

PORTAL

ASSET MANAGEMENT

Thematic Report on DeFi & Lending

August 2021

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Introduction to DeFi

‘Once you’ve understood the potential, you cannot unsee the value’

- The advent of decentralised finance (DeFi) removes the need for trusted intermediaries
 - There is no middleman between the user and the financial product being utilised, only a protocol
 - A protocol is a set of rules that govern the transfer of data between two or more electronic devices
- DeFi uses a multi-layered architecture:
 - The layers build on each other and create an open infrastructure that allows everyone to build on
- DeFi improves the financial infrastructure by increasing:
 - Efficiency – smart contracts replace trust requirements and decreases counterparty credit risk
 - Transparency – all transactions and the smart contract code can be analysed on-chain
 - Accessibility – DeFi protocols can be used by anyone, anywhere

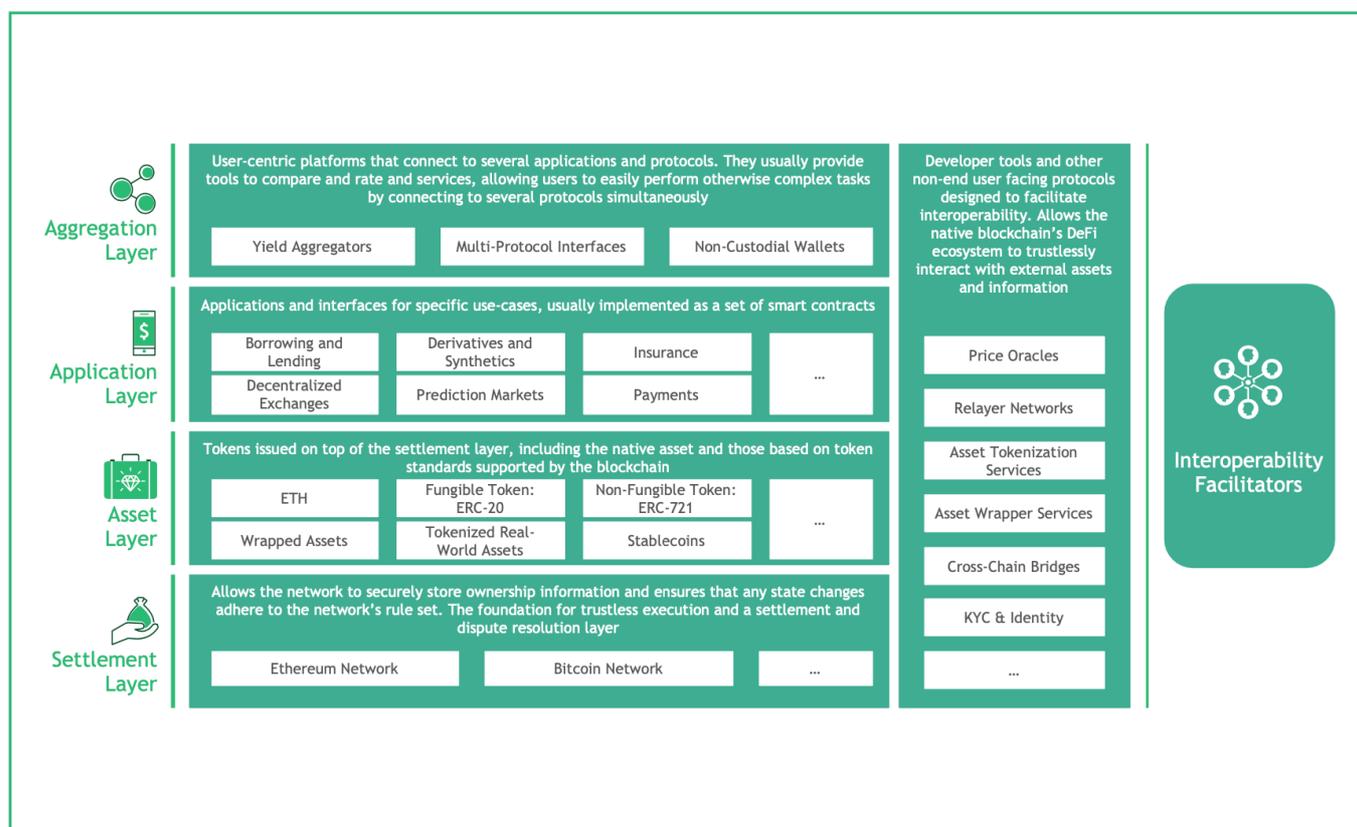


Exhibit 2 | The Decentralised Finance Stack

Source: Fabian Schär, BCG, Crypto.com

Decentralised Lending

- The biggest DeFi sector, according to [DeFi Pulse](#), is lending at approx. \$33B in size - representing almost half of the total value locked in DeFi.

Total Value Locked (USD) in DeFi

[TVL \(USD\)](#) | ETH | BTC

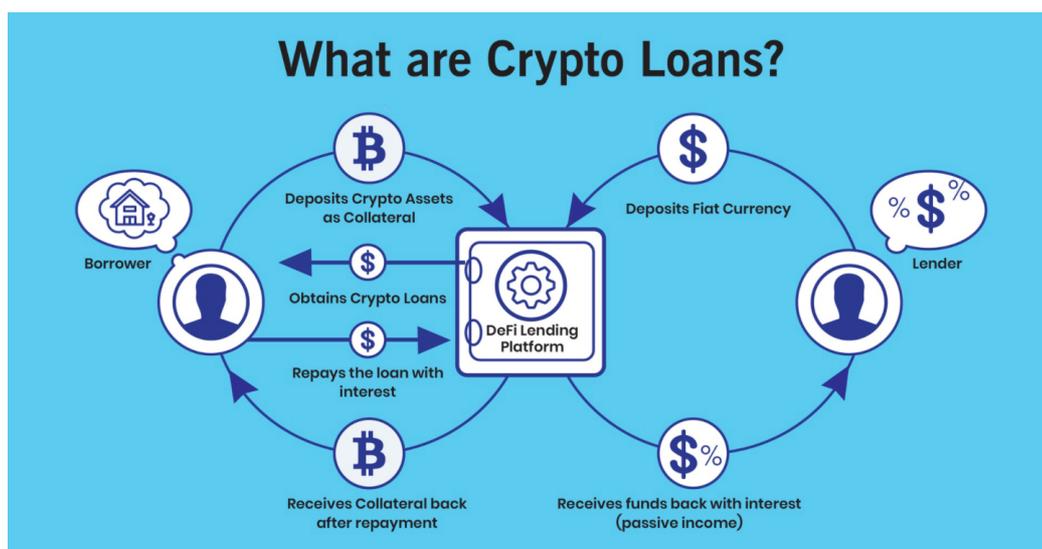
All | [1 Year](#) | 90 Day | 30 Day



- DeFi lending platforms offer loans in a trustless manner as smart contracts are self-executing.

DeFi lending protocols require no permission to use so they don't rely on conventional evaluations like credit score or income to determine the loan amount. Instead, lending platforms only require borrowers to put up crypto assets as collateral.

The lender and borrower accept a specific interest rate and the crypto loan amount is deposited in the borrower's account. When the amount is paid back in full, the lender releases the collateral that acted as security.



Source: [Blockchain Simplified](#)

The backbone of all DeFi applications is smart contracts:

- Smart contracts have functions such as distributing interest payments and enacting variable interest rates
- They will always execute as specified which minimises the risk of manipulation
 - Although smart contracts are incapable of their own nefarious motives, if there is a vulnerability in the code, the protocol can be exploited, and crypto assets can be seized.

Advantages of DeFi lending:

- For lenders, interest rates on certain platforms far outpace returns at traditional banks
- As a borrower with crypto collateral there are less barriers to securing a loan than there are in traditional lending processes
- As a borrower and investor, borrowing crypto assets or stablecoins prevents selling crypto assets which comes with fees and opportunity cost.

Lending Protocols

Lending protocols Compound and Aave offer variable interest rates determined purely by the supply and demand for an asset on their platforms.

Maker has a decentralized governance system that determines interest rates instead.

Case Study: Compound

Compound lets you lend and borrow crypto assets without a middleman

- As a lender, you don't lend money directly to a borrower. You lend assets to the Compound 'liquidity pool', from which borrowers can borrow assets:



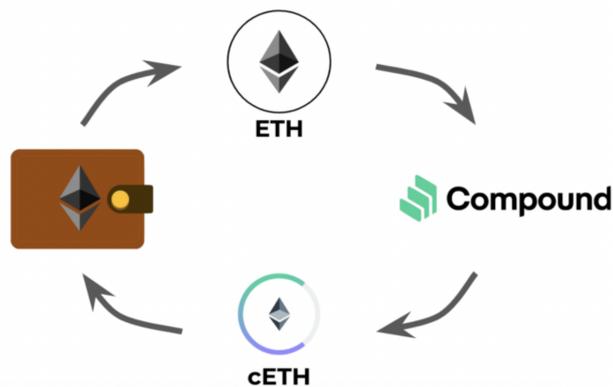
Source: [Exodus](#)

- The liquidity pool is a series of smart contracts that automatically matches borrowers to available assets, applies interest payments and determine interest rates using algorithms.

- There is no lock-in period – users can withdraw/repay their collateral whenever they want.
- The interest you earn is denominated in the same token that you lent. The interest rates accrue each time an Ethereum block is mined, i.e. every 15 seconds.

In a traditional savings account, you deposit money into the bank and earn interest. However, once it's earning interest, the funds cannot be used in any other way.

- Compound solves this problem by allowing the users to use their interest-earning assets as collateral and borrow against it.
 - You lend out your assets/tokens on Compound and you get cTokens to represent your claim to a portion of an asset pool.



E.g. you lend out your ETH and you receive cETH tokens

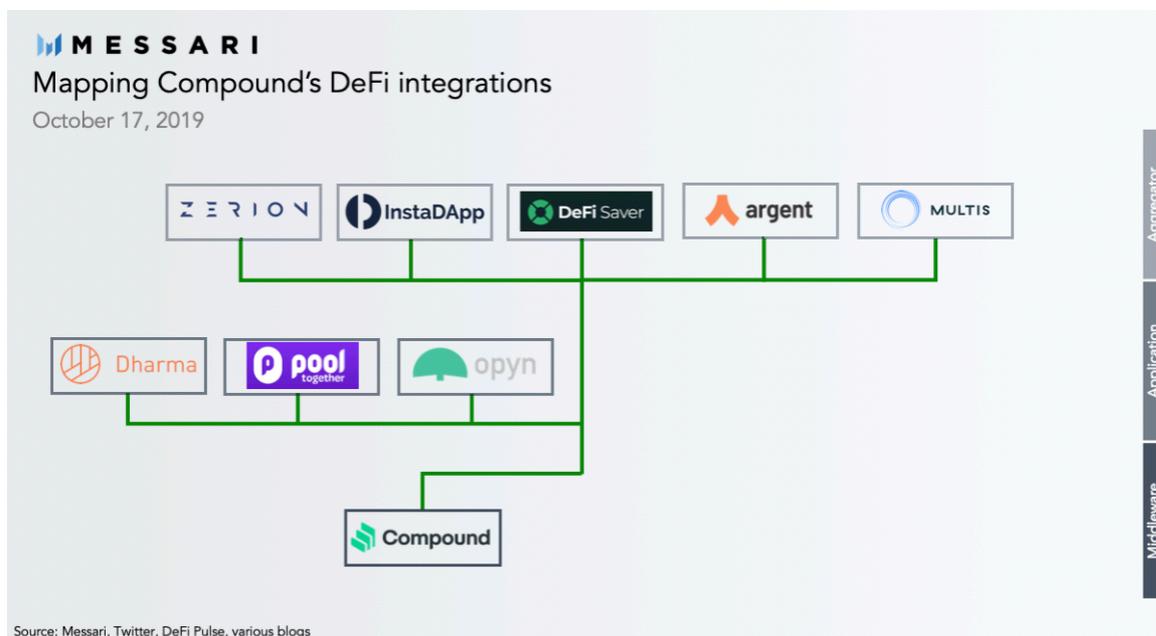
- By designing cTokens as ERC20 tokens, Compound has opened up a whole new world of functionality and liquidity. The cTokens can be transferred, traded, or used in other applications, all while still earning interest.
- The use of cTokens represents a fundamental feature of the DeFi movement - the ability to combine different protocols as different building blocks – often referred to as ‘money legos’.
- Your collateral must stay above a minimum amount when borrowing or else it will liquidate your collateral to repay the loan.
- As a reward for supplying or borrowing assets on Compound, you automatically receive COMP tokens – these are Compound’s governance tokens (giving rights to propose/vote on protocol changes).
- Once repayment is made, you can withdraw your crypto assets locked in the Compound protocol.

Composability

DeFi took off on the Ethereum blockchain primarily because it allowed different smart contracts to interact with each other – making it ‘composable’.

Ethereum’s composability was enabled by the ERC-20 token standard, developed by Fabian Vogelsteller, which allowed a variety of tokens to interface with wallets, exchanges and other smart contracts in a common way.

This type of standardisation meant that developers could leverage the work of others like lego blocks and tap into existing user bases. Just like how standardising the internet and email were crucial to the growth of the web, standardisation on Ethereum increased the rate of innovation and compounded the network effects.



Compound as a ‘middleware’ connects the base Ethereum layer with consumer applications built above it.

The cTokens you get from Compound can now be used in other applications such as Dharma (a user-friendly app designed to onboard the mainstream market onto DeFi by connecting straight to fiat bank accounts).

The ability to share liquidity between layers and allow developers to create projects without having to build everything from scratch has endowed DeFi projects on Ethereum to flourish at a rapid pace.

[Linda Xie of Scalar Capital writes](#) ‘Composability leads inevitably toward more choice, and better user experiences, because there are no obstacles to someone taking an existing idea and making it easier to use, or adapting it to new use cases. As more and

more of the underlying technology gets abstracted away, the focus will shift towards what people can do with their money, and not the inefficiency that marks much of the traditional finance world.'

Current State of Lending

The total amount of value locked in DeFi lending platforms is substantial – with leading platforms Compound, Maker and Aave, collectively accounting for over \$27 billion.

However those figures still pale in comparison with traditional lending – outstanding US consumer debt is approx. \$15 trillion.

[DeFi Rate](#) is a resource that allows you to compare lending interest rates:

Crypto Lending Interest Rates for July 2021

	Lend								Current Rates	30 Day AVG
	Compound v2	Aave Lend	dYdX	Fulcrum	BlockFi Lend	Nexo Lend	Celsius Lend	Ledn Lend		
DAI	2.73%	2.74%	1.41%	5.5%	8.5%	8%	4.6%	–		
USDC	2%	2.26%	1.32%	6.26%	7.5%	8%	8.88%	8.5%		
ETH	0.21%	0%	0.1%	0.65%	4%	5%	5.35%	–		
BTC	–	–	–	–	4%	5%	6.2%	6.1%		
WBTC	0.42%	0.04%	–	25.37%	–	–	–	–		
USDT	2.34%	3.08%	–	3.05%	7.5%	8%	8.88%	–		

It's worth noting that **BlockFi, Nexo, Celsius** are centralised versions of DeFi lending as they bear custody of the users' assets.

Compound, Aave, Yearn on the other hand are not in custody of users' assets.

Centralised DeFi (CeFi) apps offer intuitive user interfaces, technical support and they utilise third-party digital asset custodians and insurance for added protection of funds. Their ease of use and higher yields is appealing to mainstream users; however they go against the DeFi ethos for removing intermediaries and being in custody of your own assets.

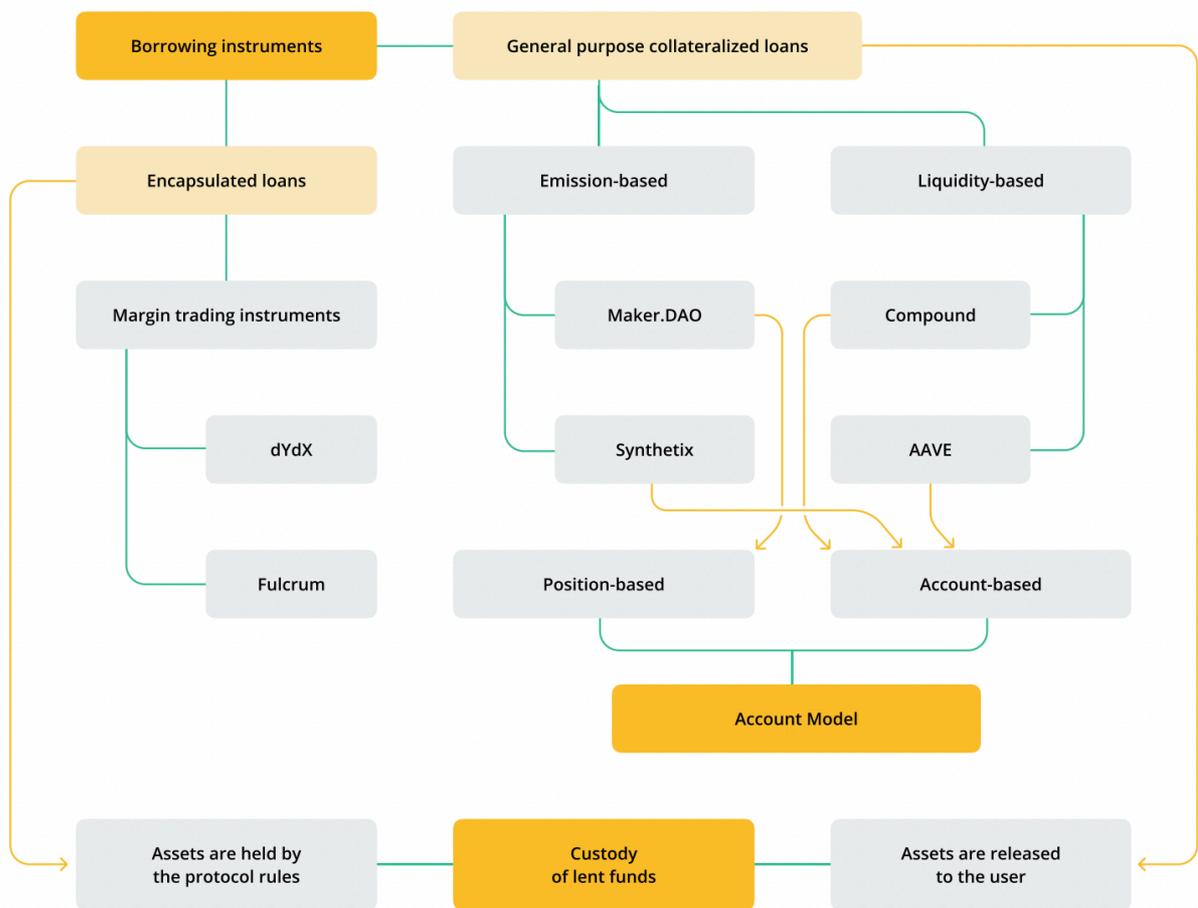
Parameters	CeFi	DeFi
Verification	Yes	No
Custody	Yes	No
UI/UX	Highly intuitive	Not usually highly intuitive
Exchange	Centralised	Decentralised
Control	Tight	Autonomous
Examples	Binance, Coinbase, Celsius, Nexo, SwissBorg	MakerDAO, Aave, dYdX, Compound,

Source: [SwissBorg](#)

The mainstream markets' wariness of potential loss of assets or wallet keys can be a major hindrance on broad DeFi adoption. CeFi apps offer a hybrid model to bridge the gap between traditional banks and DeFi.

CeFi and DeFi can be viewed as complementary as they both capture different growing markets.

Within DeFi currently there are general purpose overcollateralized loans, borrowing of leverage for margin trading and uncollateralized 'flash loans'.



Classification of borrowing instruments by function and account model

Source: [Redefine 2020](#)

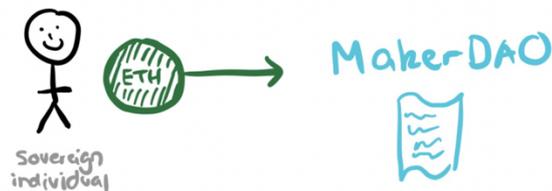
The loans through Compound are **liquidity-based** as the asset being lent is supplied by third parties in a liquidity pool.

On the other hand, Maker.DAO is **emission-based**, as the lent asset is minted on the spot by the Maker.DAO itself.

Case Study: Maker.DAO

1. You deposit ETH to Maker's smart contract, creating a Collateralised Debt Position (CDP)

Step ① ETH deposited to open CDP



Source: [Kerman Kohli](#)

2. You take out your loan in stable coin DAI (1 DAI = 1 USD)

Assuming a 150% collateralisation rate, this would allow you to take out up to 100 DAI if you deposited \$150 worth of ETH.

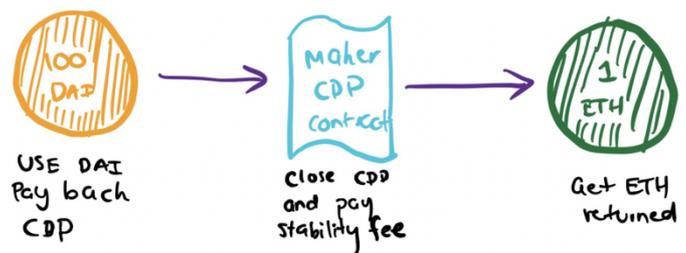
Step ② Draw DAI



3. To get your ETH back, you need to return the amount you took out in addition to a stability fee*.

If the price of ETH drops below a certain price and you do not put up more ETH as collateral, then you get liquidated.

Step ③ Pay back DAI to unlock ETH



Maker.DAO is essentially a credit facility that only serves borrowers by minting and lending out DAI.

*Stability fee is the interest rate that is applied to the newly created DAI.

Flash loans

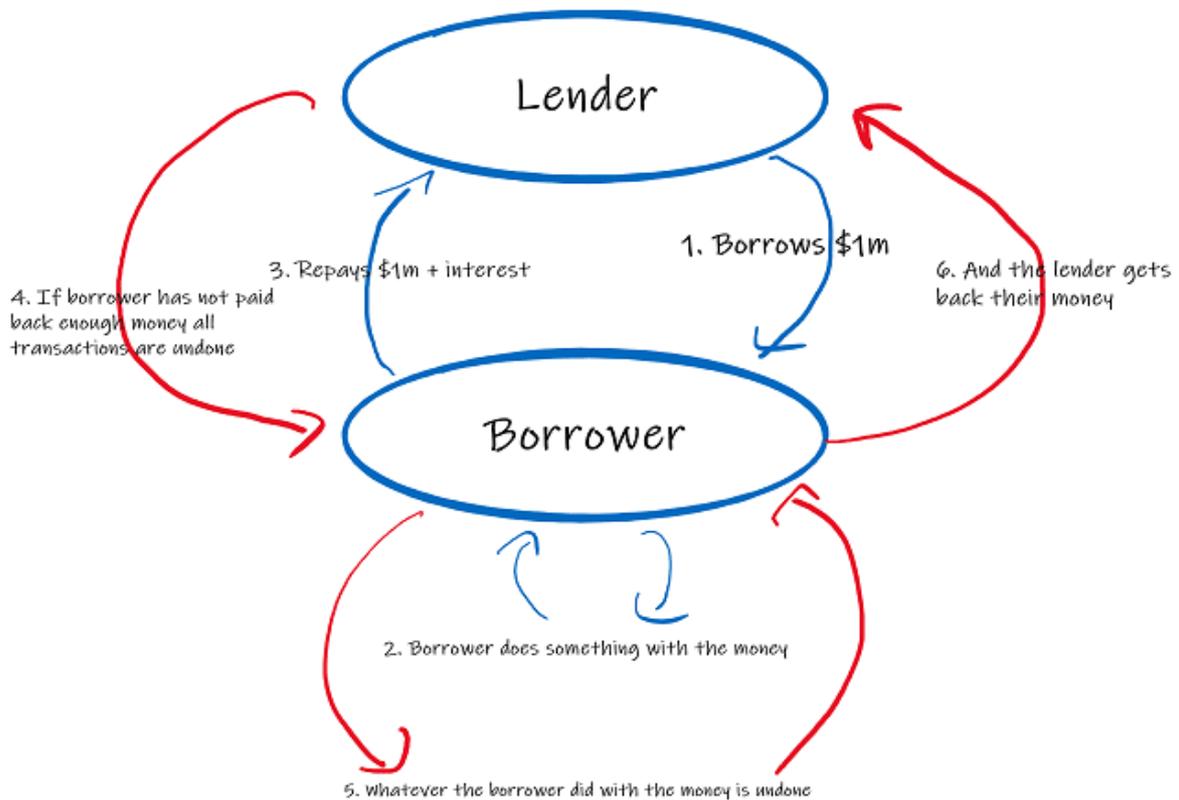
Flash loans enable users to borrow without collateral, provided that the liquidity is returned at the end of the same transaction.

If this does not happen, the whole transaction is automatically reversed.

This process which guarantees that within a complex sequence, every transaction succeeds or else everything fails - is called '**atomicity**'.

Flash loans solve a long-standing inequality in finance – capital pre-requirements. Without needing collateral, capital becomes basically free.

However, since the transaction needs to be atomically executed, flash loan use cases are limited to swapping the collateral supporting a loan, liquidations, or conducting arbitrage by exploiting the price difference of an asset across various exchanges.



Source: [SamPriestly](#)

Rationale for DeFi & Lending

'Nothing is more powerful than an idea whose time has come' – Victor Hugo

Lending has existed throughout history, and rightfully so, as it is an important tool to aid human collaboration – creating value for both the person with the surplus assets and the borrower who has a productive use for those assets.

The credit system has underwritten prosperity for farmers in ancient Mesopotamia, to the Renaissance fuelled by the Italian Banking system, to the industrial revolution accelerated by the British banks. It's given many the opportunity to go to college or finance their invention.

At the foundation of every financial ecosystem is credit, fostering innovation and collaboration.

The internet transformed banking, improving our user experience with apps and instant payments, however the critical architecture of the financial system remains the same - international wire transfers are still costly and take up to days.

Besides more bureaucracy and regulations (e.g., KYC and AML), the mechanics and accessibility of banking has not changed for generations.

'Credit', derived from its Latin roots of meaning 'to trust or believe' is fitting for a stagnated industry which still requires the trust in intermediaries and trust from creditors that a debtor will repay their loan.

Credit scores and credit ratings are common ways to measure a borrower's trustworthiness, but default risk still exists.

These measures, together with regulation have resulted in the centralised financial system excluding an enormous proportion of the world from financial services. KYC protocols only exacerbate the issue as individuals in developing economies may not hold the required documentation necessary to open an account. The World Bank believes this represents a \$380 billion opportunity.

Ironically the trust that allowed banks to thrive, is now eroding, while the redundancy of trust has become the game-changer.

DeFi presents the first time in history where we have a permissionless and trustless instrument on a global financial scale.

No credit checks or KYC processes are required – smart contracts set the terms, allowing the loan to occur automatically and instantaneously when conditions are met.

With an overcollateralization from the borrower, when market conditions change and their borrowing limit exceeds the supplied collateral, their position can be liquidated. Unlike traditional loans where the borrower has been entrusted to pay back the loan, in DeFi, even if the borrower does not repay the loan, the protocol is designed to return the supplier's assets in full.

Consequently, default risk is eliminated.

Central to the DeFi and Web 3.0 movement is the alignment of incentives.

Capitalism often gets mistakenly blamed for a myriad of financial problems – however it's the misalignment of incentives that is usually the root cause.

Marvin Ammori, Chief Legal Officer of Uniswap, illustrates this in his article [‘Decentralized Finance: What It Is, Why It Matters’](#):

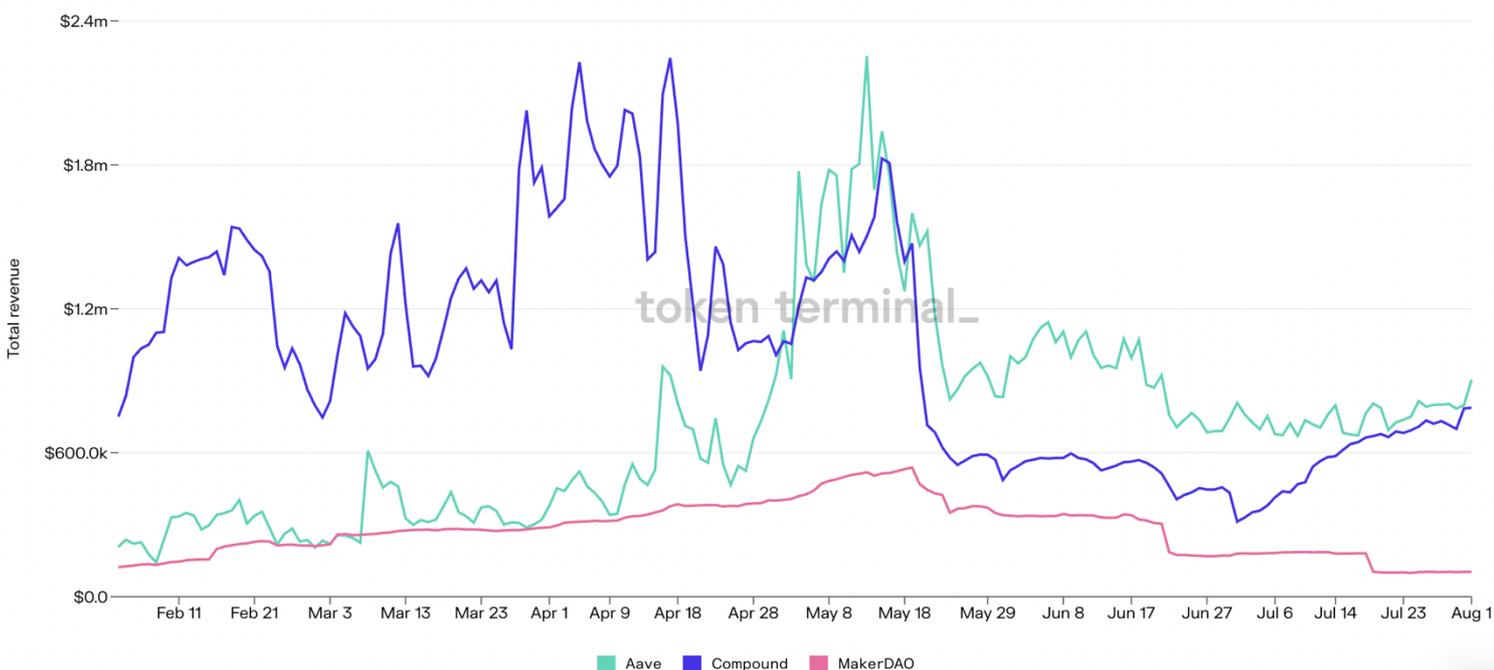
‘For example, in the MakerDAO system (a decentralized credit facility), MKR token holders earn interest paid by borrowers. However, in the event of insolvency or defaults, they serve as the primary backstop: MKR is automatically printed and sold to the market to cover losses. This programmatic enforcement creates very strict accountability, forcing MKR holders to set sensible collateral and liquidation risk parameters. The alternative — loose risk management practices — puts MKR holders at risk of dilution.

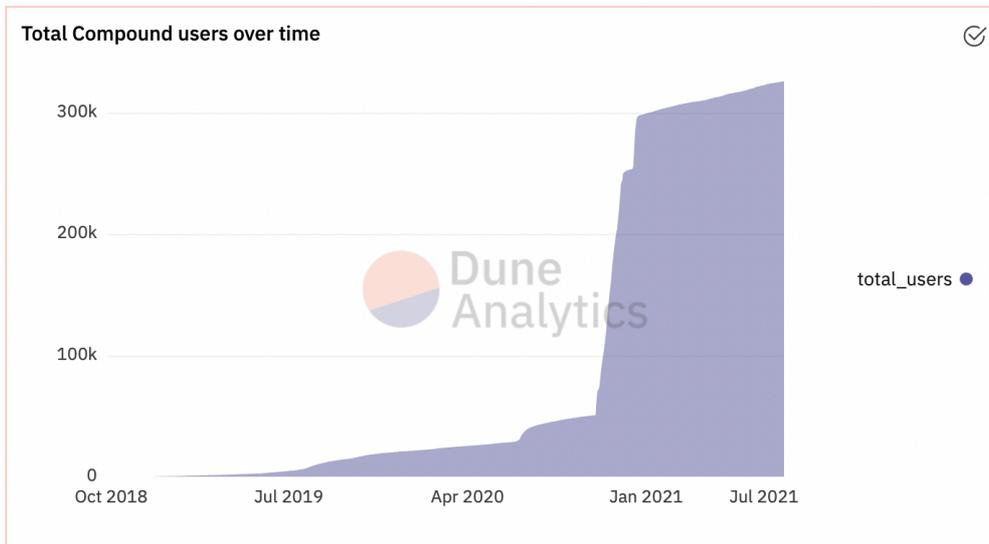
Compare this to traditional finance, where shareholders directly lose out when management makes mistakes. Archegos’ recent collapse serves as a recent example: While several senior executives at Credit Suisse left the bank, they were not personally held liable for the losses. With DeFi, however, direct accountability would translate to better risk management.’

Smart contracts and tokens align incentives, all while removing the intermediary, automating functions and lowering cost.

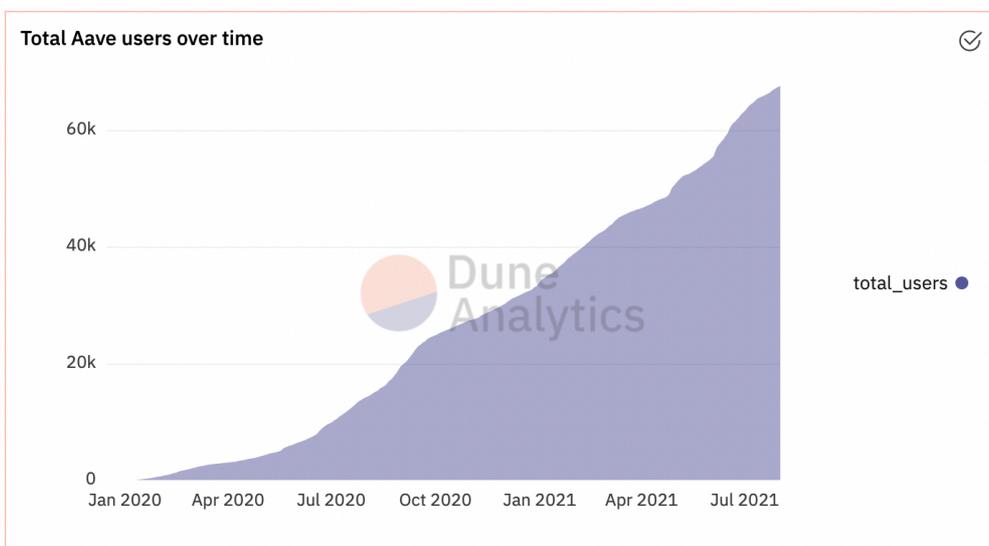
With over \$33B already locked into DeFi lending protocols, daily revenues of over \$2M, and an exponential growth in users across all protocols – the DeFi ecosystem is making strides towards traditional finance in value creation.

Daily revenue for Aave, Compound and MakerDAO in the past 180 days.





Source: [Dune Analytics](#) (Users = unique addresses. Since a user can have multiple addresses, the numbers are overestimated).



Below is a [comparison of LendingClub to Maker](#) by [Dmitriy Berenzon](#).

		
Loan Originations	\$4.3B ¹	\$1.1B ²
Revenue	\$315M	\$9.5M ³
YoY Revenue Growth	-59%	3,793%
Net Income	-\$187M	\$3.7M
Market Cap / Valuation	\$1.4B	\$590M
P/S Ratio	4.4	62
P/E Ratio	-7.5	159
Employees	1,030	117
Venture Funding	\$392M	\$63M
Years since founding	15	6

1) FY 2020. Source: [10-K](#)
 2) Total DAI issued in 2020. Source: <https://makerburn.com/#/chart>
 3) FY 2020. Source: [MakerDAO financials](#)

The fact that anyone in the world with a smart phone and an internet connection can access lending/borrowing regardless of their identity or credit rating, without the cumbersome processes associated with traditional finance, unlocks a whole new world of potential human collaboration.

However DeFi still in its infancy, has many challenges to overcome before it crosses the chasm into mainstream adoption, which makes it difficult to determine which protocols will garner the most usage long-term.

Nevertheless, as globalisation progresses and businesses shifts towards new business models built upon shared governance and decentralisation, there will no doubt be growing demand for DeFi lending solutions.

The capital markets we have today, developed over the last 100 years, have provided staggering levels of wealth creation and paved the way for technological innovation. The time has now come to continue this expansion by welcoming in a new open-source, transparent and permissionless financial services environment – one which will deliver tremendous value to both the unbanked and the banked.

When the money supply can't be manipulated and the rules can't be bent, the pursuit of peaceful collaboration becomes the most productive strategy.

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