Discussion of:

# *Central Bank Digital Currency: Welfare and Policy Implications*

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# An interesting paper

- There is growing interest in (and discussion of) CBDC
  - potential benefits and costs, unintended consequences
- Sorting through these issues systematically requires good models
- The model here generates some interesting insights
  - and raises new questions

Outline:

- Review key features of the model
- Current environment (no CBDC)
- Two CBDC policy regimes
- Comments

# Key features

- New monetarist model with bilateral exchange in DM meetings
  - some meetings require currency (physical or digital)
    - could be due to privacy concerns, or …
  - other meetings require electronic payment (deposits or CBDC)

  ⇒ these means of payment need to be created, and must be backed
- Assets:
  - physical capital: standard, subject to diminishing returns
  - govt. debt: real value outstanding is fixed by fiscal policy $\bar{v}$
- Shortage of safe assets
  - real value of means of payment needed for efficient exchange …
  - is larger than efficient capital stock $\left(f'(k^*) = \frac{1}{\beta}\right)$ plus stock of govt. debt $\bar{v}$

- Private banks:
  - issue deposits; an electronic means of payment
  - hold physical capital, govt. bonds and currency
    - agents can withdraw currency after observing their type
  - incentive constraint: must provide equity to ensure they do not abscond
    - shortage of safe assets ⇒ low real interest rate ⇒ equity is costly

| Assets | Liabilities |
|---|---|
| currency | deposits |
| capital | |
| govt. bonds | equity |

- Central bank:
  - creates currency by purchasing govt. bonds
    - currency + debt held by public = $\bar{v}$
  - faces a revenue requirement (to preserve independence)

| Assets | Liabilities |
|---|---|
| govt. bonds | currency |

# Current environment (no CBDC)

- Monetary policy in this setting is about allocating the govt. debt …
  - between currency and deposits
- Efficiency: capital, govt. bonds, and currency have same return
  - meaning the nominal interest rate on govt bonds is zero
    - no opportunity cost of holding currency relative to govt. bonds
- But: central bank makes no revenue

| Assets | Liabilities |
|---|---|
| govt. bonds | currency |

- Optimal policy:
  - provide less currency → interest rate on govt bonds increases
    - that is, the opportunity cost of holding currency increases
  - until central bank makes just enough revenue to remain independent

# Introducing CBDC

- Suppose the central bank can create a new type of currency
  - *digital currency* can be used in both types of DM meetings
    - it both provides privacy and is electronic
  - … and can bear interest
- Paper studies two distinct ways of introducing CBDC

## Policy 1: CBDC replaces cash

- Suppose CBDC does not compete with bank deposits
  - perhaps because the interest rate is set relatively low

| Assets | Liabilities |
|---|---|
| govt. bonds | digital currency |

"CBDC in the ATM"

| Assets | Liabilities |
|---|---|
| capital | deposits |
| govt. bonds | |
| digital currency | equity |

- Interest-bearing currency gives the CB a new policy tool:
  - it can set the opportunity cost of holding money ≠ inflation rate
- Is this tool useful? It depends …
- Suppose central bankers like 2% inflation (for some reason)
  - can now set opportunity cost of holding money efficiently
    - while maintaining inflation at 2%

      ⇒ raises welfare
- Here: inflation *per se* does not matter
  - already set to generate the efficient opportunity cost of holding money
    - so that the central bank can meet its revenue requirement

  ⇒ the extra tool is not useful; this type of CBDC does not raise welfare

# Policy 2: CBDC competes with deposits

- Now suppose CBDC is an attractive alternative to deposits
  - some agents hold CBDC instead of bank deposits

| Assets | Liabilities |
|---|---|
| govt. bonds | currency |
| govt. bonds | digital currency |

| Assets | Liabilities |
|---|---|
| capital | deposits |
| govt. bonds | |
| currency | equity |

- Additional benefit of CBDC:
  - economizes on the use of scarce collateral
  - central bank is more efficient at intermediating bonds → money
- Why not have CB take over the financial system?
  - not allowed to hold private assets
    - would create incentive or independence problems

- Optimal policy in this regime is tricky

| Assets | Liabilities |
|---|---|
| govt. bonds | currency |
| govt. bonds | digital currency |

| Assets | Liabilities |
|---|---|
| capital | deposits |
| govt. bonds | |
| currency | equity |

  - want CB balance sheet to be larger and private banks smaller
    - so that more safe assets are → means of payment
  - results in less physical capital, which is good (there was overinvestment)
  - some physical currency remains in circulation
    - otherwise banks could not operate → no investment
  - and CB needs to generate enough revenue to meet requirement

Result: This type of CBDC can raise welfare

Some comments

# CBDC vs. QE

| Assets | Liabilities |
|---|---|
| govt. bonds | reserves |

| Assets | Liabilities |
|---|---|
| capital | deposits |
| govt. bonds | |
| reserves | equity |

- Suppose the central bank buys government bonds
  - creates bank reserves and deposits
    - central bank chooses the interest rate on reserves
    - banks intermediate these reserves into deposits (means of payment)
- How is that different from CBDC?
- The model provides two answers:
  - privacy: I prefer using CBDC over deposits in some transactions
  - efficiency: $1 in govt bonds creates more CBDC than deposits

# Thinking about the benefits …

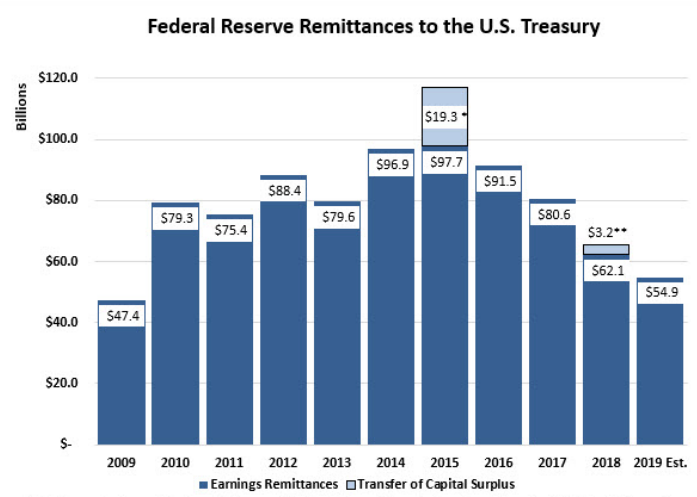
- Privacy from whom?
  - in the model, CBDC gives me privacy from my bank
    - and maybe from the seller (less clear)
  - in practice: I might worry about privacy from the CB/government

  q: how strong is (net) the privacy benefit of CBDC?
    - more generally: why do we want publicly-issued money?
- Efficiency and Modigliani-Miller
  - when banks hold more reserves, can they have higher leverage?
    - depends on the details of the collateral constraint
  - regulators seem to have mixed views:
    - risk-weighted capital requirements → yes
    - supplemental leverage ratio → no

  q: how robust is the efficiency benefit of CBDC to alternative specifications?

# Central bank revenue

- Logic of the model is leans heavily on the revenue requirement
- To what extent does this concern drive monetary policy?
  - when policy makers justify a 2% inflation target … don't hear it
  - is it in the bank of their minds?  I don't know …
- Central banks have other sources of revenue
  - maturity mismatch of assets and liabilities
  - Fed remittances to Treasury have been large in recent years
    - despite a low opportunity cost of holding money




- How comfortable are we with policy prescriptions based on this requirement?

# Velocity

- Policy regime 1 is interesting (novel?) "CBDC in the ATM"
- Individuals hold bank deposits
  - withdraw CBDC if they need privacy; otherwise pay with deposit

Q: Would introducing CBDC change the velocity of money?

- in the model, velocity is fixed at 1 (one DM meeting per period)
- more broadly: withdrawing physical currency requires a trip to the ATM
- withdrawing CBDC … could be done on my phone?
  - immediately before I make the purchase?
  - seems like velocity of CBDC could be very high …

- Good news: high velocity ⇒ efficient use of scarce collateral?
- Bad news: $mv = pq$ high $v$ ⇒ low $m$ ⇒ low CB revenue worth thinking about?

# Bottom line

- Interesting paper on an interesting topic

- A lot more issues to think about!