Web3 and Financial Market Infrastructure

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What is Web3?

- The use of some combination of blockchains and cryptocurrencies (tokens) to provide decentralized products and services.
  1. Open source
  2. Open access (anyone can use them)
  3. Native cryptocurrencies/tokens
  4. Data/programs stored on a blockchain
- Some projects incorporate only crypto/tokens or only blockchains
- Reduce the cost of transferring/owning/securitizing assets and potentially new ways of offering basic finance services.

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Tokenization and Token Types

- Dollar bills are tokens and in Web3, token is code.
  - Used to transfer information and value.
  - Anything can be tokenized: access, voting rights etc.

- Many different designs:
  - ERC-20 – most cryptocurrencies, tokens are fungible
  - ERC-731 -- non-fungible tokens, meta data keeps transaction history

- Other:
  - ERC 3643 – only transferrable to accredited investors.

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Benefit of Tokenization

- Storing, trading and tracking illiquid assets.
  - Real Estate
  - Infrastructure
- Automating payments
  - Periodic swap payments
  - Fixed income payments
- Delivery versus payment
  - Reduce collateral (nostro-vostro accounts)
  - Central Clearing credit risk

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Blockchains

- Over 200 in operation
  - Store data
  - Observe and verify transactions (movement between addresses)
  - Designed to run forever (some fail)

- Blockchains can execute basic code
- Ethereum Virtual Machine
  - Each program is stored at a unique address.

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Economic Costs and Benefits of Blockchains

- Transactions are verifiable/auditing is easier.
- Everyone using the same chain is using the same ``standard'' → reconciliation is easier.
- Economic power is not necessarily concentrated.

- Computing is not ``efficient''
- Capacity is limited

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Design Innovation: Automated Market Makers (DEXs)

- New model of liquidity provision

- Provides automated delivery against payment for any asset pairs
  1. Liquidity demand and supply are separated.
  2. Price discovery separate from liquidity provision

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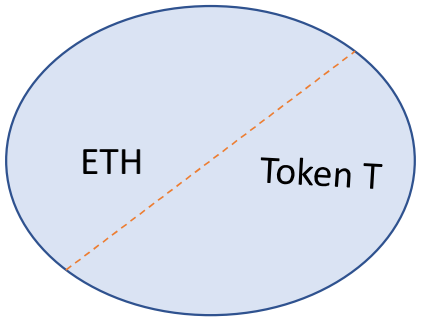
Decentralized Exchange (DEX)

- Comprises multiple bilateral swap pools

- Liquidity Supplier adds ETH, T
- Proportion given by pool
- Receives a liquidity token



Liquidity Demander exchanges ETH for T
Price impact is **deterministic**

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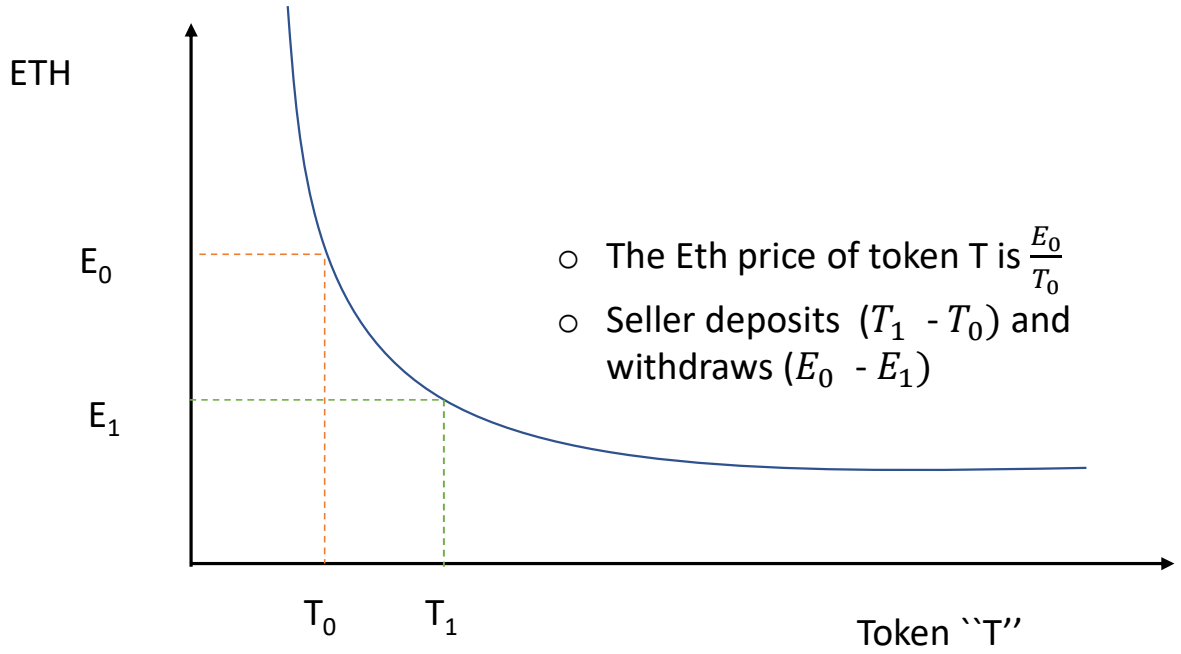
Decentralized Exchange (DEX)

- Curve is a design feature
- Price efficiency maintained by arbitrageurs.
- Integrated clearing and settlement



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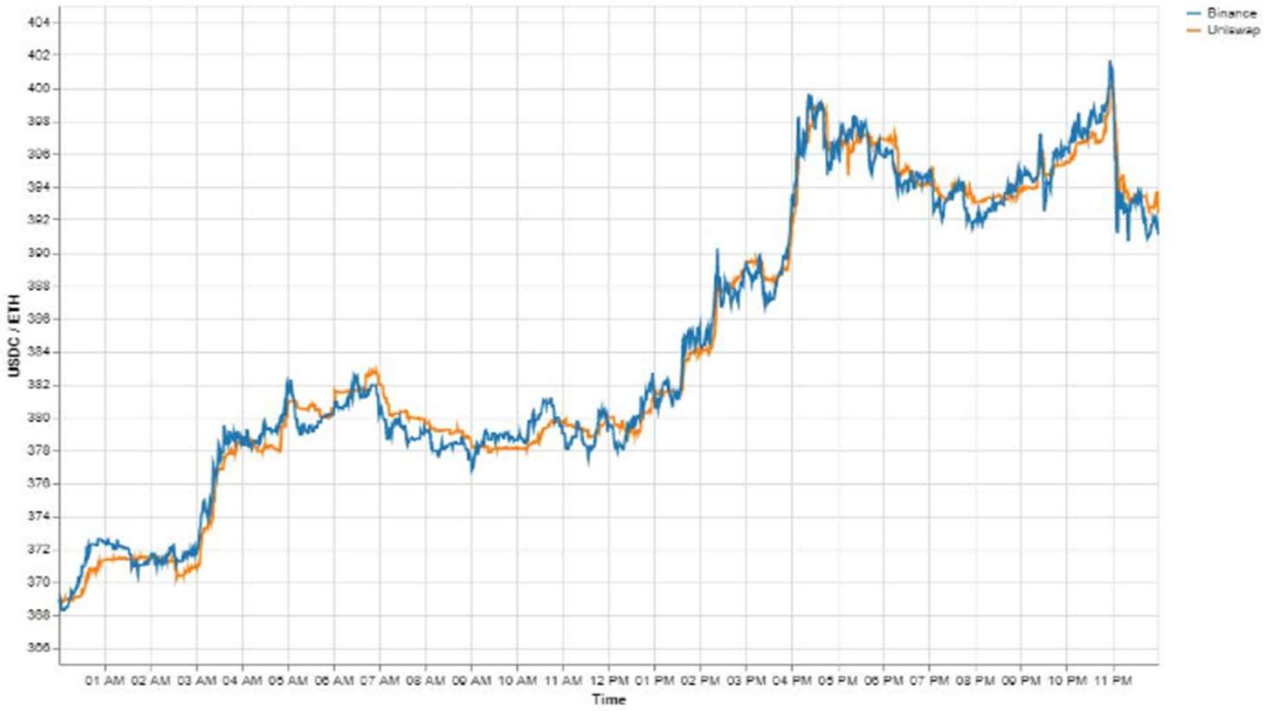
Does it work?
Price efficiency: Intra-day Prices October 21, 2020



Prices on the Dex closely aligned with off-chain (traditional exchanges)

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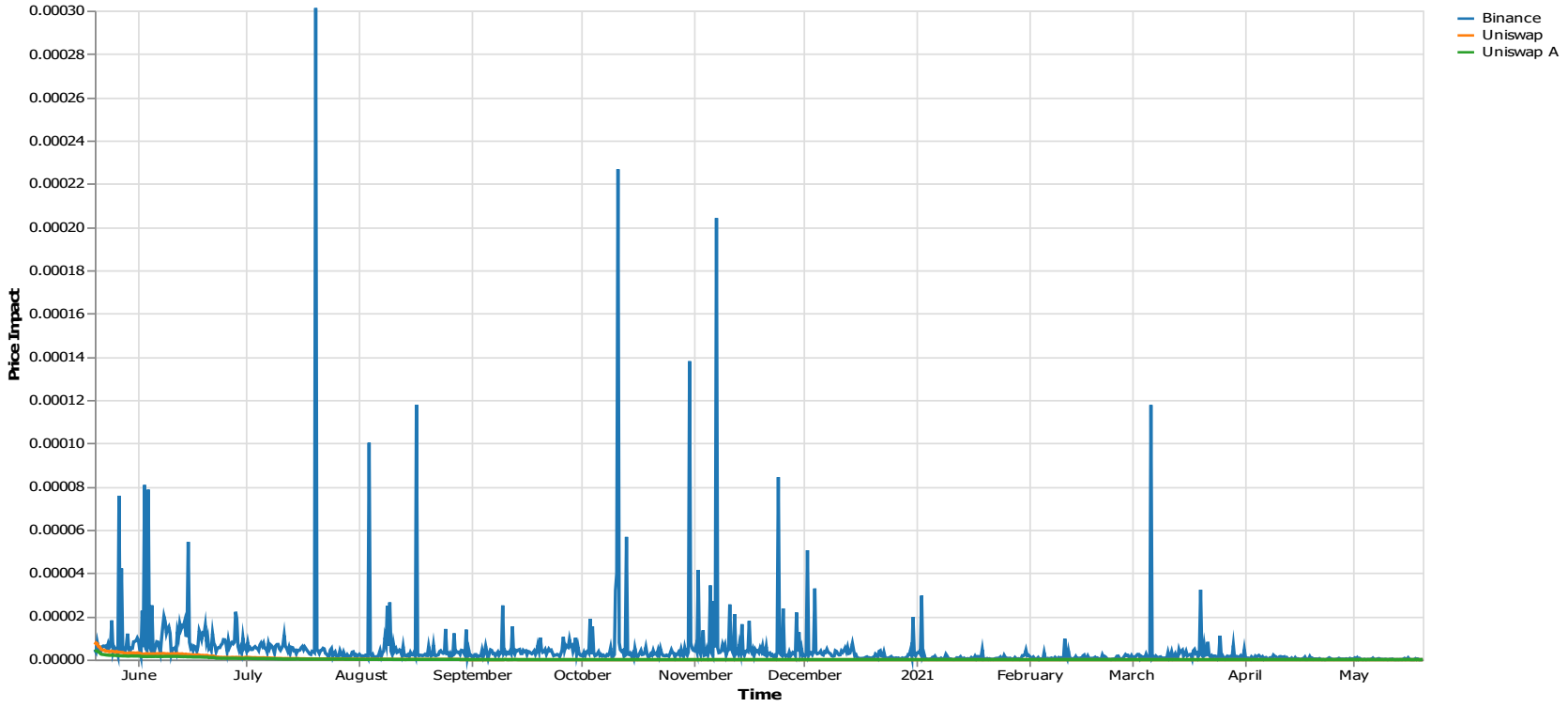
Source: Lehar and Parlour (2021)

Does it work?
Observed price impact of USD/ETH much lower than Binance



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Source: Lehar and Parlour (2021)

Design Innovation:
Intermediation with no credit risk

- Various automated finance protocols use dynamic collateral management

    1. High frequency ``marking to market'' features
    2. Loan liquidation is outsourced to markets

- Effectively reduces credit risk but affects collateral markets

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Automated Collateralized Lending (Repo)

Lenders

- Deposit crypto into a pool
- Interest paid is a function of ratio of borrowers to lenders
- Withdraw at any time
- Claims are liquid

- Floating rate transfers run risk to borrowers.
- Liquidations done by profit maximizing 3rd party traders.

Borrowers

- Deposit crypto collateral into a smart contract
- Pay high frequency floating rate
- Liquidated if LTV is too high

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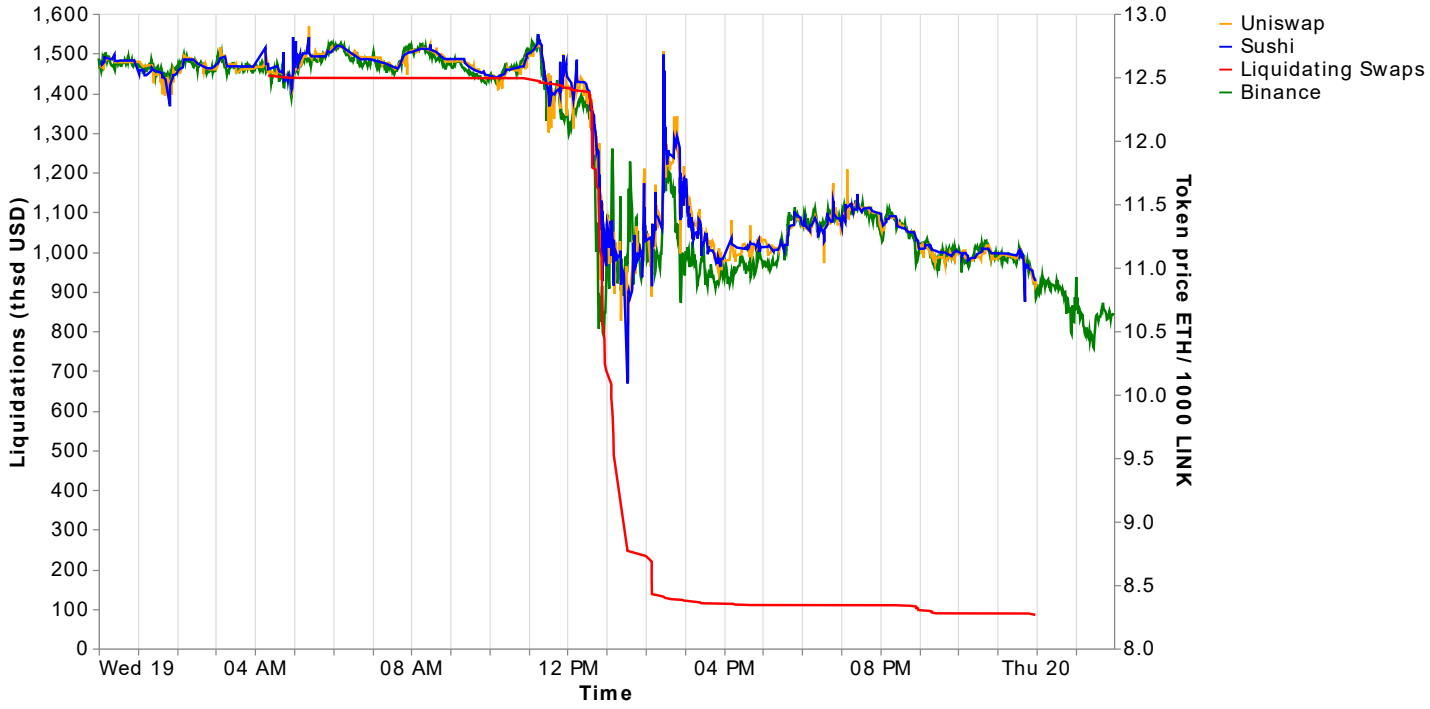
180 Liquidations of LINK on May 19, 2021



- Red line is the price calculated from the Dex
- Grey are the cumulative liquidations

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Source: Lehar and Parlour (2022)

Design Innovation: efficient payments

- Stablecoins originally used for trade on digital platforms.
  - In 2014 difficult to move fiat between exchanges and accounts.
  - Many crypto-venues did not accept fiat in order to avoid regulation.
- Now, widely used as collateral and for trade in digital assets
- Anecdotal evidence that stablecoins are used to settle trade contracts cross-border
- Success of this private money part of the impetus for Central Bank Digital Currency (CBDC) experiments.

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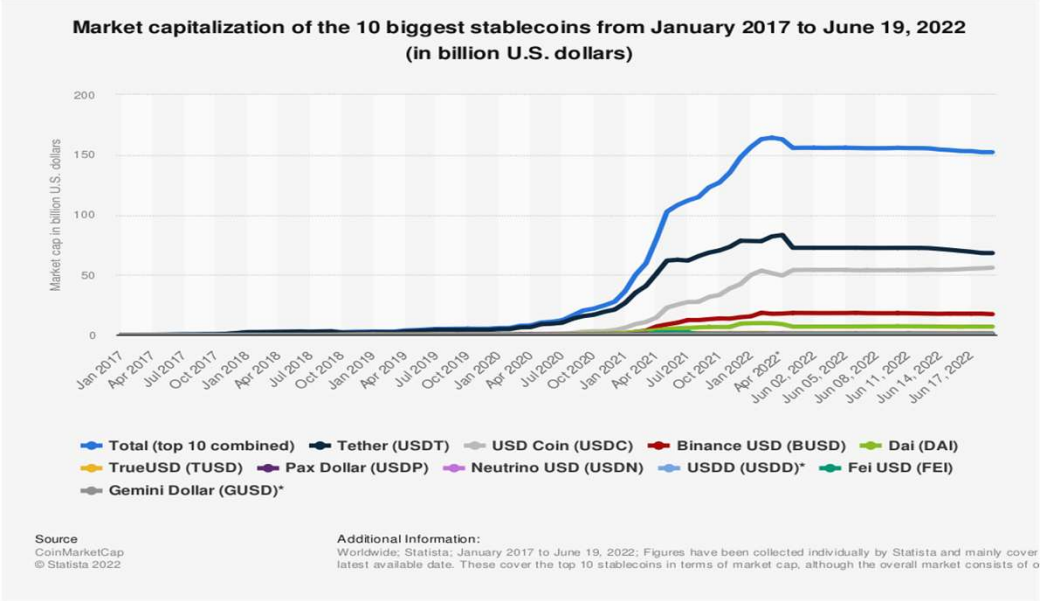
Types of Stablecoins

1. Fiat Collateralized
   - Like a money market fund
2. Crypto Collateralized
   - CDO structure
3. Algorithmic
   - Like a private central bank



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Web3 and Traditional Finance Examples

- Reducing the cost of cross-border payments and the collateral required in nostro-vostro accounts.
- Integrating delivery against payment reduces the cost of collateral in central clearing mechanisms.
- Using a blockchain reduces opacity → important for large illiquid assets.

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Adapting to Web3

- Automated finance provides a suite of effective models to exchange value and monitor credit risk.
  - May move risk from intermediaries to the market/traded prices.
- Can reduce the cost of exchanging value.
  - Also made different corporate forms possible

- Regulators: existing policy levers may work in different ways, and different policy levers may be required.

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