The economics of US digital currency policy

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A payment

Alice → $8 → Bob the baker
A bank-railed payment

Alice

Bob

Alice’s bank

Bob’s bank

message

message

payment rails

$8

$8

$8
Bank payment rails
Disruptable bank-based payment system revenues

Ratio of payment revenues to GDP: North America 2.1% versus EMEA: 1.6%

North America
$0.485 trillion
Consumer
32.7%
Commercial
32.7%

Rest of world
$1.390 trillion
Consumer
8.9%
Commercial
17.8%

Cross-border transactions
5.9%
Account-related liquidity
10.9%
Domestic transactions
9.9%
Commercial cards
10.9%

A CBDC payment

A's account ➔ $8 ➔ B's account

PSP_A message ➔ central bank ledger ➔ PSP_B message
Financial inclusion and digital payments

Data source: World Bank Global Findex Database.
Interoperability for hybrid CBDC is crucial

Is this CBDC payment feasible?
President’s Working Group Report on Stablecoins, November, 2021:

“... legislation should limit stablecoin issuance, and related activities of redemption and maintenance of reserve assets, to entities that are insured depository institutions. The legislation would prohibit other entities from issuing payment stablecoins. Legislation should also ensure that supervisors have authority to implement standards to promote interoperability among stablecoins.”
Fast payment systems?

Key defining properties:

1. 24 × 7 × 365 availability.
2. Real time gross settlement (RTGS).

Examples:

- Bank of Mexico’s Sistema de Pagos Electrónicos Interbancarios.
- Swish, a private mobile payment system available in Sweden.
- The United Kingdom’s non-profit utility, Faster Payments.
- Singapore: Fast and Secure Transfers (FAST).
- The European Central Bank TARGET Instant Payment Settlement (TIPS), based on the SEPA Instant Credit Transfer platform.
- Brazil’s Pix.
Pix adoption has been rapid

Merchant costs for cards and Pix

Weak competition for deposits reduces bank funding costs

When wholesale rates last peaked in April 2019

Data sources: FRED and FDIC.
Central banks are worried about credit provision

“A widely available CBDC [...] could reduce the aggregate amount of deposits in the banking system, which could in turn increase bank funding expenses, and reduce credit availability or raise credit costs for households and businesses.” Money and Payments: The U.S. Dollar in the Age of Digital Transformation, Federal Reserve, 2022.

The BIS and G7 central banks, including the Fed, suggest that “if banks begin to lose deposits to CBDC over time they may come to rely more on wholesale funding, and possibly restrict credit supply in the economy with potential impacts on economic growth.” Central Bank Digital Currencies: Foundational Principles and Core Features,’ BIS, 2020.
CBDC-induced deposit-market competition is unlikely to lower credit provision much for large banks

References: Andalfatto (2020); Piazzesi and Schneider (2020); Chiu, Davoodalhosseini, Jiang and Zhu (2021); Keister and Sanchez (2021); Whited, Wu, and Xiao (2022).
A monopolistic bank that funds all loans with deposits

Marginal loan profit

Marginal funding cost

$q$

Quantity of loans or deposits

$M(q)$

$C(q)$
For small monopolistic banks:
Loan provision declines as deposit-market competition rises

\[ M(q) \]  
Marginal loan profit

\[ C^*(q^*) \]  
Marginal funding cost (high competition)

\[ C(q) \]  
Marginal funding cost (low competition)

Quantity of loans or deposits

Marginal loan profit or funding cost
What about cross-border payments?
A multi-CBDC exchange corridor

Thai bank network
THB (W-CBDC) domestic

mCBDC corridor
DR-on-W-CBDCs for cross-border payment and FX PvP

China bank network
CNY (W-CBDC) domestic

Adapted from: Project Ithanon, Bank of Thailand, 2021.
The U.S. government is concerned

In addition, technological innovations such as digital currencies, alternative payment platforms, and new ways of hiding cross-border transactions all potentially reduce the efficacy of American sanctions. These technologies offer malign actors opportunities to hold and transfer funds outside the traditional dollar-based financial system. They also empower our adversaries seeking to build new financial and payments systems intended to diminish the dollar’s global role. We are mindful of the risk that, if left unchecked, these digital assets and payments systems could harm the efficacy of our sanctions.

Policies

1. Use regulations and fast-payment infrastructure to promote a more open, efficient, and competitive bank-railed payment system.

2. Allow entry by private stablecoins and fintech banks, subject to compliance and interoperability standards.

3. Continue developing CBDC technology. Deploy a CBDC when the key technology gaps are closed and the economics warrant a CBDC.

4. Support wholesale CBDCs for settlement systems and cross-border payments.

5. Analyze dollar-dominance risks and benefits carefully.
Appendix exhibits
Bank of England: CBDC Objectives

1. Supporting a resilient payments landscape.

2. Avoiding the risks of new forms of private money creation.

3. Supporting competition, efficiency and innovation in payments.

4. Meeting future payment needs in a digital economy.

5. Improving the availability and usability of central bank money.

6. Addressing the consequences of a decline in cash.

7. An enabler for better cross-border payments.
Major CBDC developers

Major CBDC developers include:

- Peoples Bank of China.
- Sveriges Riksbank.
- Bank of Korea.
- Nigeria.
- Bank of Canada.

Illustrative cryptographic payment authorization flow

Figure 2.5 illustrates the device-centric POS wallet transaction flow used by Apple Pay, Android Pay, or Samsung Pay with NFC and EMV payment tokenization.

Figure 2.

Device-Centric POS Transaction Flow

Figure 3.6 illustrates the slightly different process used for in-app mobile payments. The customer authorizes the payment within the merchant app using Touch ID or Face ID on the mobile phone for Apple Pay or selects "Buy with Android Pay" in the app. This sends the tokenized payment credentials that are securely stored in the phone and the cryptogram to the merchant app. The customer's billing information may be passed to the merchant app along with the payment credentials when the customer authorizes the purchase.

Figure 3.

In-App Device-Centric Wallet Transaction Flow with Tokenization

Source: Federal Reserve Bank of Boston.
Two-ledger payment system