The DeFi Dilemma

Aron Bodisz, Nikolaus Hautsch, and Stefan Voigt

Discussion by Alfred Lehar
London 2024

- Price differences occur on DEXs that could be arbitraged
- Arbitrage transactions are put into the mempool where they are publicly visible
- Adversaries can 'front-run' these transactions by executing them on their own behalf
- If entrepreneurs are front run they have to pay a gas cost and their transaction fails
- Front running discourages arbitrageurs
- We see persistent price deviations

Comments - story vs reality

- Story: 'Orders are visible in the mempool and arbitrageurs get discouraged by front running'
- Visibility and Front running risk
  - There is no front running as most arbitrage goes through a private mempool and **cannot be seen**
  - Arbitrageurs propose 'bundles' that are private and included by validators for a fee
  - See empirical section where the authors use flashbots
- Discouragement
  - in paper: arbitrageurs have to pay a gas cost even when they are frontun
  - Flash bot transactions pay fee contingent on execution
  - Zero gas fee but a direct transfer of fee to the validator's wallet upon successful execution
  - No downside for arbitrageur - not a plausible explanation for discouragement
  - $0.64 \times x > 0$ if $x > 0$

Comments -Other explanation: Bigger Fish to Fry

- A loan liquidation could offer much higher reward
- Liquidator bot does not want to risk failure and sells on most liquid DEX
- liquidation of $20 million of WBTC collateral on February 23rd 2021 (Lehar and Parlour - Systemic Fragility in Decentralized Markets)

- More profitable arbitrage Uniswap V3, curve, balancer not in sample
- More profitable CEX-DEX or cross-chain arbitrage
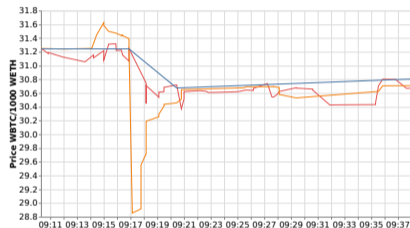
Comments

- What is the correct benchmark?
  - Arbitrageurs have to invest effort to find opportunities (Lehar and Parlour: Battle of the bots)
  - It might take a while to find the arbitrage. What is OK?
- How should profits be shared between Validator and arbitrageur
  - Why is 64% too high?
  - Because of liquid staking MEV benefits many users
- Sample only considers two leg arbitrage (between 3 pools?). Multiple arbs (each two legged) can be in one TX.
- How long to arbitrage opportunities last?

Minor comments

- Intro: flash loan requires borrow and repay with same transaction and not block
- Statistical arbitrage is murky: what are the bots really doing? Liquidations, CEX-DEX arb, JIT liquidity, ...?
- Why include Section 2.2. - definition of DeFi
- Comparative static in Section 3.4 with respect to τ is meaningless as fees are exogenous
- The discussion in 3.5 is nice but since arbs go through flashbots they bypass the fee system
- Fees for flash loans are known
- p16: with private mempools there are no bidding wars
- The positive reversal fee is not justified when trades go through flashbots

Minor comments

- The flashbots dataset is not complete. It would be nice to see a more comprehensive set of arbitrage transactions based on blockchain data.
- How do we know that Flashbots and Eden have 90% market share?
- How are the lit transactions identified? Are they in flashbots? How do we know flashbots is complete?
- p31: validators can not take a 'last look' as relays pass on blocks to validators who sign without knowing the content of the block