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E-money and Payments Policy

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E-money: should central banks issue a *new* form of e-money?

Central banks offer some payments media: high value payments systems (restricted access) and cash (universal access)

- **Have the new technologies like DLT and mobile computing changed the risk and efficiency tradeoff in the public provision of centralized and decentralized payments media?**

Preview of conclusions

- New technologies have not changed the tradeoff for the universal provision of central bank accounts
  - System would be expensive
  - Directly compete with commercial banks
- New technologies have potentially improved the tradeoff for the issuance of digital tokens
  - Likely increase in the contestability of payments platforms
  - Questions remain on counterfeiting risks (cyber)

Plan of my remarks

1. Public policy objectives

2. Technology and payment arrangements

3. Central bank e-money schemes

4. Discussion

Public Policy Objectives

Central bank e-money: what are the objectives?

Monetary policy objectives

- Improve monetary policy implementation
- Break below the effective lower bound

Financial system objectives

- Provide, regulate or oversee safe and efficient payments systems
- Ensure financial stability (with macro/micro regulation of institutions and markets)

Central bank e-money: what are the objectives?

Other public policy objectives

- Acquire reserve currency status (for seignorage and international trade)
- Reduce tax evasion and crime (by eliminating cash)
- Broaden financial inclusion (with cheaper financial instruments)
- Enable micropayments (with cheap and divisible assets)
- Spur innovation of financial services
- Provide *or restrict* anonymity

Payment Arrangements

Account- and Token-Based Systems

Payments arrangements as record-keeping systems

Two broad types of arrangements distinguished by identification requirements:

- **Account-based:** is the *individual* really who he says he is, i.e. the owner of the account?
- **Token-based:** is the *object* real or counterfeit?

This distinction helps understand the risk and efficiency tradeoffs:

- What is the cost of identifying and individual/object in a transaction?
- Who has access to the records? For safety and privacy issues.

Payments arrangements as record-keeping systems

Record-keeping has two dimensions: access to the records and the protocol to update the records

Updating \ Access	Centralized	Decentralized
Centralized	Account-based systems (LVTS, CCPs, etc.)	Hybrid systems
Decentralized	Not applicable	Token based-systems (Bitcoin, cash)

Tradeoffs: costs, risks and privacy

Account-based systems track **individuals**

- Cost structure: issuer verifies identities, monitors behaviour and handles collateral. Liability usually lies on the issuer/operator
- Users relinquish some degree of anonymity

Token-based systems track the history of **objects**

- Verification of cash is bilateral; Bitcoin is distributed
- Cost structure: issuer cares about the cost of counterfeiting tokens more than the cost of verification of transactions

Central bank e-money schemes

Central bank e-money schemes

1. Account-based scheme
2. Token-based schemes
   - Decentralized verification
   - Centralized verification
   - Delegated schemes: custodians and intermediaries

Central bank e-money: account-based scheme

- Proposal: universal account at the central bank
- Requires: i) account opening; ii) processing of transactions; and iii) management of relationships with the public
- Challenges: do we have the comparative advantage in any of these functions? No. Would compete with commercial bank deposits
- Examples of government-issued transactional accounts: Post Office UK, Japan Post, others. Redistribution motives and pricing issues

Central bank e-money: token with decentralized verification

- Proposal: develop/choose tech to issue, store and transfer tokens using a decentralized ledger of tokens
- Requires: i) decentralized token verification tech; ii) underwrite safety of the system
- Example: CADcoin, Fedcoin
- Challenges:
  - Do we decentralized verification when already have a trusted central party?

Central bank e-money: token with centralized verification

- Proposal: develop/choose tech to issue, store and transfer tokens using a centralized ledger of tokens
- Requires: i) token verification tech; ii) underwrite safety of the system
- Example: ‘digital cash’ sacrificing some anonymity, speed or safety
- Challenges:
  - Can we develop or choose the appropriate technology?
  - Counterfeiting risk (cyber) in digital is potentially catastrophic

Central bank e-money: delegated token scheme

- Proposal: delegate management of tokens to special set of institutions. Like “deposited currency schemes” or narrow banks
- Requires: i) institution supervision; ii) technology to prevent individuals from holding central bank tokens directly
- Accounts would necessarily emerge: need to identify owners of tokens
- Challenges:
  - Would current intermediaries have incentives to distribute tokens?
  - For institutions tokens would be inferior to reserves

Conclusions

Conclusions: forms

Account-based system:

- Requires management of relationships with the public
- Not a new possibility, and directly competes with bank deposits

Token-based system:

- Allows simpler delegation of operations
- New technology, cyber risks can be catastrophic

Conclusions: tiering and the role of the central bank

Accounts are likely to emerge in equilibrium

- Due to returns to scale in verifying identities, monitoring individuals or managing tokens complete decentralization is socially inefficient

Role of the central bank

- Tiering will involve central banks because some transactions require certainty of settlement and stable value of tokens
- Central banks can commit to both

Conclusions: broader tradeoffs

- **Payments systems:** efficiency likely to improve
- **Financial intermediation:** uncertain effect at this point; need to consider threat to commercial deposits and the response of banks
- **Cyber risk:** hacking can have catastrophic consequences; paper money does not have such risks