Central Bank Digital Currencies (CBDC)

Introduction and updates

Aug 2021
Definition of Central Bank Digital Currencies...

Definition

A CBDC is a digital form of central bank money, denominated in the national unit of account, that is often described as “digital cash”.

CBDCs are held in a digital wallet and can be used as a payment instrument by its owners – in contrast to money held in current accounts at commercial banks CBDCs are a direct liability of the central banks (similar to cash).

Thus, CBDCs are central-bank issued, electronic (digital) and universally accessible (currently central bank-digital money can only be accessed by financial institutions while non-digital money, or Cash, can be accessed universally)

...and its potential advantages depending on region & design

Developed countries

<table>
<thead>
<tr>
<th>Advantage</th>
<th>Description</th>
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<tr>
<td>Privacy-by-design</td>
<td>CBDC could allow for anonymity features similar to regular Cash</td>
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<td>Countering “private money” &amp; increase own innovation</td>
<td>Some central banks view CBDC as healthy – potentially necessary – competition against privately issued digital currencies, some of which may be denominated in foreign currencies</td>
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<td>Monetary policy with “programmable currency”</td>
<td>CBDCs could enhance transmission of monetary policy as an interest-bearing CBDC would increase the economy’s response to changes in the policy rate</td>
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<td>Offline payments</td>
<td>CBDC could allow for payments in an environment where there is no internet connection</td>
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<td>Cost of cash</td>
<td>CBDC could lower costs associated with providing a national means of payment (e.g. countries with vast territory, remote islands)</td>
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<tr>
<td>Financial inclusion</td>
<td>CBDC may provide a safe and liquid government-backed means of payment to the public that does not require individuals to even hold a bank account</td>
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Emerging markets

Source: Autonomous, BIS, World Bank
Around ~80% of central banks globally conduct at least research on CBDCs with ~10% being in a pilot-phase

Survey results, % of central banks

Global CBDC engagement status

- Research/study: 80%
- Experiments/proof-of-concept: 40%
- Development/pilot arrangement: 10%

Respondents can choose multiple answers

Focus of engagement

- Wholesale: 15%
- Retail: 35%
- Both: 50%

Despite a stronger interest in retail CBDCs by central banks, most engagements currently reaching a proof-of-concept/pilot stage are in the wholesale CBDC segment

Source: BIS Survey Data, press search, team analysis
Central banks globally highlight a number of potential benefits and challenges of CBDC
Selected potential advantages and disadvantages of CBDCs

<table>
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<th>Benefits</th>
<th>Challenges</th>
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<tr>
<td><strong>Cost of cash</strong></td>
<td>Deposits could be withdrawn from commercial banks, should people decide to hold CBDC in significant volume. Banks would have to raise expensive wholesale funding or raise interest rates on deposits</td>
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<td><strong>Financial inclusion</strong></td>
<td>In times of crisis, bank customers could flee from deposits to CBDC, which might be seen as safer and more liquid</td>
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<td><strong>Stability of the payment system</strong></td>
<td>CBDC of reserve currency countries available across borders could increase currency substitution (“dollarization”)</td>
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<tr>
<td><strong>Countering new, private digital currencies</strong></td>
<td>Offering CBDC could be very costly for central banks, and it could pose risks to their reputations. Offering full-fledged CBDC requires central banks to be active along several steps of the payments value chain</td>
</tr>
<tr>
<td><strong>Monetary policy in times of “programmable currency”</strong></td>
<td>Benefits and challenges of CBDCs are highly specific to design choices</td>
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</tbody>
</table>

Source: IMF

**Benefits**

- **CBDC could lower costs associated with providing a national means of payment (e.g. countries with vast territory, remote islands)**
- **CBDC may provide a safe and liquid government-backed means of payment to the public that does not require individuals to even hold a bank account**
- **Some central banks view CBDC as a means to enhance the resilience of their payment system due to concentration of payment system in the hands of foreign entities**
- **Some central banks view CBDC as healthy — potentially necessary—competition against privately issued digital currencies, some of which may be denominated in foreign currencies**
- **CBDCs could enhance transmission of monetary policy as an interest-bearing CBDC would increase the economy's response to changes in the policy rate. It is also suggested that CBDC could be used to charge negative interest rates in times of prolonged crisis (thus breaking the “zero lower bound” constraint)**

**Challenges**

- **Banking-sector disintermediation**
- **“Run risk”**
- **International implications**
- **Costs and risks to the central bank**
## Case study: PBoC’s perspective on why E-CNY

<table>
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<tr>
<th>Key Motivations</th>
<th>Drivers for Adoption</th>
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<tr>
<td><strong>Support digitalized economy</strong></td>
<td><strong>Efficiency improvement</strong> – eliminate intermediary value chain steps around clearing/settlement/reconciliation etc and enable end-to-end (straight-through) business model design</td>
</tr>
<tr>
<td>• Leading in the digital economy</td>
<td>• Reducing waste of capital – reduce mismatch of funding suppliers and consumers</td>
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<td>• 100% cashless</td>
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<tr>
<td><strong>Enhance implementation of monetary policies</strong></td>
<td><strong>Market reform</strong> – enhanced regulation and tightened controls of transactions by third party payment platforms</td>
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<tr>
<td>• Micro-controllable monetary policy implementation</td>
<td>• Capital Control – preserve capital control yet enhancing operational efficiency for international usage of RMB</td>
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<tr>
<td>• Eliminate settlement risks of payment</td>
<td>• Market transparency – track fund flow and capital expenditure to identify economic risks and to assess effectiveness of national economy strategies</td>
</tr>
<tr>
<td>• Enhance capability against CTF and fraud</td>
<td></td>
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<tr>
<td><strong>Internationalize RMB</strong></td>
<td><strong>Utility currency</strong> – usage of DCEP to settle large cross-border payment with trade counterparty of China without involving the USD as intermediary or requiring usage of SWIFT</td>
</tr>
<tr>
<td>• RMB’s Global Status</td>
<td>• Global liquidity – reduce cost of liquidity by reducing duration of money sitting in nostro/vostro accounts of multiple banks</td>
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<tr>
<td>• Cross-border Settlement</td>
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Source: China Renaissance Research, HSBC Research, McKinsey Analysis
Defining Stable-coin vs CBDC

**Background**
In 2019, Facebook announced development of Libra. However, due to increasing regulatory scrutiny, the Libra Association (consortium of 22 companies) announced ‘Libra 2.0’ (now Diem)

**Architecture of the Libra 2.0**
- **Libra coin (backed by a currency basket)**
- **EUR (Single currency)**
- **USD (Single currency)**
- **GBP (Single currency)**
- **... (Single currency)**

**Distribution and Transaction Layer**

**Decentralized Network**

**Highlights**
- **Apr 2020:** Libra Association published white paper introducing Libra 2.0 concept and updates on plans of the Association. The updated model is a step closer to meeting regulatory requirements
- **Feb 2020:** Shopify joined the Libra Association; while Mastercard quits the Association amid regulatory concerns
- **Jan 2020:** Vodafone pulls out of Libra Association to focus on M-Pesa

**Background**
In 2019, People’s Bank Of China, announced a blockchain-based digital RMB currency, called DCEP (Digital Currency Electronic Payment)

**Architecture of the Chinese E-CNY**
- **E-CNY Retail Wallets**
- **E-CNY (M0 Equivalent)**
- **E-CNY Wholesale Distribution**

**Transaction Layer**

**Distribution Layer**

**Centrally Operated Decentralized Network**

**Highlights**
- **Jun 2021:** Pilot testing covered 1.3m+ payment scenario in 24m+ wallets, 70M+ transactions involving RMB$3.4+b value
- **Apr 2020:** PBOC rolls out DCEP trial, started pilot with app based payments (wallet)
- **Jan 2020:** PBOC finishes CBDC development and launches a CBDC pilot in Shenzhen and Suzhou
- **Sep 2019:** Started “closed-loop testing”

Source: McKinsey analysis, press search
What we learned about E-CNY

- M0 equivalent
- Zero transaction/transfer fee
- No interest paid by PBoC
- Launch in 2022 (TBC)
- Two-tiered System
  - Central Bank - Store/Other Operating Institutions: Banks offer 100% reserve in exchange for E-CNY
  - Also money hundred sales company - retail: commercial retail customers distribute E-CNY.
- Focus on payment scenario (e.g. transportation, shopping, government services)
- Pilot involving 100k+ personal wallet, 8k+ merchant wallet, RMB 1b+ transaction amount
- Offline payment between offline payer and payee wallets
- Cross-border payment in testing
- Based on the account loose coupling mode, and the use of central operations. Trading data is transmitted daily from the operating institution to the central bank asynchronously
- Controlled anonymity, only central banks have access to all trading data
- NFC-based payment methods support dual offline payment of devices
Comparing E-CNY vs HKD (Fiat)

**Architecture of the Chinese E-CNY**

- E-CNY Retail Wallets
- E-CNY (M0 Equivalent)
- Distribution Layer: Centrally Operated Decentralized Network
- Transaction Layer

**Highlights**

- Level set competitive advantage of large FinTech (Alibaba and Tencent) on proprietary infrastructure
- Higher operating cost for commercial bank during parallel run period

**Notes**

- Higher deposit rates for note issuing banks hence overall lower cost of capital
- Studying of E-HKD (retail CBDC) according to FinTech 2025 paper published in June 2021

**HKD**

- Note Issuing Bank Reserves with in HKMA
- 3 designs of banking notes with the same legal status
- Centrally Operated Clearing and Settlement Systems (e.g. CCASS, RTGS, FPS, etc.)
Potential implications to commercial bank

**Reserve and Capital Requirements**
- Potential impact subject to change to the existing capital adequacy rules and other rules and regulations
- Potential outflow of deposits from general commercial banks to E-CNY distributing institutions, and eventually higher cost of capital for non-CNY distribution commercial banks

**Cost of Compliance**
- Potentially mitigated KYC risks and reduction of compliance cost on transaction monitoring and reporting (or on par with non-bank FinTech)

**Payment Business**
- The new infrastructure will simplify the clearing and settlement processes between banks and make it an indifferenciable services. Fees income will drop eventually

**Investment and Wealth Management**
- Shorter turnaround time and much effective settlement for securities trading and IPO subscription
- Potential new financial instruments leveraging the programmability nature of E-CNY (e.g. hedging products)

**Infrastructure Investment**
- Fundamental changes in core banking operation; Subject to regulatory changes, there will be a period of time which commercial banks will need to maintain the legacy operation and a new operation to support E-CNY in parallel

**Lending Business**
- Innovation that leverages the smart contract functionality for policy driven lending products such as government guarantee funding scheme, policy loans, etc.