Central Bank Digital Currency: Stability and Information

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Introduction

CB tend to think CBDC is a threat to financial stability

- but little formal analysis

Intuition is simple

- CBDC is a "safe option" to depositors, and
- withdrawals more likely at first sign of trouble
- increases fragility of the system

Another positive side of the story

CBDC can change the flow of information to regulators

Improved information is “good” for financial stability

The role of information

Governments bail out large troubled banks

Banks have private information on the quality of their assets and their liquidity position

Banks have an incentive to hide their situation (for a while) to

- avoid triggering supervisory actions,
- gamble for resurrection,
- maximize the private value of bailout

The role of information

Short-term creditors may have private info

- regulator could make inference from their actions, but...

Regulator has limited ability to observe/learn from creditors' actions

- lacks real time information on bank transfers
- might see some cash withdrawals...
- creditors' incentives distorted by anticipated bailout

Delaying policy action can turn a manageable situation into a full-blown crisis

CBDC can increase the flow of information to the regulator

CB can directly observe (some) flows in real time

Information is granular and not aggregated

Changes the incentives of banks' creditors in times of stress

Policy implications

- Provide safe assets, better than bonds (price signal is aggregate)
- Account rather than token based CBDC
- “High” limits if any
- (Not too generous) remuneration can be optimal
- Outsourcing could work
  - Narrow banks
  - reporting requirements

Model

Keister-Mitkov environment based on DD

Three periods $t = 0, 1, 2$, no discounting

Measure 1 of investors, endowed with 1 unit of good at $t = 0$

Gvt taxes τ to invest in public good/bailout

Investors invest after tax $1 - \tau$ in a DD-bank

Model

Three types, revealed at $t = 1$, private information

Utility:

$$v(g) + \begin{cases} u(c_1) & w.p. \quad \pi(1-\alpha_s) \quad \text{(impatient)} \\ u(c_m) & w.p. \quad \pi\alpha_s \quad \text{(movers)} \\ u(c_2) & w.p. \quad 1-\pi \quad \text{(patient)} \end{cases}$$

Movers save with return $R_3 \sim F_s(\cdot)$
consume $c_m = R_3 c_1$
Assume for all x, $\alpha_\ell F_\ell(x) \leq \alpha_h F_h(x)$

DD-Banks

- invests after tax endowments $1 - \tau$.
- Two states for asset return at $t = 1$, $R_h > R_\ell$.
- Payments at $t = 1, 2$ can depend on everything that is observable to the bank.

Information

- At the beginning of $t = 1$, investors observe
  – aggregate state R_s,
  – own preference shock ω_i and R_3 if movers
- Announce withdrawal decision to their bank.
- There is no sequential service constraint.
  – $w =$ fraction who want to withdraw early.
  – bank knows w *before* allowing withdrawals,
  – may choose to serve only $\bar{w} \leq w$.
- Bank's state (R_s, w).
- Given state, banks decide on c_{1s}, c_{2s} and $\bar{w}$.

Government

- Fiscal authority
  - $t = 0$: taxes endowments
  - $t = 1$: provides public good and bailouts
  - can't commit to no bailout if $s = \ell$
- Regulator:
  - cannot directly observe state
  - can restrict payments made $c_s \in \mathcal{X}$
  - observes recourse to CBDC
- Suppose $\mathcal{X} = \{c^*_{1s}, c^*_{2s}\}$.

Efficient allocation

Efficient allocation has

$$c^*_{1s} < c^*_{2,s}$$

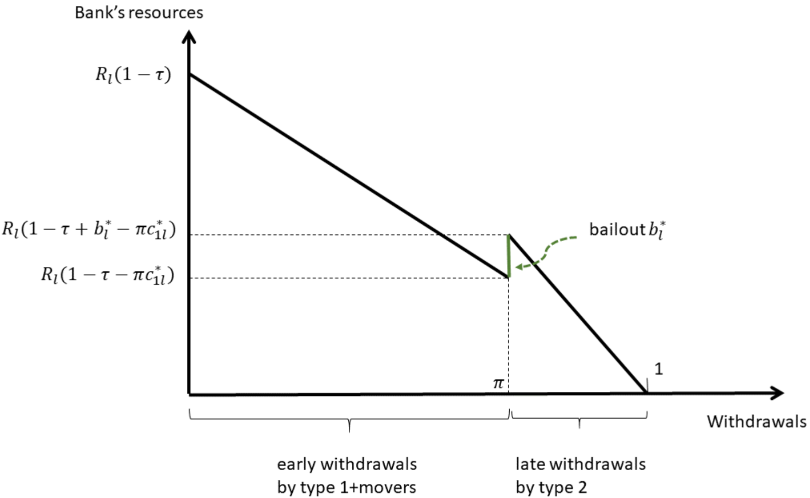
and

$$c^*_{1,\ell} < c^*_{1,h}$$

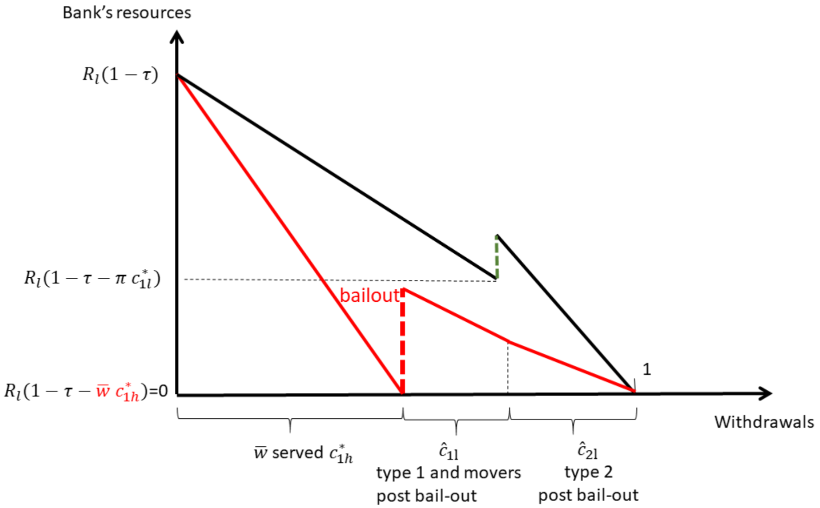
Bailout $b^*_\ell > 0$ redistributes resources between public good and private consumption

$$\begin{aligned} v'(\tau - b^*_\ell) &= \alpha_\ell u'(c^*_{1\ell}) + (1-\alpha_\ell)\int R_3 u'(R_3 c^*_{1\ell}) dF_\ell \\ &= R_\ell u'(c^*_{2\ell}) \end{aligned}$$

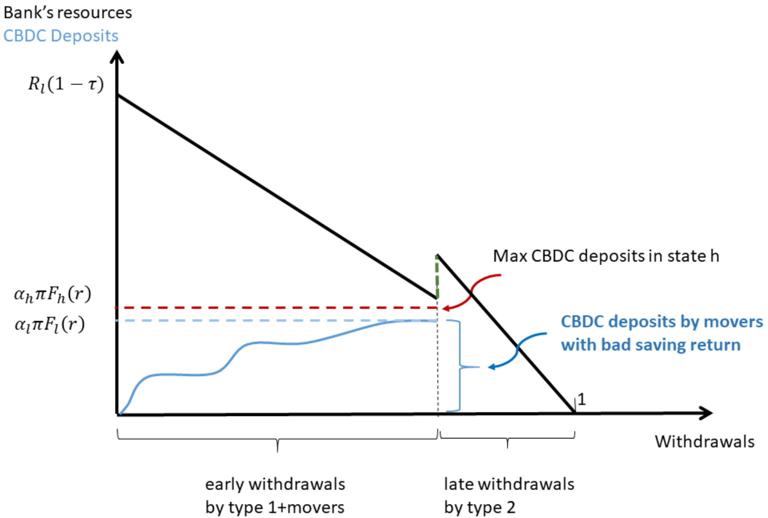
Resources in the bank



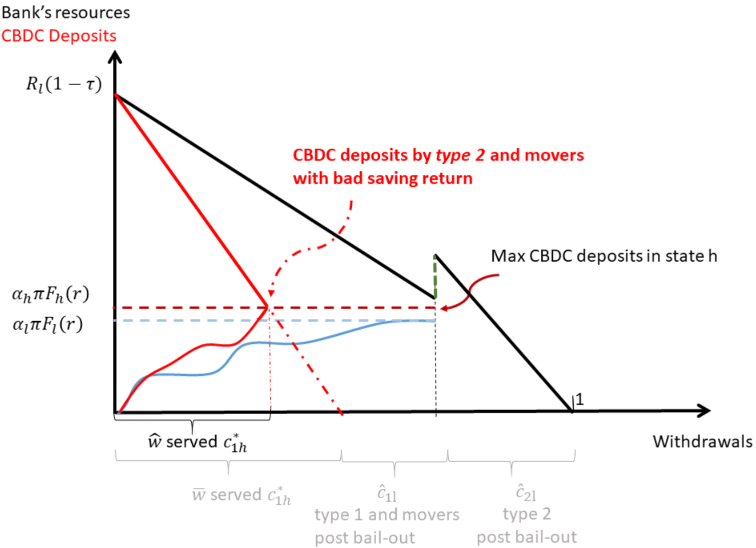
No CBDC - free riding on bailouts



Flows into CBDC paying r



Flows into CBDC is a signal



Conclusion

- CBDC usage can provide real time information about state of banks, which helps timely intervention by regulator and discipline banks.

- Necessary that CBDC is account based, with sufficiently high limits.

- KYC regulation may speak in favor of intermediated CBDC, e.g. via a narrow bank

– comes at the cost of coarser information.

– need clear disclosure rules.

Conclusion

- CBDC could pay interest, but delicate balance

- If the interest rate spread is positive $r - i^f > 0$
– delays information flow (more users in normal times)
– financing cost

- If the interest rate spread is negative $r - i^f < 0$
– could reduce effectiveness of information channel (by limiting CBDC use)

- Trade-off implies "best" CBDC rate could be rate on Treasuries.