Reserve-backed tokens: a money for the future?
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Disclaimer: The views expressed here are mine and not necessarily those of the BIS.
Overview

- Distributed ledgers and tokenisation → advanced payment features (e.g., atomicity, programmability)

- What is an ideal form of retail tokenised medium of exchange?

- Money issuers that do not innovate will see their monies fall behind

- Multiple initiatives by stakeholders
  - Central banks → Retail CBDCs
  - Commercial banks → Tokenised deposits
  - Fintech players → Fiat-backed stablecoins

- This paper → reserve-backed tokens (RBTs)
What is an RBT?

- Tokens that are *solely and fully backed by central bank reserves*

- Issued by *well regulated private entities*

- Dedicated *RBT reserve facility* at the central bank

- Primary purpose is to serve as a *medium of exchange*
There is precedence ...

- Researchers
  - Adrian and Mancini-Griﬃoli (2021), Auer and Bohme (2021), Kahn and Singh (2021)
  - The Chicago Plan (1933) → Narrow Banks

- Central banks
  - BoE – systemic stablecoins to be fully backed by central bank reserves
  - RBA – facilitate competition and innovation
  - BoK – complement tokenised deposits

- Practice
  - Hong Kong and UK (Scotland) – currency notes issued by select banks against monetary authority debt / reserves
  - China – Alipay wallet balances are fully backed by central bank reserves
  - US – The Narrow Bank (TNB), Custodia
  - UK – Fnality
  - India – Payment banks
Outline of the presentation

1. RBT design trade-offs

2. Compare RBTs with retail CBDCs, tokenised deposits, and stablecoins

3. Implications for the central bank and the banking industry

4. Compare RBTs with similar arrangements in practice
Key takeaways

- Ideal RBT design elements include
  - Can be issued by regulated entities (including non-banks, fintechs)
  - No interest and wallet limits for token holders, while RBT reserves pay interest
  - Beyond minimum safeguards, flexible transfer model and crypto compatibility

- RBTs provide unique benefits
  - More flexible design than retail CBDCs
  - More stable alternative → crowd out unstable breeds of stablecoins
  - Unlike tokenised deposits, immune to runs and unencumbered by legacy features

- Alternatives are not necessarily substitutes → co-exist and serve different purposes and clienteles

- May lead to *narrower* financial institutions over time
  - Payment-service-providers *versus* savings-and-lending institutions

- Central bank balance sheet impact → manageable via careful design and gradual rollout
RBT design elements
Transfer model
Who can issue?
Crypto-friendly?
Regulatory rules
RBT reserve facility
Revenue model

Main design aspects
Who can issue RBTs?

- Banks are obvious initial candidates
  - Access to central bank balance sheet + already well regulated
  - But, uneven playing field for non-banks and fintechs

- Democratic RBT licensing subject to minimum criteria and oversight:
  - Improve competition and innovation in the RBT ecosystem
  - May require change in law

- Way forward could be to begin with a few licenses for banks and non-banks
  - Adjust eligibility based on how the ecosystem and demand for RBT licenses evolve
Regulatory framework

- Draw elements from the framework for banks and mutual funds:
  - KYC, customer due diligence, AML/CFT rules
  - Regulatory ratios (e.g., leverage)
  - Supervisory requirements

- Framework for RBTs likely to be simpler as banks are more complex

- Potentially unified *minimum* framework for RBTs and fiat-backed stablecoins
  - RBT license could be more stringent (due to privileged access to central bank reserves)
Should RBTs pay interest to users?

- RBT = medium of exchange
- RBT ≠ mean to save

- Prohibit RBT issuers from paying interest (similar to cash and retail CBDCs)

- Revenue model for RBT issuers?
  - Transaction fees
  - Platform fee via auxiliary services (eg AliPay and YueBao)
  - Interest on RBT reserves
    - Need not be the same as the rate on traditional reserves
    - Could be calibrated to match profitability of peers
    - Also advocated by Friedman (1960) in the context of 100% reserve banking
RBT reserves

- To de-couple interest rates → RBT reserves ≠ traditional reserves
  - Desirable also from an accounting viewpoint
  - Reduce monetary policy implications of RBTs

- Possible operating models
  - Centralised ledger
    - Similar to existing RTGS systems
    - Operationally easier in the initial stages (eg during a pilot)
  - Permissioned distributed ledger
    - Better for novel features (eg programmability)
    - Central bank = special node, RBT issuers = standard nodes
    - A wholesale CBDC could underpin RBTs (not necessary)
Transfer model or the ‘rails’

- **Burn-issue**
  - Resolve old liabilities and create new ones (like deposit transfer)
  - Singleness satisfied during transfers, which is compelling (Garratt and Shin, 2023)

- **Bearer (freely traded)**
  - Can violate singleness ...
  - Could be better at harnessing the full potential of tokenisation (eg no need for public money on the same ledger)

- **Given trade-offs → give issuers flexibility to choose the transfer model**
  - Banks may issue burn-issue RBTs
  - Fintechs likely to choose bearer RBTs

- **Beyond minimum degree of stability, users judge the trade-off between singleness and use cases**
  - E.g. foreign investors accept FX risk when buying EME assets →
    could additionally accept RBT’s valuation risk when buying tokenised EME assets
Compatibility with other parts of the financial system

- Between different RBTs and with bank deposits
  - Central bank reserve backing would facilitate settlement ...
  - ... but regulation needed to ensure no walled gardens

- Crypto/permissionless public ledgers
  - Desirable if RBTs are to be a credible alternative to stablecoins
  - Yet, spike in RBT demand (eg safe haven) \(\rightarrow\) increase central bank balance sheet
  - Crypto accidents \(\rightarrow\) spillovers + financial/reputational damage

- Not a binomial choice \(\rightarrow\) allow issuers to choose degree of crypto-friendliness beyond minimum safeguards
  - Banks may issue non-crypto RBTs (eg third-party risk management laws)
  - Fintechs likely to issue crypto-friendly RBTs
RBT vs other forms of tokenised money
## Comparing tokenised money attributes

<table>
<thead>
<tr>
<th>Attributes</th>
<th>RBTs</th>
<th>Retail CBDCs</th>
<th>(Tokenised) Deposits</th>
<th>Fiat-backed stablecoins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issue</td>
<td>Private</td>
<td>Public</td>
<td>Private</td>
<td>Private</td>
</tr>
<tr>
<td>Asset backing</td>
<td>Central bank reserves</td>
<td>Central bank assets</td>
<td>Central bank reserves, bonds, and risky loans</td>
<td>Ostensibly low risk and highly liquid assets</td>
</tr>
<tr>
<td>Intended purpose</td>
<td>Means of payment</td>
<td>Means of payment</td>
<td>(i) Means of payment</td>
<td>Means of payment</td>
</tr>
<tr>
<td>(ii) Means of payment</td>
<td></td>
<td></td>
<td>(ii) Store of value</td>
<td></td>
</tr>
<tr>
<td>Interest bearing</td>
<td>No</td>
<td>No</td>
<td>Possibly</td>
<td>No</td>
</tr>
<tr>
<td>Revenue source for issuer</td>
<td>(i) Transaction fee*</td>
<td>(i) Transaction fee*</td>
<td>(i) Transaction fee*</td>
<td>(i) Transaction fee*</td>
</tr>
<tr>
<td>(ii) Interest on reserves</td>
<td>(for wallet provider)</td>
<td>(ii) Interest margin</td>
<td>(ii) Interest on assets</td>
<td></td>
</tr>
<tr>
<td>Transfer model</td>
<td>Issuer can choose</td>
<td>Bearer or burn-issue (if account-based)</td>
<td>Burn-issue</td>
<td>Bearer</td>
</tr>
<tr>
<td>Tradable on public ledgers?</td>
<td>Issuer can choose</td>
<td>Unlikely</td>
<td>Unlikely</td>
<td>Yes</td>
</tr>
<tr>
<td>Issuer distress probability</td>
<td>Zero*</td>
<td>Zero*</td>
<td>Positive</td>
<td>Positive</td>
</tr>
<tr>
<td>Satisfy singleness</td>
<td>Depends on transfer model</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Complexity / intensity of regulation</td>
<td>Medium</td>
<td>Low</td>
<td>Very high</td>
<td>High</td>
</tr>
</tbody>
</table>

* Could include “platform fee” via value-added functions like “money market fund sweep” or sale of insurance products.

# This abstracts away from the fact that the issuer or intermediary can still engage in fraud (eg fail to reconcile RBT liabilities with central bank reserves).
Tokenised monies on a continuum

P.S. The transfer model or "rails" also matter for the riskiness of an arrangement, but this aspect is abstracted away from for this part of the discussion.
RBTs versus retail CBDCs

- **Issuer of CBDC versus enabler of RBT**
  - Latter is operationally simpler but supervisory burden may be higher

- RBT issuers would have more skin-in-the-game than CBDC wallet providers
  - Own liability + RBT reserves pay interest
  - Greater incentive to innovate

- RBTs conducive to programmable money*
  - Central banks are not in favour in case of retail CBDCs (goes against “neutrality of public money”)

- Similar risk of inward run during stress
  - Wallet and/or transaction limits can help

- Not substitutes – one is private liability, other is public liability
  - lessons from one could inform the other (eg use cases)

*Not the same as programmable payments
RBTs versus stablecoins

- Stablecoins → doubts about asset backing can trigger runs / deviations from par (eg USDC in 2023)

- Deviations in case of *bearer* RBTs likely to be less severe
  - RBTs backed by the ultimate unit of account → reduces scope for doubts about asset backing*
  - Fully backed *bearer* currency notes in HK and UK are doing fine

- No direct asset price impact of large redemptions

- Simpler structure (backed by one asset) → easier to regulate

- Potentially crowd out unstable stablecoins ...
  - ... while *well-regulated* stablecoins can still thrive

* Fraud risk remains (eg failure to reconcile token and reserve balances 1:1)
RBTs versus tokenised deposits

- Both subscribe to public-private partnership
  - Central bank backing + privately issued money

- Tokenising retail deposits can be complicated due to legacy features
  - Pay interest? Subject to deposit insurance?
  - Less flexible design (eg cannot be freely traded on permissionless public ledgers)

- Expose bank funding to added demand shock based on tokenised deposit use cases
  - More volatile funding → exacerbate run risk

- RBTs = narrow purpose + no burden of precedence
- More flexible design (eg lower KYC than bank account)

- Once level playing field, would banks prefer to issue RBTs or tokenised deposits?
Two ways banks could issue RBTs

Panel A: Original bank balance sheet
- Traditional reserves
- Deposits
- Loans
- Capital

Panel B: Issuing RBTs via the existing balance sheet
- RBT reserves
- Traditional reserves
- Loans
- Deposits
- Capital

Panel C: Issuing RBTs via a subsidiary
- RBT reserves
- Other assets
- Capital
- Deposits
- Loans
- Capital
Implications for the central bank and for commercial banks
Impact on commercial bank and central bank balance sheets

Panel A: Original balance sheets

Panel B: Balance sheets after some deposits are converted to RBTs
Impact on central bank balance sheet

- Likely to expand but by less than 1:1 relative to RBT issuance
  - Users only switch payment method – no increase in money demand *per se*

- Safe asset perception can lead to volatile demand for RBTs (and thus reserves) during stress

- Challenges
  - Need to adjust assets
  - Undermine capital adequacy → lower dividends
  - Ask for capital from government → hamper independence
  - Larger balance sheet → typically linked to higher inflation / credit booms

- Potential benefits
  - Expanded repo program (Bernanke, 2016) [not a justification for RBTs]

- RBT wallet limits and gradual roll-out could help manage balance sheet impact
Impact on commercial banks

- Short run
  - Chip away *demand* deposits
  - Run on *time* deposits during stress (flight to safety)

- Longer run
  - *Multifunction banks today* = savings + lending + payments
  - Enabling RBT may pave way for *narrower institutions*
    - Payment service providers (RBTs and regulated stablecoins)
    - Banks that use time deposits to lend

- Advantages
  - Less prone to bank runs + less complex + easier to regulate (eg Fisher, 1936; Friedman, 1960; Pennacchi, 2012)

- Critiques
  - Lost economies of scope (but open finance, for eg, could help)
  - Financial activity may shift to shadow banks and non-banks
RBTs compared with similar arrangements in practice
Payment banks

- A new bank model conceptualised by the Reserve Bank of India in 2015
  - Upper limit on deposit balances
  - Deposits pay interest
  - Hold central bank reserves and government bonds (primarily) but cannot lend
  - Profitability has been under pressure, especially with the rise of digital payments (UPI)
  - 6 operators currently

- In case of RBTs
  - Liability is non-interest bearing + assets still interest bearing
  - Tokenisation provides novel use cases
Fnality

- A DLT-based payment platform company (non-bank) in the UK
  - Access RTGS via a new “omnibus account” (≠ master account)
  - Focus is on wholesale payments among platform participants
  - Participant balances are pooled and placed in omnibus
  - Omnibus account is interest bearing
  - Participants have full legal claim to the omnibus account
  - Participants are financial institutions with master account access

- In case of RBTs
  - Focus is on retail use
  - RBTs are liabilities of the issuer → more than just a platform
The Narrow Bank (TNB)

- Proposal in the US to:
  - Accept institutional deposits
  - Park 100 percent of the funds at the Fed
  - Earns interest on Fed reserves, keep a cut, and pass the rest to depositors

- TNB proposal was rejected
  - Central bank balance sheet size could increase
  - Less activity in federal funds (FF) market could make the FF rate more volatile (require change in policy target)
  - Commercial bank disintermediation and higher cost of funding
  - Flight-to-safety during stress can amplify stress

- In case of RBTs
  - Non-interest bearing medium of exchange (not a savings vehicle)
  - Focus on retail use
  - Limits on account balances
Custodia

- Proposal in the US to:
  - Issue dollar-denominated tokens fully backed by Fed reserves (Avits)
  - Compatible with public ledgers like Ethereum
  - Ownership, transactions and redemptions not limited to Custodia customers ...

- Custodia’s proposal was rejected
  - Can effectively give retail users, including foreigners, access to the Fed balance sheet
  - Serve as a volatile demand source for Fed liabilities
  - Scope to hold Avits anonymously → money laundering and illicit financing
  - Avits may be seen as a security → also need security regulations
  - Run on Avits may not be an issue per se, but could have spillovers

- In case of RBTs
  - Ownership limited to KYC-ed users (eg hosted wallets only)
  - Issued from a separate and dedicated balance sheet (not multipurpose, unlike Custodia)
To summarize
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- Public money (cash) and private monies (e.g., deposits) in retail form have co-existed for long

- Technology is changing the balance
  - Cash is declining → users seek innovative features offered by private monies

- Retail CBDCs, stablecoins, and tokenised deposits are credible candidates → RBT’s pose unique benefits
  - Safer than stablecoins and more flexible design ...
  - ... while still capturing benefits of tokenisation and maintaining public-private partnership

- Not necessarily substitutes
  - Can co-exist, interoperate, and serve different purposes and clienteles

- RBTs may induce narrower institutions in the longer run, which has advantages
  - Payment focused entities and savings-lending focused banks

- Unknowns and risks → careful design and gradual implementation
Thank you!

Feedback welcome at Tirupam.goel@bis.org

(forthcoming in the Journal of Payment Strategy and Systems)
Select references

- BIS (2023a): BIS report to the G20 on “The crypto ecosystem: key elements and risks”, July