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Recent Emergence of Central Bank Digital Currencies

Central banks across the world are vying to take the lead in the field of central bank digital currencies (CBDCs). Mainland China is a forerunner in piloting retail CBDC within its economy, while Hong Kong is an early adopter of wholesale CBDC projects.

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August 2021

Prepared by The Bank of East Asia, Limited
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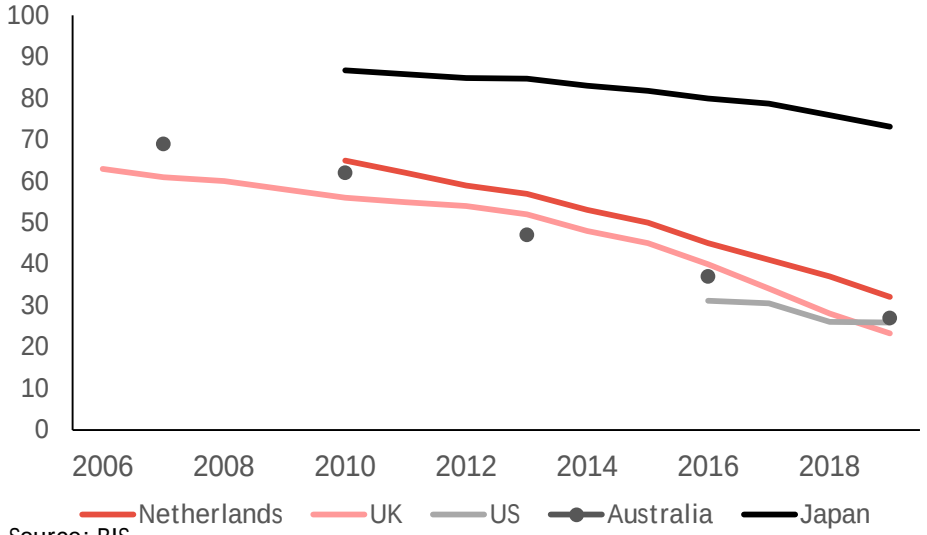
Central bank digital currency (CBDC) projects moving ahead as cash use declines and digital payments increase

Cash use declining, while use of digital payments increases

Use of cash in daily transactions

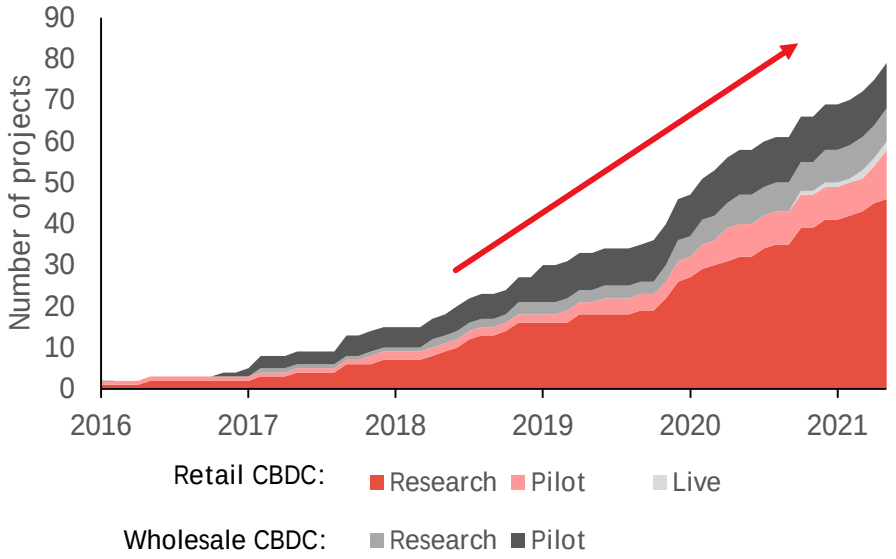


Source: BIS

- The rise in non-bank payment services and retail fast payment systems (FPS) is leading to a decline in cash usage.
- Cash use is likely to have fallen even further during Covid-19.

Central banks quickly develop interest in CBDCs

Research and development relating to CBDCs



Source: BIS

- By mid-April 2021, 28 countries and regions (including the US, UK, and eurozone) had set up working groups; 19 (including China and Sweden) had launched pilot schemes.
- The Bahamas launched the world's first nationwide CBDC, the Sand Dollar, in October 2020.

What is a central bank digital currency (CBDC)?

A CBDC is an electronic version of cash

- Backed by the full faith and credit of the government, and fully controlled by the central bank.
- Individuals and companies can conduct transactions in CBDC through digital wallets.

Retail or wholesale CBDC?

Retail CBDC

- Used by consumers & businesses.
- Comparable with digital cash.

Wholesale CBDC

- Used between financial institutions only (wholesale transactions).
- Multiple-CBDC (m-CBDC) bridges can enable cross-border payments using CBDCs.

Why has CBDC become a major focus in recent years?

3 major entities have emerged to challenge the power of central banks

Crytocurrencies

- These currencies have become highly speculative, and are related to money laundering and other financial crimes.
- Challenge central banks' role in monetary sovereignty and policymaking.

Stablecoins

- Prices are less volatile, as they are backed by real currencies.
- Also challenge the role of central banks.

Big techs

- Use big data for financial services, allowing for greater financial inclusion and enhanced service quality.
- Have become too powerful (too big to fail) and engage in anti-competitive practices.

Benefits for central banks of issuing digital currencies

- Identify money laundering, tax evasion, and other financial crimes more easily.
- Improve financial inclusion (i.e. people who cannot afford a bank account could have a CBDC account) and lower transaction costs.
- Keep a tangible connection with the public, even if cash use dwindles.
- Gain a much more direct means to exert monetary policy (e.g. introduce stimulus more effectively and targeted to individuals and businesses in real need, rather than relying on commercial banks for policy transmission).

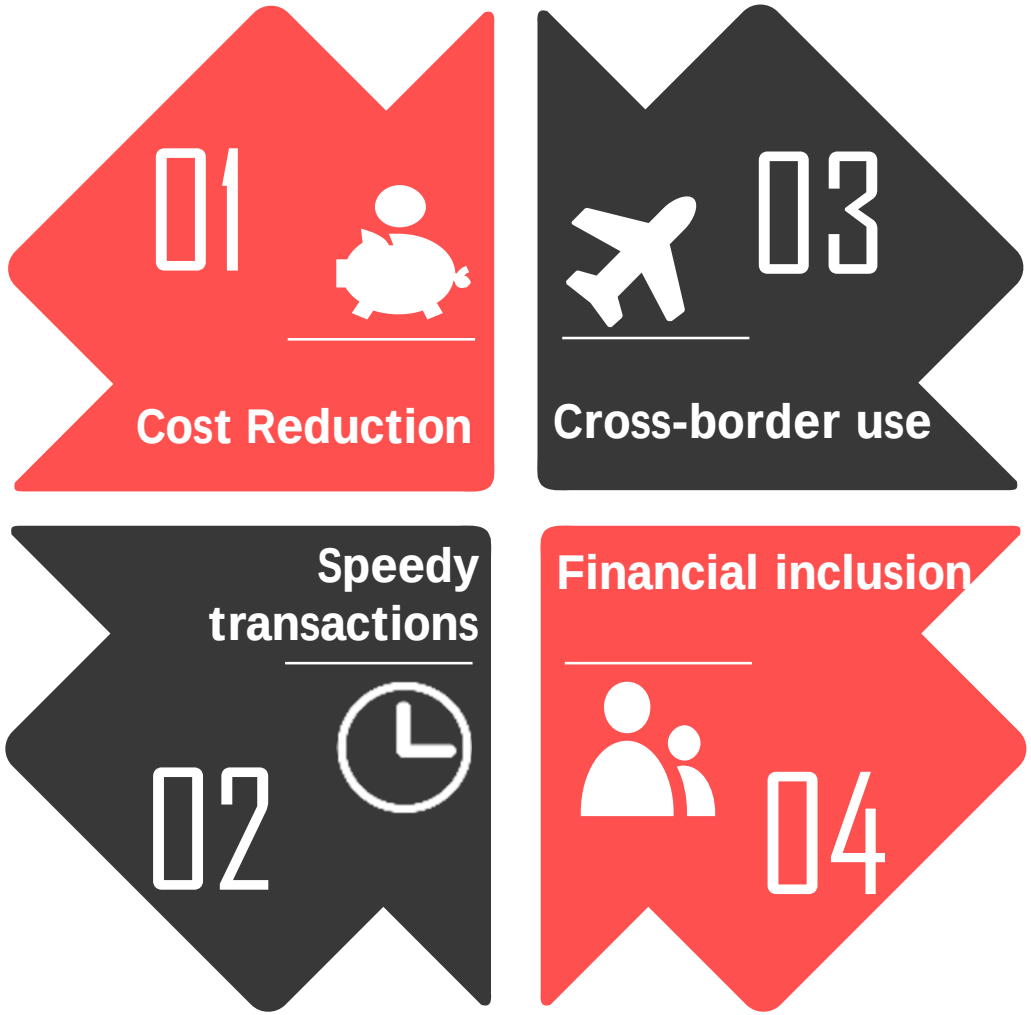
Why use a CBDC?

Lower transaction costs for merchants

Cost of conventional digital payment options such as credit and debit cards remains high, and still exceeds that of cash.

Instant settlements 24x7x365

Cashing a cheque can take 3 days, whereas Alipay can execute 120,000 transactions per second (tps), Visa 65,000 tps, and Bitcoin 4.6 tps, according to Forbes.



Easier cross-border payments

With no intermediaries, cross-border payments can become faster, cheaper, and more efficienct.

Enhanced financial inclusion

CBDCs can bring households currently lacking access to bank accounts and associated financial services back into the financial system.

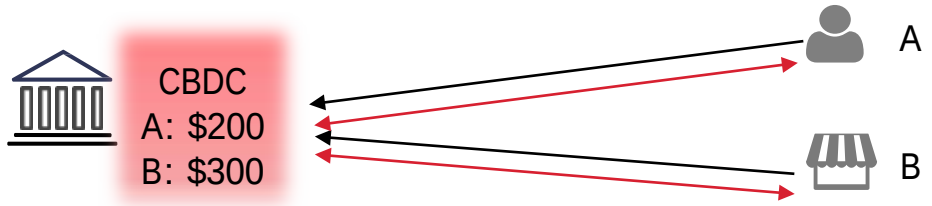
How do CBDCs differ from other retail payment methods?

	Cash	Retail CBDC	Retail Faster Payment System (FPS)
Safety	Direct central bank liability	Direct central bank liability	Liability rests with commercial banks that have collateralisation and deposit insurance, but some non-bank payment service providers (PSPs) may not have deposit insurance.
Transaction settlement	Immediate (but requires physical proximity)	Immediate	Immediate for retail payees, but the underlying wholesale settlement between PSPs may be deferred.
Identification required for access?	No, except for high-value payments in many jurisdictions	Yes/no, depending on the design	Yes
Anonymity for users	High	Yes/no, depending on the design	No anonymity, but confidentiality protected by system design and data protection laws.
Offline payments	Yes	Generally yes	No
Cross-border use	Yes, with physical transport (subject to limits/regulations)	May be more convenient and cheaper to operate than cash. Could offer cheaper and more convenient access.	Potential to link up with other jurisdictions' FPS systems, but would require inter-FPS settlement arrangements.

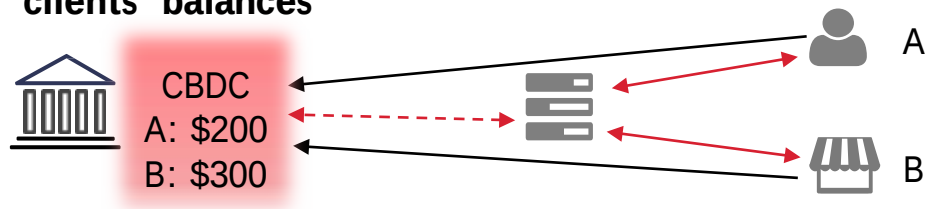
Source: BIS

Future of retail CBDCs — will they lead to decentralised finance (DeFi)?

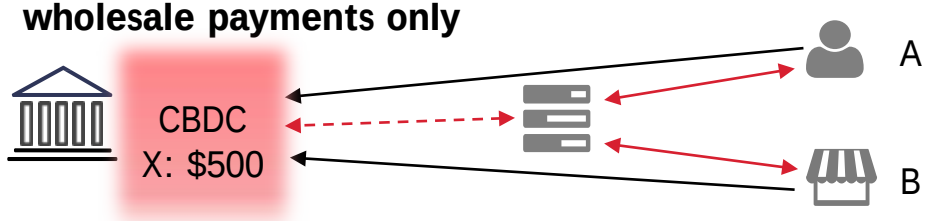
1. **Direct CBDC – Central bank handles retail payments**



2. **Hybrid CBDC – Central bank periodically records retail clients' balances**



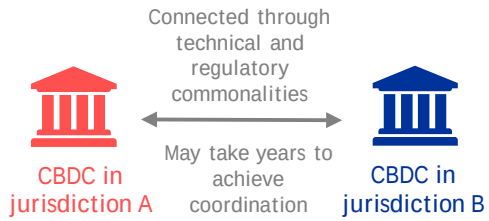
3. **Intermediated CBDC – Central bank processes wholesale payments only**



Source: BIS

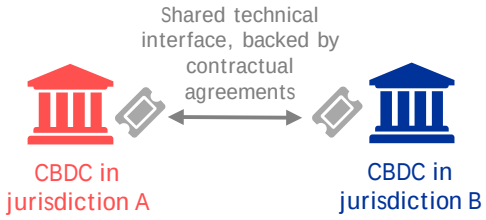
- There are worries that a central bank's essential role as a loan giver will be at risk if it issues CBDC directly to retail customers (DeFi). In fact, the risk will depend on the CBDC design.
- Direct CBDC model might lead to DeFi, and has the added disadvantage of a large shift of operational risks associated with client-facing activities from financial institutions to the central bank.
- Two-tier retail CBDC model gives the central bank and financial institutions allotted roles to play.
  - Hybrid CBDC – Central bank acts as a backstop for the payment system and records individual bank balances. This design creates a more competitive level playing field, but the central bank holds a great concentration of data (e.g. the e-RMB)
  - Intermediated CBDC – Central bank does not record retail transactions (enhancing privacy for users)

Future of cross-border CBDC (multiple-CBDC, or mCBDC) — will it lead to currency substitution?



mCBDC Model 1 – Enhanced compatibility

- CBDCs of different countries and regions are connected through compatible regulatory frameworks, market practices, and messaging formats.



mCBDC Model 2 – Interlinking

- CBDC systems are linked through technical interfaces that process end user-to-end user transactions across currency areas without going through any middlemen.
- The system needs to be safe, scalable, and resilient to avoid substantial risk.

mCBDC Model 3 – Single mCBDC system

- A jointly operated payment system hosting multiple CBDCs.

Source: BIS

- In terms of the three mCBDC models, the greatest share (17.5%) of central banks prefer Model 2, but **the majority (~60%) are undecided**.
- Key concern at the moment regarding mCBDC is currency substitution.
  - A foreign digital currency could displace a domestic one, especially in smaller nations with less effective financial systems.
  - This will affect financial stability and monetary sovereignty, and lead to tax avoidance and more volatile domestic exchange rates.
  - The process seen in dollarisation could also happen with CBDCs.

Potential risks from CBDCs

Privacy concerns

Central banks need to balance retail customers' privacy concerns with the advantages of greater transparency.

Customer protection

The possibility can't be ruled out that a central bank could abuse its power and block transactions/confiscate assets.

Cybersecurity threats

CBDC systems will store massive amounts of economic information, making them prime targets for cyber attacks.

Financial instability

In a bank run, depositors might flee for the safety of the central bank, potentially threatening the financial stability of the banking sector.

Currency substitution

A highly trusted central bank in stable political and financial condition with no capital control might attract capital inflows from emerging economies, undermining those countries' monetary stability.

Faster risk transmission

CBDCs will allow for faster cross-border capital flows, and may well accelerate the transmission of risk across borders.

Mainland China — a front-runner of retail CBDC

China conducting major pilot tests of retail e-RMB

- In August 2020, China's government announced the launch of an e-RMB pilot scheme in the Beijing-Tianjin-Hebei area, Yangtze Delta area, and Guangdong-Hong Kong-Macau Greater Bay Area.
- By 30th June, there were more than 10 million users, who had made 70 million transactions – a total of CNY34.5 billion.
- e-RMB allows payments or transfers to be made offline through smartphone apps. Physical cards are also issued for less tech-savvy users.

Use of e-RMB in China

Pilot cities

- At least 11 cities have launched pilot e-RMB schemes on a retail basis, including Shenzhen, Shanghai, and Beijing.

Pilot banks

- 7 operators, including 6 state-owned banks and 1 private bank (MYBank), have set up infrastructure for e-RMB.

Retail usage

- Individuals can use e-RMB to purchase goods, charge prepaid cards, and pay electricity fees.
- Some organisations, including JD.com and the Beijing and Shanghai city govts, are paying salaries in e-RMB.

Hong Kong — leading in wholesale CBDC projects

Hong Kong Monetary Authority (HKMA) adopts 3-stage approach

1

- **HKMA** has teamed up with **the Bank of Thailand** to develop a software prototype to enable cross-border settlements.

2

- **UAE's** central bank and the **PBOC** have also joined the HK-Thailand project, which has been renamed "m-CBDC Bridge". The coordinator is the BIS.
- **Real-time 24/7 FX settlements** are being tested in the 4 jurisdictions**.** Results will be available in a few months.

3

- The HK stock exchange, the stock exchange of Thailand, and 30 commercial banks in 4 jurisdictions will be executing real CBDC transactions by year-end.

Hong Kong also aims to speed up its retail CBDC

- Fintech 2025 Vision: researching the feasibility of issuing e-HKD on a retail basis.
- HK has opted for a two-tier retail CBDC structure.
- Ongoing model testing of tradeoff between data privacy and system resilience, with some initial results expected in 12 months' time.
- Core mission: deliver fairer and more efficient services to all customers.

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