Disscussion: "Best Before? Expiring Central Bank Digital Currency and Loss Recovery," by Kahn/van Oordt/Zhu

Stephen Williamson

University of Western Ontario

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Key Ideas

- There are important questions relating to how CBDC – were it to be issued – could be used in conducting transactions offline.
- The advantages of CBDC in conducting online transactions (where the seller could be on the other end of an internet connection, or a physical establishment) relative to existing private payments technologies offered by banks, is not obvious.
  - financial inclusion?
  - we can trust the central bank, but we can't trust private banks, which are regulated at a cost?
- But maybe CBDC can provide features that people find useful as attributes of physical currency, but with improvements?

The Ups and Downs of Physical Currency

- Physical currency is a good thing.
  - it's a very simple technology – can be used even when the power fails.
  - settlement is instantaneous, with instant finality.
  - transactions are private.
- Physical currency is a bad thing.
  - can't be used for internet transactions.
  - takes up space, and hard to move around in large quantities.
  - typically, if someone takes it, you can't get it back.
  - if you lose it, it's gone.
  - transactions are private.

Main Points in the Paper

- Design CBDC to be convertible between 2 forms:
  - Online CBDC (like a checking account).
  - Offline CBDC (more like physical currency).
- Idea is that offline currency is stored on your phone, and there is a technology that permits you to move it to someone else's phone (I think), even if the power grid is down, for example.
- So, that makes offline CBDC work like physical currency.
- But maybe we can improve on physical currency by giving the offline CBDC an expiration date.
- If not spent by the expiration date, it goes back in your online CBDC account.
- Therefore you can't lose it – here, potential loss could come from losing your phone or dropping the phone in the toilet, for example.

The Models

- K/vO/Z work with 2 models:
  - finite-horizon model, 2 kinds of money, which look like commodity monies.
  - infinite-horizon cash-in-advance, 2 kinds of money, fixed aggregate money stock.
- finite-horizon model used for most of the analytical results, but doesn't have anything to say about effects of time to expiry.
- infinite horizon setup can deal wtih the effects of time to expiry, but have to rely on numerical results.

Finite-Horizon Model

- Fixed real stock of money (or "gold")
- Gold is convertible one-for-one into online money or offline money in period 0.
- Exchange between consumers and producers in period 1.
- Problems:
  - can't pay with online money in an outage (occurs with some probability).
  - can't pay with offline money if you lose it (occurs with some probability).
  - consumer can lose offline money before payment is made, producer can lose it after payment is made.
- Expiry for the offline money balances might increase welfare. Two cases considered:
  - No information exchange. Money reimbursed to consumer if the producer doesn't deposit it. But maybe the producer lost it.
  - Information exchange – central bank can learn if the money was actually spent. But consumer has the option to put this into effect as it only happens when they go online after payment may have occurred.

Comments

- In practice, we might think of "offline" not just as an "outage," but circumstances where consumers want privacy – and maybe privacy could sometimes be socially desirable and sometimes not.
  - same questions of loss come up, but we also have to address issues related to how much privacy is socially desirable, and whether the central bank can or should provide it.
- "Loss" could be due to theft, but then endogeneity may be important. If this offline money is ubiquitous, then the cost of theft is low and there is more of it. And we need to think about investing in security.
- Why can't interest be paid on the offline money?
- If we take the ideas in the paper seriously, then people are currently holding currency in part to insure against outages.
  - But I don't keep a large wad of cash in my house, as I'm more worried about theft than about being able to buy stuff in an outage.
  - And if I did store a large wad of cash in my house, the probability of an outage is so low, that I will find expiry dates really irritating.