An Introduction to Decentralized Finance

Blockchains and cryptocurrency have revolutionized money over the course of the past decade and a half. Bitcoin is a household name. "Wallets" are now unlocked with private keys. The advent of Ethereum advanced the possibilities of blockchains significantly, allowing for new tokens and protocols to be created within its blockchain. Several of these decentralized finance (colloquially known as "DeFi") protocols, including Compound and Aave, enable many of the same functions as traditional financial institutions, such as lending and borrowing.

Compound

Compound is (from its whitepaper), "a decentralized protocol which establishes money markets with algorithmically set interest rates based on supply and demand". With its whitepaper being published in February 2019, Compound is among the first lending platforms within the Ethereum ecosystem.

Versions One and Two

Version one and version two of the Compound protocol use a system of assets called "cTokens." Each cToken corresponds to another, underlying Ethereum token. For example, cETH corresponds to ETH, cUSDC to USDC, etc. Each of these cTokens creates a money market. cTokens can be converted to or from their corresponding, underlying token. Based on its calculated interest rate, each cToken becomes redeemable for an increasing amount of its underlying token.

Each Compound money market has a collateral factor determining the amount of its cToken's underlying asset that can be borrowed. From the whitepaper, "The sum of the value of an accounts underlying token balances, multiplied by the collateral factors, equals a user's borrowing capacity." In a manner consistent with traditional financial institutions, borrowers face the risk of liquidation should the value of their loan exceed their borrowing capacity.

Compound III

Compound III, announced in August 2022, simplifies versions one and two, allowing fewer assets to be lent or borrowed. At the time of writing, assets which can be borrowed on the Ethereum blockchain include USDC, USD₮, and (wrapped) ETH.

Aave

Aave, announced in January 2020 (via whitepaper), is another major lending protocol that exists on the Ethereum blockchain. Much like Compounds cToken's, Aave uses "aTokens." Unlike cTokens, which are exchanged for their underlying assets at variable prices, aTokens are purchased and redeemed 1:1 with their underlying assets. Interest accrues to the lender as the quantity of their aTokens increase over time. Aave expands upon Compound by adding

optional stable interest rates rates, which are, like the protocols' variable interest rates, algorithmically calculated.

Beyond Lending and Borrowing

Decentralized finance extends beyond money markets. Assets can be exchanged in decentralized exchanges, also known as "DEX's." These protocols, including the leading [decentralized exchange by volume](#), [Uniswap](#), use algorithms based on supply and demand to calculate buy and sell prices of different assets. Users can swap between Ether and/or Ethererum tokens, and liquidity providers earn fees with each swap. Given that Uniswap is among the earliest (if not the earliest) DEX's, its [whitepaper](#) provides insight into the inner workings of decentralized exchanges in general.

Fluid

Fluid was [announced](#) in October 2023; the Fluid protocol augments Compound and Aave with its utilization of a single liquidity layer. This approach offers multiple advantages. It allows borrowers to earn DEX exchange fees on their collateral and their debt, which Fluid calls "smart collateral" and "smart debt", respectively. It also allows lenders to migrate to enhanced lending protocols without moving their assets. For example, when was Compound III was released, in order to utilize the advantages it provides over version two, lenders were required to migrate their assets to the new version. With Fluid, this is no longer necessary.

More information about lending and borrowing within Fluid is available in its whitepaper, "[Vault Protocol on Fluid](#)"; Additional information about the Fluid DEX is available in the blog post, "[Introducing Fluid DEX!](#)'

A New Horizon

Providing functionality similar to traditional financial institutions, DeFi represents a giant leap forward through its transparency and its continuous, automatic adjustments to supply and demand. Any interested party can view the precise means by which DeFi protocols calculate APY and/or distribute exchange fees, because each protocol's code is [open-source](#). A radical departure from the opaque, opinionated processes by which traditional financial institutions calculate interest rates, lending and borrowing through DeFi protocols is provably fair. Open-source has potential to revolutionize money in the same way it has revolutionized software.

—Stephen Corya