Central Banking

Week 12: Central Bank Digital Currencies (CBDCs)

Iegor Vyshnevskyi, Ph.D.

Sogang University

May 21, 2025

Agenda

1. Central Bank Digital Currencies (CBDCs)
2. Class Activity

1. Central Bank Digital Currencies (CBDCs)

Introduction

- Central Bank Digital Currencies (CBDCs) are digital forms of a nation's fiat currency issued by the central bank.
- The emergence of CBDCs is driven by the rise of cryptocurrencies and the need for more efficient payment systems.
- This lecture will cover:
  - The concept and design of CBDCs.
  - The motivations and implications for central banks.
  - Case studies of CBDC implementation globally.
  - Challenges and risks associated with CBDCs.

What is a CBDC?

- A digital form of a central bank-issued currency.
- Can be account-based or token-based.
- Unlike cryptocurrencies, CBDCs are state-backed and represent legal tender.

Key Features of CBDCs

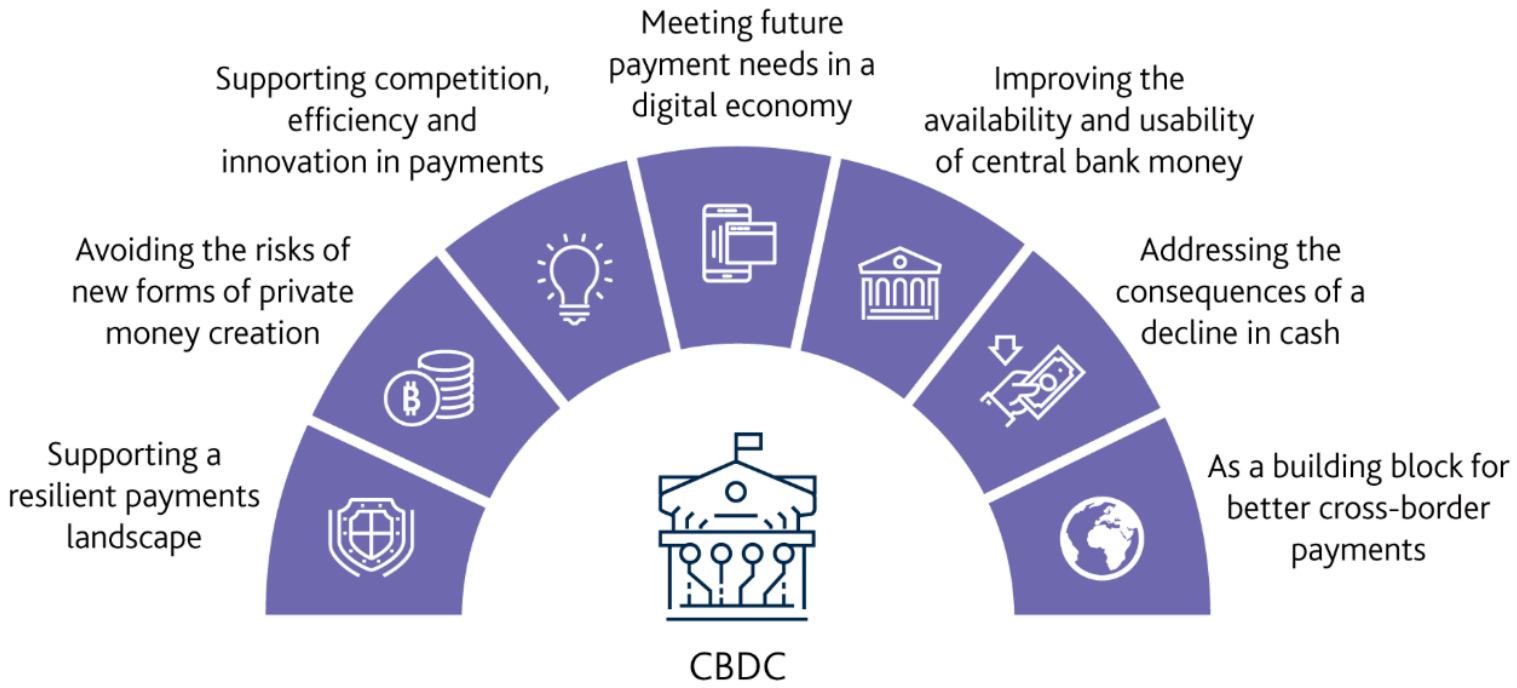
- **Legal Tender:** Recognized as a valid form of payment.
- **Central Bank Backing:** Issued and regulated by the central bank.
- **Digital Nature:** Exists only in digital form, not physical cash.
- **Programmability:** Potential for smart contracts and programmable money.
- **Interoperability:** Ability to work across different payment systems and platforms.
- **Privacy and Security:** Balancing user privacy with transaction traceability.
- **Accessibility:** Ensuring that all citizens can access and use the CBDC.
- **Resilience:** Robust against cyber threats and operational risks.
- **Monetary Policy Tool:** Potential to enhance monetary policy transmission and financial stability.
- **Cross-Border Payments:** Facilitating international transactions and remittances.

Motivations for CBDCs

- Increase financial inclusion.
- Improve payment systems.
- Enhance monetary policy transmission.
- Counteract private digital currencies.
- Strengthen financial stability.

Example: Opportunities for the BoE objectives

CBDC could present a number of opportunities for the way that the Bank achieves its objectives of maintaining monetary and financial stability.



(Source: BoE)

Renewed monetary system

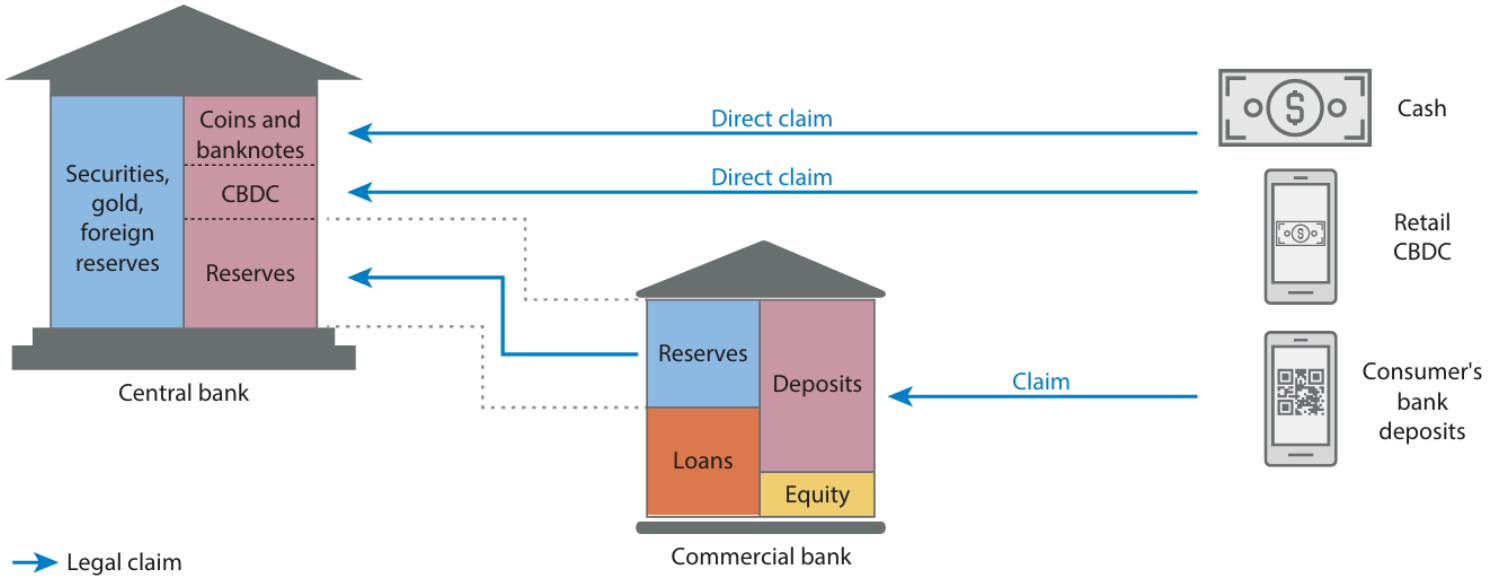


Figure 1

The monetary system with a retail central bank digital currency (CBDC). The schematic compares cash and retail CBDCs, both of which are a direct claim on the balance sheet of the central bank, and consumer bank deposits, which are a claim on a commercial bank (which, in turn, holds reserves with the central bank). Figure adapted with permission from Auer & Böhme (2021).

(Source: Auer, Raphael, et al. "Central bank digital currencies: motives, economic implications, and the research frontier." Annual review of economics 14.1 (2022): 697-721.)

Motivations for CBDCs

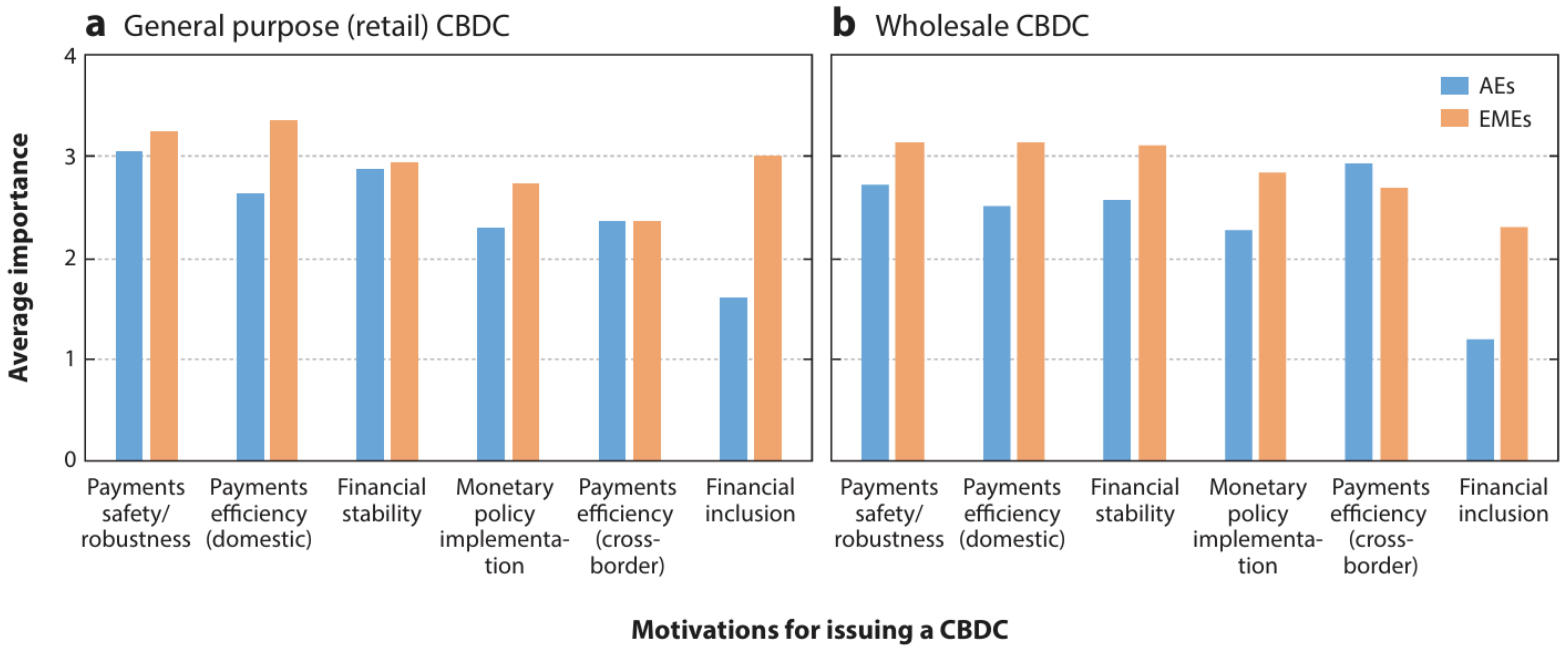
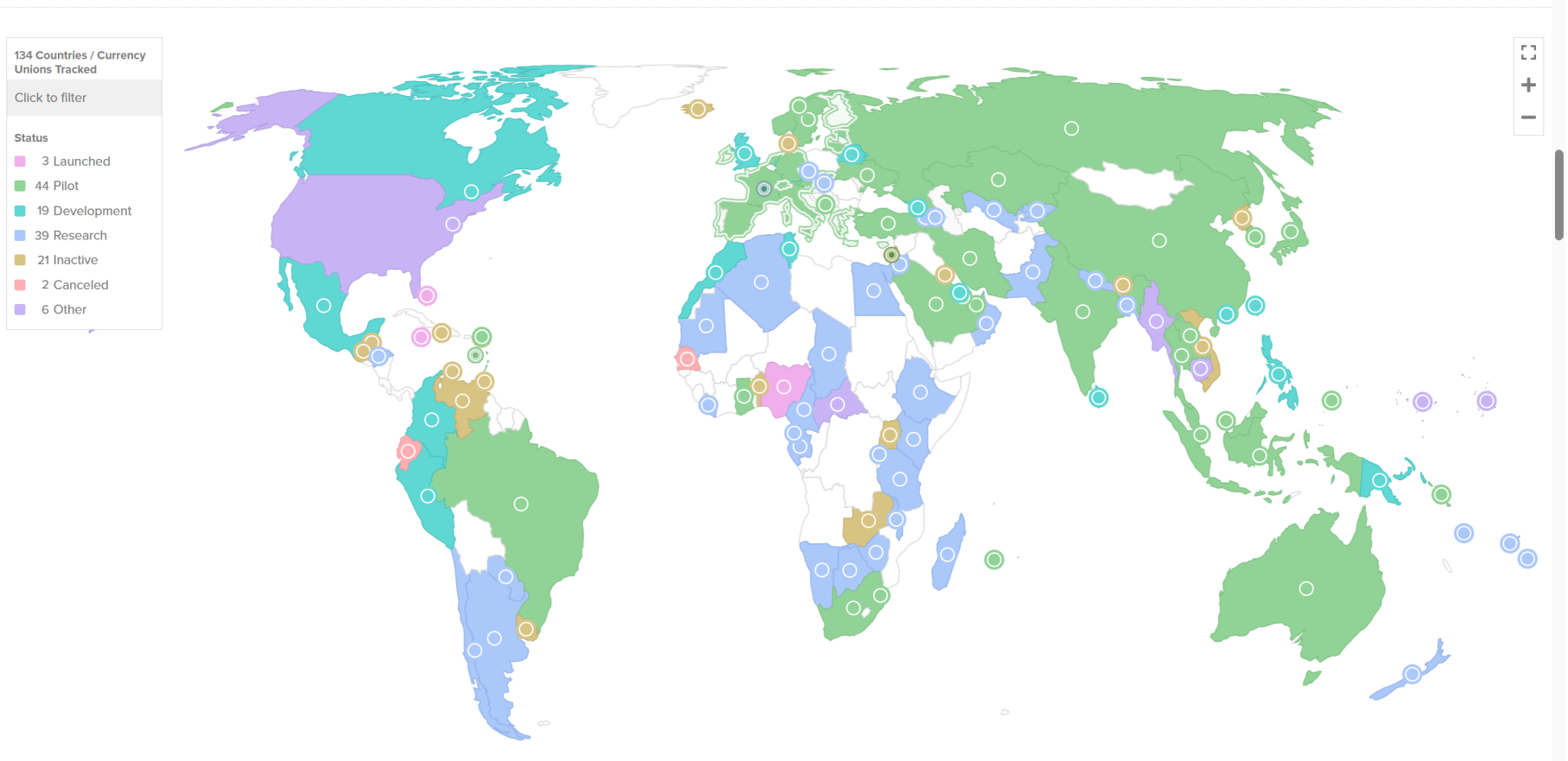


Figure 2

Motivations for issuing a central bank digital currency (CBDC). (*a*) General purpose (retail) CBDC, designed for use by the wider economy. (*b*) Wholesale CBDC, designed for use by financial intermediaries only. The bars show the relative importance of different motivations for CBDC issuance by central banks. Central banks rank these predefined potential factors as follows: 1, not very important; 2, somewhat important; 3, important; 4, very important. Abbreviations: AE, advanced economy, EME, emerging market economy. Figure adapted with permission from Boar & Wehrli (2021).

(Source: Auer, Raphael, et al. "Central bank digital currencies: motives, economic implications, and the research frontier." Annual review of economics 14.1 (2022): 697-721.)

Adaptation progress of CBDCs



(Source: CBDC tracker)

CBDC Design Models

- **Account-Based:**
  - Linked to user identity.
  - Similar to bank accounts but managed by central banks.
- **Token-Based:**
  - Digital tokens serve as the medium of exchange.
  - Anonymity and offline transactions possible.
- **Hybrid Model:**
  - Combines features of both account-based and token-based systems.
  - Users can hold accounts with the central bank and also use digital tokens.

Case Study: China's Digital Yuan

- Pioneering CBDC project globally.
- Launched to counteract the dominance of private cryptocurrencies.
- Focus on domestic retail payments.
- Emphasizes controlled data privacy and transaction tracking.
- Pilot programs in major cities.

Digital Yuan: Current Status in 2025

- The Digital Yuan has been rolled out in **29 cities**, shifting from pilot testing to full-scale implementation.
- Despite significant state backing, adoption remains limited due to the dominance of **Alipay and WeChat Pay**.
- Payment volumes have increased but still constitute only **0.16% of total monetary volume**:
  - 2023 H1: **$250 billion in transactions**
  - 2024: Cumulative transactions reached **$7.3 trillion**, with 180 million e-CNY wallets created.
- **Hong Kong** has also begun accepting the e-CNY, with state media promoting its use.

Risks and Challenges of CBDCs

- Cybersecurity threats and data privacy.
- Financial disintermediation and impact on banking sector.
- Operational risks and technology implementation.
- Cross-border implications and international coordination.

Example: eNaira in Nigeria

- Implemented by the Central Bank of Nigeria (Ozili, 2023).
- Aimed to promote financial inclusion and reduce reliance on cash.
- Key challenges:
  - Digital literacy.
  - Security concerns.
  - Public trust in digital currency.

CBDC and Monetary Policy

- Potential to enhance monetary policy transmission.
- Direct control over digital currency issuance.
- Faster policy implementation through programmable money.

Conclusion

- CBDCs represent a significant evolution in monetary policy and financial stability.
- While they offer potential benefits, they also present unique risks and operational challenges.
- The future of CBDCs will depend on effective governance, technology infrastructure, and international coordination.

2. In-class Group Activity

Any QUESTIONS?

Thank You!

Next Class

-(May 28) Global Coordination and Central Banking

- The readings will be posted on the Cyber Campus website.