Central Bank Digital Currency and Quantitative Easing

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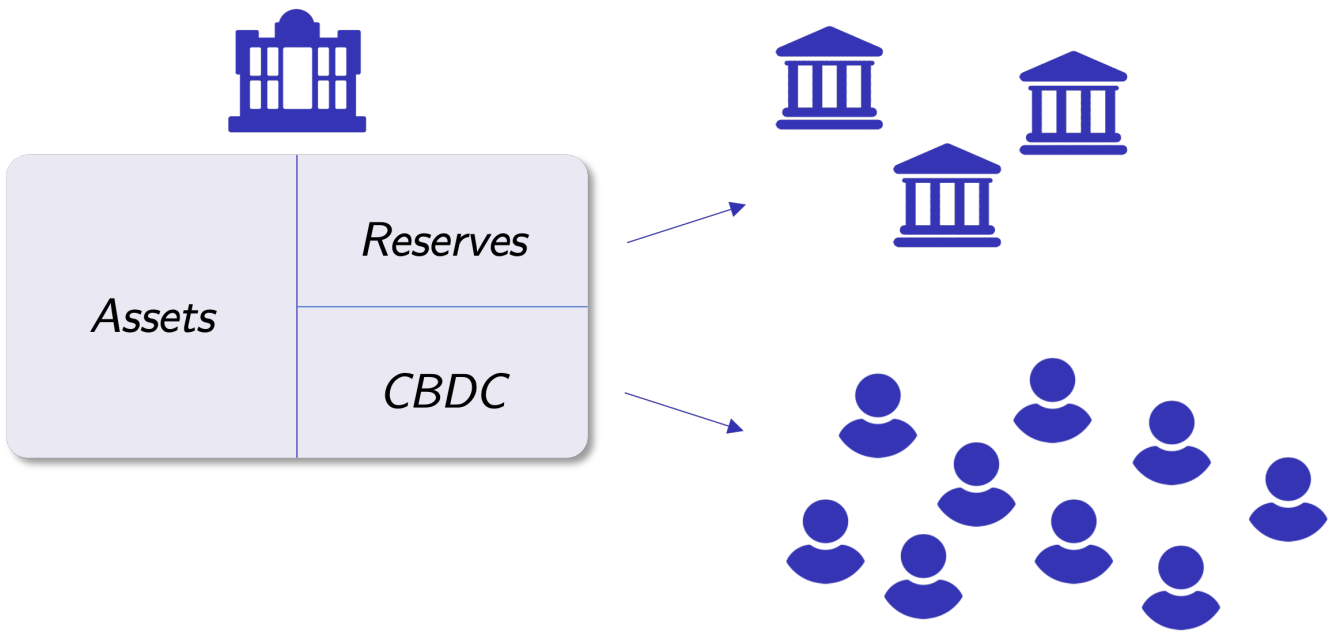
What is a Central Bank Digital Currency?

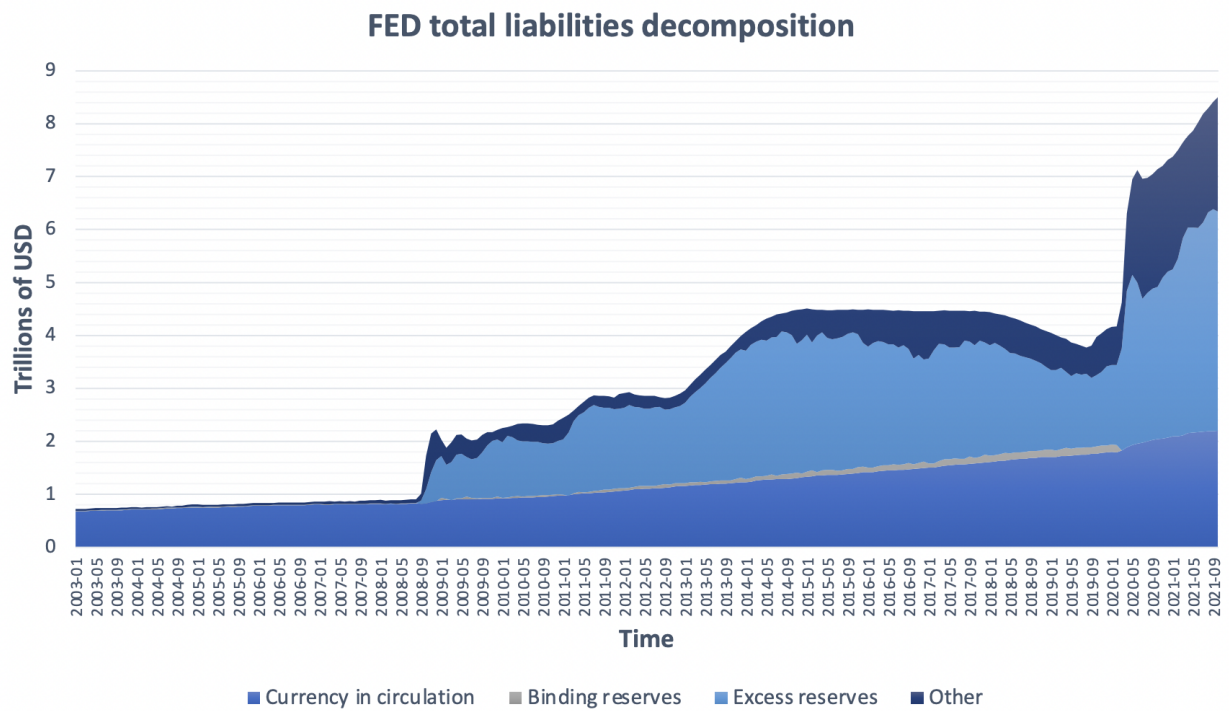
"*[A CBDC is] a digital payment instrument, denominated in the national unit of account, that is a direct liability of the central bank.*"

(BIS, 2020)



Motivation

- FED's balance sheet size: $\sim$ 9 trillions USD
- Excess reserves in US: $\sim$ 4 trillions USD
- Bank deposits in US: $\sim$ 17 trillions USD



Source: FRED, Federal Reserve Bank of St. Louis

Summary

Problem:

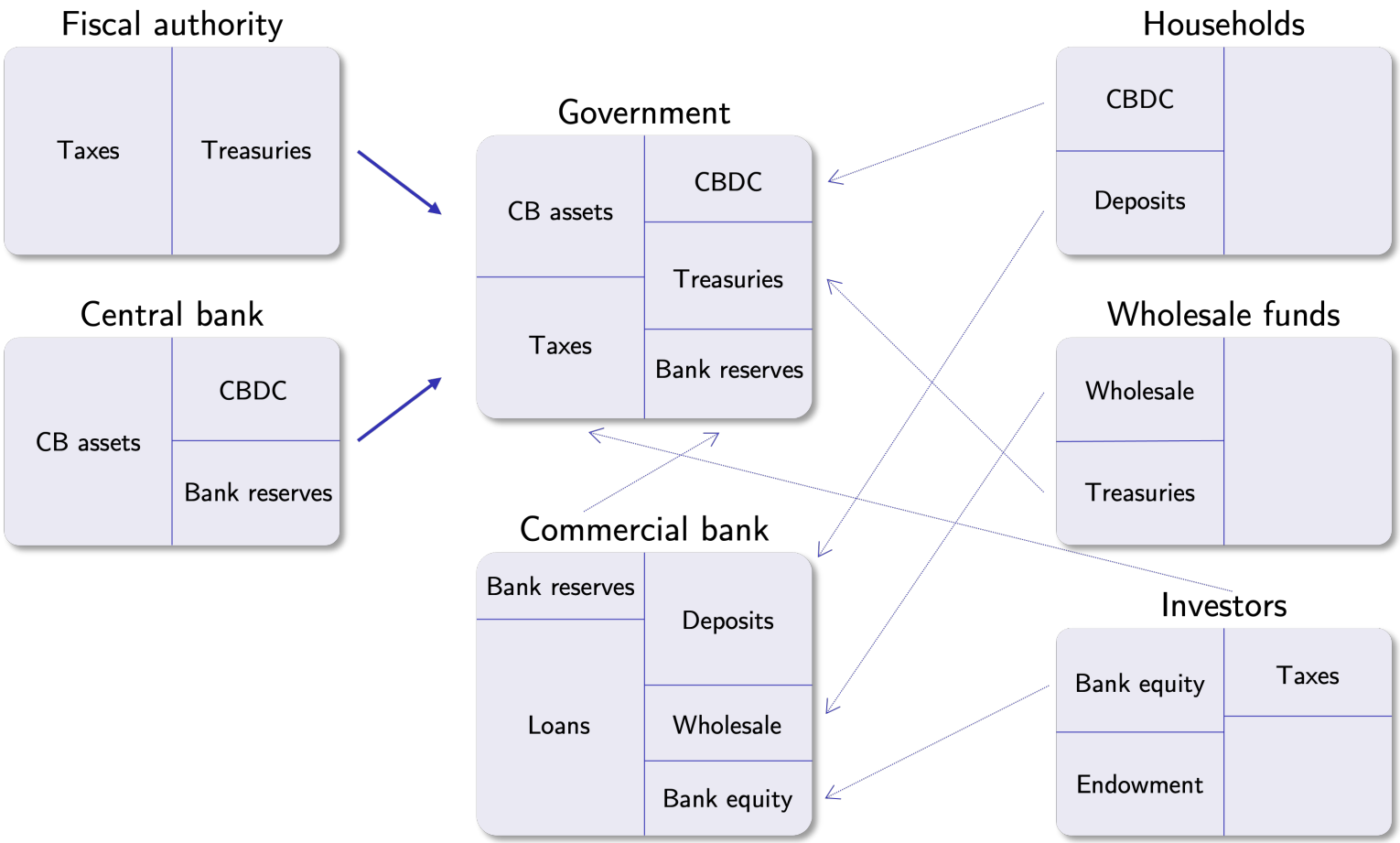
- Study **how the introduction of a CBDC interacts with ongoing monetary policies** (standard policy or quantitative easing).

Results:

- The equilibrium impact of a CBDC depends on the ongoing monetary policy.
- The introduction of a CBDC can be neutral to the economy under specific conditions.
- Under quantitative easing, commercial banks optimally use their excess reserves to accommodate retailers' demand for switching from bank to CBDC deposits.
- Introducing a CBDC is likely to render quantitative easing a quasi-permanent policy.

Model

We extend the model in Magill, Quinzii and Rochet (2020) by adding an interest-bearing CBDC.



Monetary policies

1. **Standard** pre-2008 policy:

   $\rightarrow$ central bank holds *treasuries* as assets

2. **Quantitative easing** (QE) policy:

   $\rightarrow$ central bank holds *risky securities* as assets

CBDC introduction mechanism

When households want to transfer 1 unit of their savings from bank deposits into CBDC deposits, the commercial can:

- Liquidate 1 unit of its assets in favour of the central bank

  $\rightarrow$ central bank balance sheet: $+$ 1 unit

- Swap 1 unit of excess reserves into CBDC deposits

  $\rightarrow$ central bank balance sheet: $\pm$ 0 unit

When possible, the commercial bank prefers to liquidate excess reserves to accommodate households' demand for CBDC.

Equivalence Theorem

Definition

We define the introduction of a CBDC as **neutral** for equilibrium economic allocations when it has no impact both on banks lending and on taxes.

CBDC impact under standard policy

- Since the liquidity requirement is binding, the commercial bank can only liquidate assets in favor of the central bank to accommodate CBDC demand.
- The central bank indirectly channels funds back to the commercial bank.
- The reduction in bank deposits is fully compensated and lending to the economy not affected.

Theorem

Under standard policy, introducing a CBDC is neutral for the economy when there is no impact on taxes:

$$(1+\mu_d)R^d = (1+\mu_h)R^h.$$

CBDC impact under quantitative easing

- Since the liquidity requirement is not binding, the commercial bank prefers to reduce its excess reserves to accommodate CBDC demand.
- If the demand for CBDC deposits is lower than the amount of excess reserves, lending to the economy remains unchanged.
- If the demand for CBDC deposits is greater than the amount of excess reserves, the central bank is not able to channels funds back to the commercial bank and lending decreases.

Theorem

Under QE, introducing a CBDC is neutral for the economy when there is no impact on lending ($h < \bar{h}$), and no impact on taxes:

$$R^r = (1 + \mu_h) R^h.$$

Reverting quantitative easing

QE tapering: reverting asset-purchase programs, the central bank sells assets back to the banking sector in exchange for reserves.

This operation would be much harder after introducing a CBDC for two reasons:

1. Commercial bank's reserves have been transferred to households in the form of CBDC deposits;
2. Deposits tend to be inelastic.

The adoption of a CBDC under QE policy might render quantitative easing quasi-permanent.

Conclusions

- The equilibrium impact of a CBDC depends on the ongoing monetary policy.
- The introduction of a CBDC can be neutral to the economy under specific conditions.
- Under quantitative easing, commercial banks optimally use their excess reserves to accommodate retailers' demand for switching from bank to CBDC deposits.
- Introducing a CBDC is likely to render quantitative easing a quasi-permanent policy.

Selected literature

[1] M.K. Brunnermeier and D. Niepelt. On the equivalence of private and public money. *Journal of Monetary Economics*, 106:27–41, 2019.

[2] Bank for International Settlements (BIS). Central bank digital currencies: foundational principles and core features. 2020.

[3] M. Magill, M. Quinzii, and J.C. Rochet. The safe asset, banking equilibrium, and optimal central bank monetary, prudential and balance-sheet policies. *Journal of Monetary Economics*, 112(C):113–128, 2020.

Questions?

Download the paper!