
Next Generation AMMs
Eliminating LVR
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Why change the system?

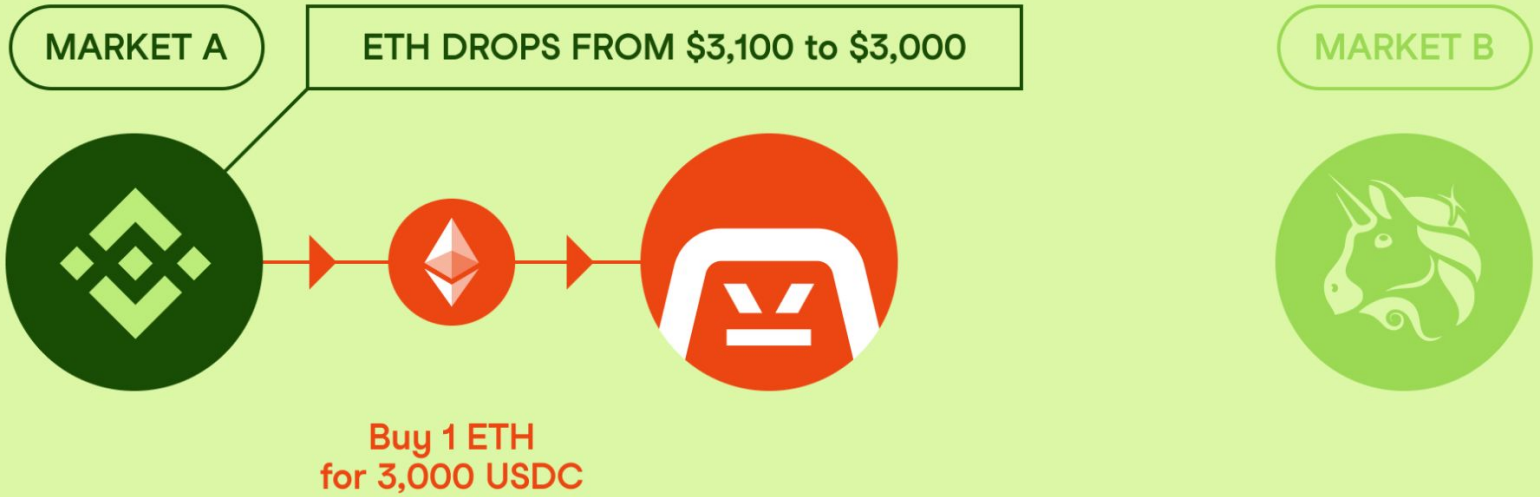
Liquidity Providers Lose Money

Loss Versus Rebalancing (LVR)

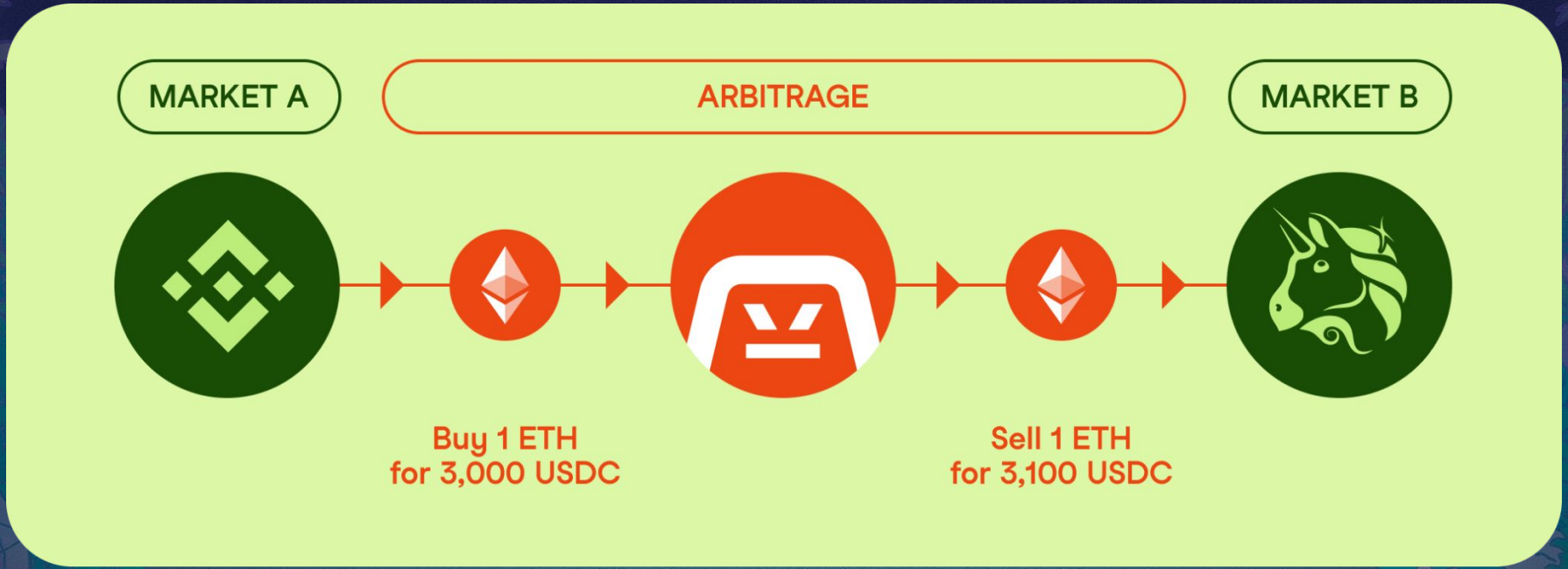
Terminology defined
by Tim Roughgarden et al (Aug 2022)

Adverse selection cost:
whenever there's a rebalancing event,
the AMM trades at an outdated price

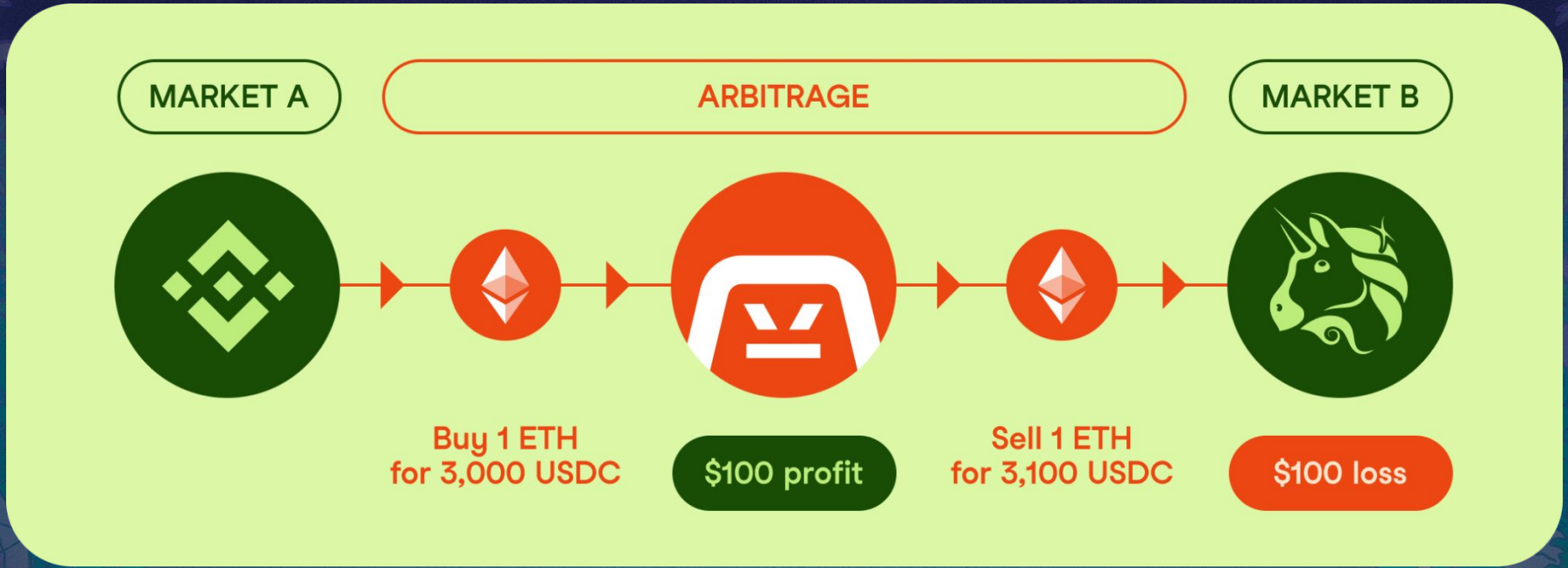
What is LVR?


MARKET A
ETH DROPS FROM $3,100 to $3,000
MARKET B
Buy 1 ETH
for 3,000 USDC

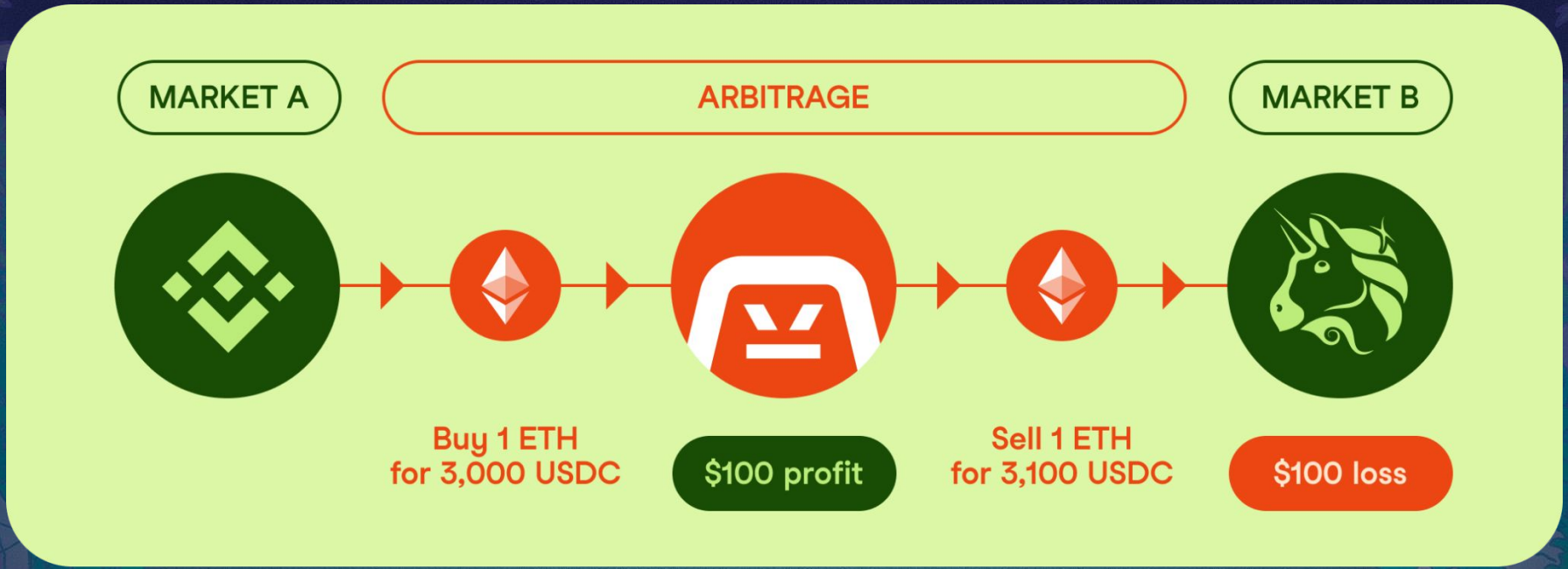
What is LVR?


MARKET A
ARBITRAGE
MARKET B
Buy 1 ETH
for 3,000 USDC
Sell 1 ETH
for 3,100 USDC

What is LVR?


MARKET A
ARBITRAGE
MARKET B
Buy 1 ETH
for 3,000 USDC
$100 profit
Sell 1 ETH
for 3,100 USDC
$100 loss

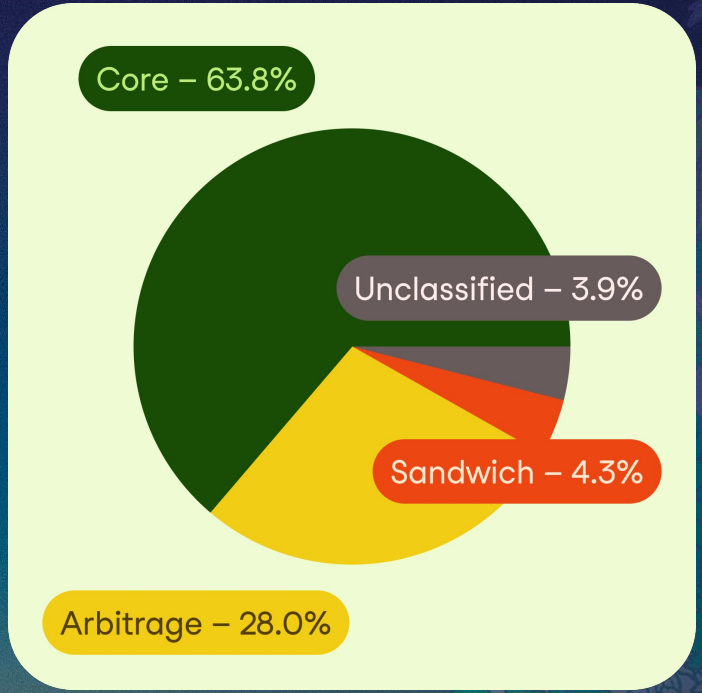
What is LVR?



LVR is the difference between a LP portfolio and a rebalancing portfolio.

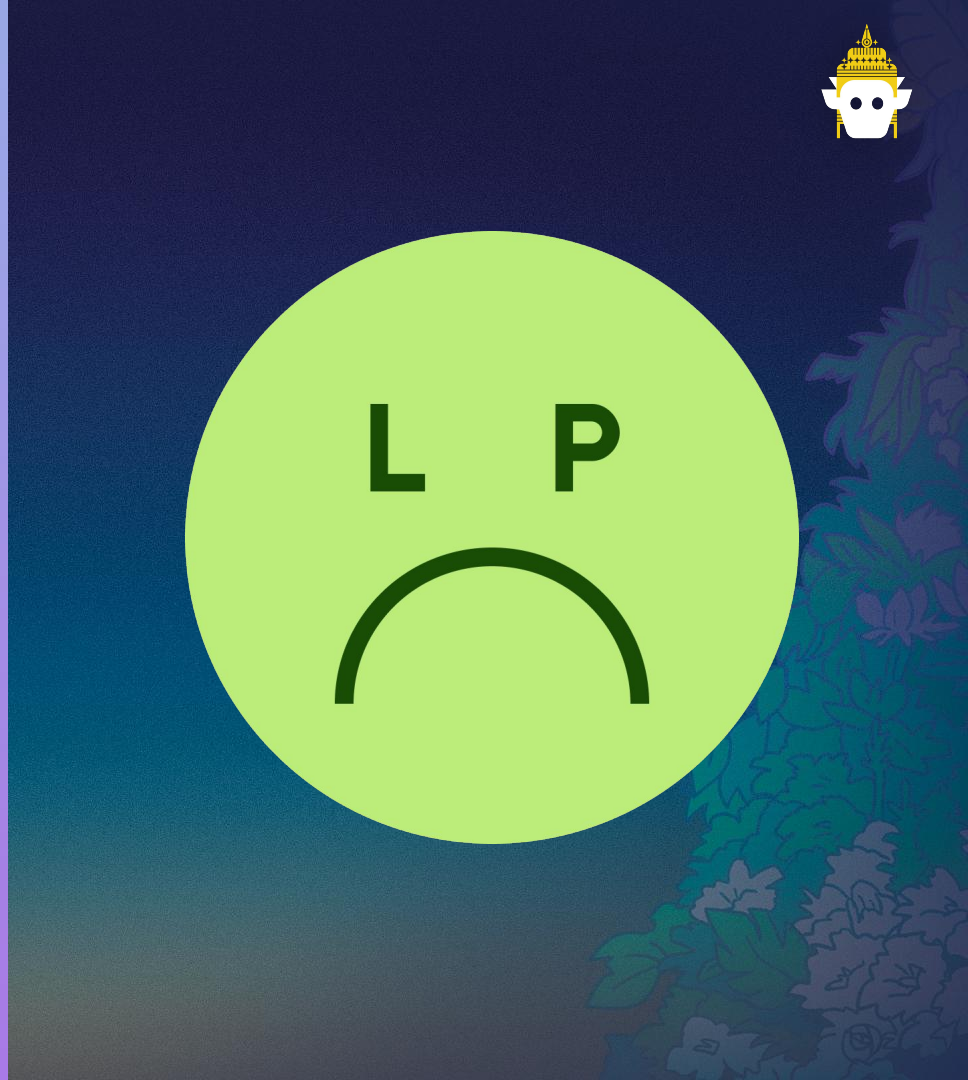
Impact of LVR

- Over 30% of the total post-merge Uniswap v2 volume results from arbitrage transactions
  - Arbs only trade to make profit
    (fees paid to LPs + gas < profit made with trade)
- LVR can cost LPs 5-7% of their liquidity annually
- Estimated lower bound: 500M on Ethereum



Source:
Uniswap v2: Still a Good Deal for Liquidity Providers? A Retrospective of 2023 – by Atis E

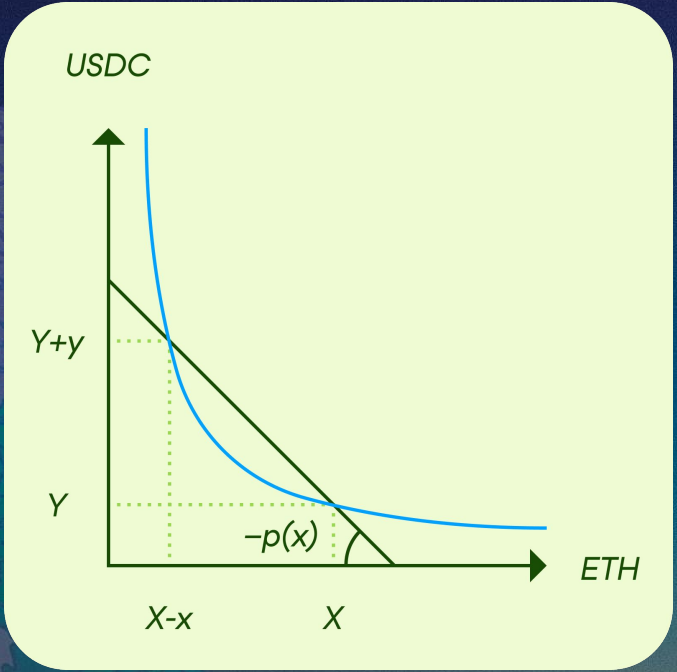
Traditional AMMs leak significant value to LVR.



Solving LVR

*or: how to turn that fr😌wn upside d😌wn

Constant Function AMM



Traditional AMMs process trades sequentially and need to satisfy path independence – which limits the design space for an AMM

Batching as Solution

- Aggregating all tx in a single batch with uniform clearing price:
  - Order of trades doesn't matter, all trades in one batch receive the same price
  - No incentive to split trades

Batch Implementation *

*leveraging CoW Protocol

Batching

Trades collected over a time period in a batch

(CoW AMM LPs are treated as traders on CoW Protocol)

+

Best Price Auction

Solvers compete to execute the batch

Rules:
- UCP
- EBBO

→ guarantees always executed at best price

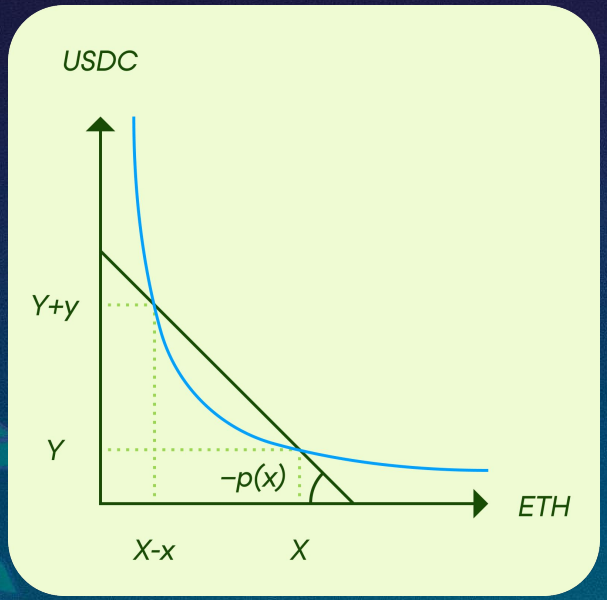
+

Generates Surplus

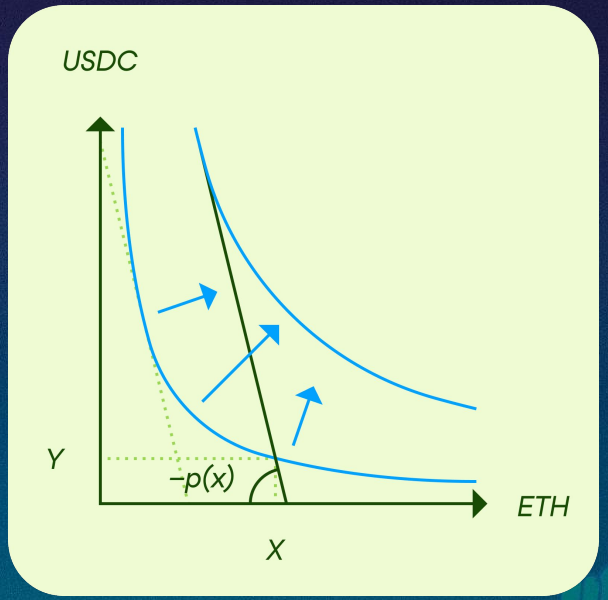
The solver that finds the most surplus wins the right to execute the trade – maximizing value for LPs (traders)
Trades are netted out and surplus distributed.

=

LVR and additional surplus is captured & distributed to LPs



VS



CF-AMM

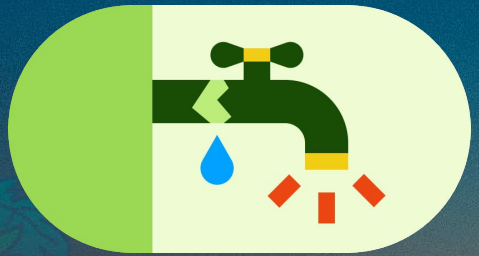
Traditional AMMs process trades sequentially and need to satisfy path independence – which limits the design space for an AMM

FM-AMM

FM AMM is defined as AMM in which, for every trade, the average price equals the marginal price after the trade. It is therefore called Function Maximizing.

CF-AMM

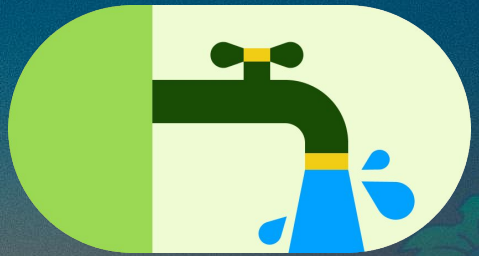
Returns
=
Rebalancing Strategy
-
LVR
+
Fees



VS

FM-AMM

Returns
=
Rebalancing Strategy
(-)
~~LVR~~
+
Surplus



Batching + New AMM Design = Removes LVR

Benchmarking Performance

Live FM AMM: CoW AMM

- Live since August 8th
- TVL: 20M
- 29 pools across Ethereum, Arbitrum and GnosisChain > 10k

Outperforms UniswapV2 50% of times
(and performs even better against other popular AMMs)

Methodology

Growth of 10K

- Initial investment of $10K
- Specific start date
- Can be negative

APR comparison

- Used by most AMMs
- APR = Expected Fees / TVL
- *Somewhat misleading as it's always positive*

CoW AMM vs Uniswap v2

- CoW AMM is already outperforming Uni in pools where CoW liquidity is up to 10x smaller
- CoW AMM is not yet outperforming Uni in pools where Uni liquidity is at least 29x larger
  - *Larger pools attract over proportionally more trading volume and hence lead to more fees*

CoW Pool	Uni Pool	CoW AMM hedge over the reference pool	How much bigger is Uni TVL
wstETH/DOG	WETH/DOG	0.02%	5x
wstETH/PNK	WETH/PNK	0.04%	9x
SAFE/WETH	SAFE/WETH	0.02%	3x
USDC/WETH	USDC/WETH	-0.29%	46x
MKR/WETH	MKR/WETH	-0.23%	80x
BAL/WETH	BAL/WETH	-1.35%	29x

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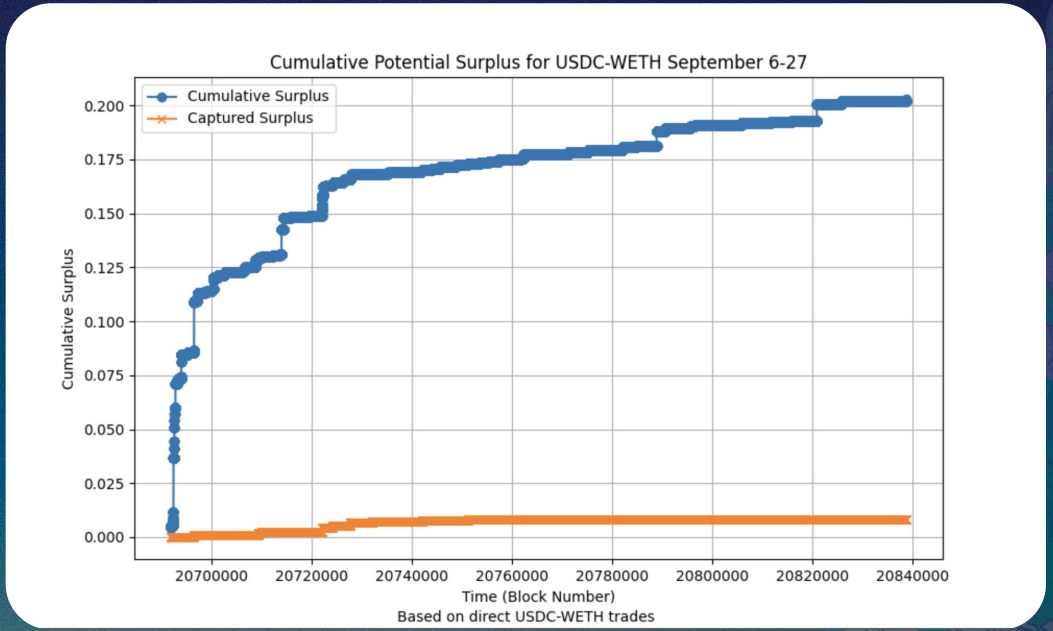
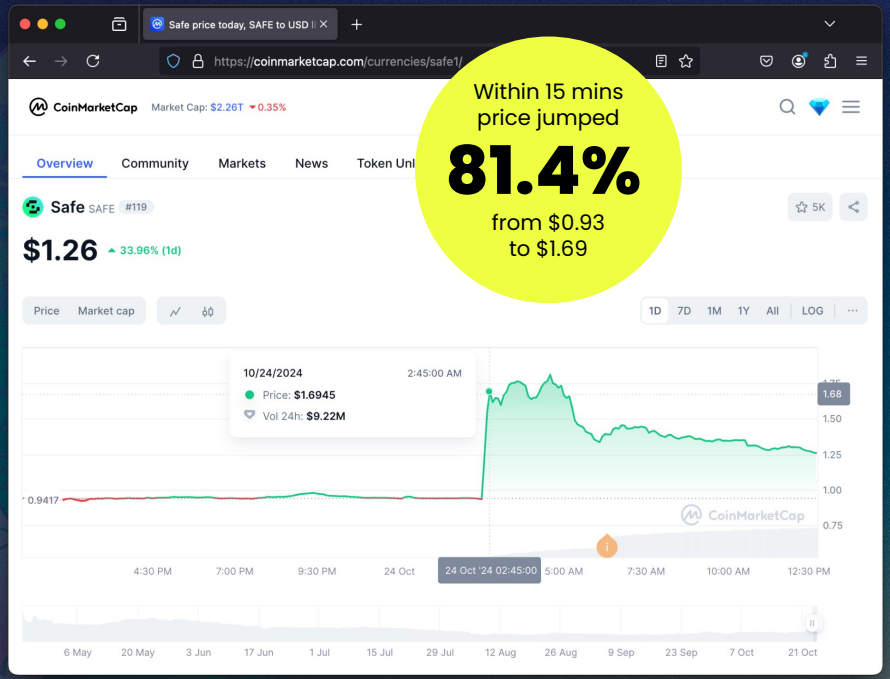
CoW AMM still unfolding full potential

96% of surplus is still left on the table

- Solvers often don't touch CoW AMM liquidity yet
- Solvers are not yet using CoW AMM for indirect routing



Big Price Movements:
CoW AMM outperforms other AMMs



Within 15 mins
price jumped
81.4%
from $0.93
to $1.69

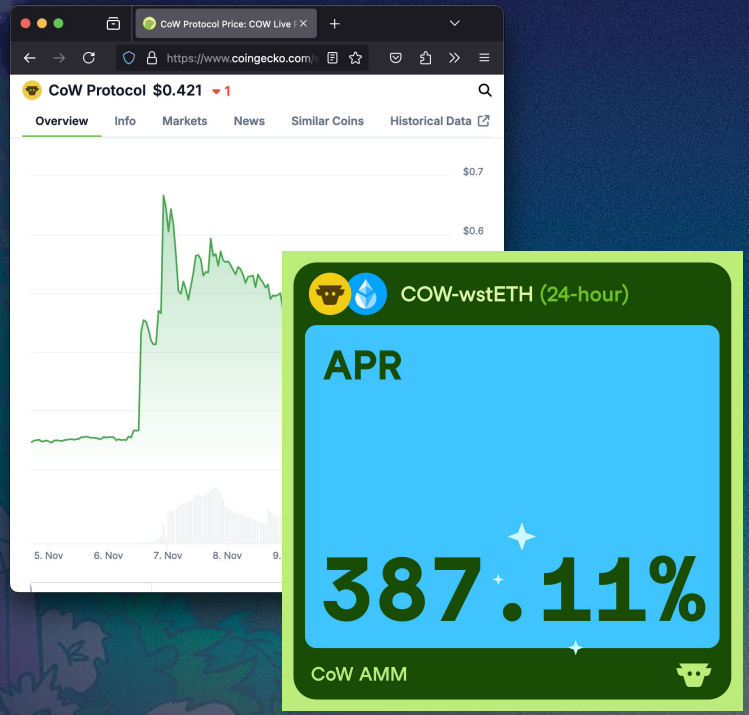
Uniswap

- Rebalancing tx
- Captured 0.3% (Fees)

CoW AMM

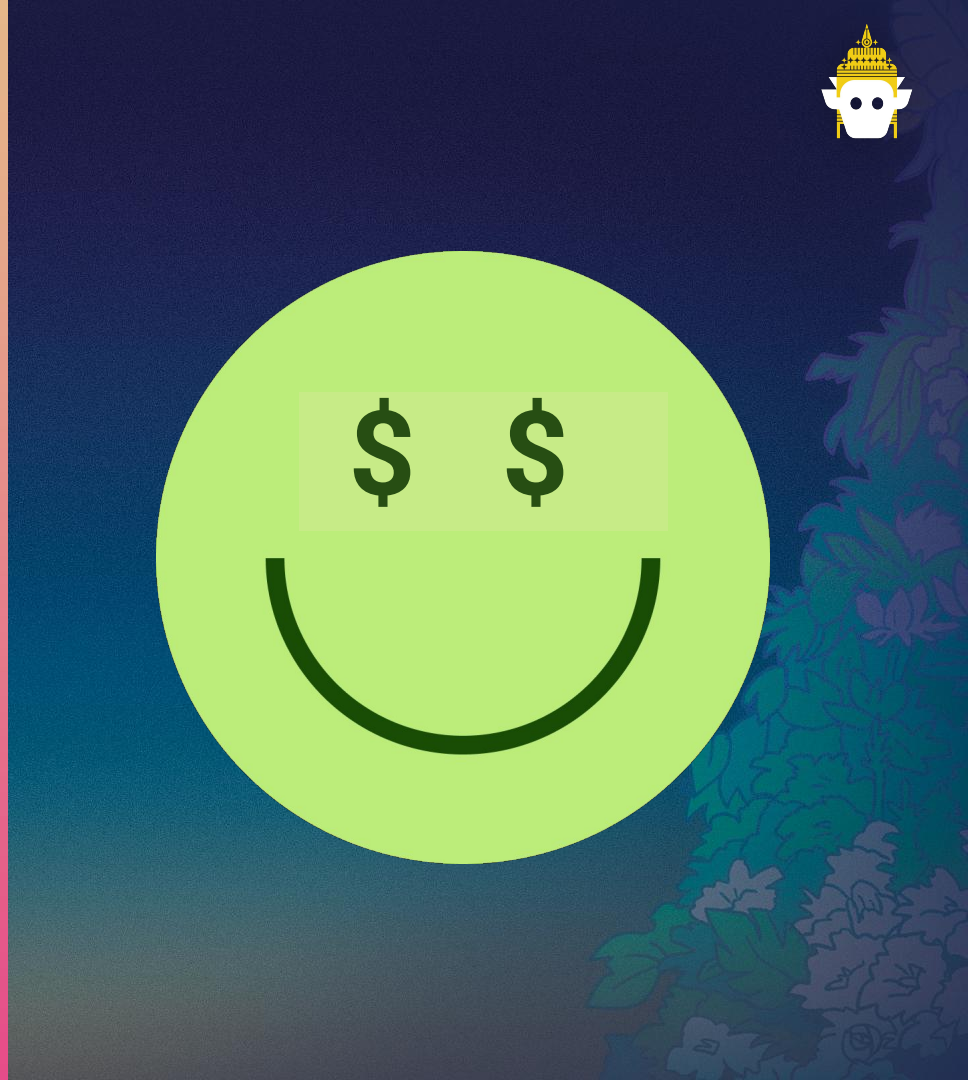
- Rebalancing tx
- Created >10% in Surplus
- Did 30x better than Uniswap

Big Price Movements: CoW AMM outperforms other AMMs



- Rebalancing order where a solver sold 83.5K $COW for at least 9.2 $wstETH
- Link CoW Explorer
- LPs received 15.18% of the tx value as surplus
- Over 50x better than Uniswap (who would have received only 0.3% in fees)

LVR removal + Surplus maximize LP returns



CoW AMMs as Investment Strategy

CoW AMMs are enhanced index funds

CoW-AMMs rebalance automatically and don't lose money to LVR, meaning they already behave like (decentralized, crypto-native) index funds today

In fact, they're "enhanced" index funds:

- No fees
- Gain additional fees via surplus

EDTFs

Decentralized Exchange Traded Fund

- Financial upsides (no fees, no LVR, plus Surplus)
- Multi token support: access multiple assets with one fund (50/50; 80/20; any combination)
- Full control & accessible anytime

EDTFs

Decentralized Exchange Traded Fund

- Financial upsides (no fees, no LVR, plus Surplus)
- Multi token support: access multiple assets with one fund (50/50; 80/20; any combination)
- Full control & accessible anytime
- \+ Leverage yield-bearing assets: CoW Protocol's intent based mechanism swaps in and out of interest bearing tokens, allowing for additional return on otherwise idle staked tokens.

Rebalancing on CoW AMM + Surplus + Interest Bearing Fees = Best Passive Investment Strategy

Summary

- LVR is the LP profitability killer
- FM AMMs fix the LVR problem
- FM AMMs are already outperforming Uni v2 pools in many cases
- Performance will continue to improve with more TVL and more solver support
- FM AMMs can unlock passive investment strategies across DeFi

Thank mooo!

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