Liquidity fragmentation on decentralized exchanges

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Research Questions in a Nutshell

Pool	Project	Chain	TVL	APY	7d Volume
1 WETH-USDT (0.3%)	Uniswap V3		$57.84m	7.03%	$34m
2 WETH-USDT (0.05%)	Uniswap V3		$35.35m	9.81%	$234.04m

- The paper empirically documents the following facts:
  1. There exist two pools with the same pair (for example WETH-USDT) but different fees (high 0.3%, and low 0.05%)
  2. High-fee pool with larger TVL
  3. Low-fee pool with larger volume
  4. Low-fee pool with higher APY

Question: Why is that?

Main Results

- Investigate, theoretically and empirically, how explicit transaction costs affect liquidity supply.
- Rigorously documents the empirical facts from the previous slide analyzing a large cross-section of Uniswap pools.
- Rationalizes the results by applying a simple model of liquidity supply with two markets (high fee vs. low fee).
- Fixed gas fees translate into market fragmentation (wedge between large institutional and small retail) of market makers.

This Paper and Main Results

- Traders route their orders first to the low-fee pool to minimize transaction costs.
  - $\Rightarrow$ low-fee markets are actively traded
- What happens if:
  - $\uparrow$ gas price $\rightarrow$ position management becomes more costly $\rightarrow$ 1.$\downarrow$ TVL low-fee pool, 2.$\uparrow$ TVL high-fee pool
- Economic mechanism: smaller liquidity providers face a trade-off of a lower execution probability against higher liquidity fees and lower gas fees.

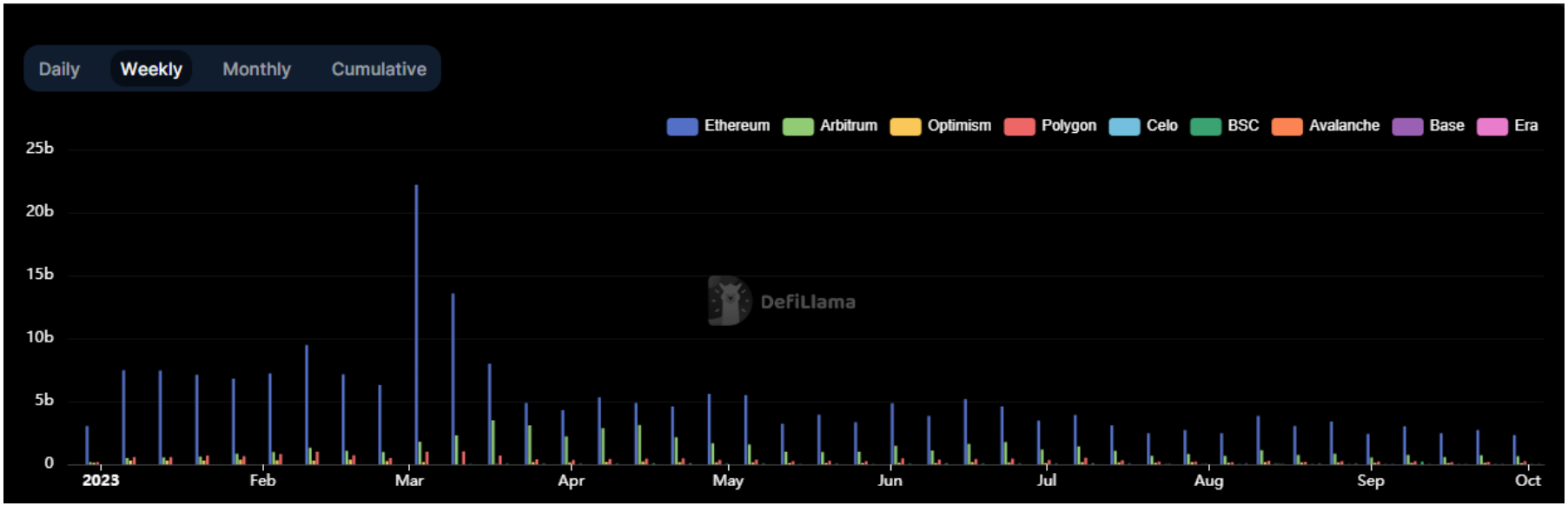
Feedback – Model Calibration

- Is it possible to calibrate your model (at least for one relevant token pair)?
  - Gas costs (Γ)
  - Pool sizes ($\mathcal{L}_l, \mathcal{L}_h$)
  - Pool fees (l, h)
  - Aggregate liquidity demand: $dD_t = \theta dt + \Theta dJ_t(\lambda)$ with (θ, Θ, λ)
  - $[1, Q]$ (range of the Pareto distribution)
- It would be interesting to see Figure 2, Figure 3, Figure 4, and Figure 5 using calibrated quantities.

Feedback – Further Questions – I

- As an LP I rather stake in the (low-fee) pool with the larger APY, but the impermanent loss (IL) is larger as well. What is the difference in "net APY" between the pools with the same token pair?
- Your paper argues that LPs are more sophisticated than we thought. Worth elaborating?
- From a "social planers" perspective - would it be better to have only one fee pool?

Feedback – Layer-2 Scaling – I



- What about Layer-2 Blockchains? (lower gas fees)
- Abitrum: April $\approx$ 50% volume
- What happens if the gas fee becomes significantly lower?
- Example: providing liquidity $\approx$ 0.14USD[1]
  - Subgraph: `https://thegraph.com/hosted-service/subgraph/messari/uniswap-v3-arbitrum`

[1] `https://arbiscan.io//tx/0x68d56962e38df1607f627d74a4c0cd4923708f6b27c2b4f32435ea3bd17bf100`

Feedback – Layer-2 Scaling – II

- What are the implications for Layer-2 solutions?
- Would the market still be fragmented?
- "Staking and hold" still predominant for retailers?

Feedback – Minor comments

- *We use intraday data on liquidity events (either mints or burns) to measure the duration between two consecutive opposite sign interactions by the same Ethereum wallet with a liquidity pool: either a mint followed by a burn, or vice-versa.*
  - What if you have a few consecutive burns or mints? Maybe clarify
- I never saw the word "transactions costs" (first paragraph of the paper)

Conclusion

- Interesting paper!
- I could learn a lot!
- Well-written paper and rigorous empirical analysis
- Model calibration + Layer 2 implications would round up the story.

$$t^h a_n(k)\ y_o[u]\ !$$

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References I