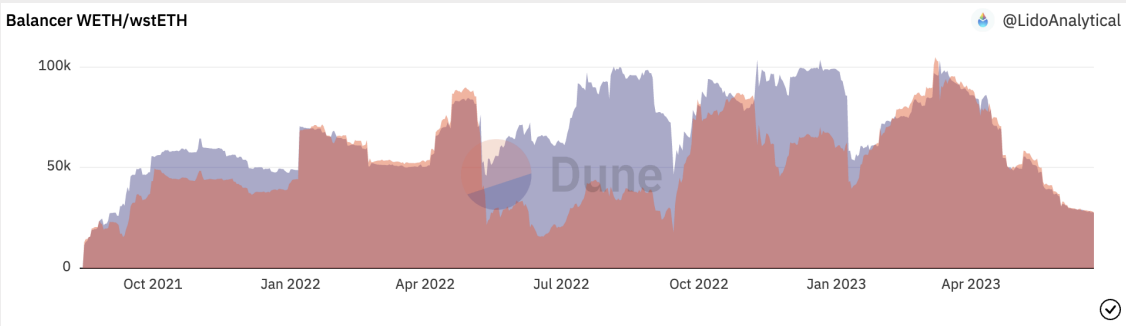
This analysis focuses on the price impact (PI) of large trades and the associated value loss as a proxy for poor tokenholder experience. Volume is excluded as a KPI as it can even out, keeping prices stable without big swings in any direction.

We consider large trades to be in the scope of the analysis when they occur under a healthy peg between stETH and ETH prices. Since incentivising liquidity represents a cost for the DAO, it is questionable whether large arbitraging and speculation should be protected from price impact by renting enough liquidity at the expense of the Lido community. This also excludes large collateral liquidations, as described in this study shared in the MakerDAO forum.

The price of stETH is observed in Curve's ETH/stETH StableSwap, the largest pool thus far. As seen in Dune Lido's dashboards, the pool reserves are correlated across different DEXes:



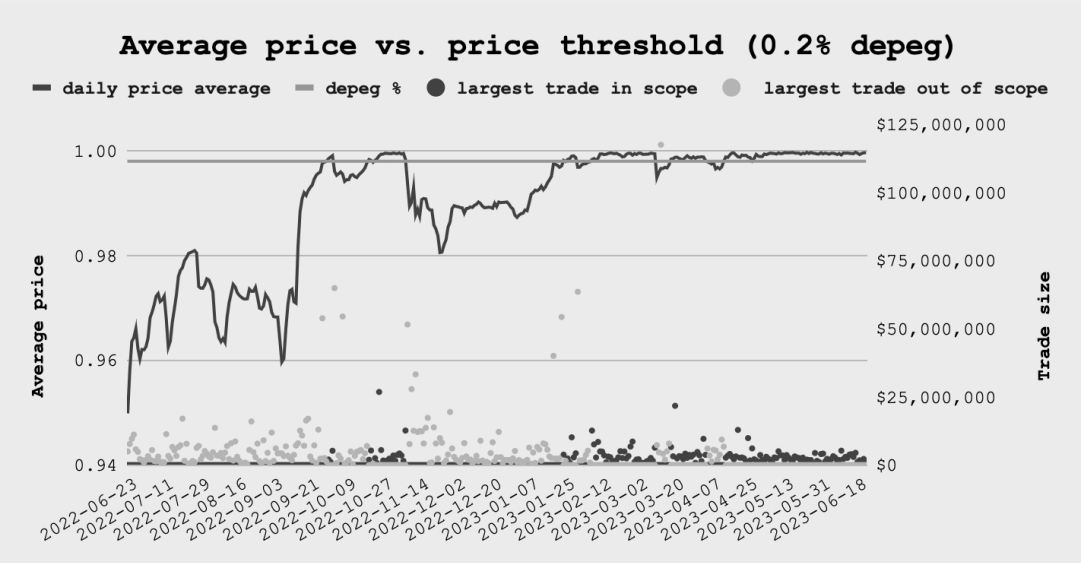




The picture and table below show the correlation between the depeg and the largest trades per day recorded between June 23, 2022 and June 23, 2023 (365 days). The depeg threshold is set as the price of stETH > 0.998 ETH (0.2% depeg, 20x the fees on the stETH/WETH pool in Curve as reference), categorizing trades as in scope or out of scope of the analysis. The price peg is a design parameter and could be modified. As can be seen, there are larger trades in the “out of scope” set (light grey) compared to the “in scope” one (dark grey):

Depeg	0.05%	0.10%	0.15%	0.20%	0.25%	0.30%	0.35%	0.40%

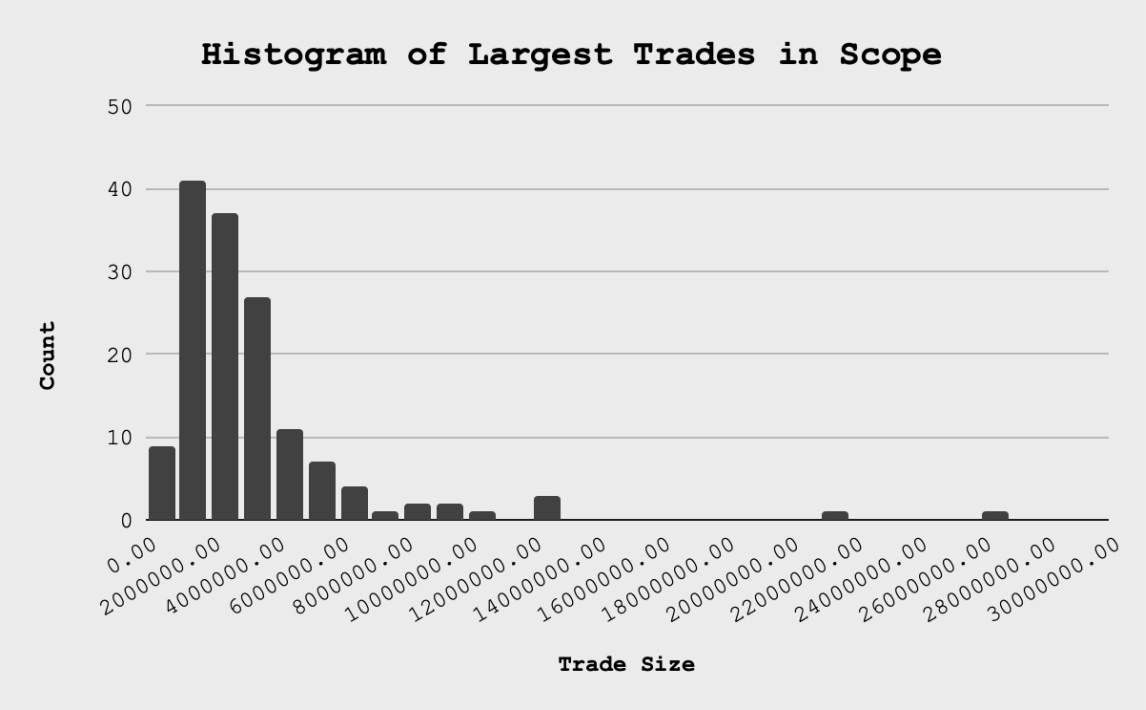
Largest Trade ($K)	6,779	26,827	26,827	26,827	53,878	54,353	117,582	117,582



Even though there are 50% more “largest trades” in the “out of scope” set, the following histogram clearly shows there is a more significant share of trades to the right compared to the “in scope” set. In any case, leveraging on “in scope” trades for liquidity requirements still satisfies many trades that took place on the dates in the “out of scope” set.

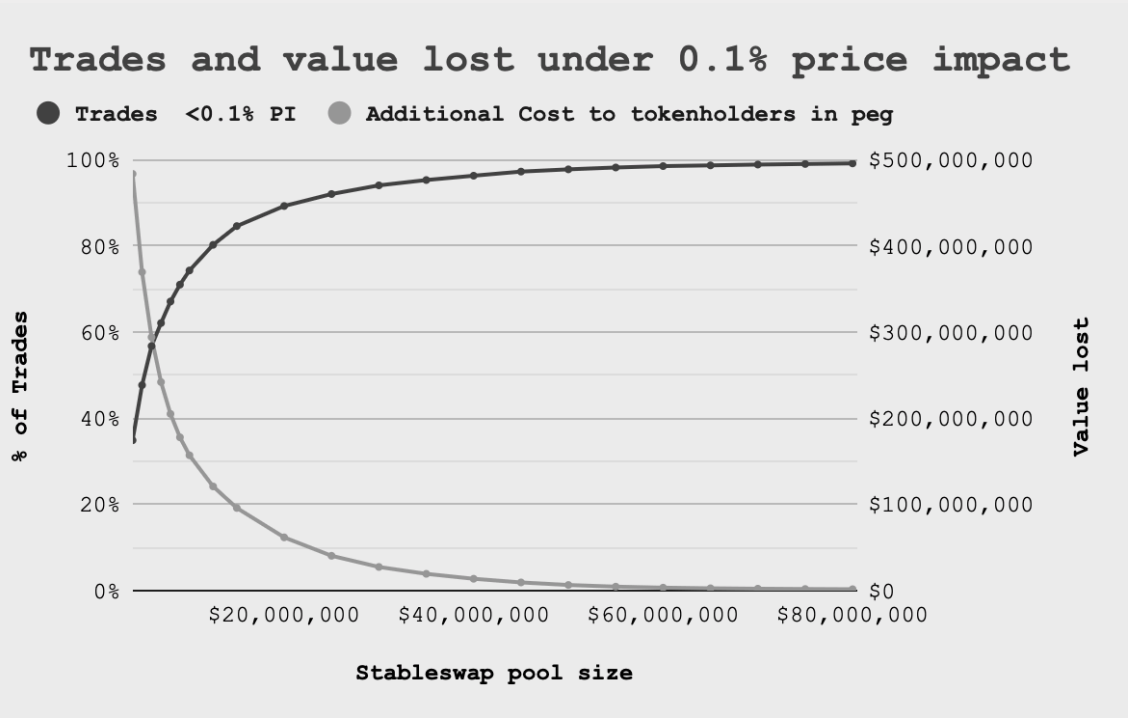
A price impact of 0.5% and 0.1% is proposed. Even though this is a discretionary choice, the UX on main DEXes can be used as guidance. Balancer shows a default slippage tolerance of 0.5%, with a custom tolerance pre-configured at 0.1%. Curve shows a default of 0.03% for stableswaps, highlighting a more significant price impact in red. Other trading pairs like USDC/WETH have a slippage tolerance of 0.1%. Uniswap shows yellow warnings above 1% and red warnings above 5%.

Based on an 80-20 principle, designing a liquidity depth of $33M to support a $4M trade with 0.5% PI means 77% of the days in scope would experience a price impact below that.



Extending the analysis to all trades above $100k that took place within the in-scope dates, 80% of them would have experienced a price impact under 0.5% for a $4M pool and under 0.1% for a $12.5M pool. Backtesting was done on a Curve v1 stableswap pool design with Balancer's mainnet parameters of 0,04% fee and 25 for A coefficient.

The cost that traders will absorb as value lost to price impact can be another design variable when considering different pool sizes. The following chart shows the share of trades with a PI below 0.1% and the marginal value lost for trades above 0.1%. Trades over $100k would generate $120M in losses for a pool with $12.5M TVL and $1.8M for a pool with $75M TVL. The bigger the pool depth, the less value is lost to price impact.



Deploying a pool within the range of $9M to $12.5M efficiently captures most of the benefit. The share of trades that result in a price impact lower than 0.1% ranges between 70% and 80%. A pool of $75M represents 99% of the trades with similar PI.