Curve stETH/ETH vs Mav swETH/ETH Pool Evaluation

Yield performance comparison of above 2 pools. Note I'll focus on market risk, and not cover LST depeg risk or underlying asset safety.

Overall Finding & Recommendation

Annualized Yield In ~90 day period (20230908-20231208)					
	Total Return	Staking	Trading Fee	Protocol/project incentives	Staking asset ratio
Curve stETH/ETH	2.23%	1.78%	0.14%	0.30%	50.20%
Mav swETH/ETH	**3.67%**	3.06%	0.61%	0%	86.16%
Lido Staking only	3.55%	3.55%	0%	0%	100%

- MAV pool annualized return (**3.67%**) is highest.
- Curve and MAV difference is **mainly from staking** (MAV stakes 86% vs Curve 50%)
- MAV fees (**0.61%**) about **4.4x** of Curve fee (**0.14%**) due to:
    - Daily turnover ratio (8.3% vs 4.3%) and fee rate (0.02% vs 0.01%)
- 30-day results are shared in section on detail.

Recommendation: MAV pool

Selection criteria:

- Flexibility in allocating more to staking asset when needed (during low trading vol)
- Flexibility in set LP price range and boost fee income
    - Trading_fee = fee_rate * daily_turnover * capital_efficiency_from_bin_set
    - Only factor capital_efficiency_from_bin_set is directly controllable by LP
- Higher total (potential) yield than pure staking

MAV swETH/ETH pool meets such criteria. Comparatively, **Curve pool unlikely to beat pure staking due to insufficient trading volume:**

- Current 90-day average daily turnover is only **4.26%, way below required 50%** to match 100% staking)

Further study needed on setting MAV pool LP range to balance fee income boost & impermanent loss.

Details & Data

Annualized Yield In ~90 day period (20230908-20231208)					
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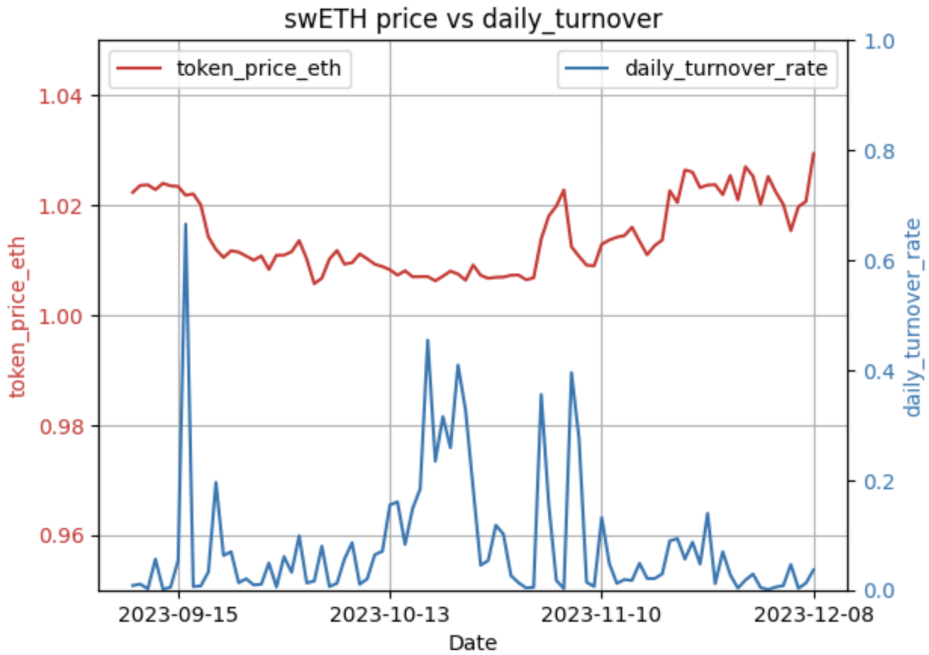
Annualized Yield In ~30 day period (20231108-20231208)					
	Total Return	Staking	Trading Fee	Protocol/project incentives	Staking asset ratio
Curve stETH/ETH	2.30%	1.81%	0.19%	0.30%	50.20%
Mav swETH/ETH	**3.12%**	2.84%	0.28%	0%	78.64%
Lido Staking only	**3.61%**	3.61%	0%	0%	100%

MAV pool 30-day yield drop to 3.12% from 3.67% (90-day) due to:

- **swETH % drop** (86.16% vs 78.64%) + **trading vol/ fee drop** (0.61% to 0.28%)
- Currently **swETH price is at high level & stable, leading to lower vol.**



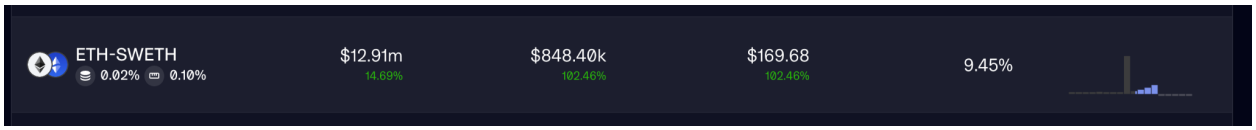
Minimum daily turnover rate needed to match yield from 100% staking:

- **MAV pool turnover target achievable** (need ~5% or ~10% due to range setting)
- while Curve turnover needs to increase 10x (4.3% to 49%)

	Curve stETH/ETH pool	MAV swETH/ETH pool	
		Average Bin-set	Narrower Bin-set
yield w 100% staking	3.6%	3.6%	3.6%
Pool staked ETH %	50.0%	80.0%	80.0%
Pool staking yield	1.8%	2.9%	2.9%
trading fee makeeven yield	1.8%	0.7%	0.7%
trading fee	0.0%	0.0%	0.0%
Bin-set capital boost	Not applicable	1	2
Required min avg daily turnover	**49.3%**	**9.9%**	**4.9%**
Past 90day avg daily turnover	**4.3%**	**8.3%**	**8.3%**

Fee income boost by Bin range set, and Impermanent loss

- MAV top bin Implicit boost is **~19x** (theoretical maximum value)

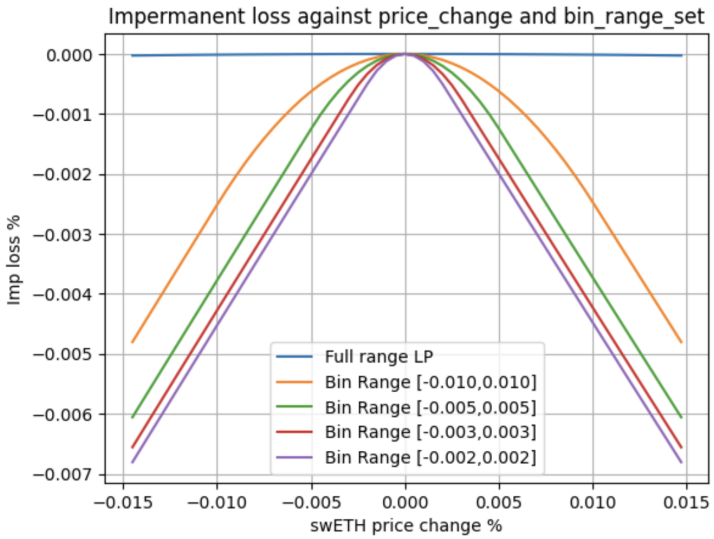


MAV ETH-SWETH pool	Value
TVL (M)	12.91
Volume (K)	848.4
Fee (dollar)	169.68
Report top bin yield	9.45%
Calculated Average yield	0.48%
Bin boost multiplier	**19.7**

- **Such a high boost (small LP range) can cause high impermanent loss**.
  - Above active bins widths (0.2%-0.3%) is even less than 7day volatility (0.48%).
  - At 0.3% width, 0.5% price change leads to ~0.2% loss (~10% loss annualized)
  - Detailed simulation & backtesting needed for setting

swETH price volatility data

Pool bin/price Statistics	Value
Active Bin price range	**0.2% ~ 0.3%**
7-day volatility	**0.48%**
Max price vs median	**0.87%**
Min price vs median	**-1.45%**
90d swETH max price	1.0293
90d swETH min price	1.0057
90d median price	1.0205



Source Code

- How to get curve total yield:
  - Trading fee + staking reward from LP_token_vitual_price change
  - Project Incentives from website
- How to estimate 90day / 30day pure staking yield:
  - Use Curve LP_token_virtual_price yield, and trading_fee yield
  - Formula: (LP_token_virtue_price_yield - trading_fee_yield) / stETH_share_%.
- How MAV pool total yield is estimated:
  - its_trading_fee_yield + swETH_share_% * staking_yield_estimate
- How to get trading_fee yield
  - Get pool eth/token related tx with both in and out leg under same tx hash
  - Above filter to remove add/remove liquidity
- Code Github link:

file	description
main_lst_pool_eval.py	Main
library_pool_data.py	Data download and clean using alchemy, coingecko api
library_pool_logic.py	Metric calc
library_constant.py	pool, token address, abi

Code not optimized, have also used ChatGPT in some parts with followup check.
ChatGPT is super helpful.