



Mastering DeFi

Processes, Benefits, and Legal Considerations

Intermediate Level – Short Course

AGENDA

- The Impact of Cryptocurrency on Traditional Finance
- From CeFi to DeFi
- CeFi vs DeFi
- Risks and Challenges in DeFi
- Conclusion
- References

LEARNING OUTCOMES

- Understand the concept of DeFi, its process, benefits and drawbacks.

———— The Impact of Cryptocurrency on Traditional Finance

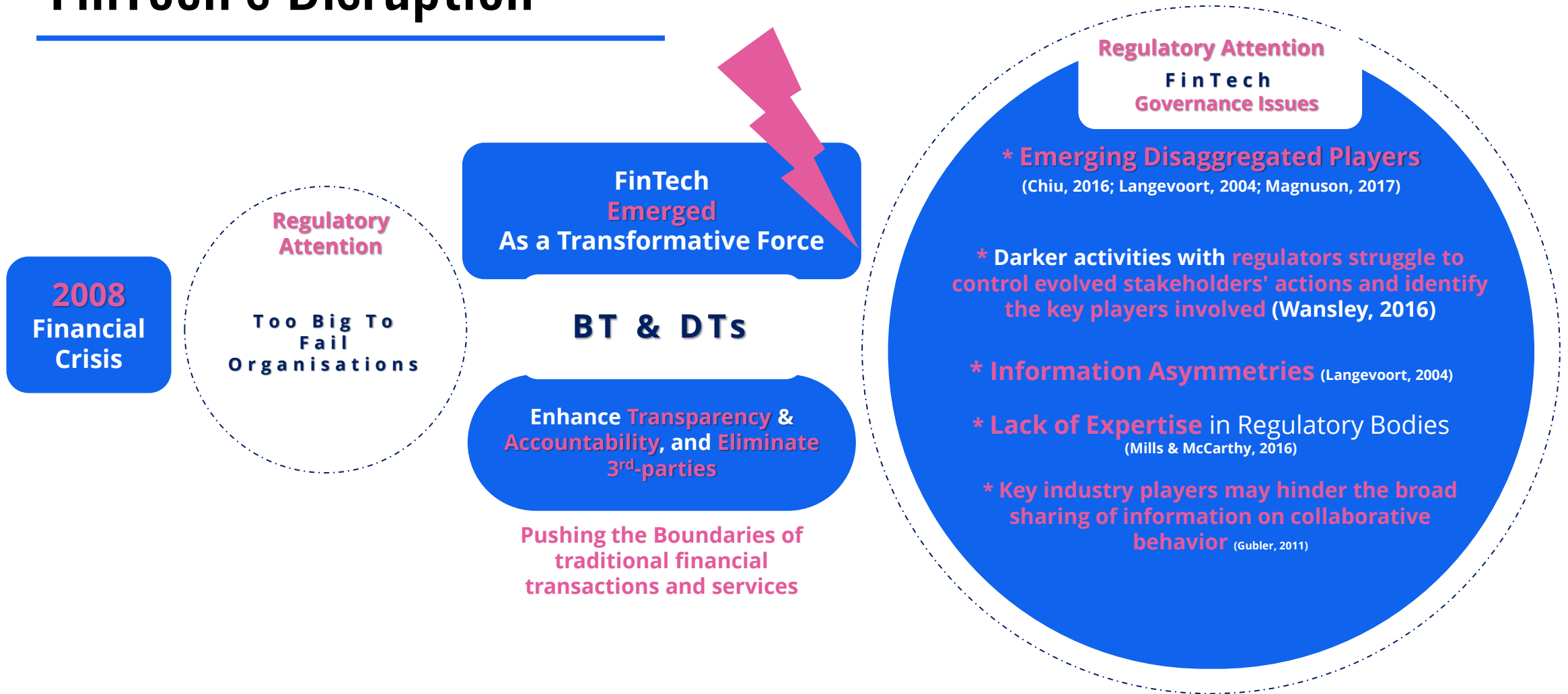
From Finance to FinTech

“Finance is the process that involves the creation, management, and investment of money. A financial system links those in need of finance for investment (borrowers) with those who have idle funds (depositors).”

'FinTech' refers to the delivery of financial technology solutions, and it was coined in the early 1990s when Citigroup launched a consortium to facilitate technology cooperation efforts (Puschmann, 2017).

- Since the 2008 global financial crisis, FinTech has been viewed as a distinct **combination of financial services and information technology**.
- Interestingly, between 2010 and 2019, the total value of investments in FinTech companies skyrocketed to **215.1 billion dollars**, a dramatic increase (Statista, 2022).

FinTech's Disruption



Disintermediation of Financial Institutions

✓ Direct Transactions

- ✓ Cryptocurrencies facilitate P2P transactions without intermediaries (e.g., banks).
- ✓ This direct exchange **reduces transaction costs** and **processing times**, presenting a significant challenge to traditional banks.
 - For instance, by using Bitcoin and Ethereum users transfer value globally without the need for a bank or payment processor, bypassing **somehow** traditional financial institutions.

Disintermediation of Financial Institutions Cont.

- **Decentralized Finance (DeFi)**

- DeFi platforms, built primarily on blockchain networks like Ethereum, offer financial services such as

- ✓ *lending,*
 - ✓ *borrowing, and*
 - ✓ *trading*

} *without traditional financial intermediaries*



- An example is [Aave](#), a DeFi protocol that allows users to lend and borrow cryptocurrencies without needing a bank. This trend is reducing the reliance on traditional financial systems, potentially leading to a significant shift in how financial services are provided.

As of 2024 there is around **\$52 billion** of value locked in DeFi.

Challenges to Monetary Policy Cont.

- **Sovereignty and Control**

- Cryptocurrencies operate independently of central banks, **challenging traditional monetary policies**.
- Governments typically control the money supply and stabilise their economies through central banks, but the decentralised nature of cryptocurrencies like Bitcoin limits these powers.
 - *For example, in Venezuela, the hyperinflation of the bolívar led many citizens to turn to Bitcoin as a store of value and medium of exchange, undermining the government's monetary control.*

Why are Venezuelans seeking refuge in crypto-currencies?

🕒 19 March 2019



Challenges to Monetary Policy Cont.

- **Stablecoins and Central Bank Digital Currencies (CBDCs)**
- In response to cryptocurrencies, **some governments are developing CBDCs** to combine digital currency's benefits with traditional currencies' regulatory oversight.
 - *China, for instance, has been a pioneer with its [Digital Currency Electronic Payment \(DCEP\) system](#), commonly known as the digital yuan.*
- This move represents a significant step toward integrating digital currency within a controlled, state-backed framework, potentially altering global finance dynamics.

Regulatory Implications

- **Evolving Regulatory Frameworks**
- The rise of cryptocurrencies has led to **regulatory uncertainty and challenges**. Traditional finance operates under well-established legal frameworks, but cryptocurrencies' decentralised and often anonymous nature complicates regulation.
 - *For example, the United States has seen varied responses from different agencies, with the SEC classifying some cryptocurrencies as securities while the CFTC treats others as commodities.*
- **This lack of uniformity in regulation can create confusion and risks for investors.**

Regulatory Implications Cont.

- AML and KYC
- Traditional financial institutions must adhere to strict AML and KYC regulations to prevent illicit activities.
- However, cryptocurrencies, particularly those that emphasise privacy (like Monero or Zcash), present challenges to these regulations.
- In 2021, the U.S. Treasury proposed new rules requiring cryptocurrency exchanges to report transactions over \$10,000 to the IRS, reflecting the government's efforts to impose traditional financial standards on the cryptocurrency industry.
- Another prominent example is Binance. Binance operations are restricted to specific countries. **Think Critically. Why?**



International Organisations

- *Financial Action Task Force (FATF)*
- *International Monetary Fund (IMF)*
- *World Bank*
- *Basel Committee on Banking Supervision (BCBS)*

———— From CeFi to DeFi

From CeFi to DeFi

Centralised Finance (CeFi), which dates back to ancient Mesopotamia, has always relied on centralised entities to back currencies, whether they hold intrinsic value or are assigned imputed value.

However, this system has inherent limitations, paving the way for the introduction of Decentralized Finance (DeFi).

Intermediaries and Middlemen, Lack of Transparency, Restricted Access, Single Points of Failure, Slow and Costly Transactions, Censorship and Control, Inefficiencies in Borrowing and Lending, Limited Financial Innovation

From CeFi to DeFi

Eliminating	Intermediaries: DeFi removes the need for banks and financial institutions, enabling direct peer-to-peer transactions.
Enhancing	Transparency: DeFi provides a transparent system where users can inspect the rules and operations of financial assets.
Increasing	User Control: DeFi gives users full control over their assets, preventing unauthorised alterations or seizures.
Improving	Accessibility: DeFi offers financial services to anyone with internet access, overcoming traditional barriers.
Fostering	Innovation: DeFi introduces new financial products and services, such as flash loans and decentralised exchanges, enabling more flexible solutions.

Introduction to Decentralized Finance (DeFi)

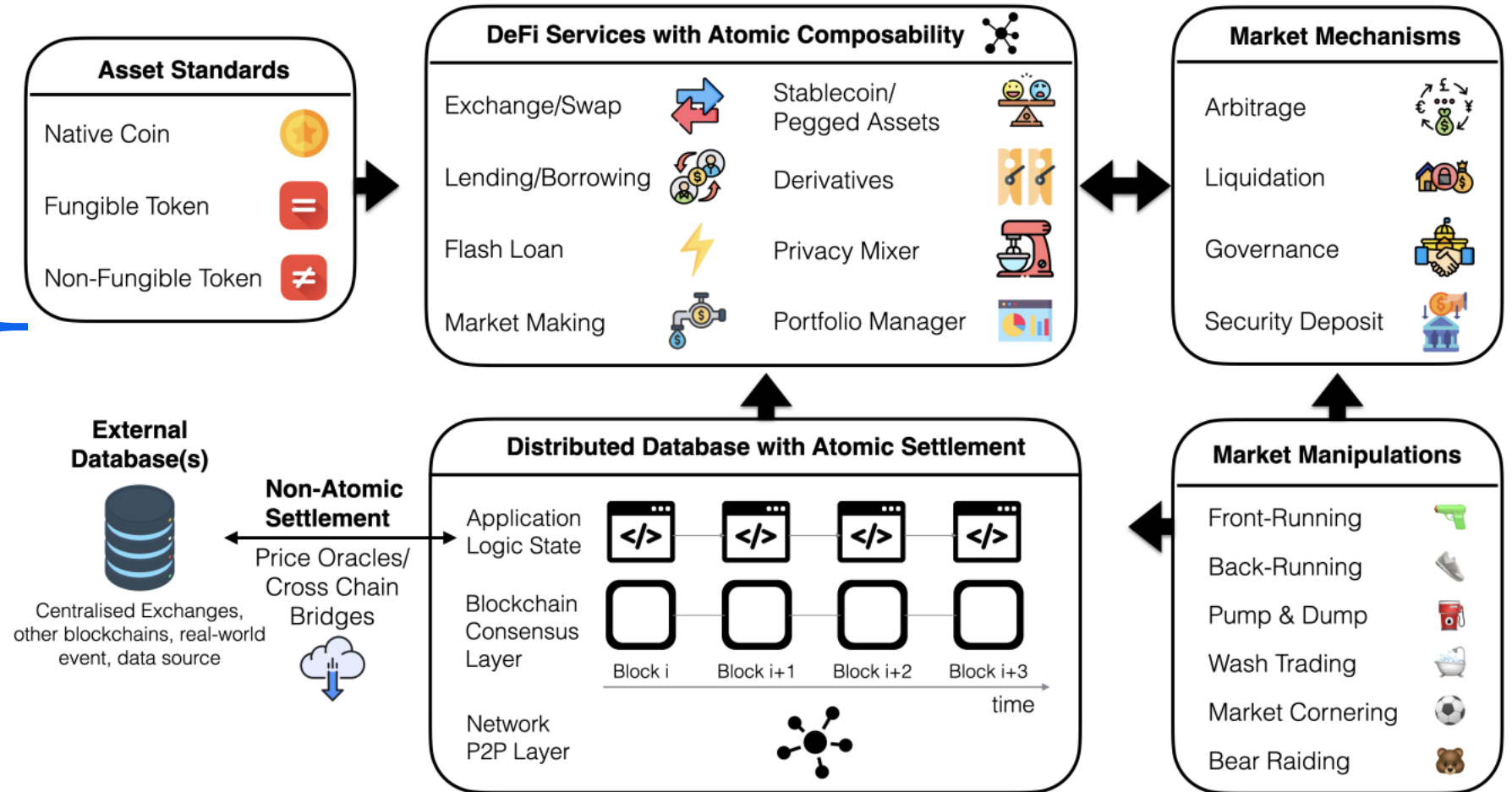
- DeFi, refers to a new category of financial applications built on blockchain technology that operates without intermediaries.
- These applications are **composed of smart contracts- self-executing contracts** with the terms of the agreement directly written into code, running on the blockchain's virtual machine- and are deployed on permissionless blockchains, accessible to everyone without authorisation from a central entity.
- They utilize **cryptographic mechanisms to ensure secure and transparent transactions across decentralized networks**. The consensus protocols used in these blockchains incentivize participants to maintain network security.

*The total value locked (TVL) in DeFi applications grew exponentially, **from \$675 million at the beginning of 2020 to over \$40 billion by early 2021**, highlighting the rapid adoption and potential impact of DeFi.*

High-level Systematization of DeFi

DeFi builds upon a ***distributed blockchain database***, enabling atomic transaction settlement.

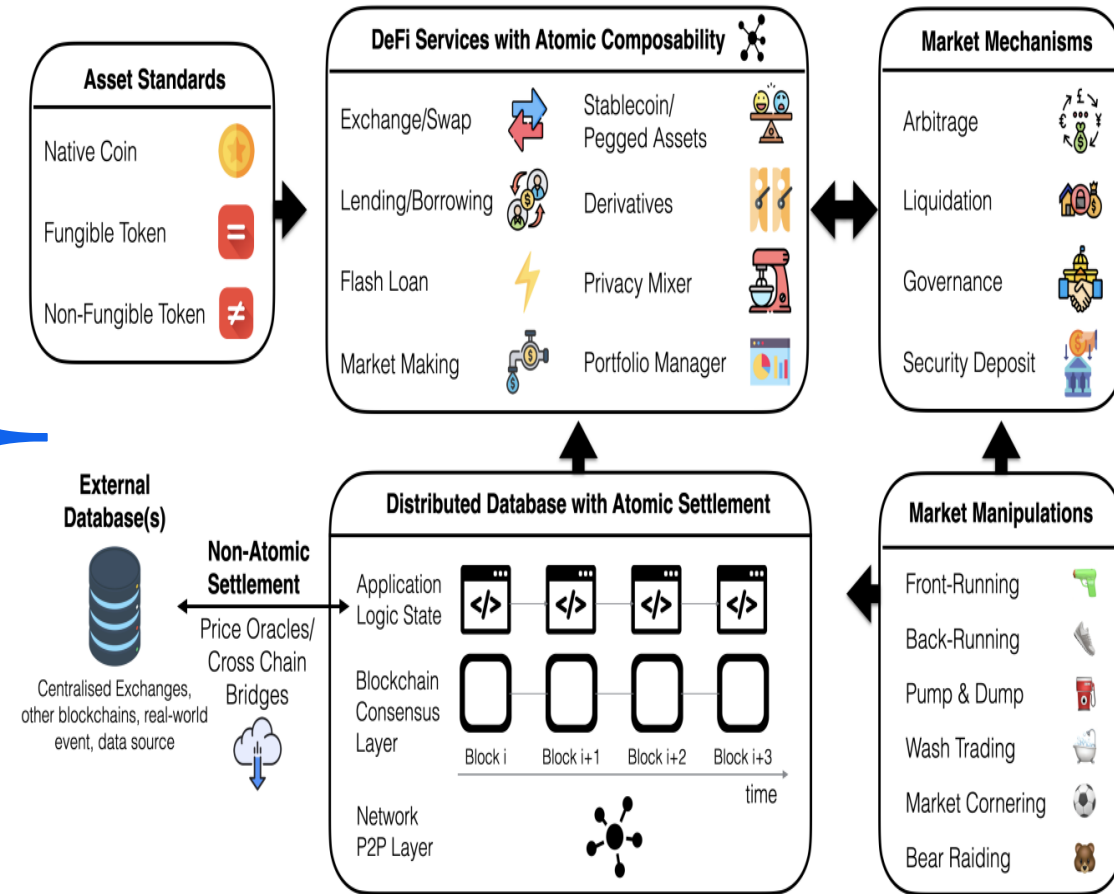
Communication with external databases, such as other blockchains, centralised exchanges etc is possible through ***non-atomic interactions**.



*operations that are not guaranteed to be executed as a single, indivisible unit.

High-level systematization of DeFi Cont.

- ✓ DeFi transactions must be recorded on the blockchain to reflect changes in the system.
- ✓ A user initiates a transaction broadcasted to a public P2P blockchain network.
- ✓ Miners choose to include the transaction in the blockchain based on the transaction fees offered.
- ✓ Once included in the blockchain, the transaction is confirmed and may become final after a certain period.
- ✓ A confirmed transaction updates the blockchain and the DeFi system, such as adjusting liquidity in an exchange.
- ✓ DeFi operates on the blockchain's state machine, providing various financial services, such as lending, market-making, stablecoins, privacy services, and more.



The Most Prevalent DeFi Properties

Public Verifiability: DeFi's execution and bytecode (the low-level representation of a smart contract's logic) must be publicly verifiable on a blockchain. This would allow users to inspect and verify state transitions, ensuring transparency and trust.

Custody: Users have direct control over their assets at all times, but they bear the technical risks unless insured. Centralized exchanges are often used for asset storage.

Privacy: DeFi operates on non-privacy-preserving blockchains, offering pseudoanonymity but no true anonymity. Blockchain addresses can be traced, and centralized exchanges can disclose ownership to law enforcement.

Atomicity: DeFi transactions can combine multiple financial operations into a single atomic action, ensuring either full execution or complete failure, a feature largely absent in CeFi.

The Most Prevalent DeFi Properties Cont.

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DeFi Ecosystem



Uniswap:
Ethereum's top decentralized trading platform



Aave:
The largest lending platform on Ethereum



Lido:
Ethereum's leading staking protocol



EigenLayer:
Ethereum's top re-staking protocol



Ondo Finance:
The largest RWA protocol



PancakeSwap:
Top decentralized trading platform on BNB chain



Jito:
Top dApp on Solana Blockchain



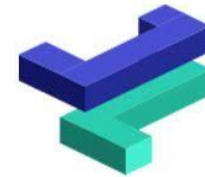
MakerDAO:
Creator of the largest decentralized stablecoin (DAI)



Raydium:
Leading Decentralized Exchange on Solana



1inch:
Ethereum's veteran decentralized trading platform

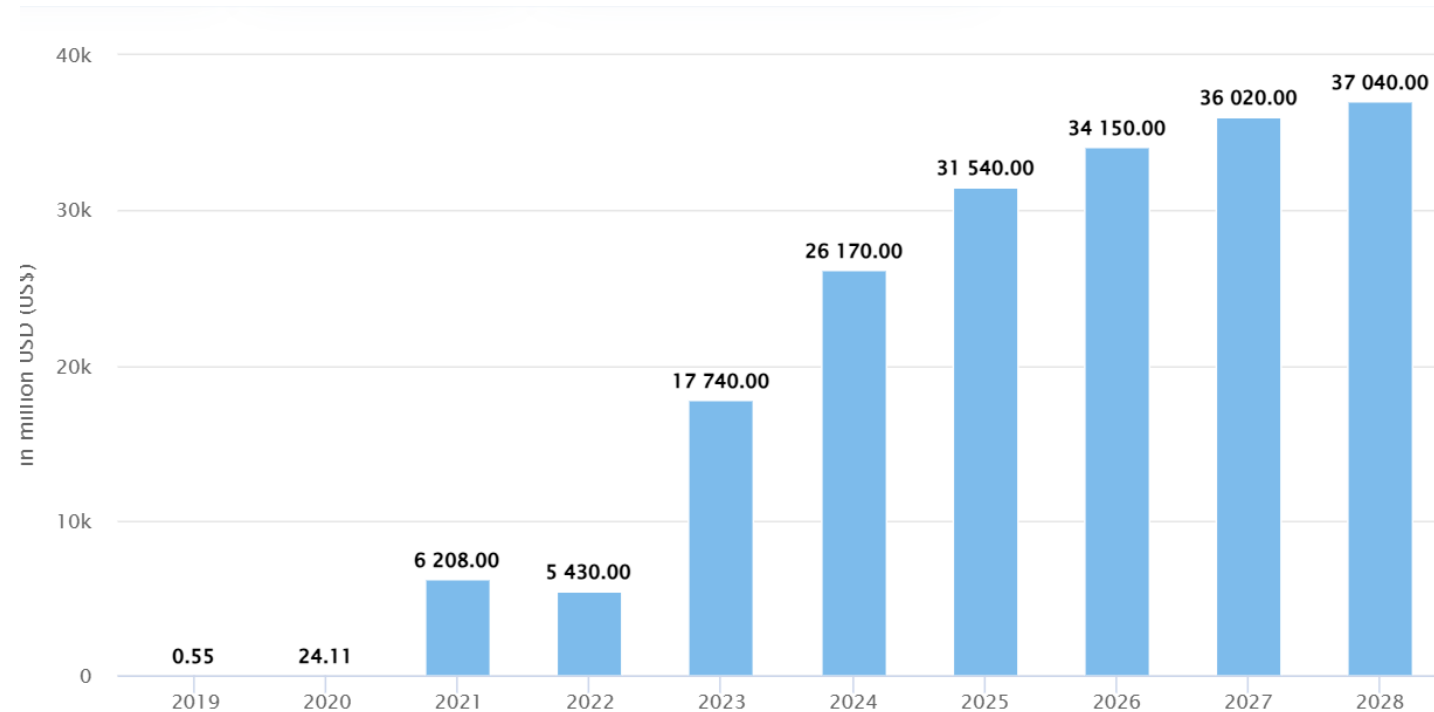


Just Lend:
The largest lending protocol on TRON

And many more players....

DeFi Ecosystem

- ✓ Revenue in the DeFi market is projected to reach **\$26.17** billion in 2024.
- ✓ It is expected to grow at a compound annual rate of 9.07% from 2024 to 2028, reaching **\$37.04** billion by 2028.
- ✓ The average revenue per user in 2024 is estimated at \$1,378.
- ✓ Globally, **the US is expected to generate the highest revenue, with \$12.53 billion in 2024.**
- ✓ The number of DeFi users is projected to reach **22.09 million by 2028**, with user penetration increasing from 0.25% in 2024 to 0.28% by 2028.



DeFi Agent Taxonomy

DeFi ecosystems involve various participants, each playing a critical role in the system's functioning.

These agents include:

- ✓ **users** who interact with the applications to gain profits or access credit
- ✓ **liquidity providers**, who supply the capital needed for trading or lending activities
- ✓ **arbitrageurs**, who help maintain market equilibrium
- ✓ **application designers**, who develop and maintain the DeFi platforms.

Each agent operates within the decentralised framework, *driven by specific incentives.*

DeFi Agent Taxonomy Cont.

The different agents in the DeFi ecosystem are motivated by potential rewards such as profits, governance tokens, or protocol fees.

However, participation in DeFi also comes with risks.

Agent:	Role:	Incentives for participation:	Key risk:
Users	Utilizing the application	Profits, credit, exposure and governance token	Market risk, technical risk
Liquidity Providers	Supply capital to the application in order to ensure liquidity for traders or borrowers	Protocol fees, governance token	Systemic economic risk, technical risk, regulatory risk, opportunity costs of capital
Arbitrageurs	Return the application to an equilibrium state through strategic purchasing and selling of assets	Arbitrage profits	Market risk, network congestion and transaction fees
Application Designers (Team and Founders)	Design, implement and maintain the application	Governance token appreciation	Software bugs

Key Components of DeFi Applications

Asset Layer: The asset layer in DeFi consists of base assets created using standardized smart contracts. These assets form the foundation for more complex financial instruments within the DeFi ecosystem. By leveraging blockchain technology, these assets are securely stored and can be freely traded or used in various financial operations.

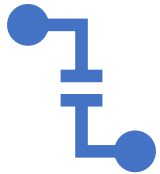


Application Layer: This is where the core functionalities of DeFi take place. The application layer comprises sophisticated smart contracts that execute complex business logic, such as trading, lending, and derivatives. These contracts are designed to operate without intermediaries, providing users with direct access to financial services.



User Interaction: Unlike traditional financial systems where users interact through intermediaries, DeFi allows direct interaction with applications via user-friendly interfaces. These interfaces resemble conventional banking apps but operate on a decentralized infrastructure, offering greater transparency and control over financial assets.

Decentralised Exchanges (DEXs) and Automated Market Makers (AMMs)



DEXs are platforms that **allow users to trade cryptocurrencies directly with one another without relying on a central authority**. Early implementations of DEXs attempted to replicate the traditional central limit order book (CLOB) design but faced challenges due to the high computational costs and inefficiencies inherent in blockchain technology.



AMMs address the scalability and efficiency issues of DEXs by **using pooled liquidity to facilitate trades**. Instead of matching buyers and sellers directly, AMMs allow users to trade against liquidity pools funded by other users who earn fees in return. This innovative approach eliminates the need for a traditional order book, enabling more seamless and cost-effective trading on decentralised platforms.

Derivatives in DeFi

DeFi derivatives are financial contracts built on blockchain technology that replicate traditional instruments like options, futures, and synthetic assets. These derivatives allow users to hedge against potential market movements or speculate on future prices. By leveraging blockchain technology, DeFi derivatives provide a decentralized and transparent alternative to traditional financial products.

Synthetic Assets are a novel type of derivative in DeFi. They are tokenised representations of real-world assets, such as commodities or stocks, created by collateralising crypto assets. These synthetic assets are pegged to an external price feed, which allows them to mimic the value of the underlying assets while being traded on decentralized platforms.

CeFi vs DeFi

CeFi vs. DeFi

<i>Feature</i>	<i>CeFi</i>	<i>DeFi</i>
<i>Governance</i>	Centralized control by institutions such as banks, exchanges, or regulators	Decentralized, governed by smart contracts and sometimes DAOs
<i>Transparency</i>	Limited transparency; operations are often opaque to end-users	High transparency; all transactions are publicly verifiable on the blockchain
<i>Custody</i>	Assets are held and managed by financial institutions on behalf of users	Users retain full custody of their assets, with no need for intermediaries
<i>Accessibility</i>	Limited to those who have access to traditional banking services	Accessible to anyone with internet access and knowledge of how to use DeFi platforms
<i>Privacy</i>	Privacy is maintained by institutions, but user data is subject to regulation and oversight	Limited privacy due to the transparency of blockchain, though pseudonymity exists
<i>Security</i>	Security is provided by the institution, with insurance and regulatory oversight.	Security relies on the strength of the underlying blockchain and smart contract code.

CeFi vs. DeFi Cont.

Feature	CeFi	DeFi
<i>Market Hours</i>	Limited to specific hours; markets are closed during weekends and holidays	Operates 24/7 without downtime, as it is built on blockchain technology
<i>Interest Rates</i>	Typically lower, as they are regulated and backed by central banks.	Often higher yields due to the lack of intermediaries and global participation.
<i>Trans. Speed</i>	Slower due to reliance on legacy financial systems and intermediaries.	Faster, as transactions are processed directly on the blockchain.
<i>Trans. Costs</i>	Can vary widely and sometimes include hidden fees; generally lower for simple transactions.	Transaction costs are generally transparent but can be high during network congestion
<i>Legal Compliance</i>	Strictly regulated, including KYC and AML requirements.	Mostly unregulated, with some platforms imposing KYC/AML; anonymity is possible but challenging.
<i>Risk of Manipulation</i>	Manipulations are regulated and prosecuted, but still possible (e.g., insider trading).	Vulnerable to new forms of manipulation like front-running and MEV (Miner Extractable Value).

CeFi vs. DeFi Cont.

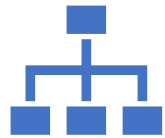
Feature	Cefi	Defi
<i>Product Variety</i>	Offers traditional financial products such as loans, insurance, and investment funds.	Offers innovative products such as flash loans, liquidity mining, and synthetic assets.
<i>Liquidity</i>	Provided by centralized entities such as banks, ensuring stable markets.	Provided by users through liquidity pools, leading to higher volatility.
<i>Regulatory Oversight</i>	Subject to stringent oversight by government bodies.	Largely operates in a regulatory gray area, allowing greater innovation but higher risk.
<i>Innovation</i>	Slower due to regulatory constraints and stability requirements.	Rapid innovation due to the open, permissionless nature of blockchain technology.
<i>User Experience</i>	Generally user-friendly with customer support and accessible interfaces.	Can be complex, with a steeper learning curve and higher risk of user error.
<i>Market Integrity</i>	Maintained through regulatory enforcement and institutional oversight.	Maintained by the code and protocols, which can be exploited if not well-designed.

CeFi vs. DeFi Cont.

Feature	CeFi	DeFi
<i>Insurance and Protection</i>	Deposits are often protected by government-backed insurance (e.g., FDIC).	Insurance is optional, decentralized, and may not cover all risks.
<i>Economic and Social Impact</i>	Plays a significant role in global economy, influencing policy and stability.	Potential to democratize finance but may exacerbate inequality if not widely accessible.
<i>Asset Types</i>	Deals with traditional assets like stocks, bonds, and fiat currencies.	Primarily deals with digital assets like cryptocurrencies and tokenized versions of traditional assets.

—— Risks and Challenges in DeFi

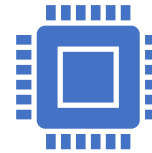
Risks and Challenges in DeFi



Decentralization Illusion: Despite the promise of decentralisation, DeFi often relies on central governance structures, concentrating power and decision-making. This centralisation is necessary for strategic and operational decisions, undermining the fully decentralised ideal.



Transaction Costs: High transaction fees during network congestion can make DeFi interactions costly, reducing accessibility for smaller users.



Software Integrity: The immutable nature of blockchain transactions means that any bug in a smart contract can lead to irreversible loss of funds, posing significant risks.



Governance and Interoperability: The decentralized governance of DeFi applications can lead to challenges in decision-making, while the interconnected nature of DeFi platforms introduces systemic risks.

Risks and Challenges in DeFi Cont.

High Leverage and Proccyclicality:

DeFi is characterised by high leverage, exacerbating market volatility. The lack of traditional financial shock absorbers, such as banks, makes the system vulnerable to price swings and forced liquidations during downturns.

Liquidity Mismatches & Stablecoin Risks:

Stablecoins, a key component of DeFi, are prone to liquidity mismatches and market risks. Their value depends on the quality of underlying collateral, which can be volatile, leading to potential runs and ecosystem destabilisation.

Lack of Shock Absorbers:

Unlike traditional finance, DeFi lacks entities that can provide liquidity or stability during times of stress, increasing the risk of cascading failures within the system.

Regulatory and Legal Challenges:

The largely unregulated nature of DeFi poses challenges in ensuring financial stability, investor protection, and preventing illicit activities. As DeFi grows, these regulatory gaps become more significant.

Conclusion

CONCLUSION

- ✓ DeFi transforms traditional finance by enabling disintermediation, greater transparency, and user control over financial assets.
- ✓ Key processes such as tokenisation, lending, and borrowing through DeFi platforms present significant benefits, including reduced costs and enhanced accessibility to financial services.
- ✓ Despite its advantages, DeFi poses challenges such as high volatility, software vulnerabilities, and regulatory uncertainties, particularly regarding KYC/AML compliance.
- ✓ The evolving legal and regulatory frameworks are critical in determining DeFi's long-term viability and global adoption.
- ✓ As DeFi continues to grow, it offers the potential to democratise finance, promote innovation, and enhance financial inclusion, but it requires cautious navigation of its inherent risks.

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