digital currency initiative
Cellular structure for a digital fiat currency

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Cellular structure for a digital fiat currency (DFC)

- Goals
- Cellular structure
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- Central bank digital currency
Goals of a DFC
Goals

- **Financial stability/resilience** – Having an alternative infrastructure to make fiat currency payments enhances stability in two ways (a) providing a payment system separated out from the balance sheets of commercial banks and the risks they face, (b) allow a DFC to operate independently of operational failure or cyber attack on the banking system and vice versa.

- **Competition** – Separate infrastructure, service providers and fee structure for a DFC provides competition to existing payment providers, giving merchants and customers a viable alternative. Greater competition lowers costs of payment system, clearing and settlement.

- **Innovation** – A DFC can incorporate innovations from the cryptocurrency system and provide a platform for building new financial services which incorporate fiat currencies.
Backings

- Direct issue by central bank (Central bank digital currency or CBDC)
  - Effect on the existing banking system
  - Wider discussion of credit creation, maturity transformation and how productive enterprise is financed

- Privately issued (Digital fiat currency or DFC)
  - Cash at central bank (no market or credit risk)
  - Government bonds (minimal to no credit risk, market risk)
  - Other assets such as corporate bonds, loans (credit and market risk)
  - Commercial bank money (credit risk, no market risk)
Cellular structure
DFC single cell

- **Issuer**
  - Holds cash at the central bank (systemic stability)
  - Simplified version of UK commercial banknotes system
  - One ledger, one cell
  - Decides how the cell functions internally (consensus mechanism, software, validators, fees)

- **Validators**
  - Order transactions
  - Maintain copies of the ledger
DFC single cell
DFC system - single currency
DFC system - single currency

- Holding DFC
  - With a single issuer
  - Across multiple issuers
  - Cost of fragmented liquidity

- Inter-chain transactions
  - Routing payments - multi-hop
  - Trustless intermediaries
  - Lower barriers to entry for intermediation
  - More competitive market for liquidity provision
DFC system - single currency

Customer → Cell 1 → Trustless intermediary → Cell 2 → Merchant

A → C → B
DFC system - multiple currencies
DFC system - multiple currencies

- Intermediaries
  - Routing payments (payment versus payment)
  - Market making for currency pairs

- Application to other tokenized assets (delivery versus payment)
  - Shares
  - Bonds
  - Commodities
Rationale for cellular structure
Financial stability/resilience

- Existing system
  - Efficiency of matching money and credit (Kashyap et al, liquidity paper)
  - Structural fragility from maturity transformation
  - Deposit insurance, regulation, lobbying, shadow banking
  - Credit and liquidity risks in payment systems - PFMI s

- DFC
  - Parallel system immune from contagion (fully collateralized)
  - Structural elimination of credit risk
  - System can survive failure of individual cells (resilience)
Competition

- Present competition
  - Merchant payments
  - Decline of cash

- Future competition
  - Cryptocurrency strategy
  - Changing the organizational structure
Innovation

- Technological and organizational change
  - Parallel with dynamos in factories
  - Technological change alone did not produce significant productivity gains

- Bitcoin as organizational change
  - Payments without banks
  - Financial system as a set of functions
  - How to extend this concept to the existing financial system
    - Cross chain atomic swaps (PvP, DvP)
    - Discreet log contracts (derivatives)