Thoughts on Modeling CBDC

Narayana R. Kocherlakota
University of Rochester

June 2019

My Main Question

- What are the key features/foci of useful models of central bank digital currency (CBDC)?

Answer 1: Cash and CBDC

- At its heart: CBDC is a substitute payments technology for *physical currency* (henceforth: ***cash***).

Useful models of CBDC should be grounded in the role of currency – both physical and virtual – in the economy.

Answer 2: Banks and CBDC

- CBDC can (and likely will) be implemented so that it poses little risk to banks' role in ***liquidity transformation.***

- But CBDC may well threaten banks' fee income from ***payment services***.

Models of CBDC should be able to assess the costs/benefits of banks' privileged roles in the payment system.

CBDC and Cash

What is CBDC?

- Like cash, CBDC is primarily a recordkeeping device.
  - They both encode the net value of a person's past "gifts" to others.

- Unlike cash, CBDC is virtual.

- In language of Kocherlakota (1998): cash is "**money**" and CBDC is "**memory**".

Key Differences Between CBDC and Cash

- CBDC can (and likely will) encode a great deal more information about various agents' transaction histories (for potential use by the government).

Key Differences Between CBDC and Cash

- CBDC can (and likely will) encode a great deal more information about the history of transactions (for potential use by the government).

- CBDC can be used between ***non-proximal*** agents

Key Differences Between CBDC and Cash

- CBDC can (and likely will) encode a great deal more information about the history of transactions (for potential use by the government).
- CBDC can be used between ***non-proximal*** agents
- CBDC can be easily designed to pay negative interest in at least some circumstances.

Key Differences Between CBDC and Cash

- (Much) Less Privacy
- (Possibly) Less Proximity
- (Possibility of) Negativity

Useful models of CBDC should capture implications of these differences and their possible interactions.

CBDC and Banks

CBDC and Liquidity Transformation

- At least initially, CBDC seem likely to be designed to mimic cash and pay no interest (see Riksbank report 1 or Engert and Fung (2017)).

- My own conjecture: central banks are likely to charge fees/interest for use of CBDC (especially as part of NIRP or during financial crises).

- ***CBDC seems unlikely to be any more of a threat to (taxpayer-subsidized!) bank liquidity transformation than cash itself.***
  - Piazzesi-Schneider paper shows why this may be a good thing.

Bank Payments: Observations

- Banks (in the US) earn rents from:
  - Debit/credit card transactions (arguably)
  - Wire transfers (inarguably)

- In the future: I would expect that they will likely earn rents from real-time value transfer networks like Zelle.

CBDC and Bank Payments: Questions

- How will different implementations of CBDC affect the banks' rents from the payment system?

- And what level of these bank rents is socially desirable?

Concluding Questions

Modeling Question 1: CBDC and Cash

- CBDC differs from cash because:
  - it is less private
  - eliminates the need for proximity
  - allows for negative interest

- How would adding these features (and their interactions) affect the economy?

Modeling Question 2: CBDC and Banks

- CBDC seems unlikely to undercut bank liquidity transformation any more than cash itself.

- But CBDC seems likely to affect banks' payment system functionality and profitability.
  - Are those effects desirable ones?