Discussion of:

Designing Central Bank Digital Currencies

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- Paper studies the *design features* of a CBDC
  - should it be *cash-like* (very anonymous)?
  - should it be *deposit-like* (more secure)?
    - or somewhere in between?
  - what interest rate (if any) would it pay?
- The model has many elements
  - network effects, externalities from crime, imperfect competition ...
- My plan: focus on the simplest version of the model
  - highlight a couple of results I think are important (and not obvious)
  - raise two questions for discussion

The baseline model

- Set $\beta = \gamma = \eta = 0$
  - no externalities from cash usage or bank lending
  - no network externalities
- A payment instrument has characteristics $x \in [0,1]$
  - reflects degree of anonymity, security, etc.
- To begin, there are only two options:
  - bank deposit has $x = 0$
  - cash has $x = 1$

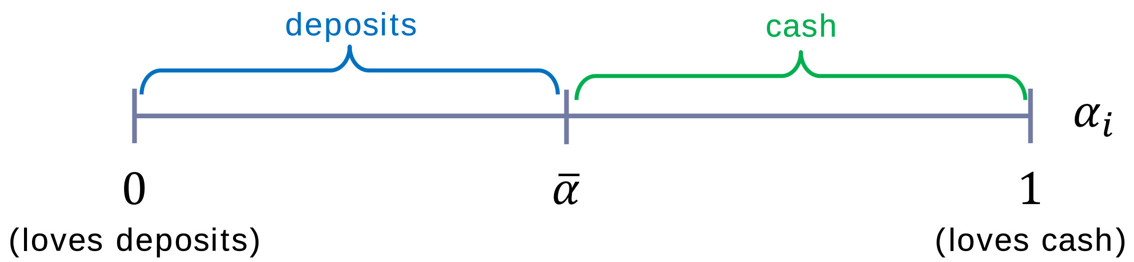
Demand for payment instruments:

- Agent i has ideal characteristic $\alpha_i \in [0,1]$

uniform distribution

- Utility:

$$u = \overbrace{r_i}^{\text{interest}} - \underbrace{|x_i - \alpha_i|}_{\text{“mismatch”}}$$



- Result: there is a cutoff $\bar{\alpha}$ such that:
  - agents with $\alpha_i < \bar{\alpha}$ use deposits (and the others use cash)
  - $\bar{\alpha}$ is an increasing function of the interest rate r_d

Supply of payment instruments:

- Cash: available in any amount with a fixed real return $(= 0)$
- Deposits: created when banks make loans
  - r_l is decreasing in the quantity of loans (diminishing returns)
  - $r_d = r_l$ (competition in banking)

Equilibrium:

- Market clearing: $\alpha(r_d) = L(r_d)$
- The equilibrium cutoff satisfies:

$$\underbrace{r_d - (\bar{\alpha} - 0)}_{\text{deposit}} = \underbrace{0 - (1 - \bar{\alpha})}_{\text{cash}}$$

An externality

- Suppose we compare:
  - equilibrium cutoff $\bar{\alpha}$
  - the welfare-maximizing cutoff α^*

Is the equilibrium cutoff optimal?

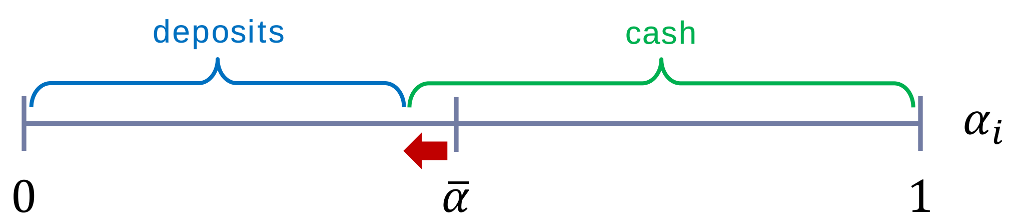
- Result: $\bar{\alpha} > \alpha^*$

No!

  - *too many* deposits in equilibrium (and too much investment)
- Reason: an externality (of sorts)
  - when I choose deposits over cash, I drive down the interest rate for all agents
  - borrowers benefit, of course, but with $\gamma = 0$ they do not count
- Demand for bank deposits as a payment instrument ...
  - ... leads to too much lending, investment in this setting

Interest on money

- There are many ways this externality could be corrected
  - but I want to focus on a particular approach
- Suppose we could pay interest on cash
  - financed by a lump-sum tax
- Effect: $r_{cash} > 0$ induces some agents to switch from deposits



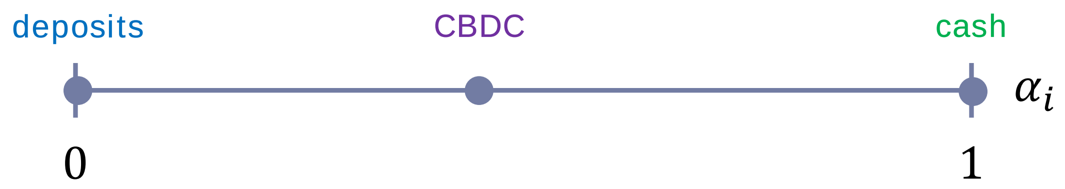
Optimal policy:

- Set r_{cash} so that $\bar{\alpha}(\mathrm{r_{cash}}) = \alpha^*$ $\Rightarrow$ efficient allocation

Turning to CBDC (finally...)

A CBDC offers two potential benefits in this environment:

1. A new payment instrument with $0 < x_i < 1$



- reduces the total "mismatch costs" $|x_i - \alpha_i|$

  "... the potential social value of a CBDC comes from the demand for payments instruments that can blend features of cash and deposits" (p.2)

2. A new tool for offsetting externalities

- even if $\theta = 1$ (so CBDC ~ cash), setting $r_{cbdc} > 0$ can raise welfare

- Optimal CBDC design takes advantage of both benefits

Introducing other concerns

- The paper also studies:
  - $\beta > 0$: negative externalities from cash usage (crime)
  - $\gamma > 0$: positive externalities from deposits (~benefits from firms paying less to borrow)
  - $\eta > 0$: network effects (critical mass of users is required to keep a payment medium viable)
  - $r_d < r_{loan}$: imperfect competition
- These changes affect the optimal design of a CBDC
  - might want $r_{cbdc} < 0$, for example
- But not the basic insights. Optimal design is still about:

1. providing better payment "coverage"
2. offsetting externalities that cause too much/little use of some instrument

Takeaways

- Nice, clean model of CBDC as a new payment instrument
- Interesting implications:
  1. a CBDC cannot complete only with cash
     - if anyone uses it, some agents will shift out of bank deposits
  2. a shift out of bank deposits might be a good thing!
     - the demand for deposits as a payment instrument may push lending rates too low
- Model emphasizes the importance of r_{cbdc} as a policy tool
  - if chosen appropriately, a CBDC is always desirable
  - CBs should think twice before deciding to set $r_{cbdc} = 0$

Two questions

Q1) Why the central bank?

- Banks provide $x_i = 0$ and central bank can create $x_i \in (0,1]$.
- Why can't private markets/institutions provide $x_i > 0$?
- If some people are concerned about privacy/anonymity ...
  - don't want my bank to observe too much information
- ... it seems like there could be private-sector solutions
  - example: stored value cards not linked to my identity
  - or perhaps "First National Bank Coin"
- Want to understand well the rationale for the "CB" in CBDC
  - perhaps: private solutions would not get optimal interest rate

  $\Rightarrow$ central bank wants to crowd them out?

Q2) How many?

- Might it be optimal to have multiple types of CBDC?
  - with different pairs of design characteristics
  - “Fedcoin” and “Fedcoin Cash”?

- Suppose there is a fixed cost of creating a CBDC type
  - perhaps an operating cost as well
- Could this framework provide insight into the optimal number of CBDC types?