Central Bank Digital Currency (CBDC)

Dr. Gina C. Pieters

Twitter: @profpieters

Email: pieters.econ@gmail.com

Mastodon: @gcpieters@econtwitter.net

Outline

- A Brief Discussion of a Currency Digitalization
  - Cryptocurrencies
  - Sweden
  - Kenya
- Central Bank Digital Currencies
  - Big picture of current status
  - Decision Choices
  - USA CBDC Discussion

Currency Digitalization

Digitalization not a “brand new” concern

- King, Mervyn. 1999. "Challenges for Monetary Policy: New and Old"." *Speech delivered at a symposium by the Federal Reserve Bank of Kansas City, Jackson Hole, WY.* August 27.
- Woodford, Michael. 2000. "Monetary Policy in a World without Money." *International Finance* 3 (2): 229-60.

- These papers were triggered in part by the increased Digitalization enabled by the internet, but in part by the rise of a new, non-sovereign digital currency E-Gold
  - Found in 1996. A digitally traded currency backed by gold that could be traded for sovereign currency.
  - Incorporated in Nevis, Saint Kitt with operations out of Florida, USA.
  - Shut down in 2009 due to legal issues.

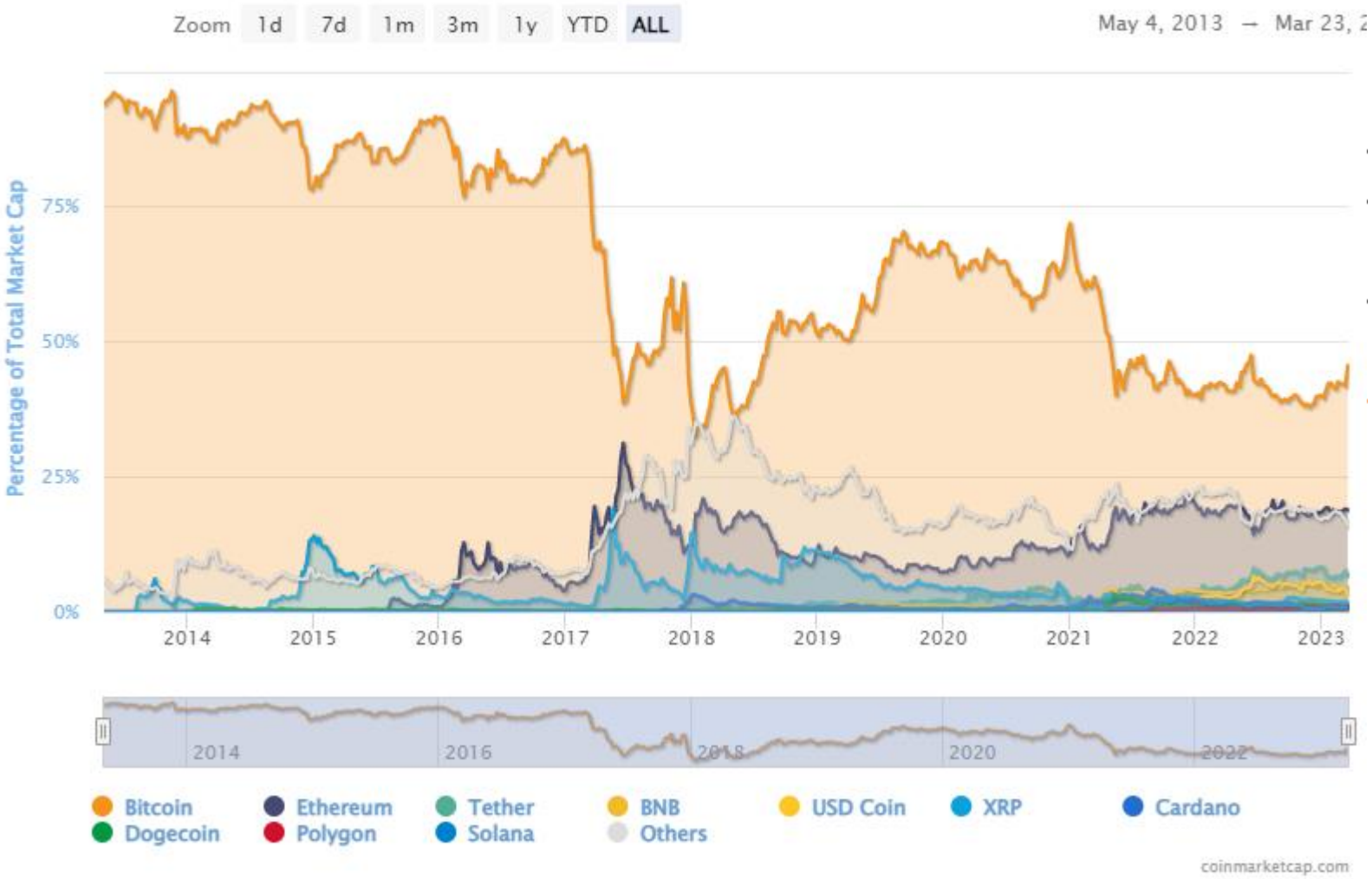
What did Bitcoin Contribute?

- Bitcoin is **NOT** the first proposed private electronic payment system/money. PayPal, Venmo, Apple/Google Pay, or credit cards are well-known and familiar electronic payment system.

- Nakamoto found a way to **decentralize** the record keeping.
  - Need some way to prevent "copy-and-paste" spending in electronic systems (Double Spending)

- Traditionally, a central party would verify accounts (VISA, E-Gold, Amazon).
  - Blockchain provides a way to verify the records without a central agent.

Many more designs now

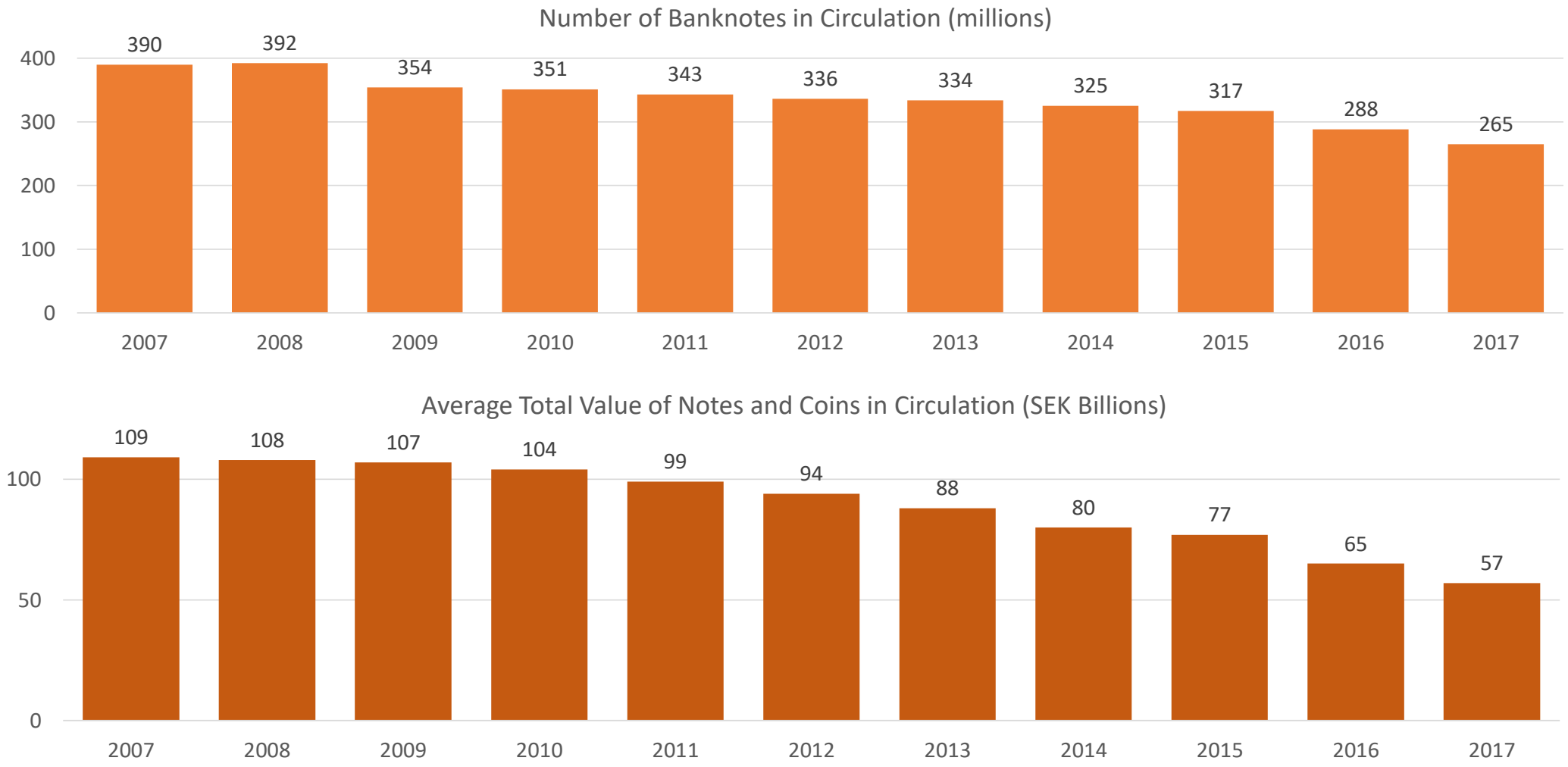


Bitcoin: The original
Ethereum: A combination of Etsy and Amazon Marketplace…
Tether: A stablecoin

A stablecoin is a cryptocurrency that attempts to maintain a fixed exchange rate to something.

- Tether is supposed to maintain a 1-for-1 fixed exchange rate with the US dollar.

Currency Digitalization: Sweden



Sweden has experienced a decline in both the value and number of banknotes and coins in circulation.
Source: The Riksbank, author calculations.

Decrease of storage or of use?

- Note: Central Bank of Sweden is the Sveriges Riksbank ("Riksbank").

- Money “in circulation” can decline because people are no longer using it as a store of value (transitioning to other assets) or because people are not using it to purchase goods.

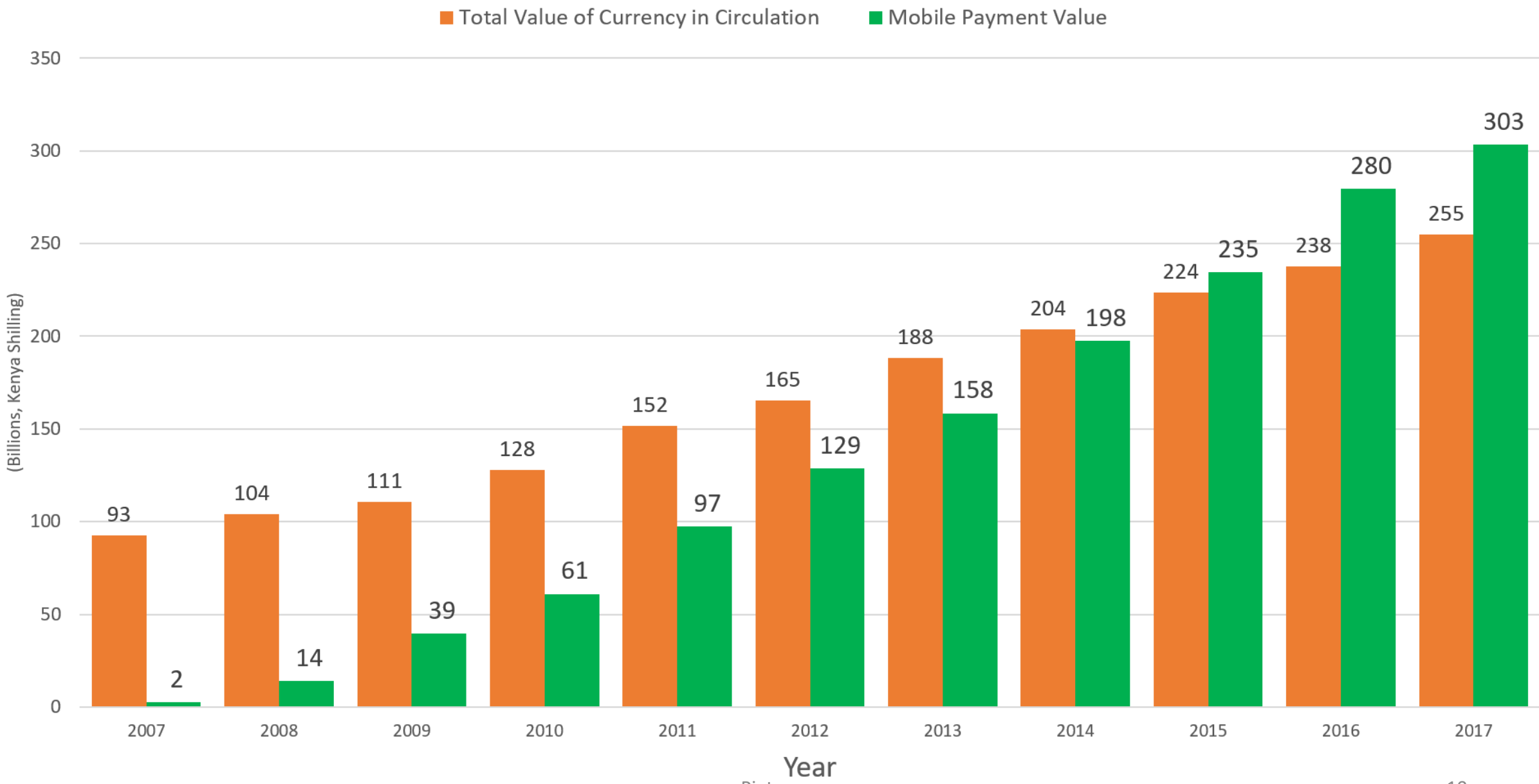
- A Riksbank Survey (2018) of Swedes found evidence of reduction in use:
  - 13% reported using cash for their last transaction, 80% reported debit card.
  - 20% reported never withdrawing cash from an ATM or a cash desk at a bank.
  - 47% reported encountering no problems when trying to pay with cash.
  - 48% of the aggregate felt fairly-to-very positive about the decline of the use of cash.
    - 32% in rural areas.

Riksbank Response

- Riksbank has become concerned about
  - Payment intermediaries (all are private companies)
  - Accessibility of physical cash (Banks removing ATMs, shutting down branches, refusing to accept cash deposits, etc.). Tech illiterate or disabled can become excluded.

- The Parliamentary Riksbank Committee proposed that all banks should be obligated to handle physical cash. Riksbank counter proposed that "not only bank, but all other credit institutions that offer payment account should be obligated to handle cash". (Ingves et. al 2018)

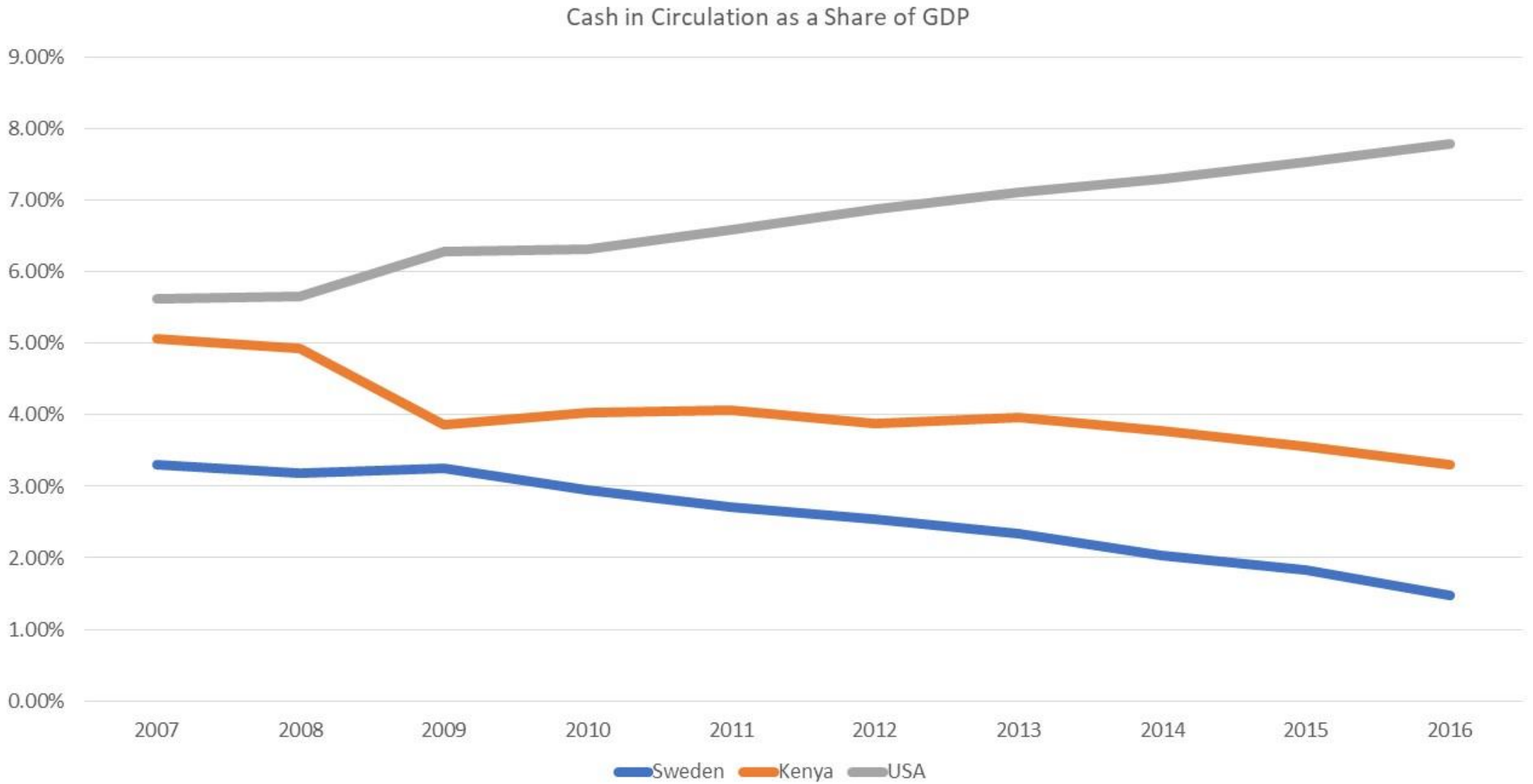
Currency Digitalization in Kenya



Kenya and m-Pesa

- Launched in 2007, m-Pesa is an electronic payment system linked to a cellphone (mobile) account.
  - Can go to a cellphone stall to deposit money into their m-Pesa account.
  - Funds can be transferred between phones.
  - m-Pesa **increased** economic access of the poor, elderly, or those living in rural areas who were previously unbanked, or lived far away from banks. [Jack, Ray, and Suri (2018), Jack, Suri, and Townsend (2010)]

Currency Digitalization



Sources: The Riksbank, Statistics Sweden, Central Bank of Kenya, FRED, authors calculations.

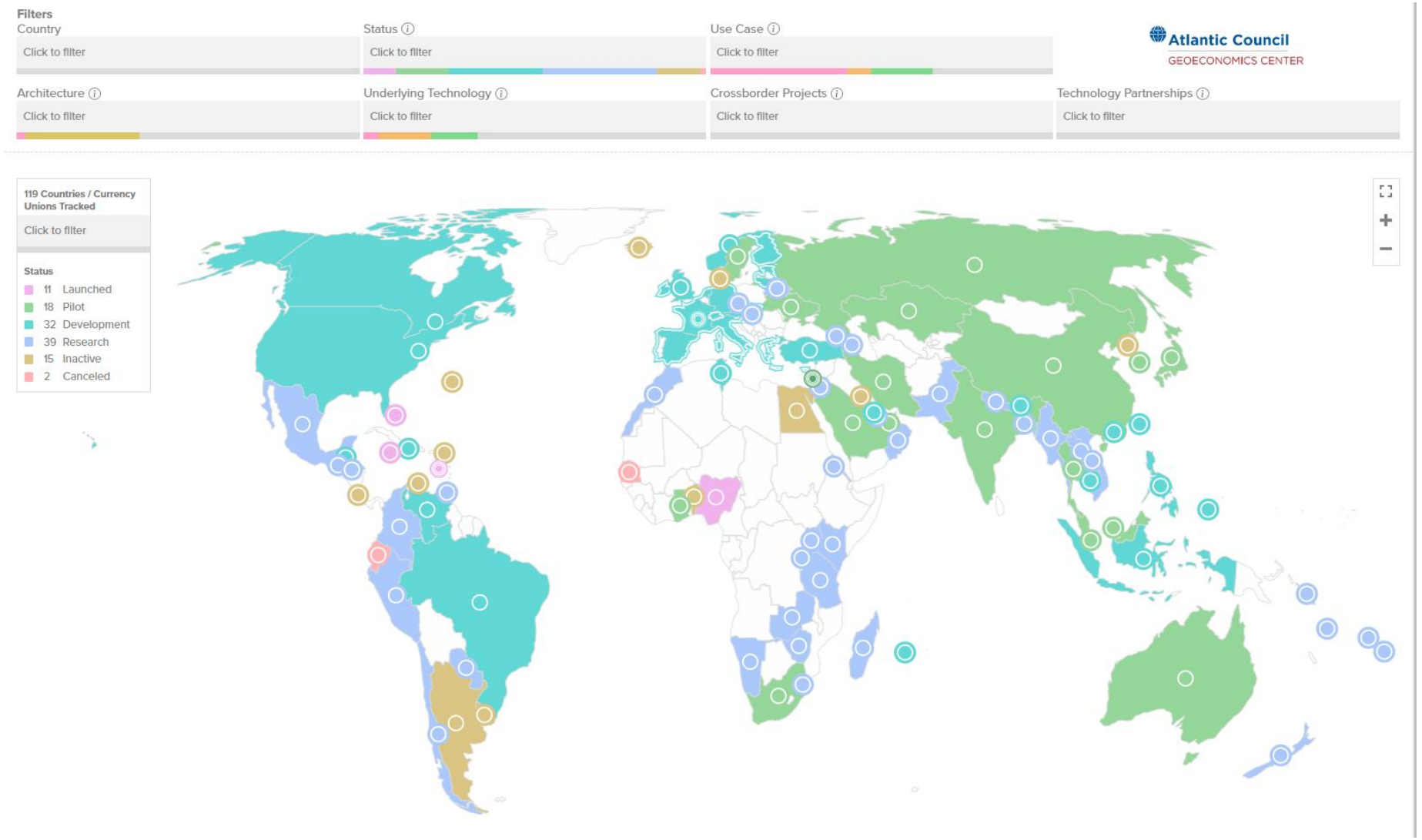
CBDC = “Central Bank Digital Currency”

- A reaction to the rise of Digitalization: if the sovereign currency is not being used in the physical form then (maybe…) the monetary authority should support the digitized form as well. Two forms:
  - Payment network
  - A literal digital currency = CBDC
    - Name is intentional! Not a “Central Bank Cryptocurrency”

- Easier for international transactions (nothing physical to transfer)

Central Bank Digital Currencies

CBDC Tracker



https://www.atlanticcouncil.org/cbdctracker/

CBDC Design Decisions

1. Remunerated or not remunerated
   - Essentially: Is it interest bearing? Physical cash-in-wallet does not earn interest.

2. Elastically Supplied or with cap/frequency restrictions
   - Can holders move into/out of CBDC freely, or are there deposit limits or withdrawal/deposit frequency limit

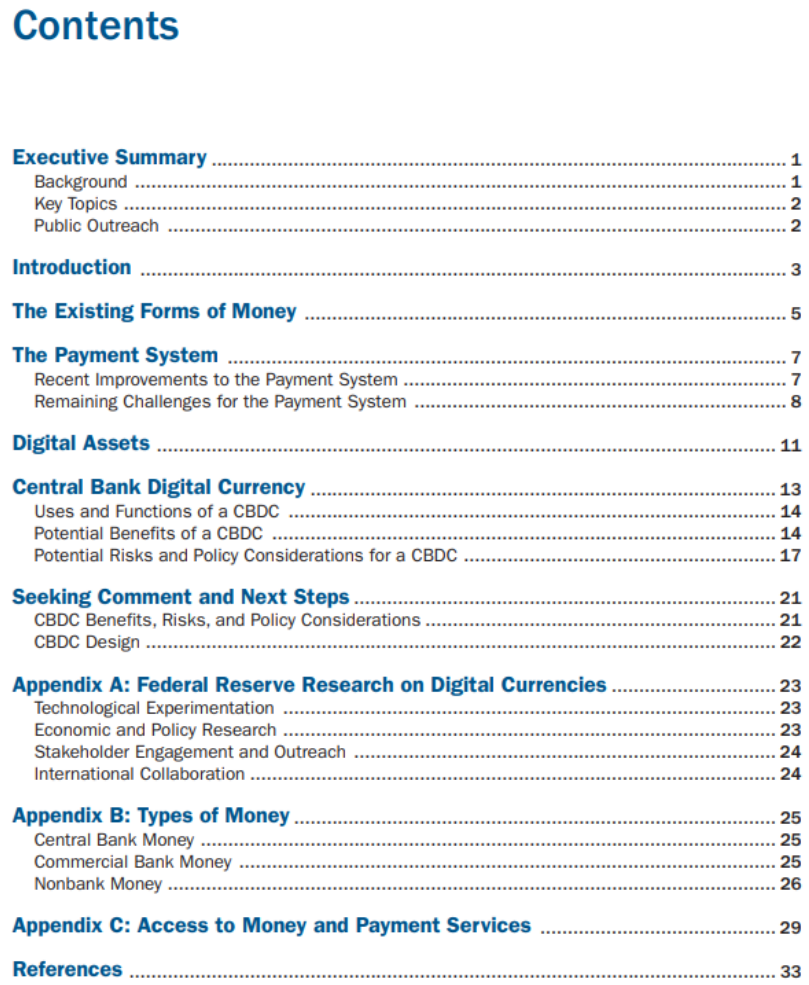
3. Token or Account Based Design
   - Messy given that different fields use the words differently.
   - Roughly: Does the code track the ownership of a specific issuance (CBDC bill number #3023) OR does the code track the account balance (Account #3023).
   - Can argue that the two choices are not exclusive.

4. Directly Administered or Intermediated
   - Distributed through accounts with the Central Bank, or through other systems
     - CBDC is given to central banks, individuals can go to the bank to “withdraw cash in physical or digital form”

Focusing on the USA

- January 2022: The Federal Reserve published "*Money and Payments: The US Dollar in the Age of Digital Transformation*"
  - https://www.federalreserve.gov/publications/files/money-and-payments-20220120.pdf
  - Easy to read 40-page paper focused on the USA.

- "Project Hamilton" is the exploratory research project to study the potential of a CBDC.
  - Joint project between Boston FRB and MIT DCI
  - Phase 1 concluded in February 2022
    - Looked at technical design choices.



Contents

Executive Summary 1
Background 1
Key Topics 2
Public Outreach 2
Introduction 3
The Existing Forms of Money 5
The Payment System 7
Recent Improvements to the Payment System 7
Remaining Challenges for the Payment System 8
Digital Assets 11
Central Bank Digital Currency 13
Uses and Functions of a CBDC 14
Potential Benefits of a CBDC 14
Potential Risks and Policy Considerations for a CBDC 17
Seeking Comment and Next Steps 21
CBDC Benefits, Risks, and Policy Considerations 21
CBDC Design 22
Appendix A: Federal Reserve Research on Digital Currencies 23
Technological Experimentation 23
Economic and Policy Research 23
Stakeholder Engagement and Outreach 24
International Collaboration 24
Appendix B: Types of Money 25
Central Bank Money 25
Commercial Bank Money 25
Nonbank Money 26
Appendix C: Access to Money and Payment Services 29
References 33

CBDC Design Decisions

1. Remunerated or not remunerated
   - Is it interest bearing? Physical cash-in-wallet does not earn interest.

2. **Elastically Supplied** or with cap/frequency restrictions
   - Can holders move into/out of CBDC freely, or are there deposit limits or withdrawal/deposit frequency limit

3. Token or Account Based Design
   - Messy given that different fields use the words differently.
   - Does the code track the ownership of a specific issuance (CBDC bill number #3023) OR does the code track the account balance (Account #3023).

4. Directly Administered or Intermediated
   - Distributed through the Central Bank, or through other systems (i.e. private sector banks)

CBDC and the USA
(quoting from the report)

- Potential Benefits
  - Future Needs and Demands for Payment Services
  - Improvements to Cross-Border Payments
  - Support the US Dollar's International Role
  - Financial Inclusion
  - Extend Public Access to Safe Central Bank Money
- Potential Risks and Policy Considerations for a CBDC
  - Changes to Financial-Sector Market Structure
  - Safety and Stability of the Financial System
  - Efficacy of Monetary Policy Implementation
  - Privacy and Data Protection and the Prevention of Financial Crimes
  - Operational Resilience and Cybersecurity

CBDC and the USA
(quoting from the report)

- Potential Benefits
  - Future Needs and Demands for Payment Services
  - Improvements to Cross-Border Payments
  - Support the US Dollar's International Role
  - Financial Inclusion
  - Extend Public Access to Safe Central Bank Money
- Potential Risks and Policy Considerations for a CBDC
  - Changes to Financial-Sector Market Structure
  - Safety and Stability of the Financial System
  - Efficacy of Monetary Policy Implementation
  - Privacy and Data Protection and the Prevention of Financial Crimes
  - Operational Resilience and Cybersecurity

Changes to Financial-Sector Market Structure

- Could a CBDC reduce aggregate deposits in the banking system?
  - CBDCs could act as a substitute for a bank deposits
  - “Bank disintermediation”

- Academic Work states that it depends on:
  - Degree of banking sector competition
    - Monopolistic-competition banking sector: CBDC increases bank deposits by breaking the inefficient monopoly
    - Perfectly competitive banking sector: CBDC decreases bank deposits based on similarity to deposits
  - CBDC renumeration: Almost always have disintermediation if CBDC pays “high enough interest rate”
    - Limits on CBDC holding size could reduce banking disintermediation

Safety and Stability of the Financial System

- Normal times:
  - Banking disintermediation: Reduction of deposits, reducing bank lending, compress safe asset yields

- Market Stress
  - Bank runs if shifting funds into a CBDC in times of stress is easy, cheap, and rapid.
    - I.e. SVB collapse: what would have happened if everyone could just convert their deposits to a CBDC at a click, instead of waiting for transfers to a different bank account?
    - Could also exist as an outside option for liquidations of other assets: not just bank runs.

Efficacy of Monetary Policy Implementation

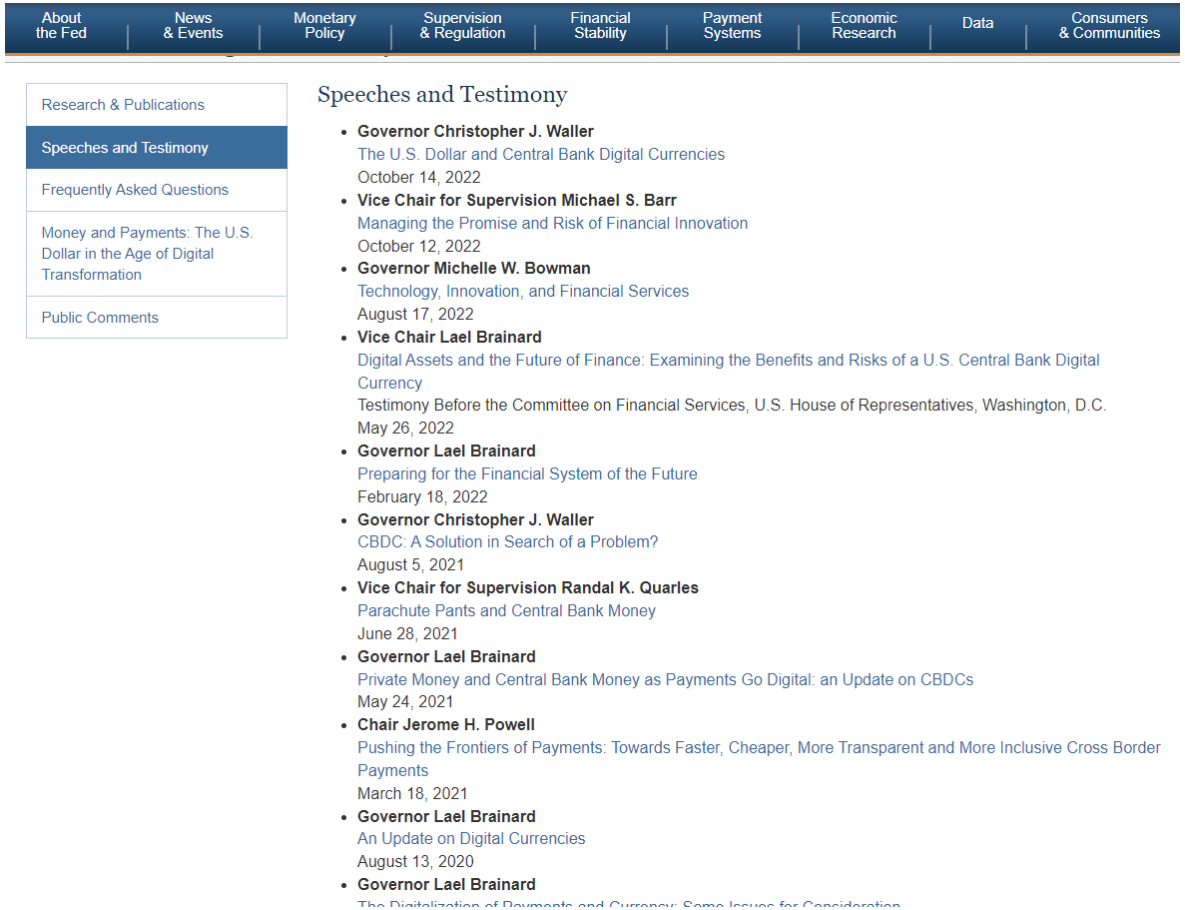
- CBDC may not change monetary policy.
  - Important to remember that this is a base case!
  - Depends on CBDC design decisions: Cap on holdings, renumeration, etc.

- Bank disintermediation: Decreases reserves at central bank
  - How does the Central Bank react to “recycle” reserve changes if they need to increase “reserve”? [Ample vs. Scarce Reserves monetary policy model]
    - Purchase government bonds, provide loans, credit facility?

- Broader Implications
  - Rate Level: Potential compression of convenience yields may require boosting of rates
  - Can strengthen/weaken, speed/slow passthrough of changes in rates
  - Renumeration can act as an additional monetary policy tool
  - Negative interest rate policy option [legal, communication, and political challenges!]

USA-Specific CBDC Resources

- https://www.federalreserve.gov/cbdc-research-and-publications.htm



Outline

- A Brief Discussion of a Currency Digitalization
  - Sweden
  - Kenya
  - Cryptocurrencies
- Central Bank Digital Currencies
  - Big picture of current status
  - Decision Choices
  - USA CBDC Discussion

Thank You!
Questions?

- Twitter: @profpieters
- Email: Pieters.econ@gmail.com

Mastodon: @gcpieters@econtwitter.net