DEFI

Introduction to Decentralized Finance

Traditional Financial Institutions

Financial Institutions

- Banks
- Exchanges (Financial Markets)
  - Stock Exchange
  - Commodity Exchanges
  - Derivatives Exchange
  - Bonds Exchanges etc
- Insurance Companies
- Asset Management Companies
- Payment/ Exchange Companies (Western Union, Money Gram etc.)

How Traditional Financial Institutions Work

The Banks

Banks are the financial industry's giants that facilitate payments, accept deposits, and offer financing to individuals, businesses, other financial institutions, and even governments.

They are so large that the total market capitalization of the top 10 banks in the world is $2 trillion.

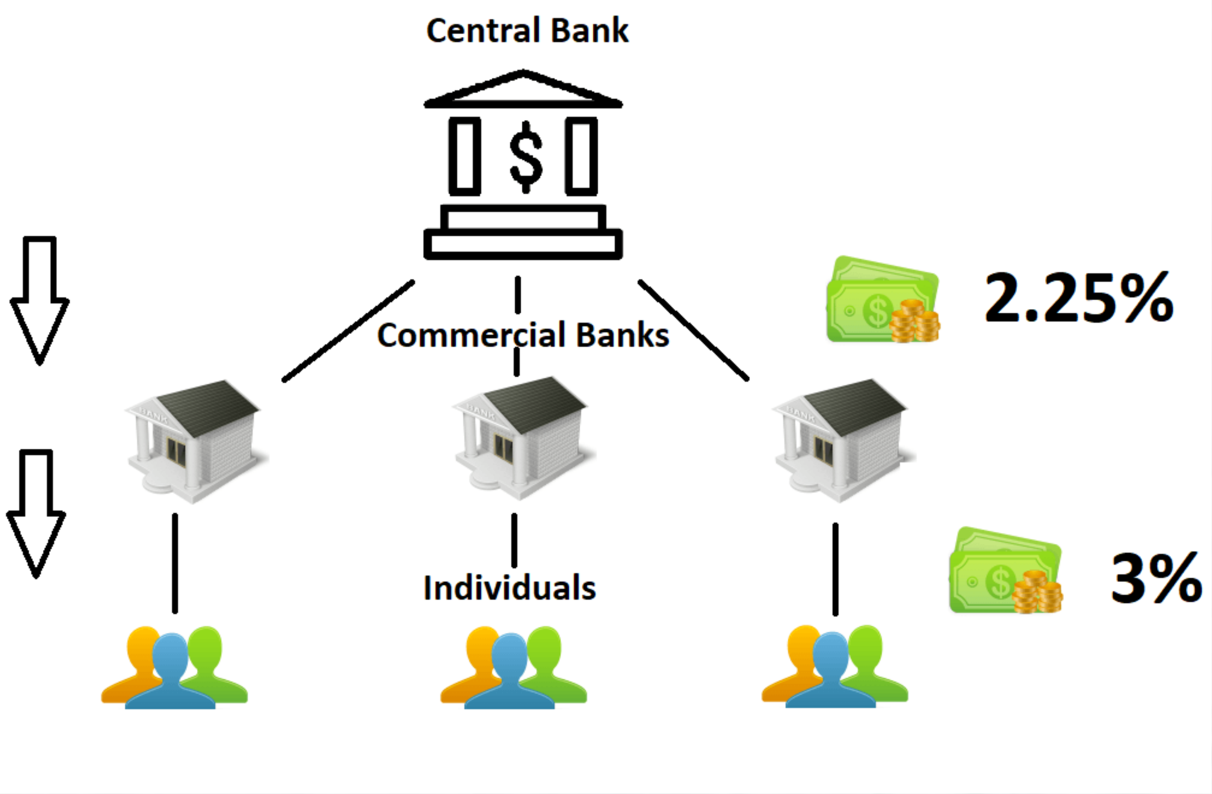
In April 2021, the total market capitalization of the entire cryptocurrency market surpassed $2 trillion.

Key Segments of Banking System

1. Payment & clearance system (remittance)

2. Accessibility

3. Centralization & Transparency



1. Payment and Clearance System

- If you have tried to send money to someone or a business in another country,
- Remittances involving banks worldwide typically take a few working days to complete and involve all sorts of fees.
- To make matters worse, there may also be issues with <u>documentation</u>, <u>compliance with anti-money laundering </u>laws, <u>privacy concerns</u>, and more.
- Typically three fees involved:
  - The exchange rate from your bank,
  - The international wire outbound fee, and
  - The international wire inbound fee.

2. Accessibility

- Chances are if you are reading this book, you are banked and have access to financial services offered by banks—to open a savings account, take a loan, make investments, and more.

- However, many others are less fortunate and do not have access to even the most basic savings account.

- World Bank estimates that as of 2017, there are 1.7 billion people who do not own an account at a financial institution, and more than half of them are from developing nations.

3. Centralization & Transparency

- There is no denying that traditional, regulated financial institutions that comply with government laws and regulations are some of the most secure places to park funds.

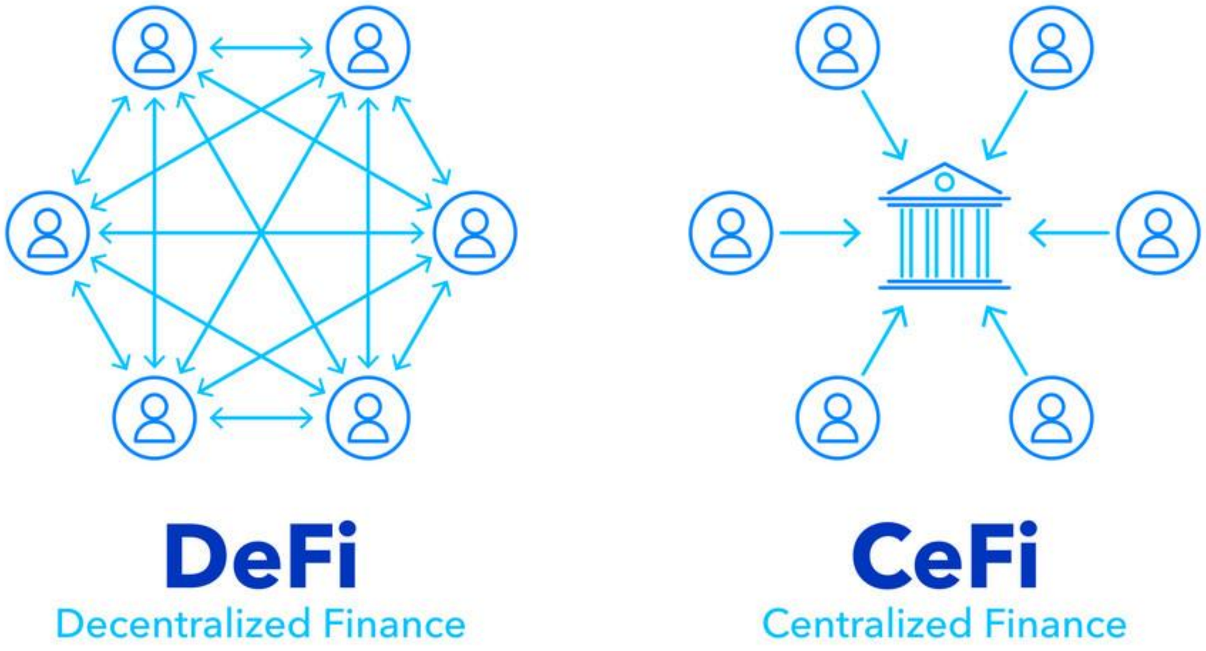
- Even large banks can fail.

- Banks are one of the centralized points of failure in the financial system. The fall of Lehman Brothers triggered the start of the 2008 financial crisis.

- The centralization of power and funds in the hands of the banks is dangerous, and rightfully so, looking at past incidents

- 2008 financial crisis included credit rating agencies giving AAA ratings (best & safest investments) to high-risk mortgage-backed securities. (Transparency issues)

Decentralized Finance



Decentralized Finance - DeFi

- DeFi is an umbrella term that is meant to define a financial system that functions without third-party intermediaries like banks
- DIFI "can offer improved transparency and more robust security while replacing many of the current outdated processes which can lead to a truly decentralized and democratized financial ecosystem,"

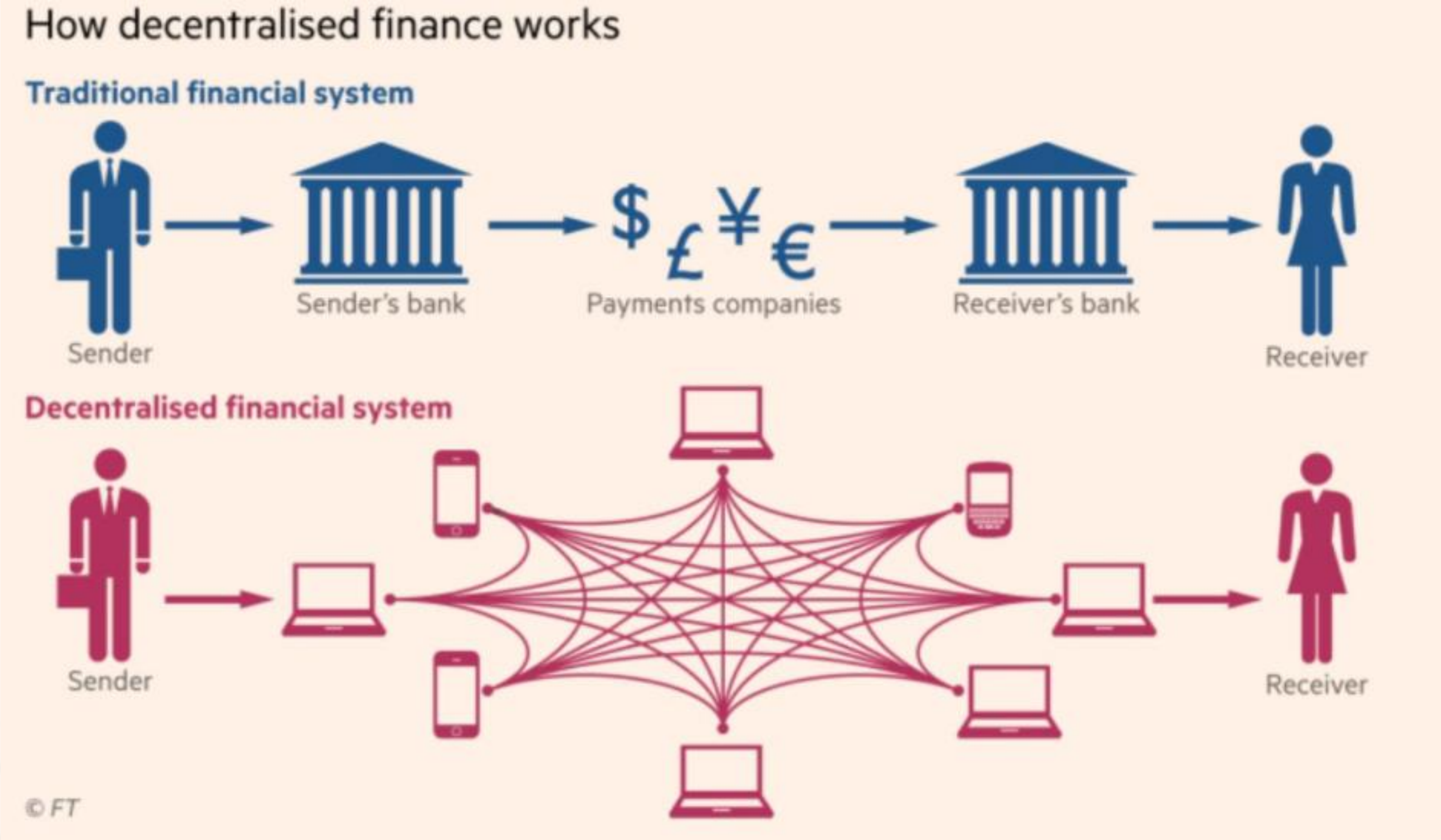
- Peter Wall, CEO of global crypto mining company Argo Blockchain

- "Much like Uber UBER +1.6% connected drivers and passengers without the need for a Taxi company or email, DeFi is connecting financial users"
- "DeFi is currently gaining traction in borrowing, lending and trading specifically"

- Andrew Kiguel, CEO and Founder of Tokens.com

- DeFi will also open up banking and investing opportunities to everyone regardless of their citizenship or financial status.
- This technology could make financial transactions less expensive and more secure while also increasing access to everyone — and not just certain demographics or a chosen few.

Decentralized Finance vs. Traditional Finance


How decentralised finance works
Traditional financial system
Sender
Sender's bank
$ £ ¥ €
Payments companies
Receiver's bank
Receiver
Decentralised financial system
Sender
Receiver
© FT

What is DeFi

- DeFi protocols (Series of Smart Contract) built on top of public blockchains such as Ethereum are mostly open-sourced for audit and transparency purposes.
- They usually have decentralized governing organizations to ensure that everyone knows what is happening and that no bad actors can single-handedly make bad decisions.
- DeFi protocols are written as lines of codes—you cannot cheat the codes as it treats every participant equally without discrimination.
- The codes run exactly as they are programmed to, and any flaws quickly become evident as it is open for public scrutiny.
- DeFi's biggest strength is thus its ability to remove intermediaries while operating with zero censorship.

DeFi Movement

- The DeFi movement is about bridging these gaps and making finance accessible to everyone without any form of censorship.

- In short, DeFi opens up huge windows of opportunities and allows users to access various financial instruments without any restriction on race, religion, age, nationality, or geography.

- When comparing both traditional and decentralized financial products, there will be pros and cons on each side.

- In this book, we will walk you through the concepts and possibilities of decentralized finance so that you will know how to use its best features to solve real-world problems.

DeFi Movement

- Is the movement that allows users to utilize financial services such as
  - Borrowing,
  - Lending, and
  - Trading
- Without the need to rely on centralized entities.
- These financial services are provided via Decentralized Applications (Dapps),
- Majority of which are deployed on the Ethereum platform.
- DeFi is not a single product or company, but a range of financial services which emulates traditional financial industries, including banking, insurance, bonds, money markets and more.

How Decentralized is DeFi?

1. Centralized
    - <u>Characteristics</u>: Custodial, uses centralized price feeds, centrally-determined interest rates, centrally-provided liquidity for margin calls
    - <u>Examples</u>: Salt, BlockFi, Nexo and Celsius

2. Semi-Decentralized (has one or more of these characteristics but not all)
    - <u>Characteristics</u>: Non-custodial, decentralized price feeds, permissionless initiation of margin calls, permissionless margin liquidity, decentralized interest rate determination, decentralized platform development/updates
    - <u>Examples:</u> Compound, MakerDAO, dYdX, and bZx

3. Completely Decentralized
    - <u>Characteristics</u>: Every component is decentralized
    - <u>Examples</u>: No DeFi protocol is completely decentralized yet.

Currently, most DeFi dapps are sitting in the semi-decentralized category.

DeFi Key Categories

1. Stablecoins

- The prices of cryptocurrencies are known to be highly volatile.
- It is common for cryptocurrencies to have intraday swings of over 10%.
- To mitigate this volatility, stablecoins that are pegged to other stableassets such as the USD were created.
- Tether (USDT) was one of the first centralized stablecoins to be introduced.
- Every USDT is supposedly backed by $1 in the issuer's bank account.
- However, one major downside to USDT is that users need to trust that the USD reserves are fully collateralized and actually exist.
- While stablecoins are not financial applications themselves, they are essential in making DeFi applications more accessible to everyone by having a stable store of value.

2. Lending and Borrowing

- Traditional financial systems require users to have bank accounts to utilize their services, a luxury that 1.7 billion people currently do not have.
- Borrowing from banks comes with other restrictions, such as having a good credit score and having sufficient collateral to convince the banks that one is credit-worthy and able to repay a loan.
- Decentralized lending and borrowing remove this barrier, allowing anyone to collateralize their digital assets and use this to obtain loans.
- One can also earn a yield on their assets and participate in the lending market by contributing to lending pools and earning interest on these assets.
- With decentralized lending and borrowing, there is no need for a bank account nor checking for credit-worthiness.

3. Exchanges

- To exchange one cryptocurrency for another, one can use exchanges such as Coinbase or Binance.
- Exchanges like these are centralized exchanges, meaning they are both the intermediaries and custodians of the traded assets.
- Users of these exchanges do not have complete control of their assets, putting their assets at risk if the exchanges get hacked and are unable to repay their obligations.
- Decentralized exchanges aim to solve this issue by allowing users to exchange cryptocurrencies without giving up custody of their coins.
- By not storing any funds on centralized exchanges, users do not need to trust the exchanges to stay solvent.

4. Derivatives

- Is a contract whose value is derived from another underlying asset such as stocks, commodities, currencies, indexes, bonds, or interest rates.
- Traders can use derivatives to hedge their positions and decrease their risk in any particular trade.
- For example, imagine you are a glove manufacturer and want to hedge yourself from an unexpected increase in rubber price.
- You can buy a futures contract from your supplier to deliver a specific amount of rubber at a specific future delivery date at an agreed price today.
- Derivatives contracts are mainly traded on centralized platforms.
- DeFi platforms are starting to build decentralized derivatives markets.

5. Fund Management

- Fund management is the process of overseeing your assets and managing its cash flow to generate a return on your investments.
- There are two main types of fund management
  - Active fund management has a management team making investment decisions to beat a particular benchmark, such as the S&P 500.
  - Passive fund management does not have a management team but is designed in such a way to mimic the performance of a particular benchmark as closely as possible.
- In DeFi, some projects have started to allow passive fund management to occur in a decentralized manner.
- The transparency of DeFi makes it easy for users to track how their funds are being managed and understand the cost they will be paying.

6. Lottery

- Putting a DeFi spin onto lotteries allows for the removal of custodianship of the pooled capital into a smart contract on the Ethereum Blockchain.
- With the modularity of DeFi, it is possible to link a simple lottery Dapp to another DeFi Dapp and create more value.
- One DeFi Dapp that we will explore in this book allows participants to pool their capital together.
- The pooled money is then invested into a DeFi lending Dapp and the interest earned is given to a random winner at a set interval.
- Once the winner is selected, the lottery purchasers get their lottery tickets refunded, ensuring no-loss to all participants.

7. Payments

- A key role of cryptocurrency is to allow decentralized and trustless value transfer between two parties. With the growth of DeFi, more creative payment methods are being innovated and experimented upon.
- The possibility of providing payments as streams open up a plethora of potential applications of money. Imagine “pay-as-you-use” but on a much more granular scale and higher accuracy.
- The nascency of DeFi and the rate of innovation will undoubtedly introduce new ways of thinking on how payments work to address many of the current financial system’s shortcomings.

8. Insurance

- Insurance is a risk management strategy in which an individual receives financial protection or reimbursement against losses from an insurance company in the event of an unfortunate incident.
- It is common for individuals to purchase insurance on cars, home, health, and life. But is there decentralized insurance for DeFi?
- All of the tokens locked within smart contracts are potentially vulnerable to smart contract exploits due to the large potential payout possible.
- While most projects have gotten their codebases audited, we never know if the smart contracts are truly safe, and there is always a possibility of a hack that may result in a loss.
- The risks highlight the need for purchasing insurance, especially if one deals with large amounts of funds on DeFi. We will explore several decentralized insurance options in this book.

9. Governance

- Governance is essentially crypto's idea of business management.
- In order for DeFi protocols to manage a project, governance tokens are often introduced to give users voting power and have a say in the protocol's roadmap.
- Naturally, multiple toolkits and Dapps have also been developed to facilitate effective governance and complement existing systems.

An eventful year for Bitcoin in 2021

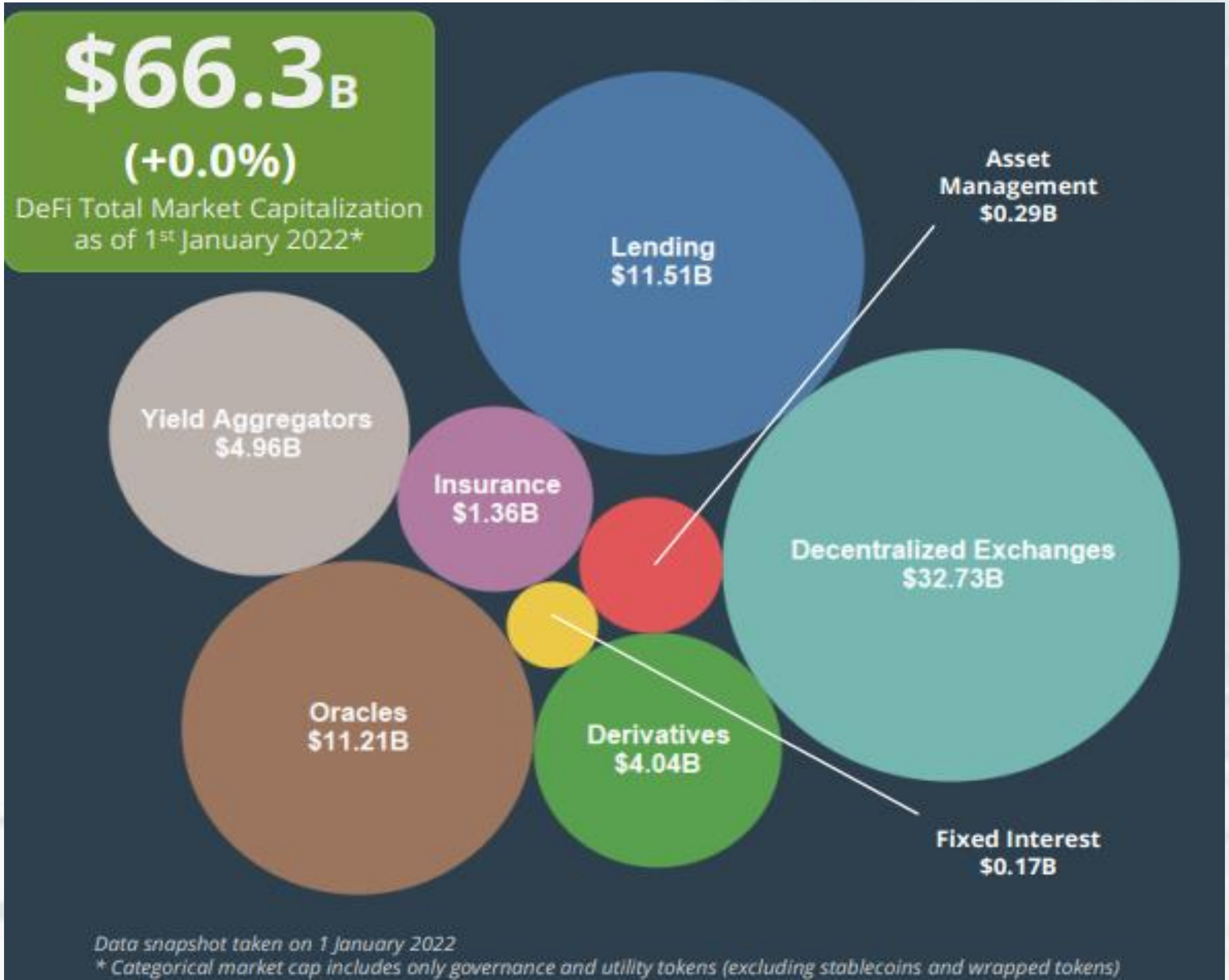
Bitcoin hit its all-time high in 2021 as well, reaching $69,045 on 10th Nov

- Public listed companies added BTC to their treasuries
- El Salvador adopted BTC as a form of currency
- Crypto clampdown by Chinese authorities, and great mining migration
- Taproot upgrade launched, providing greater privacy and enabling the deployment of smart contracts
- Tesla’s $1.5 billion initial Bitcoin investment
- Visa supporting USDC as a settlement option on Ethereum
- Fidelity’s plans for a Bitcoin Exchange-Traded Fund
- Coinbase’s listing on the NASDAQ

DEFI SNAPSHOT

- The rise of Decentralized Finance (DeFi) took the crypto world by surprise during the summer of 2020, so much that we refer to the period as **DeFi Summer 2020**.
- **Total Value Locked (TVL)**, a measure of the amount of capital locked inside DeFi protocols, has been increasing at a breakneck speed, breaching the magic number of **$1bn in May 2020**
- Since then, DeFi has been growing non-stop, expanding into other non-Ethereum chains.
- DeFi TVL has reached an astounding figure of **$110 billion in Nov 21**, showcasing the exponential growth of the crypto industry.
- TVL is one of the most widely used metrics in DeFi because it represents the total amount of assets held by each protocol. The **more value locked in a protocol, the better it is for the protocol.**
- The **Decentralized Exchange** category is the highest valued category

Market Capitalization of Each DIFI Category (Oct – Dec 21)



Weightage (By 2021 Q4 Market Cap Share)	Sector
	Total DeFi Market Cap
49.4%	Decentralized Exchanges
16.9%	Oracles
17.4%	Lending
6.1%	Derivatives
7.5%	Yield Aggregators
2.1%	Insurance
0.4%	Asset Management
0.3%	Fixed Interest

DEFI PULSE

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Introducing the Scalara NFT Index

Read on the DeFi Pulse Blog

TOTAL VALUE LOCKED (USD)

$78.64B

MAKER DOMINANCE

21.00%

DEFI PULSE INDEX

173.69 +2.36 (+1.38%)

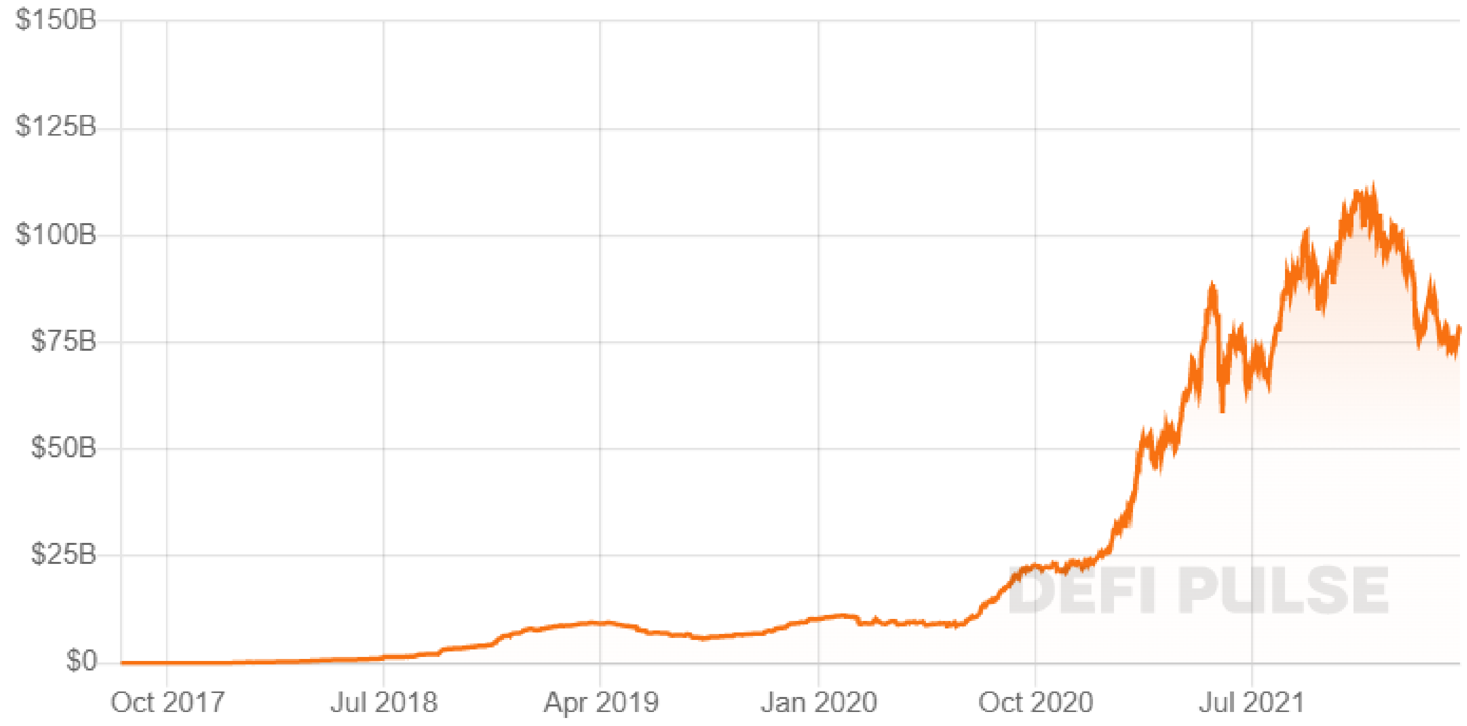
Available from Set TokenSets

TOTAL VALUE (USD) LOCKED IN DEFI

SHARE

TVL (USD) | ETH | BTC

All | 1 Year | 90 Day | 30 Day



#	NAME	CHAIN	SECTOR	TVL (USD)	1 Day %
1	Maker	Ethereum	Lending	$16.51B	1.71%
2	Curve Finance	Ethereum	DEXes	$10.70B	0.66%
3	Convex Finance	Ethereum	Assets	$9.44B	1.34%
4	Aave	Multichain	Lending	$8.62B	-10.87%
5	Uniswap	Ethereum	DEXes	$7.04B	3.76%
6	Compound	Ethereum	Lending	$6.97B	-0.57%
7	InstaDApp	Ethereum	Lending	$5.02B	4.81%
8	Balancer	Ethereum	DEXes	$2.19B	-1.68%
9	yearn.finance	Ethereum	Assets	$2.15B	-22.04%
10	Bancor	Ethereum	DEXes	$1.84B	-0.05%
11	SushiSwap	Ethereum	DEXes	$1.54B	2.04%

The increased **media attention** in the **broader crypto market** has also led to more eyes on DeFi.

Institutional investors started to take notice.

For example, in Citibank's Global Perspective and Solutions (Citi GPS) report entitled "**Future of Money: Crypto, Digital currencies and 21st Century Cash,**"

"Maker can be thought of as a digital pawnshop, where users post something that is already valuable in exchange for a cash loan. If they repay that loan with the required interest, they get their asset back. If they default, or if the collateral value falls below a predefined threshold, the collateral is automatically liquidated," Citibank explained.

Similar DeFi protocols such as Maker, Compound, Uniswap, and UMA.

Reserve Bank of St Louis also highlights DeFi's potential to cause a "paradigm shift in the financial industry and potentially contribute toward a more robust, open, and transparent financial infrastructure".

DEFI ACTIVITIES

DeFi Activities

- Activities such as market-making, insurance underwriting, and structured product creation were previously only accessible to institutions with a large capital base and specialized knowledge.
- DeFi has significantly reduced these barriers and availed these activities to the masses.
- We will explain further some of the key areas and activities of DeFi, such as
  - Yield farming,
  - Liquidity mining,
  - Airdrops, and
  - Initial DEX Offerings (IDO).

Yield Farming

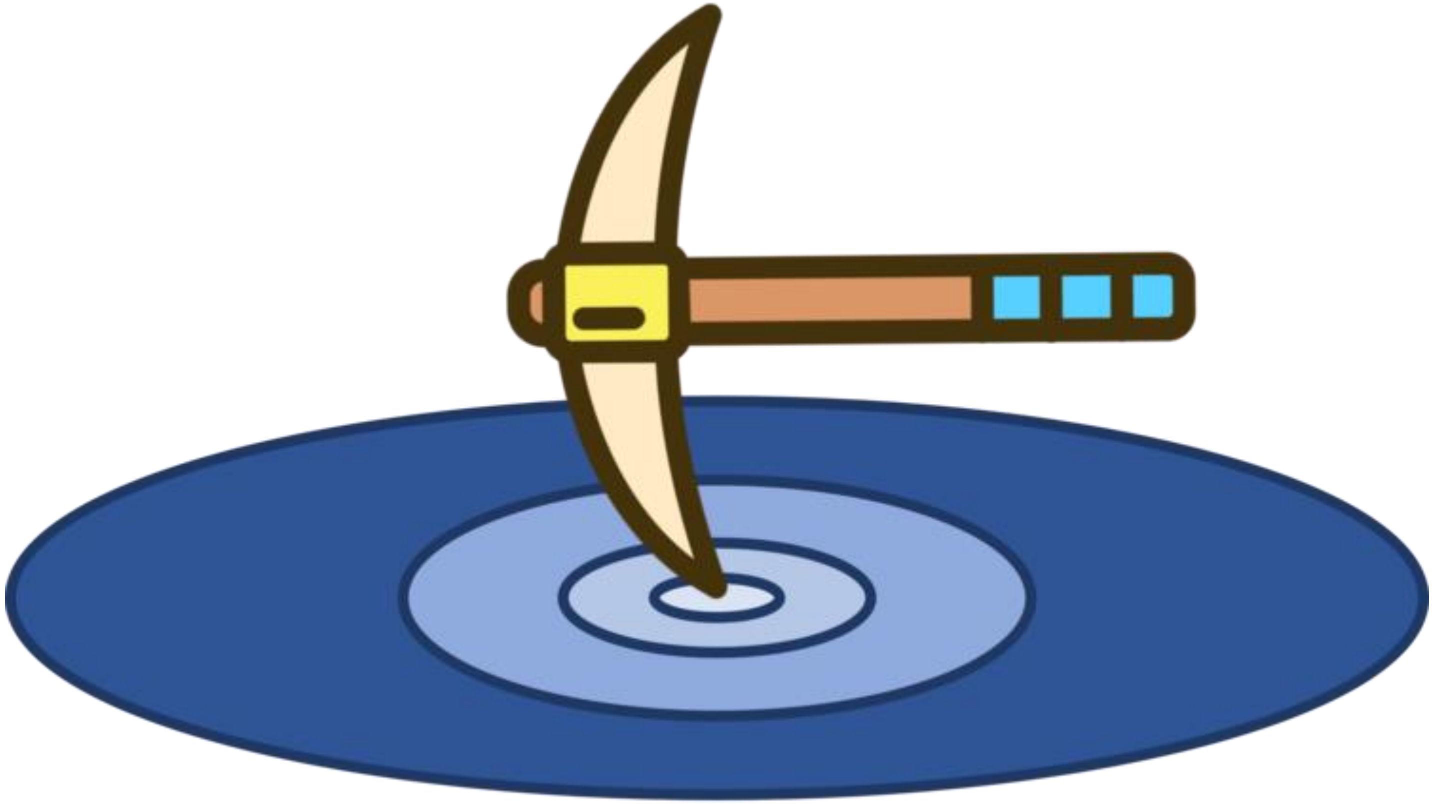
Yield Farming (Investors -> Yield farmers)

- Yield farming is perhaps one of the most innovative features of DeFi. It refers to the activity of allocating capital to DeFi protocols to earn returns.
- Most DeFi protocols are peer-to-peer financial applications where capital allocated is used to provide services to end-users.
- The fees charged to users are then shared between the capital providers and the protocol. The fees that capital providers get are the yield.
- In crypto slang, we refer to these investors as “yield farmers” and the yield opportunities as “farms”. Many yield farmers constantly rotate their farms in search of the highest-yielding opportunities.

Below are some examples of yield farming, where the capital provided will be used for a variety of purposes:

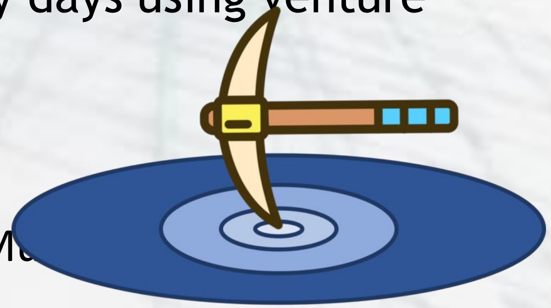
- **Exchanges** - Provide capital for market-making on decentralized exchanges. (earning transaction fees)
- **Lending** - Provide loans to borrowers. (earning an interest)
- **Insurance** - Underwrite insurance. (earning premiums while undertaking the risk of paying out claims)
- **Options** - Underwrite options by selling call and put options to earn a yield.
- **Synthetic Assets** - Mint stablecoins or other synthetic assets. (earning fees in return).

Liquidity Mining



Liquidity Mining (Native tokens in exchange for capital)

- Financial services is a capital-intensive industry and usually benefits from having economies of scale.
- More capital that firms have, the better.
- DeFi protocols are no exception - obtaining sizable capital will be a substantial competitive advantage for DeFi protocols.
- In crypto, DeFi protocols incentivize the provision of liquidity via liquidity mining programs.
- **Liquidity mining** refers to the reward program of giving out the protocol's native tokens in exchange for capital.
- These tokens usually come with governance rights and may have the possibility of accruing cash flows from the DeFi protocols.
- When designed right, liquidity mining programs are a quick way to bootstrap large sums of liquidity in a short timeframe, albeit with a dilution of token ownership.
- These programs can also be used to incentivize new users to try out new DeFi protocols.
- You may think of these incentives similar to how Uber subsidizes rides in the early days using venture capital.



Air Drops

Airdrops (Free Tokens distribution)

- Airdrops are essentially freely distributed tokens.
- Projects usually conduct airdrops as part of their marketing strategy to generate attention and hype around their token launch, even with the tradeoff of diluting token ownership.
- Some projects also conduct airdrops to reward early users who have interacted with their protocols.
- Each protocol will have criteria for qualifying airdrop recipients, such as the timing of interaction and minimum amounts used.
- One of the most notable airdrops was the one conducted by Uniswap.
- Early users were awarded a minimum of 400 UNI. As of 1 April 2021, the airdrop is worth as much as $11,484.

IDO

Initial DEX Offerings (IDO)

(Tokens launch on Decentralized Exchanges)

- Crypto projects have to be creative over their token launch and distribution strategies.
- An initial DEX offering or IDO refers to the launching of a cryptocurrency on a decentralized exchange (DEX). In an IDO, a blockchain project makes a coin's first public debut on a DEX in order to raise funding from retail investors.
- With the growing popularity of Decentralized Exchanges (DEX), projects now have a viable option of going direct to users without paying sky-high fees to get listed on centralized exchanges.
- Crypto project teams can now list their tokens without the need for permission on these DEXs.
- However, distributing tokens fairly and to a wide group of users at a fair price is still a difficult endeavor.
- projects issuing initial DEX offerings receive financing from individual investors. Unlike an initial public offering, investors in initial dex offerings never own any equity in the project.
- IDOs have similarities with **initial exchange offerings (IEO**s), where crypto projects launch their token and raise funds via a centralized exchange, since both allow immediate trading on top of raising funds. However, centralized exchanges impose strict ground rules

Associated Risks

- Once you are familiar with the DeFi ecosystem, you will inevitably see various protocols offering eye-popping yields, sometimes more than 1,000% Annual Percentage Yield (APY)!
- While it is tempting to plow your money in, such APYs are usually temporary and will eventually stabilize to lower numbers once other yield farmers start coming in.
- Given the fast-paced world of DeFi, investors also have to make quick decisions on whether a project is worth investing in. Fear of Missing Out (FOMO) is real and should not be taken lightly.
- Regardless of whether you are a trader, investor, or yield farmer, one should always be wary of the usual risks such as smart contract risk, impermanent loss risk, and relevant systemic risk.
- No matter how technically sound a project may be, liquidity exploits are always possible from malicious actors.
- Users need to understand that the DeFi ecosystem is still nascent, and most DeFi activities are still experimental.
- Different types of risks associated with each DeFi category throughout this book, and dedicate the whole of Chapter 15 to risks associated with smart contract exploits.

Conclusion

- DeFi is groundbreaking.
- We are witnessing a financial revolution happening right in front of us, one which democratizes access to finance, promotes financial inclusion, and promises financial transparency.
- Although DeFi in its current iteration is not perfect, it does provide us with a glimpse of what the future may look like.
- Anyone in the world with access to the Internet can now participate in this grand financial experiment.
- Crypto financial primitives such as being a liquidity provider and the tokenization of ownership allow new forms of organizations to be formed.
- It will not be long before we see DeFi protocols being more valuable than the largest companies in the world.