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.
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.
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 (nosto-vostro accounts)
  • Central Clearing credit risk
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.
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
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
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**
Decentralized Exchange (DEX)

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

The Eth price of token T is $\frac{E_0}{T_0}$

- Seller deposits $(T_1 - T_0)$ and withdraws $(E_0 - E_1)$

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ETH

$E_0$

$E_1$

$T_0$

$T_1$

Token “T”
Does it work?
Price efficiency: Intra-day Prices October 21, 2020

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

Source: Lehar and Parlour (2021)
Does it work?
Observed price impact of USD/ETH much lower than Binance

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
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

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

- Floating rate transfers run risk to borrowers.
- Liquidations done by profit maximizing 3rd party traders.
180 Liquidations of LINK on May 19, 2021

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

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.
Types of Stablecoins

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

Source:
CoinMarketCap
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Additional Information:
Worldwide: Statista, January 2017 to June 19, 2022. Figures have been collected individually by Statista and mainly cover the latest available data. These cover the top 10 stablecoins in terms of market cap, although the overall market consists of a
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.
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.