



University  
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Center for  
Innovative Finance

# **Decentralized Finance: On Blockchain- and Smart Contract-based Financial Markets**

Prof. Dr. Fabian Schär

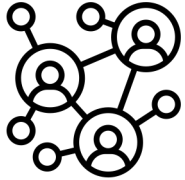
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# Overview

- I. Quick Primer
- II. What is DeFi?
- III. Risk and Regulation

# **I. Quick Primer**

# Blockchain



Peer-to-Peer  
Network



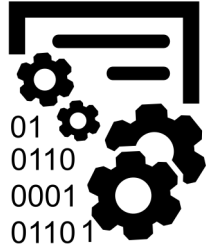
Public Key  
Cryptography



Consensus  
Protocol

> Depending on the exact specifications, this MAY create an **open** and **immutable ledger**.

# Smart Contracts



## Key Characteristics:

- > Code is observable
- > Execution is verifiable
- > Smart Contract can control assets

## Smart Contracts

### Examples:

- > Decentralized Exchanges / CFMM
- > Collateralized Loans
- > Synthetic Assets
- > ...

## **II. What is DeFi?**

# What is DeFi?

No clear definition, i.e., result may vary depending on who you ask...

## My definition:

DeFi employs public Blockchain networks and smart contracts to build **open, transparent, composable** and **non-custodial** financial protocols.

**Open:** By default – no access restrictions.

**Transparent:** Mathematically verifiable by anyone.

**Composable:** Interoperable lego pieces.

**Non-Custodial:** No trust requirements

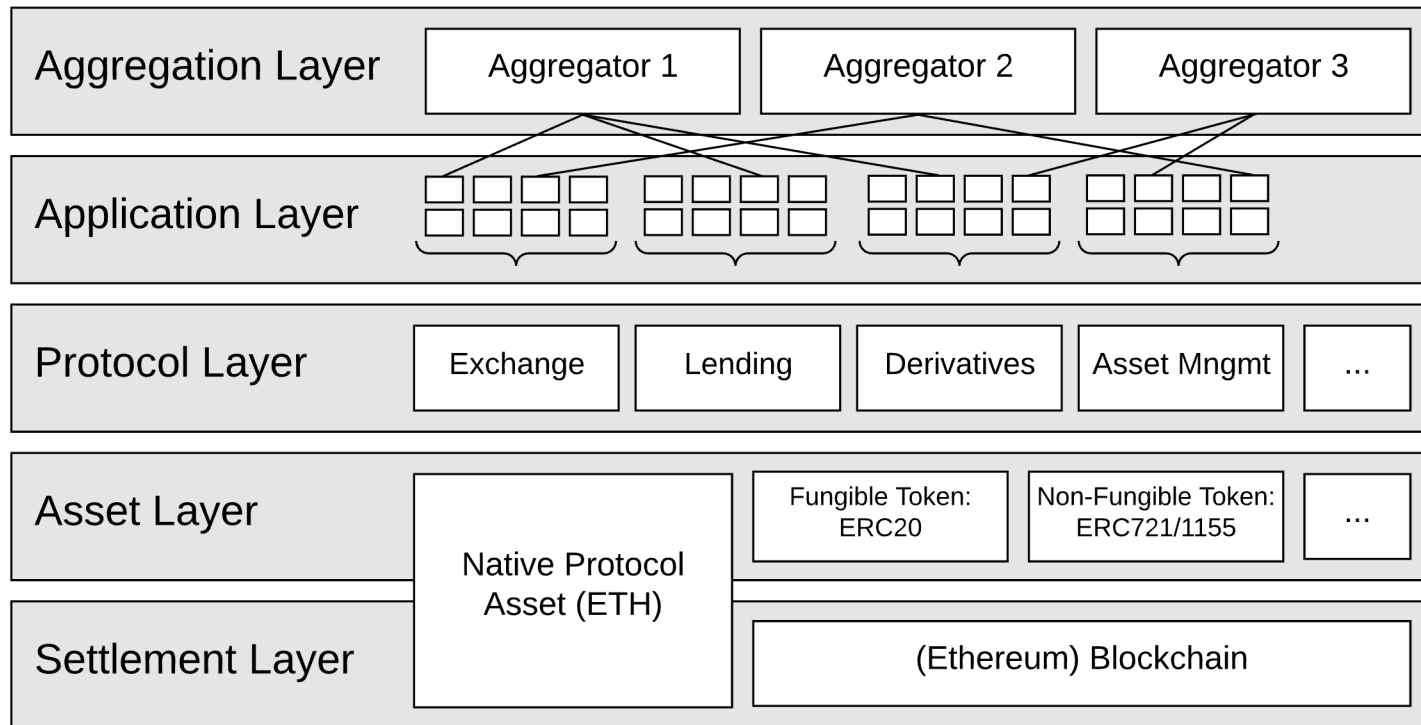
# A Negative Definition

- DeFi  $\neq$  CBDC / Programmable Euro
- DeFi  $\neq$  Running an In-house “Blockchain”
- DeFi  $\neq$  Heavily centralized settlement chain

DeFi is the idea of having an independent settlement layer and an open financial platform. Think of it as **open banking on steroids**.



# The DeFi Stack



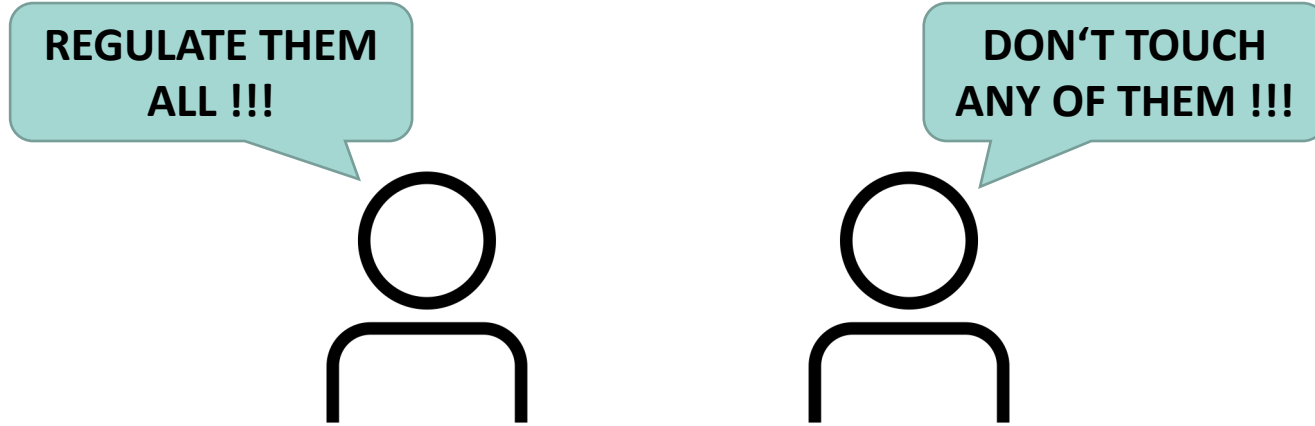
Schär (2021) Decentralized Finance: On Blockchain- and Smart Contract-based Financial Markets.

# **III. Risks and Regulation**

# Some of the Main Risks in DeFi

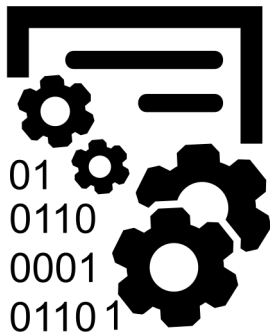
- Phishing Attack, Rug Pulls... (Consumer Protection)
- Smart Contract Issues & Economic Attack Vectors
- ERC-20 Issues
- Wrapping Complexity
- Systemic Risks
- Governance Attacks
- Centralization Creep
- ...

# Two Approaches – Both Wrong!



→ The truth is much more nuanced and requires research.

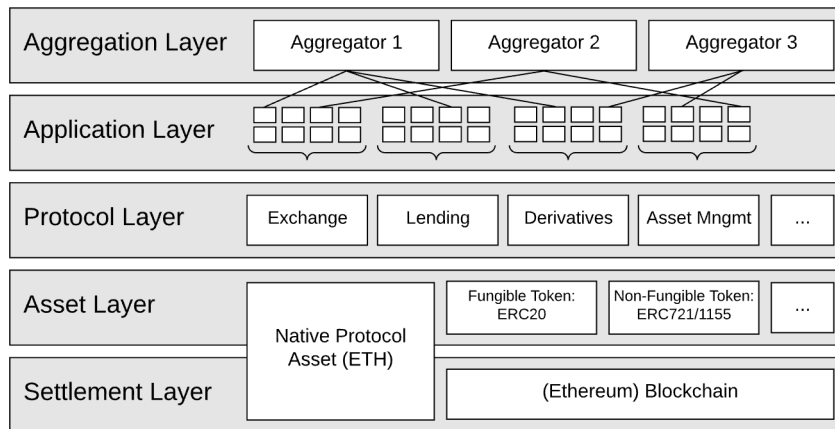
# True DeFi...



**True decentralization** can provide mutually beneficial and provably fair infrastructure. It may **decrease** the **need for** and the **effectiveness of regulation**.

**My proposal:** Regulate on- and off-ramps. Do NOT regulate the devs or protocols.

# Decentralization Theater...



## Things to Consider (non-exhaustive list)

Settlement Layer: Is the Blockchain truly decentralized?

Asset Layer: Off-Chain collateral? Blacklisting/Expropriation functions?

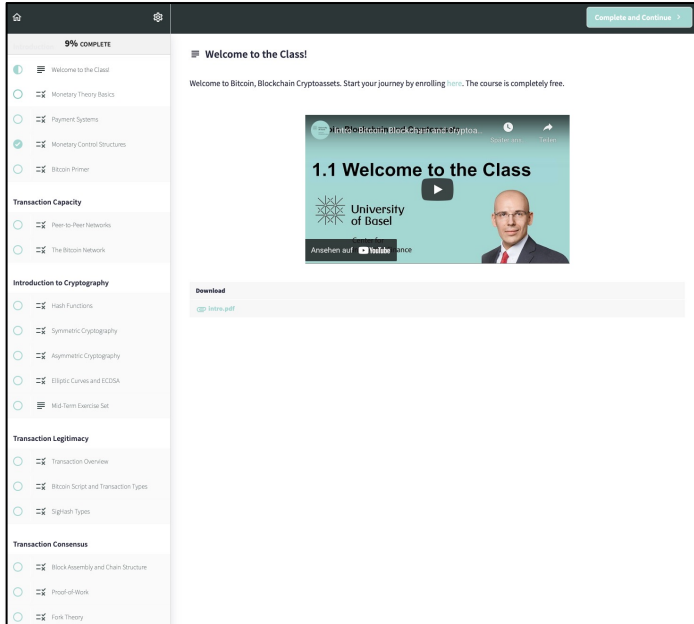
Protocol Layer: Admin Keys? Gov Token Allocation? Oracles? Kill Switches?

App/Agg Layer: Frontend-specific risk? Advertisement and suitability?

# Key Takeaways

1. DeFi is super exciting and here to stay. However, in its current state, it is risky for investors.
2. There is a place for FIs in DeFi.
3. The interpretation of the term DeFi differs significantly.  
Regulators must analyze these protocols in great detail before deciding to step in / stay away.
4. In any case: (Not) Regulating something because of its name, is a bad idea!

# Some Resources



<https://cryptolectures.teachable.com>



# Some Resources (ctd.)

## Decentralized Finance: On Blockchain- and Smart Contract-Based Financial Markets

By Fabian Schär

The term decentralized finance (DeFi) refers to an alternative financial infrastructure built on top of the Ethereum blockchain. DeFi uses smart contracts to create protocols that replicate existing financial services in a more open, interoperable, and transparent way. This article highlights opportunities and potential risks of the DeFi ecosystem. I propose a multi-layered framework to analyze the implicit architecture and the various DeFi building blocks, including token standards, decentralized exchanges, decentralized debt markets, blockchain derivatives, and on-chain asset management protocols. I conclude that DeFi still is a niche market with certain risks but that it also has interesting properties in terms of efficiency, transparency, accessibility, and composability. As such, DeFi may potentially contribute to a more robust and transparent financial infrastructure. (JEL: G15, G23, E59)

Federal Reserve Bank of St. Louis Review, Second Quarter 2021, 10(2), pp. 153-74  
<https://doi.org/10.20955/r.103.153-74>

### 1 INTRODUCTION

Decentralized finance (DeFi) is a blockchain-based financial infrastructure that has recently gained a lot of traction. The term generally refers to an open, permissionless, and highly interoperable protocol stack built on public smart contract platforms, such as the Ethereum blockchain (see Buterin, 2013). It replicates existing financial services in a more open and transparent way. In particular, DeFi does not rely on intermediaries and centralized institutions. Instead, it is based on open protocols and decentralized applications (DApps). Agreements are enforced by code, transactions are executed in a secure and verifiable way, and legitimate state changes persist on a public blockchain. Thus, this architecture can create an immutable and highly interoperable financial system with unprecedented transparency, equal access rights, and little need for custodians, central clearing houses, or escrow services, as most of these roles can be assumed by "smart contracts."

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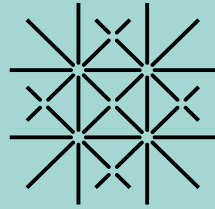
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