From gold to code

Evolution of Money to CBDCs

From intrinsic value to programmable code

BLUF

CBDCs convert money from a bearer asset and accounting entry into a **programmable policy instrument** directly controlled by the central bank. You gain instant settlement and precise policy delivery; you lose transactional privacy and introduce a centralized operational and governance risk. Every historical step away from tangible backing increased central control. CBDCs are the logical endpoint of that trajectory.

AIMS

Assumptions

- “CBDC” = a digital instrument, denominated in national currency, that is a **direct liability of the central bank** (retail focus).
- Audience already understands basic fiat and card/mobile payments.

Intelligence Requirements

1. Trace the evolution from commodity money to fully digital liabilities.
2. Identify what CBDCs change relative to today’s bank-deposit money and fast payment systems.
3. Extract practical lessons from early CBDC pilots.

Method

- Synthesize central bank (BIS/IMF/CBDC pilots) documentation and standard monetary history.
- Compare designs on five axes: backing, privacy, control, resilience, adoption.

Scope & Limits

- Focus on **retail CBDCs**; wholesale CBDCs and private crypto only as contrast.
- No normative verdicts; emphasize mechanisms, trade-offs, and observable outcomes.

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1. Background: how money actually works

- **Commodity money**: shells, salt, metals; scarcity and usefulness confer value.
- **Coinage**: standardized weight/purity; portable store of value and unit of account.
- **Gold standard / Bretton Woods**: convertibility anchors price levels and external balances.
- **Fiat (post-1971)**: unbacked state money; value from law, credibility, and policy.
- **Digital account money**: commercial-bank deposits moved over cards/FPS.
- **CBDC**: central-bank liability in digital form with potential **programmability** at wallet or transaction level.

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2. Timeline: key monetary breaks

- **Ancient–Medieval**: shift from barter goods to standardized coinage.
- **1870s–1914**: classical gold standard globalizes convertibility.
- **1944–1971**: Bretton Woods fixes exchange rates to the dollar, and the dollar to gold.
- **1971–present**: end of dollar–gold convertibility; fiat era consolidates.
- **1990s–2010s**: card networks, internet banking, fast payment systems.
- **2020–present**: live CBDC pilots (Bahamas Sand Dollar, e-CNY, eNaira).

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3. What CBDCs change (mechanisms)

- **Liability location**: balances move (potentially) from commercial banks to the central bank.
- **Programmability**: holding limits, transaction caps, time/place/purpose constraints are technically feasible.
- **Policy transmission**: targeted transfers, instant stimulus, tiered or even negative interest on retail balances become implementable.
- **Competition with FPS**: both offer instant payments; only CBDC is a CB liability with policy “knobs.”
- **Data visibility**: default visibility at the issuer level unless privacy-by-design is mandated.

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4. Case studies (signals, not verdicts)

A. Nixon Shock (1971)
Ending convertibility severed the money–metal anchor. It removed a hard constraint, expanded policy space, and normalized fiat flexibility.

B. Sand Dollar (Bahamas)
First live retail CBDC (2020). Goals: inclusion and resilience across islands. Adoption has been modest; authorities push tighter integration with banks to improve usage.

C. e-CNY (China)
Large pilot with two-tier distribution via banks/PSPs, staged expansion, and feature experimentation (tiered wallets, offline trials).

D. eNaira (Nigeria)
Launched 2021 with tiered wallets. Early challenge: driving merchant acceptance and everyday usage in competition with existing rails.

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5. Comparative matrix (retail focus)

Criterion	Gold/Metal	Fiat (post-1971)	Card/FPS (today)	CBDC (pilot concepts)
Backing	Intrinsic commodity	None (credibility)	Bank deposits (insured)	Central bank liability
Settlement	Physical finality	Legal finality	Instant/near-instant	Instant on CB ledger
Policy levers	None	Rates, reserves, QE	Pricing, rails	**Wallet caps, rates, access, purpose rules**
Privacy	High (bearer)	Medium	Low–medium	**Low by default; design-dependent**
Resilience	Offline, durable	Broad	Network-dependent	**Centralized cyber/ops concentration**

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6. Risks and scenarios

- **Disintermediation shock**: deposit flight to CBDC in stress; caps/tiering can mitigate, design errors can amplify.
- **Programmable control**: time-limited money, sectoral allow/deny lists, auto-taxing are feasible; governance is the real constraint.
- **Cyber/ops concentration**: issuer becomes a national single point of failure.
- **Adoption plateau**: without clear user advantage vs FPS, usage stalls.

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7. Indicators to watch (12–24 months)

- Statutory **distribution/acceptance mandates** for CBDC by banks or merchants.
- **Holding-limit calibration** and whether balances earn interest.
- **Offline CBDC** pilots and resilience claims.
- **Merchant acceptance** and wallet count vs active usage in ongoing pilots.

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8. Implications & COAs

For policymakers/central banks

- Treat FPS as baseline; deploy CBDC only where it solves real gaps (offline, resilience, cross-border).
- Bake in **privacy-by-design** and legal firebreaks for purpose-based restrictions.
- Publish clear **caps/tiers** and crisis playbooks to reduce run risk.

For merchants/PSPs

- Prepare **multi-rail acceptance**; abstract rails behind APIs.
- Budget for compliance/KYC overhead and CBDC-specific rule changes.

For citizens

- Diversify rails (cash where legal, FPS, deposits).
- Know your CBDC **wallet tier/limits** if offered; avoid single-rail dependence.
- Keep a portion of savings outside always-online rails for resilience.

Annex: glossary (concise)

- **CBDC (retail)**: central-bank digital money available to the public.
- **Programmability**: enforcement of rules in payment logic (caps, timing, purposes).
- **FPS**: instant account-to-account payment systems operated by central banks or clearing houses.

Annex: References & Resources

General history of money

- Wikipedia – History of money
- BNP Paribas – 18 dates that made the history of payments
- ThoughtCo – The invention of paper money (China)
- New Hanfu – Early Chinese banknotes
- Ampere – History of money overview

Gold standard & Bretton Woods

- Wikipedia – Gold standard
- Federal Reserve History – The Nixon Shock
- IMF – A short history of the Bretton Woods system

Digital payments

- Wikipedia – Automated teller machine (ATM)
- Wikipedia – Payment card history
- Bank for International Settlements – Fast payment systems

CBDCs

- BIS – Central Bank Digital Currencies hub
- BIS Innovation Hub
- IMF – CBDC Virtual Handbook
- European Central Bank – Digital euro
- People's Bank of China – e-CNY overview (English page)
- Central Bank of The Bahamas – Sand Dollar
- Central Bank of Nigeria – eNaira

Data & statistics

- London Bullion Market Association – Historical gold data
- World Bank – Global Financial Development data
- IMF Data – International Financial Statistics

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