



UNIVERSITY *of* NICOSIA

Session 1

# DeFi Fundamentals

BLOC 611: Introduction to Decentralized Finance

# Week 1 is just the tip of the iceberg



Week 1: DeFi Fundamentals

George Giaglis

Week 2: The DeFi ecosystem & application stack

George Giaglis

Week 3: DeFi infrastructure I: Ethereum

Klitos Christodoulou

Week 4: DeFi infrastructure II: Other L1/L2 blockchains & bridges

Klitos Christodoulou

Week 5: DeFi applications I: stablecoins (& CBDCs)

Lambis Dionysopoulos

Week 6: DeFi applications II: lending & borrowing

George Giaglis

Week 7: DeFi applications III: exchanges

George Giaglis

Week 8: DeFi applications IV: oracles, derivatives, insurance

George Giaglis

Week 9: DeFi governance & DAOs

George Giaglis

Week 10: DeFi tokenomics & real-world asset tokenization

Christos Makridis

Week 11: Beyond DeFi: NFTs & the metaverse, DeFi 2.0

George Giaglis

Week 12: DeFi Lab

Lambis Dionysopoulos

# Hybrid (Synchronous / Asynchronous) learning

- The course will last twelve weeks
- Each week:
  - Material will be uploaded on Moodle (latest by Monday)
  - A live session will take place with one of the course instructors (typically on Wednesday 17:00-18:30 Cyprus time)
- You are expected to have read the material BEFORE the live session
- Post your questions to the relevant thread in Moodle, so that they are answered during the weekly live session

# Session Objectives

- Provide a **framework for understanding Decentralized Finance**.
- Explain the **main features of DeFi**, comparing them to those of traditional finance (**TradFi**).
- Explore the **benefits** and **risks** of DeFi.
- Discuss the **size and growth of the DeFi ecosystem**.
- Provide a mental map for the remainder of this course.

**Disclaimer:** The discussion of any specific project or organisation is for educational/illustrative purposes only and should not be construed as endorsement or investment advice.

# Agenda

1. Defining DeFi
2. DeFi characteristics, benefits and risks
3. Conclusions
4. Further Reading

Session 1: DeFi Fundamentals

# **1. Defining DeFi**

# Before DeFi: Traditional Finance (TradFi)

- We will use the term **TradFi** to refer to the financial services industry of the traditional world, encompassing the management of money, credit, banking, investments, assets & liabilities, etc.
- At the center of TradFi's services and activities lie **centralized** institutions that act as **intermediaries**. So, the term **CeFi**, short for Centralized Finance, may be used as synonymous to TradFi.
- CeFi institutions include central banks, commercial banks, and all types of financial service providers.
- TradFi is based on two main pillars:
  - **Custodial approach**: assets are entrusted to CeFi entities for safekeeping and management
  - **Permissioned nature**: only vetted individuals and organizations can participate in the financial system; user activity is closely tied to identity.
- The ability to trade with untrusted entities through a trusted intermediary has arguably been a driver of economic growth for centuries.

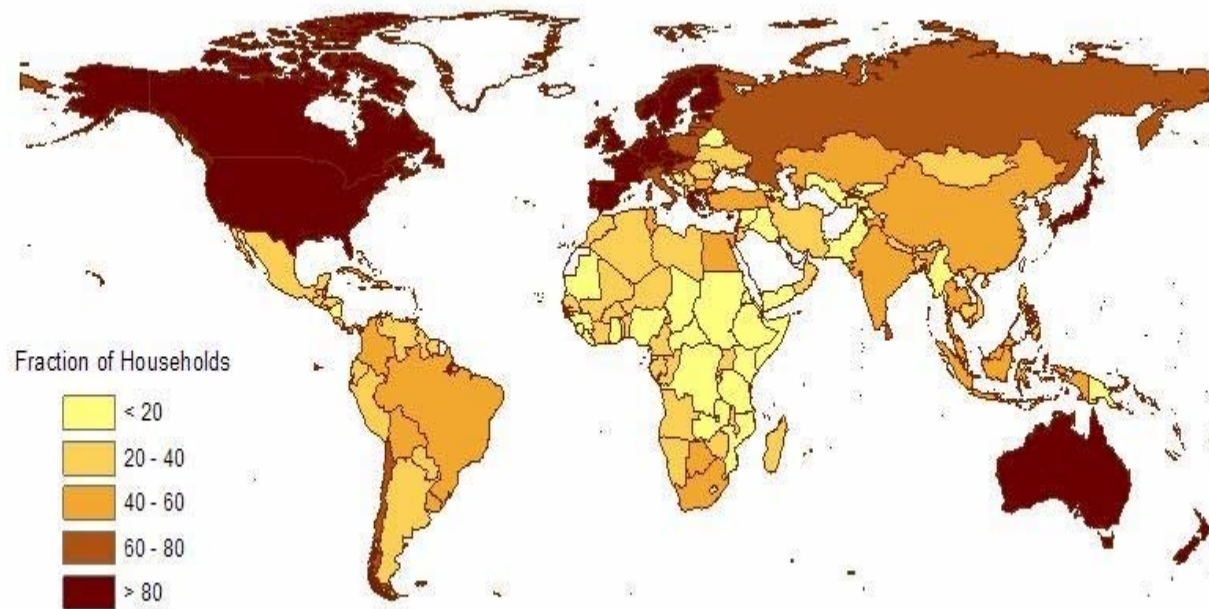
# Drawbacks of TradFi

- **Financial exclusion for the unbanked**
  - 1.7 billion people have no bank account with a financial institution.
  - This includes 26% of the population in Europe and 5.4% of US households!
  - Sources: [FDIC](#), [World Bank](#), and \*
- **High costs and artificially slow speeds**
  - The average cost of a remittance is 7% in fees per transaction; when using banks, that rises to 10.53%.
- **Politicization of money**
  - Currency manipulation, money printing – [Bloomberg](#)
  - Capital controls
- **Lack of transparency & information asymmetries**
  - See e.g. the Libor scandal ([Guardian](#))
- **Single points of failure and systemic risk.**
  - Crises and bank runs

\* *The Unbanked, Financial Exclusion: (Asli Demirgüç-Kunt et al., 2017) (EC and TNS Opinion & Social., 2016)*

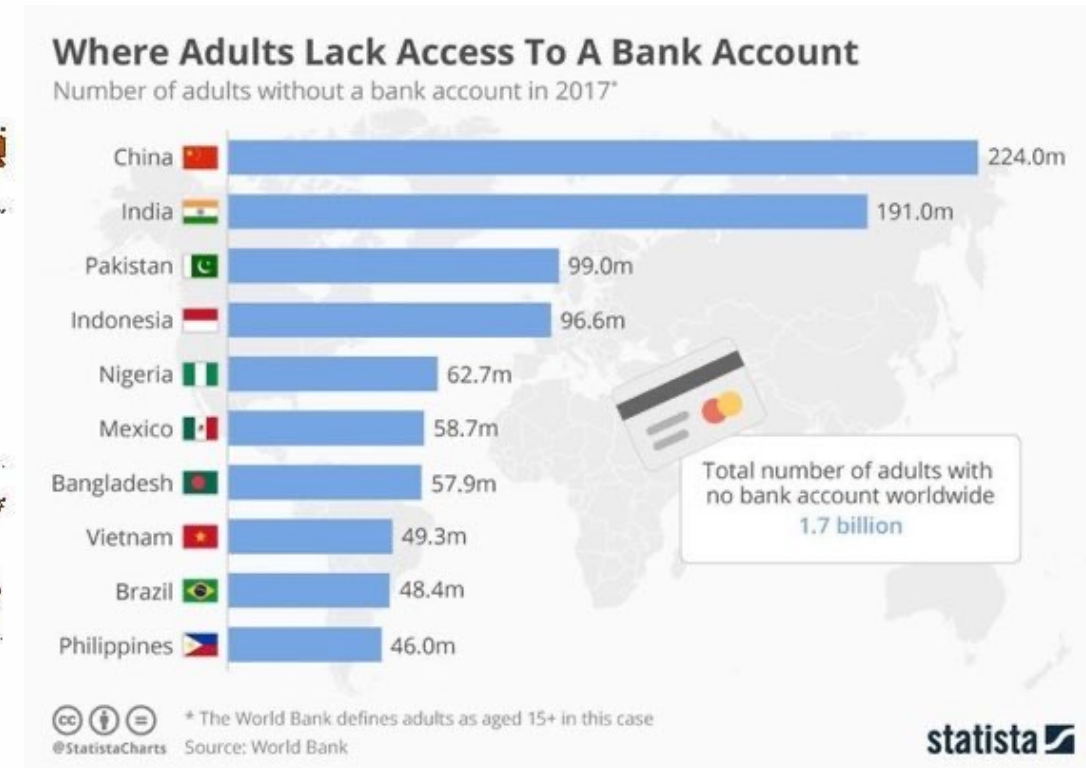


# The unbanked

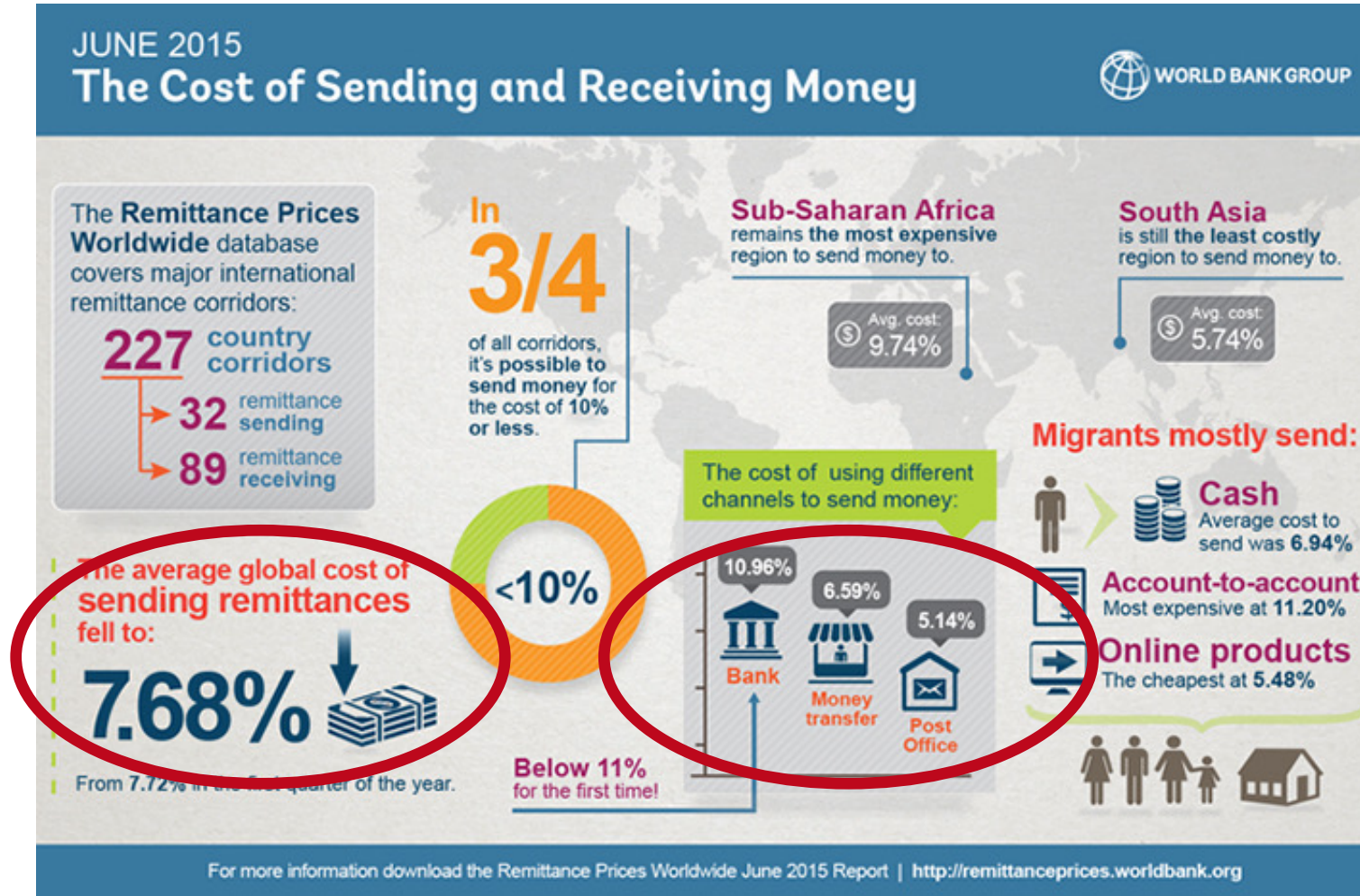


Percentage of households with an account in a financial institution

Source: [Researchgate](#), Statista



# The cost of money transfers



Source: World Bank

### Drawbacks of TradFi (a short story)

- Alarmed by the events at Nasdaq Clearing in late 2018, some financial heavyweights recently sounded a 12-page warning.
  - The group included Paul Tucker, a former deputy governor of the Bank of England; Paul A. Volcker, a former chairman of the Federal Reserve; and Sheila C. Bair, a former chairwoman of the Federal Deposit Insurance Corporation.
- Central counterparties, they warned, “*occupy a position in the financial system that leaves them **too important to fail.***”
- The lack of a clear plan to cope with a meltdown is “*one of the biggest gaps in the post-crisis regime for **financial stability.***”
- For more details see: [Systemic Risk Council](#).
- **Important note: DeFi is not a panacea and also has issues with transparency and industry self-regulation;** recent examples can be found [here](#). We will discuss these issues in the remainder of the course.

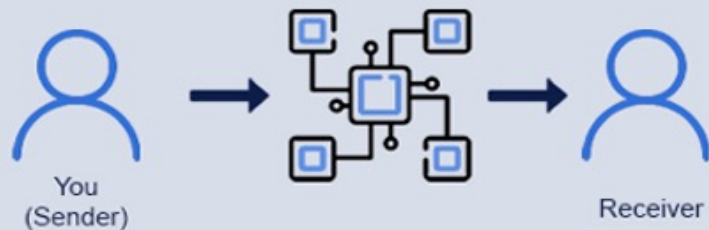
# DeFi defined

- **Decentralized Finance (DeFi) is an umbrella term for a collection of decentralized, open, and peer-to-peer (P2P) financial products and services that rely on smart contracts running on blockchains.**
  - DeFi is **not the same as fintech** (a broader term for financial technology firms, which are typically also CeFi).
- DeFi disrupts the existing financial services industry by allowing people to lend, borrow and trade financial assets without traditional intermediaries, in a **peer-to-peer fashion**.
- DeFi can replicate services found in the traditional financial sector, but can also introduce **new innovations** (business models not possible in TradFi).
- You can find a brief timeline of the DeFi history [here](#).

# DeFi and Disintermediation



**DECENTRALIZED FINANCIAL SYSTEM**

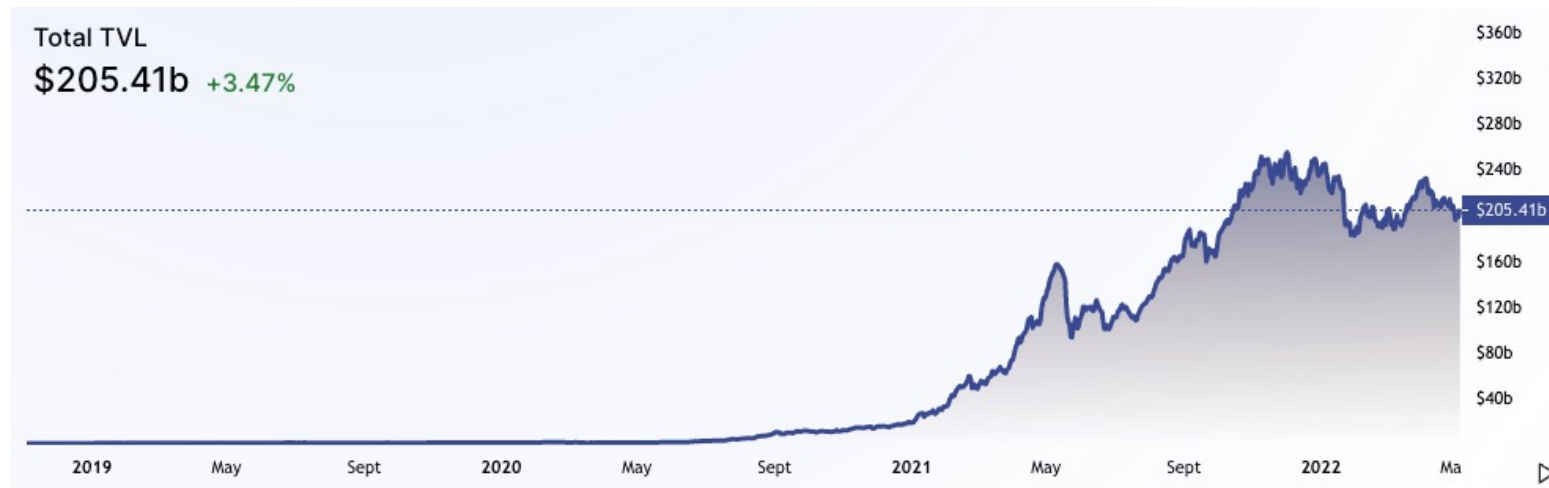


[www.stably.io](http://www.stably.io)

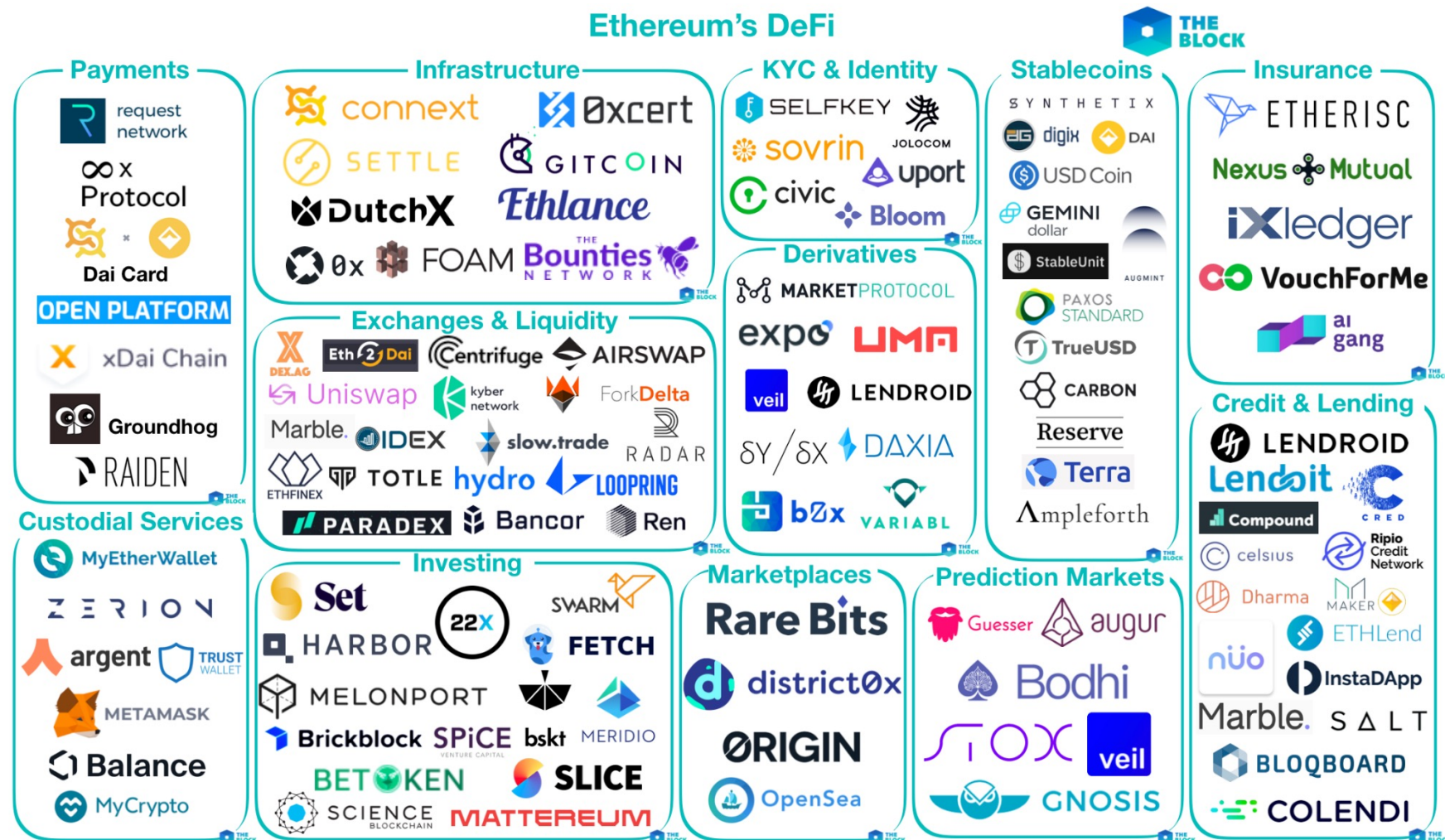


# DeFi market size

- **Total Value Locked (TVL)**, a measure of the amount of capital locked in DeFi protocols, is the main metric used to define the size of the DeFi space.
  - Other metrics, such as the number of transactions or fees generated, are also important.
- TVL increased from a \$1bn in the summer of 2020 to over \$100bn by the summer of 2021 (100x growth!)
- It then continued to increase steadily to an all time high of approximately \$250bn (Nov 2021).
- Today (May 2022), DeFi TVL is close to \$200bn.



# A very complex ecosystem



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## **2. DeFi characteristics, benefits and risks**



# DeFi characteristics

Features that differentiate public blockchains (on which DeFi runs) from the private networks used in TradFi:

- 1. Open/Permissionless & Censorship resistant:** Anyone can access DeFi. Access does not require proof of identity or any other form of authorization. No single party has the power or authority to block a valid transaction.
- 2. Peer-to-Peer:** Transactions are sent from one party to the other without intermediaries.
- 3. Decentralized:** Transaction validation of transactions is performed by multiple independent network participants.
- 4. Public:** Transactions and state transitions are available and publicly verifiable by everyone.
- 5. Immutable:** Altering the state and history of transactions is impossible or uneconomical.
- 6. Borderless:** DeFi apps are not constrained by geographical boundaries.

# Comparing DeFi to TradFi

Feature	DeFi	TradFi
<b>Censorship resistance</b>	No-one can censor participants or valid transactions	Gatekeepers can block participants/transactions
<b>Immutability</b>	Verified transactions are immutable	Transactions can be reversed/canceled
<b>Transparency</b>	Transactions are visible (even if anonymous/pseudonymous)	Transactions are typically hidden
<b>Reach</b>	Global	Typically restricted to country / economic zone (global through correspondents and banking networks)
<b>Trust/Governance</b>	Regulated by code & community	Regulated by law

# DeFi risks

- **Technology risks**
  - Failure of DeFi protocols stemming from their underlying technological infrastructure.
  - We will discuss the infrastructure of DeFi in Sessions 2-4 of this course
- **Project risks**
  - DeFi apps failing due to the idiosyncrasies of the each app.
  - We will cover types and risks of DeFi apps in Sessions 5-8 of this course
- **Economic/Governance risks**
  - Risks stemming from the ways DeFi apps are managed
  - We will cover economic and governance aspects of DeFi in Sessions 9-10 of this course

Session 1: Fundamentals of DeFi

## **3. Conclusions**

# Conclusions

- DeFi is about dis-intermediating aspects of the traditional financial services industry by leveraging open, permissionless, and censorship-resistant decentralized networks.
- DeFi applications can imitate functions of traditional finance (for example, lending/borrowing & asset exchanges), but can also create wholly new business models (for example, flash loans). We will explore both in the remainder of this course.
- DeFi has grown significantly in size, but is still a nascent application area with its own risks (technology, project, economic/governance) and unclear regulatory standing.

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## **4. Further Reading**

# Further Reading

### A beginner's guide to DeFi

- <https://blog.coinbase.com/a-beginners-guide-to-decentralized-finance-defi-574c68ff43c4>

### Adventures in DeFi land

- <https://www.economist.com/briefing/2021/09/18/adventures-in-defi-land>

### DeFi infrastructure 101 – Overview and market landscape

- <https://medium.com/racecapital/defi-infrastructure-101-overview-market-landscape-78e096a85834>

### The DeFi list:

- <https://defipulse.com/defi-list/>



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## Questions?

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