Central Bank Digital Currency

CBDC

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Overview

- Virtual fiat currency
- It is NOT cryptocurrency (Unregulated)
- Types:
  - Retail (general-purpose)
    - Meant for average consumers and the general public for conducting daily transactions
  - Wholesale
    - Meant for exchanging and trading among private banks and central banks

Properties

- Convertible, acceptable and available
- Global financial inclusivity
- Simplified financial services infrastructure
- Secure, instant and resilient
- Available and throughput
- Scalable and interoperable

Implications of society, government

- Society
  - Increase financial inclusion
  - Faster and cheaper cross-border payments
  - Less usage of cash
- Government
  - More visibility into economy, tax evasion
  - Impact on traditional banking models
  - Greater control and oversight

Concerns of privacy & security

- Tracing & monitoring transactions
- Anonymity (risk of money laundering)
- Data breach
- System failure & Cyber attacks
- Cyber crime
- Secure storage

Programmability constraints

- Balance flexibility with stability
- Clear, enforceable and transparent
- Legal & regulatory constraints
- International coordination
- Scalability
- Governance
- Interoperability

Should CBDC issued by local banks, central banks?

- CBDC Issuer: Central Banks
  - Maintains financial stability
  - Government-backed trust
  - Centralized supply management
  - Potential for government control
  - Competition with banking sector
- CBDC Issuer: Local Banks
  - Existing customer relationships
  - Maintains banking sector
  - Innovative applications possible
  - Fragmentation and instability risk
  - Limited trust and adoption

How CBDC can be implemented in real world? Simulation

- Define the parameters of the digital currency:
  - Initial coin supply
  - Block time
  - Reward for mining block
  - Mining difficulty

- Choose Programming Language:
  - Python, C++. (Which tech stack we should use according to you?)

How CBDC can be implemented in real world? Simulation

- Implement the Database
  - Centralized or distributed database

How CBDC can be implemented in real world? Simulation

- Develop UI
  - View the transactions
  - Submit transaction
  - Check balance
  - Display current state of digital currency (current coin supply, number of transactions)
  - (Are these features, okay? In addition to that what other features we should add)

How CBDC can be implemented in real world? Simulation

- Test
  - Network congestion
  - Double spending attacks
- Deploy

Existing simulators

- Crypto Miner Tycoon
  - https://store.steampowered.com/app/2304990/Crypto_Miner_Tycoon_Simulator_Starter_Edition/
- OpenCBDC – Project Hamilton CBDC
  - https://dci.mit.edu/opencbdc
- Paid simulators
- Agent-Based Simulator by Financial Network Analytics

Agent-Based Simulator by Financial Network Analytics

- Based on behavior and interaction of agents in financial system
- Agent Classes:
  - A central bank
  - A commercial Bank
  - Merchants
  - Consumers

Key Outputs of Agent-Based Simulator

- Composition of Consumer's wealth
- Diffusion of means of payments
- Bank deposits
- Interest rates
- Size of economy