



Causeway

## Central Bank Digital Currencies

July 2021

# Agenda

1. What is money?
2. Cryptocurrencies
3. Stablecoins
4. Central Bank Digital Currencies (CBDCs)
5. Implications for commercial banks
6. Implications for payments companies

# What is money?

Money comes in many different forms—any definition needs to focus on its functionality:

## *Specific functions (mostly microeconomic)*

1. Unit of account
2. Common measure of value
3. Medium of exchange
4. Means of payment
5. Standard for deferred payments
6. Store of value

## *General functions (mostly macroeconomic)*

1. Liquid asset
2. Framework of the market allocative system
3. A causative factor in the economy
4. Controller of the economy

*Money is anything that is widely used for making payments and accounting for debts and credits.*

Source: Causeway Analysis, Federal Reserve Bank of St. Louis

# Cryptocurrency's rise

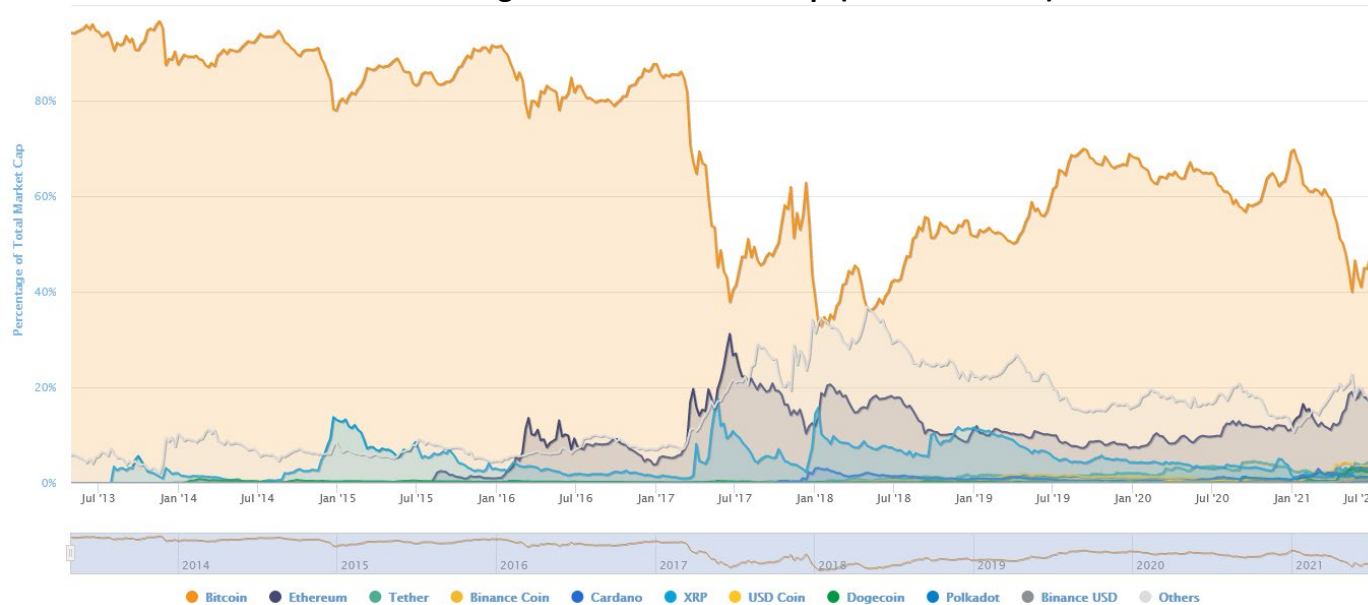
- The global crypto market totaled \$1.3T as of July 15, 2021—down from its peak of \$2.5T in May but up from \$190B at the end of 2019.

**Total cryptocurrency market cap (\$T)**



- Bitcoin's dominance has fallen over time to ~45% total market share currently, while Ethereum has 18% total share. The top 10 coins together represent ~80% of crypto market cap.

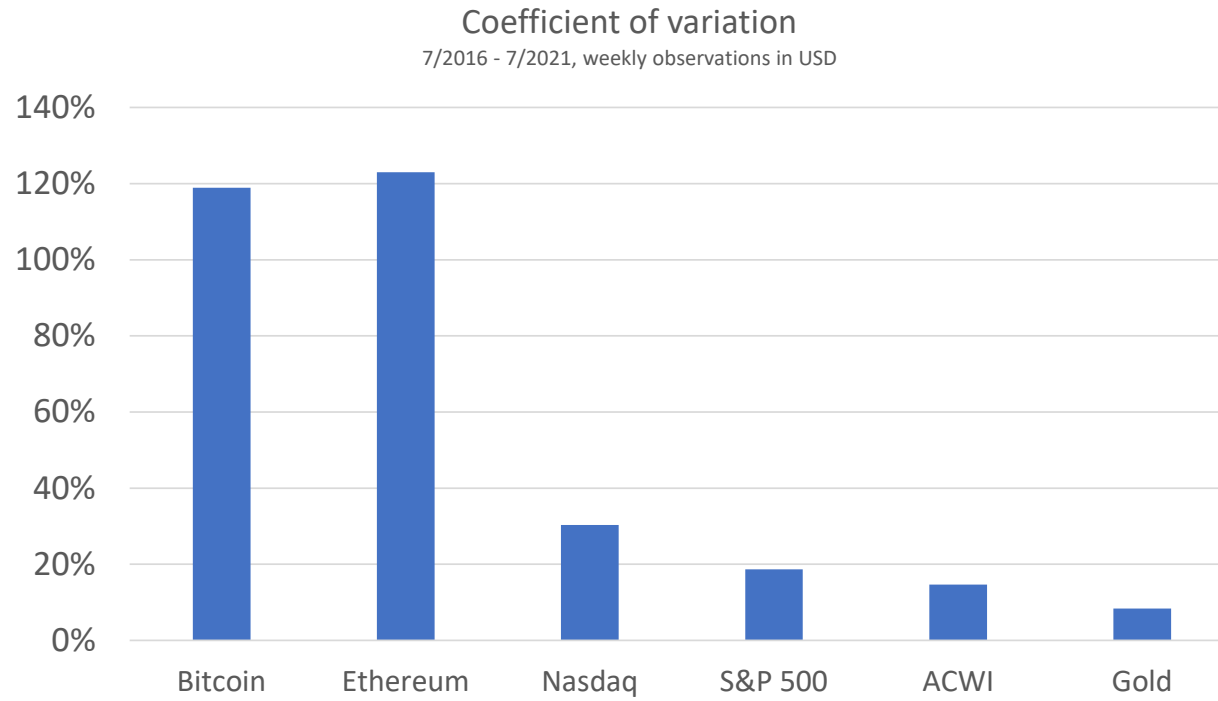
**Percentage of total market cap ("dominance")**



source: [coinmarketcap.com](https://coinmarketcap.com)

# Volatility of cryptocurrency

- Major crypto assets are exceptionally volatile. Over the past 5 years, BTC and ETH have had 4x the volatility of the Nasdaq, 6x the S&P 500, and >8x that of the MSCI ACWI Index and gold.

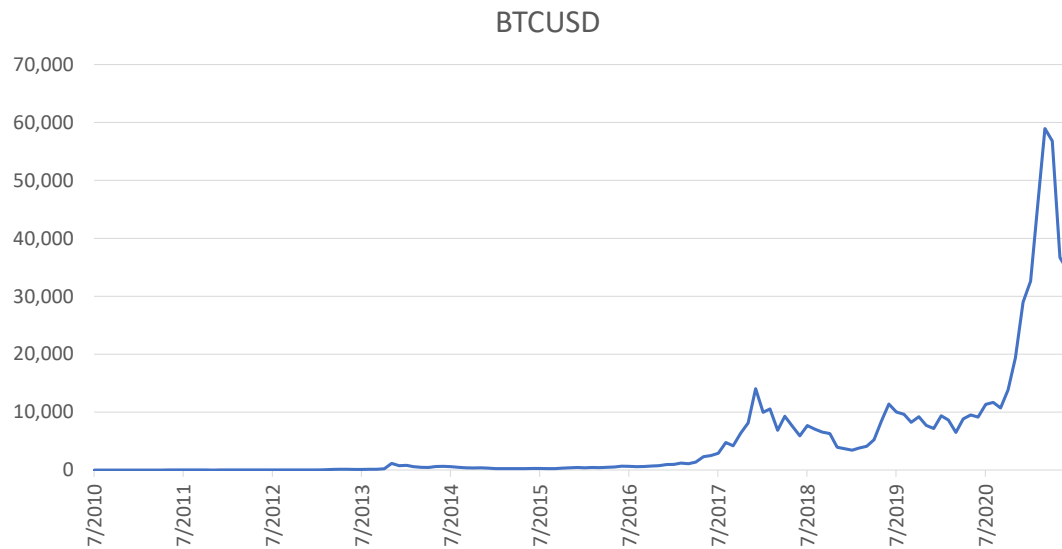


Source: Causeway Analysis. Coefficient of variation = (standard deviation / mean). Distributions with CV > 100% are considered high variance.

- This volatility supports the argument that crypto's main function to date has been as a vehicle for speculation rather than as a means of payment or reliable store of value.

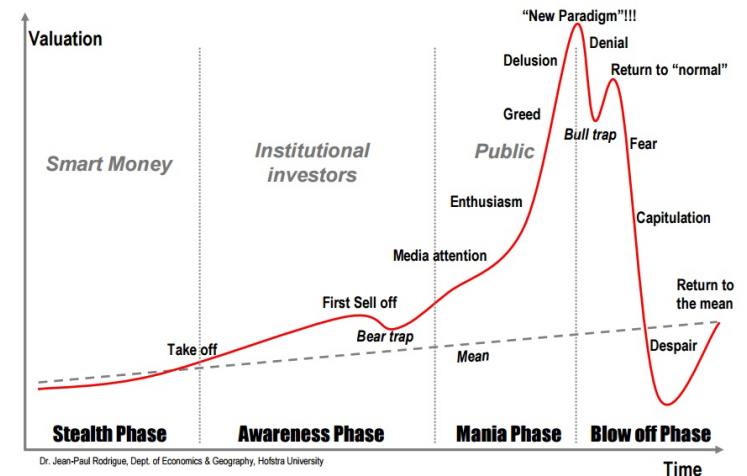
# Speculative asset bubbles - Have we seen this chart before?

- The scale of the 2017 BTC rally was more akin to the various bubbles of the past 40 years.
- The 2020-2021 breakout pushed BTC into more rarefied territory.



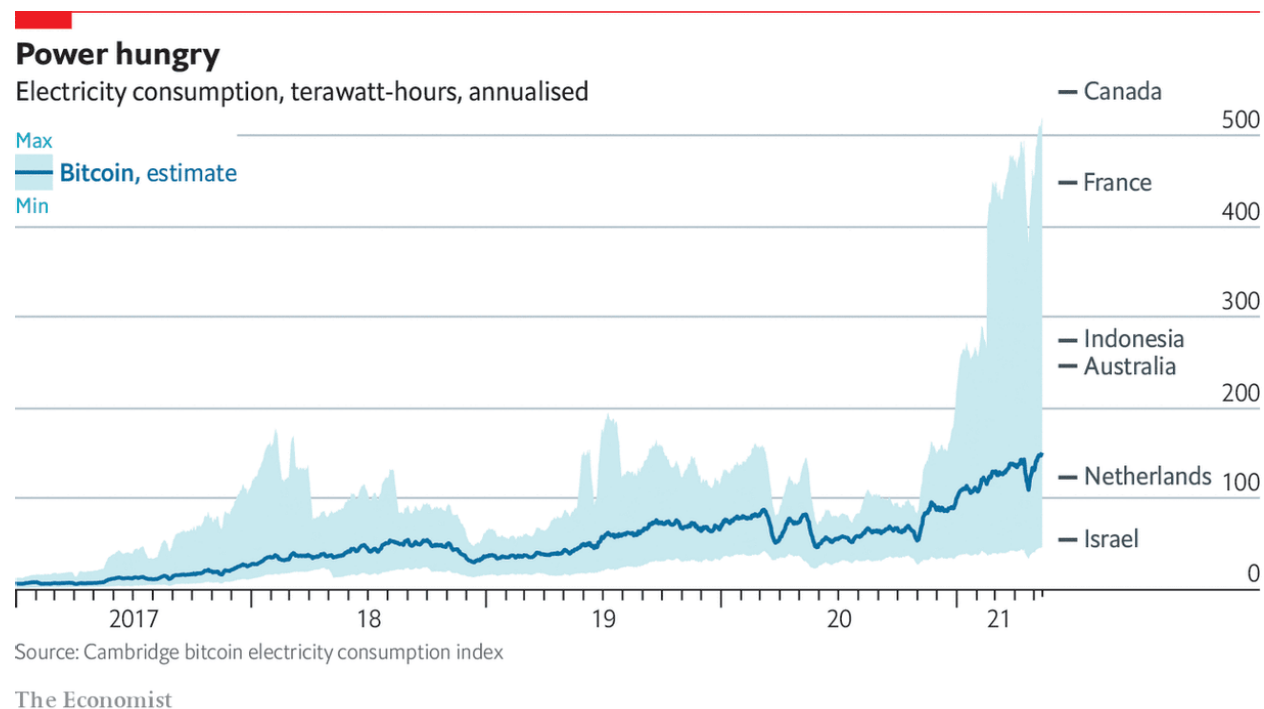
Source: Bloomberg

## Main Stages in a Bubble



# Crypto's ESG problem

- By design, the computation to solve problems for the marginal block becomes more difficult as more mining power is added to the network. This makes BTC “anti-efficient.”
- *Nature* paper\*: from 2016 to 2018, mining \$1 worth of BTC required over 17 megajoules of energy. Compare that to the energy requirements of mining gold (5MJ / \$1), copper (4MJ / \$1), and platinum (7MJ / \$1). *\*Quantification of energy and carbon costs for mining cryptocurrencies*



- ~65% of crypto mining takes place in China, which generates 60% of its energy from coal.
- Crypto mining has also exacerbated chip shortages—during the 2017/2018 BTC rally, demand from miners represented ~10% of sales for a major semiconductor manufacturer.

# Cryptocurrency — if not money, then what?

- Medium of exchange for goods and services?
  - Cryptocurrency does not currently serve this basic function as merchant acceptance is low, and the cost to transact is very high.
- Store of value?
  - Extreme volatility weakens the argument that crypto is a hedge against central bank money printing.
  - How do you value cryptocurrency?
- Measure of account?
  - Volatile cryptocurrencies do not lend themselves to acting as a unit of account for less volatile goods and services.
- Standard of deferred payment?
  - Once again, the volatility of cryptocurrencies means that they do not facilitate the provision of credit.

## What are the potential spinoffs or real-world learnings from crypto?

- Stablecoins and central bank digital currencies (CBDCs)
- Blockchain technology
- Tokenization of real assets



# Stablecoins and CBDCs in the spectrum of digital currencies

- Stablecoins
  - Digital form of private money in which the issuer of coin attempts to maintain par value with an underlying currency.
- Private stablecoin use cases
  - Facilitate crypto trading as a bridge to the fiat world (e.g. Tether).
  - Serve as the underlying instrument in order to develop new digital applications and networks prior to the rollout of CBDCs (e.g. Facebook Diem).

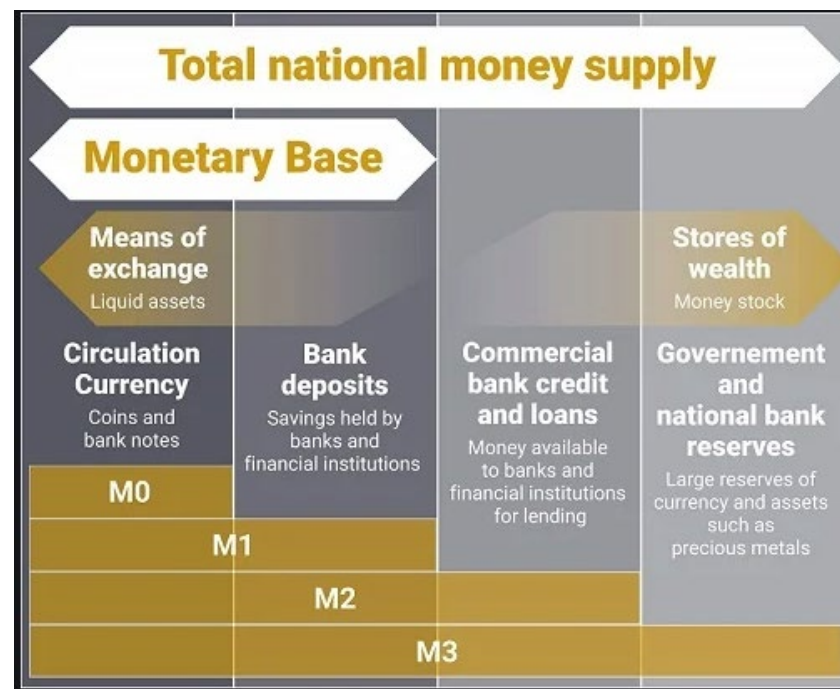
"We have a pretty strong regulatory framework around bank deposits, for example, or money market funds. That doesn't exist currently for stablecoins, and if they're going to be a significant part of the payments universe - which we don't think crypto assets will be but stablecoins might be - then we need an appropriate regulatory framework."

- Fed Chair Powell, 7/14/2021

- Tether is the leading stablecoin by market share with a \$62B market cap
  - Lacks regulatory oversight and implicit backing of the US Treasury.
- Facebook's Diem (formerly Libra) project
  - Aimed at creating a new universal payment infrastructure leveraging Facebook's global user base.
  - According to Diem's chief economist, Diem stablecoins will primarily be useful ahead of CBDC rollout, but CBDCs will be the gold standard long-term.

# Central Bank Digital Currencies — monetary system overview

- **M0** includes the total supply of currency in circulation in addition to the stored portion of commercial bank reserves within the central bank.
- **M1** includes demand deposits, traveler's checks, and other checkable deposits.
- **M2** includes savings deposits, money market securities, mutual funds, and other time deposits.



- CBDCs are a form of M0 and depending on the design may lead to a movement from M1/M2 into M0.

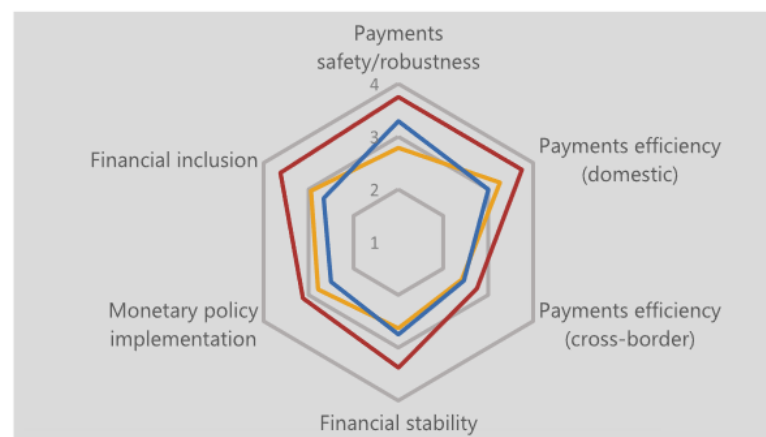
# Who is pursuing CBDCs and why?

- A recent Bank for International Settlements survey found that 86% of responding central banks are actively working on a CBDC.
- Primary motivations include:
  - **Payments**: improving safety and efficiency
  - **Financial inclusion**: extend the benefits of digital money to the un-banked and under-banked. Formalize the gray economy/improve tax collection.
  - **Financial stability**: including countering the threat from the rise of supra-national cryptos like BTC/ETH and stablecoins like Facebook's Diem project.

Average importance

Graph 5

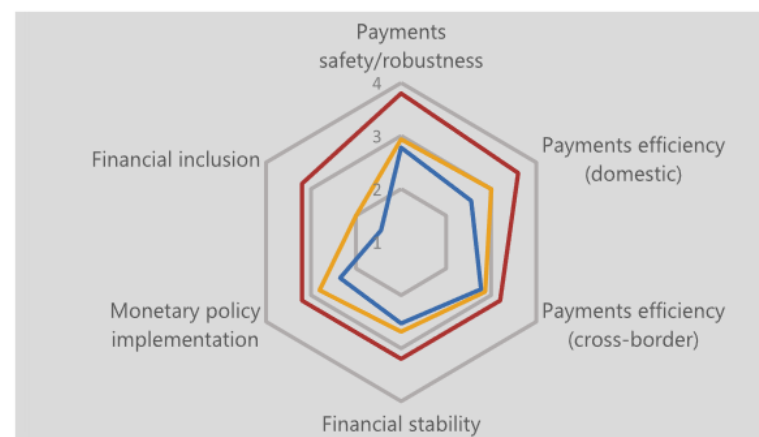
Retail CBDC



— Research only

— Research +  
Proof-of-concept

Wholesale CBDC



— Research +  
Proof-of-concept + Pilot

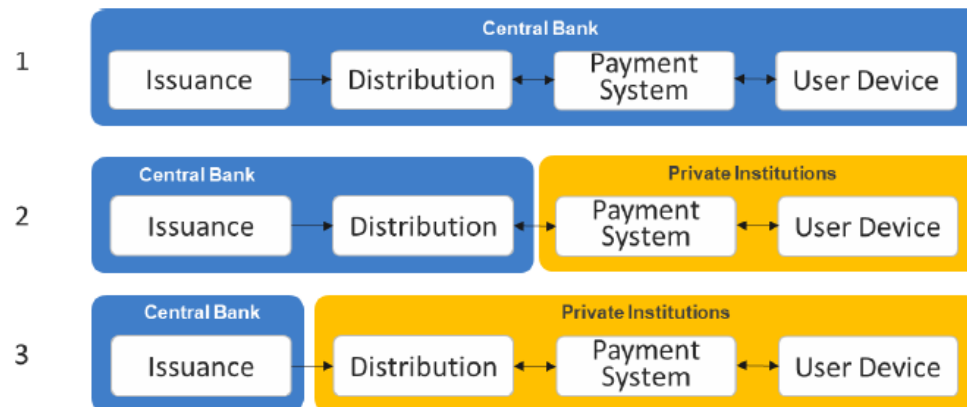
(1) = "Not so important"; (2) = "Somewhat important"; (3) = "Important"; (4) = "Very important".

Source: BIS central bank survey on CBDCs.

# Design choices for CBDCs

- Account size
  - To limit the potential for deposit runs to the extent that consumers shift funds from M1 checking accounts to M0 held at the central bank, CBDC wallets may be capped.
- Two-tier or direct to customer?
  - Early examples in the Bahamas and China operate in conjunction with incumbent banks and payments companies, but in theory the central bank could bypass these institutions altogether and go direct to the consumer.

## Central banks can adopt different degrees of responsibilities

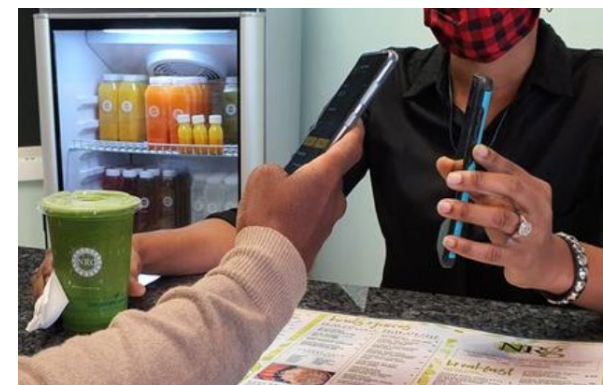
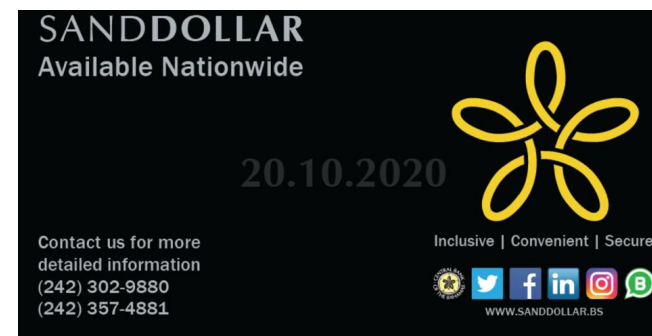


Source: IMF

- Transaction privacy
  - To what extent will transactions remain private from national authorities, merchants, payment companies etc. Anti-money laundering standards are a key impediment to full privacy.
- Technology platform
  - May or may not build on a blockchain-based infrastructure.

# Bahamas

- Development status:
  - The Bahamian Sand Dollar (B\$) is live! First CBDC in the world upon its launch in October 2020.
- Motivations:
  - Promote financial inclusion
  - Modernize payments—particularly important in a country prone to hurricanes and branch outages.
  - Make private wallets interoperable
- Design features:
  - Two-tier system (similar to China): the private sector manages the wallet via traditional banks and payments companies.
  - No promise of user anonymity.
  - Enabled via smart cards in addition to smartphones.
  - B\$ can only be used within the Bahamas for now.
- Reuters: *At the NRG cafe, Sands said the technology would help smaller business avoid fees charged by credit card companies. She said she was charged around 4% on credit and debit card sales of omelettes, panini and the like: “For a small business, 4% is a very big hit.”*



Source: Central Bank of The Bahamas

# China

- Development status:
  - China began eCNY development in 2014 and is further down the development path than its Western peers. The PBoC launched a beta test of its CBDC in October 2020.
  - 50k Shenzhen residents were awarded 200 RMB in a lottery that can be spent at 3,000 merchants.
  - The People's Bank of China is reportedly targeting broader eCNY rollout ahead of the 2022 Beijing Winter Olympics.
- Motivations:
  - Substitute for cash payments
  - Response to the rise of Alipay and WeChat Pay
  - Arrest the rise of crypto usage, which is problematic in a country with capital controls. An estimated \$17.5B exited China via BTC in 2020.
- Design features:
  - Two-tier system
  - “Controllable anonymity”
  - No bank account necessary, and CBDC balances are non-interest bearing.
  - Not blockchain based



Source: People's Bank of China

# US, UK, EU, Japan

- Development status:
  - The Federal Reserve, Bank of England, European Central Bank, and Bank of Japan are in earlier stages relative to China and are currently drafting discussion papers exploring the possibilities of introducing CBDCs.
- Motivations:
  - Blunt the potential rise of stablecoins as part of an alternative payment system that could expose consumers and businesses to risk.
  - Replace cash/accelerate the adoption of digital payments
  - Maintain a seat at the table in the development of cross-border standards.
  - Promote financial inclusion and lower transaction costs including multi-CBDC arrangements for remittances.
- Design features:
  - US: Complement physical cash and deposits at commercial banks
  - EU: Anonymity may have to be ruled out
  - BoE: no inherent reason to use blockchain technology

*Sources: Federal Reserve, Bank of England, European Central Bank, and Bank of Japan*

# Implications for commercial banks

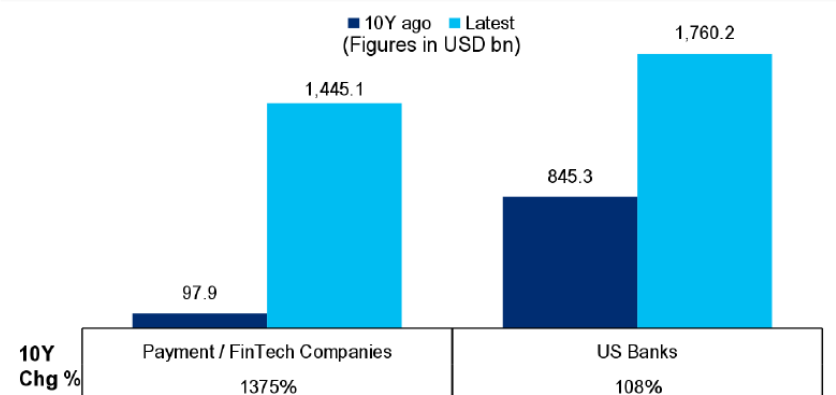
- Existential risk to deposit franchises?
  - Policymakers want to avoid liquidity risk/bank runs—two-tier systems will involve incumbent banks and payment companies.
  - Bank deposits remain on equal footing with CBDC accounts from a safety perspective given the government backing of deposit insurance schemes (such as the Federal Deposit Insurance Corporation in the US).
  - Central banks are reticent to assume the role of credit creation that commercial banks play.
- Fee pools under continued pressure
  - Payments—one of the large remaining fee pools for banks as card issuers and merchant acquirers.
  - Overdrafts/general account fees will continue to fade.
- Strategy
  - Who owns the customer relationship if your transactional cash resides in a CBDC account and a non-bank is the front-end aggregator of your financial life?
- What role do commercial banks play in a CBDC world?
  - Banking as a service—credit underwriting, know your customer, anti-money laundering
  - Advisory/wealth management capabilities remain important
  - Capital markets



# Implications for payments

- Payments defined
  - 2 elements: identity and an accounting entry
- Issues with the current payments system
  - ~300bps per transaction to process credit card payments in the US is arguably a market failure
  - Physical cash and check transactions are also expensive to process
- Fiat currency 2.0: build a stack of capabilities that addresses the weaknesses of the current system
  - Digital identity
    - National ID schemes like the Aadhaar biometric system in India
    - Bank ID in Sweden
  - The Real-Time Payments network in the USA is live (and FedNow will supplement it in 2023)
    - First new core payments infrastructure to launch in 40 years.
    - Enables instantaneous access to payments sent between consumers and businesses.
- Margins may fall across the system
  - Card issuing banks and highly-valued FinTechs alike may face fee margin pressure.

Market Capitalization (Latest vs 10Y ago)



Note: Represents market cap of US Banks and Payment companies under Citi Coverage. Coinbase latest market cap included in aggregate market cap of Payment / FinTech companies.  
Source: dataCentral, Citi Research.

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