DeFi and the Future of Finance:
4. Problems DeFi Solves

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Outline

- Inefficiency
- Limited access
- Opacity
- Centralized control and
- Lack of interoperability

Inefficiency

Volume and frictions

- DeFi can accomplish financial transactions with high volumes of assets and low friction that would generally be a large organizational burden for traditional finance.
- DeFi creates reusable smart contracts in the form of dApps designed to execute a specific financial operation.
- These dApps are available to any user who seeks that particular type of service, for example, to execute a put option, regardless of the size of the transaction.

Inefficiency

No organizational overhead

- A user can largely self-serve within the parameters of the smart contract and of the blockchain the application lives on.
- In the case of Ethereum-based DeFi, the contracts can be used by anyone who pays the flat gas fee.
- Once deployed, these contracts continually provide their service with near-zero organizational overhead.

Inefficiency

Keepers

- Keepers are external participants directly incentivized to provide a service to DeFi protocols, such as monitoring positions to safeguard that they are sufficiently collateralized or triggering state updates for various functions.
- To ensure that a dApp's benefits and services are optimally priced, keeper rewards are often structured as an auction.
- Pure, open competition provides value to DeFi platforms by guaranteeing users pay the market price for the services they need.

Inefficiency

Forking

- A fork, in the context of open source code, is a copy and reuse of the code with upgrades or enhancements layered on top.
- A common fork of blockchain protocols is to reference them in two parallel currencies and chains.
- Doing so creates competition at the protocol level and creates the best possible smart contract platform.

Inefficiency

dApps forkable

- Not only is the code of the entire Ethereum blockchain public and forkable, but each DeFi dApp built on top of Ethereum is as well.
- Should inefficient or suboptimal DeFi applications exist, the code can be easily copied, improved, and redeployed through forking.
- Forking and its benefits arise from the open nature of DeFi and blockchains.

Inefficiency

Vampirism

- Vampirism is an exact or near-exact copy of a DeFi platform designed to poach liquidity or users by offering larger incentives than the platform it is copying.
- The larger incentives usually take the form of inflationary rewards offered at a far higher rate than the original platform offers.
- Users might be attracted to the higher potential reward for the same functionality, which would cause a reduction in usage and liquidity on the initial platform.

Inefficiency

Vampirism risks

- If the inflationary rewards are flawed, over long-term use the clone could perhaps collapse after a large asset bubble.
- The clones could also select closer to optimal models and replace the original platform.
- Vampirism is not an inherent risk or flaw, but rather a complicating factor arising from the pure competition and openness of DeFi.
- The selection process will eventually give rise to more robust financial infrastructure with optimal efficiency.

Limited access

DeFi and financial democracy

- DeFi gives large underserved groups, such as the global population of the unbanked as well as small businesses that employ substantial portions of the workforce (for example, nearly 50% in the United States) direct access to financial services.
- The resulting impact on the entire global economy should be positive.

Limited access

DeFi and financial democracy

- Even consumers who have access to financial services in traditional finance, (bank accounts, mortgages, and credit cards) do not have access to the financial products with the most competitive pricing and most favorable terms; these products and structures are restricted to large institutions.
- DeFi allows any user access to the entirety of its financial infrastructure, regardless of her wealth or geographic location.

Limited access

Yield farming

- Yield farming provides inflationary or contract-funded rewards to users for staking capital or utilizing a protocol.
- These rewards are payable in the same underlying asset the user holds or in a distinct asset such as a governance token.
- Any user can participate in yield farming.
- A user can stake an amount of any size, regardless of how small, and receive a proportional reward.

Limited access

Yield farming benefits

- Yield farming is particularly powerful in the case of governance tokens.
- A user of a protocol that issues a governance token via yield farming becomes a partial owner of the platform through the issued token.
- A rare occurrence in traditional finance, this process is a common way to give ownership of the platform to the people who use and benefit from it.

Limited access

Initial DeFi offerings

- An interesting consequence of yield farming is that a user can create an *Initial DeFi Offering* (IDO) by market making his own Uniswap trading pair.
- The user can set the initial exchange rate by becoming the first liquidity provider on the pair.

Limited access

Initial DeFi offerings

- Suppose the user's token is called DFT and has a total supply of 2 million.
- The user can make each DFT worth 0.10 USDC by opening the market with 1 million DFT and 100,000 USDC.
- Any ERC-20 token holder can purchase DFT, which drives up the price. As the only liquidity provider, the user also receives all of the trading fees.

Limited access

Initial DeFi offerings

- In this way, the user is able to get his token immediate access to as many users as possible.
- The method sets an artificial price floor for the token if the user controls the supply outside of the amount supplied to the Uniswap market, and as such, inhibits price discovery.
- The trade-offs of an IDO should be weighed as an option, or strategy, for a user's token distribution.

Limited access

IDOs democratize access

- IDOs democratize access to DeFi in two ways.
- First, an IDO allows a project to list on high-traffic DeFi exchanges that do not have barriers to entry beyond the initial capital.
- Second, an IDO allows a user access to the best new projects immediately after the project lists.

Opacity

DeFi solution

- Traditional finance is not usually transparent.
- DeFi elegantly solves the transparency problem through the open and contractual nature of agreements.
- We will explore how smart contracts and tokenization improve transparency within DeFi.

Opacity

Smart contracts are transparent

- All parties of a smart contract are aware of the capitalization of their counterparties and, to the extent required, can see how funds will be deployed.
- The parties can read the contracts themselves to determine if the terms are agreeable to eliminate any ambiguity as to what will happen when they interact under the contract terms.

Opacity

Smart contracts are transparent

- This transparency substantially eases the threat of legal burdens and brings peace of mind to smaller players.
- These smaller users, traditional finance, could be abused by powerful counterparties through delaying, increasing the cost, or even completely withholding their end of a financial agreement.

Opacity

Smart contracts are transparent

- Realistically, the average consumer does not understand the contract code, but can rely on the open-source nature of the platform and the wisdom of the crowd to feel secure.
- Overall, DeFi mitigates counterparty risk and thus creates a host of efficiencies not present under traditional finance.

Opacity

Ensuring appropriate behavior in smart contracts

- One mechanism for ensuring the appropriate behavior of participants is staking.
- Staking is escrowing a cryptoasset into a contract, so that the contract releases the cryptoasset to the appropriate counterparty only after the contract terms are met; otherwise, the asset reverts to the original holder.
- Parties can be required to stake on any claims or interactions they make.

Opacity

Ensuring appropriate behavior in smart contracts

- Staking enforces agreements by imposing a tangible penalty for the misbehaving side and a tangible reward for the counterparty.
- The tangible reward should be as good as or even better than the outcome of the original terms of the contract.
- These transparent incentive structures provide much securer and more obvious guarantees than traditional financial agreements.

Opacity

Token contracts

- Another type of smart contract in DeFi that improves transparency is a token contract.
- Tokenization allows for transparent ownership and economics within a system.
- Users can know exactly how many tokens are in the system as well as the inflation and deflation parameters.

Centralized control

Monopoly in traditional finance

- The fourth flaw of traditional finance is the strong control exerted by governments and large institutions that hold a virtual monopoly over elements such as the money supply, rate of inflation, and access to the best investment opportunities.

Centralized control

DeFi is decentralized (by definition!)

- DeFi relinquishes control to open protocols having transparent and immutable properties.
- The community of stakeholders or even a predetermined algorithm can control a parameter, such as the inflation rate, of a DeFi dApp.
- If a dApp contains special privileges for an administrator, all users are aware of the privileges, and any user can readily create a less-centralized counterpart.

Centralized control

Forked away

- Flaws and inefficiencies in a DeFi project can be readily identified and “forked away” by users who copy and improve the flawed project.
- Consequently, DeFi strives to design protocols that naturally and elegantly incentivize stakeholders and maintain a healthy equilibrium through careful mechanism design.

Centralized control

Decentralization trade-offs

- Centralized control allows for radically decisive action in a crisis, sometimes the necessary approach but also perhaps an overreaction.
- The path to decentralizing finance will certainly encounter growing pains because of the challenges in pre-planning for every eventuality and economic nuance.
- Ultimately, however, the transparency and security gained through a decentralized approach will lead to strong robust protocols that can become trusted financial infrastructure for a global user base.

Centralized control

Decentralized Autonomous Organization (DAO)

- A *decentralized autonomous organization* (*DAO*) has its rules of operation encoded in smart contracts that determine who can execute what behavior or upgrade.
- It is common for a DAO to have some kind of *governance token*, which gives an owner some percentage of the vote on future outcomes.
- I will explore governance in much more detail later.

Lack of interoperability

Traditional finance vs. DeFi

- Traditional financial products are difficult to integrate with each other, generally requiring at minimum a wire transfer, but in many cases cannot be recombined.
- The possibilities for DeFi are substantial and new innovations continue to grow at a non-linear rate.
- This growth is fueled by the ease of composability of DeFi products.

Lack of interoperability

DeFi Legos

- Given some base infrastructure to, for example, create a synthetic asset, any new protocols allowing for borrowing and lending can be applied.
- A higher layer would allow for attainment of leverage on top of borrowed assets.
- Such composability can continue in an increasing number of directions as new platforms arise.
- For this reason, *DeFi Legos* is an analogy often used to describe the act of combining existing protocols into a new protocol.

Lack of interoperability

Tokenization for interactions

- Tokenization is a critical way in which DeFi platforms integrate with each other.
- Take for example a percentage ownership stake in a private commercial real estate venture.
- In traditional finance to use this asset as collateral for a loan would be quite difficult.
- Because DeFi relies on shared interfaces, applications can directly plug into each other's assets, repackage, and subdivide positions as needed.

Lack of interoperability

Tokenization of assets

- DeFi has the potential to unlock liquidity in traditionally illiquid assets through tokenization.
- A simple use case would be creating fractional shares from a unitary asset such as a stock.
- We can extend this concept to give fractional ownership to scarce resources such as rare art.
- The tokens can be used as collateral for any other DeFi service, such as leverage or derivatives.

Lack of interoperability

Bundles

- It is possible to create token bundles of real-world or digital assets and trade them like an ETF.
- Imagine a dApp similar to a real estate investment trust (REIT), but with the added capability of allowing the owner to subdivide the REIT into the individual real estate components to select a preferred geographic distribution and allocation within the REIT.
- Ownership of the token provides direct ownership of the distribution of the properties. The owner can trade the token on a decentralized exchange to liquidate the position.

Lack of interoperability

Challenges in tokenizing assets

- Tokenizing hard assets, such as real estate or precious metals, is more difficult than tokenizing digital assets because the practical considerations related to the hard assets, such as maintenance and storage, cannot be enforced by code.
- Legal restrictions across jurisdictions are also a challenge for tokenization; nevertheless, the utility of secure, contractual tokenization for most use cases should not be underestimated.

Lack of interoperability

Pluggable derivative asset

- A tokenized version of a position in a DeFi platform is a pluggable derivative asset that is usable in another platform.
- Tokenization allows the benefits and features of one position to be portable.
- The archetypal example of portability through tokenization is Compound, which we will discuss later.

Lack of interoperability

Compound preview

- Compound allows for lending markets in which a position can accrue variable-rate interest denominated in a given token, and the position itself is a token.
- If, for example, the base asset is ETH, the ETH deposit wrapper known as cETH (cToken) can be used in place of the base asset.

Lack of interoperability

Compound preview

- The result is an ETH-backed derivative that is also accruing variable-rate interest per the Compound protocol.
- Tokenization, therefore, unlocks new revenue models for dApps because they can plug asset holdings directly into Compound or use the cToken interface to gain the benefits of Compound's interest rates.

Lack of interoperability

Networked liquidity

- The concept of interoperability extends easily to liquidity in the exchange use case.
- Traditional exchanges, in particular those that retail investors typically use, cannot readily share liquidity with other exchanges without special access to a prime broker, which is generally limited to hedge funds.

Lack of interoperability

Networked liquidity

- In DeFi, as a subcomponent of the contract, any exchange application can leverage the liquidity and rates of any other exchange on the same blockchain.
- This capability allows for networked liquidity and leads to very competitive rates for users within the same application.

DeFi deep dive

Next

- We will do a DeFi deep dive looking at specific applications including: Credit/Lending, Decentralized Exchange, Derivatives and Tokenization

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