Digital Currencies: What Does the Future Hold?

IMFS Policy Webinar zu Digitalwährungen

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The Future

This talk: general remarks plus taste of my research

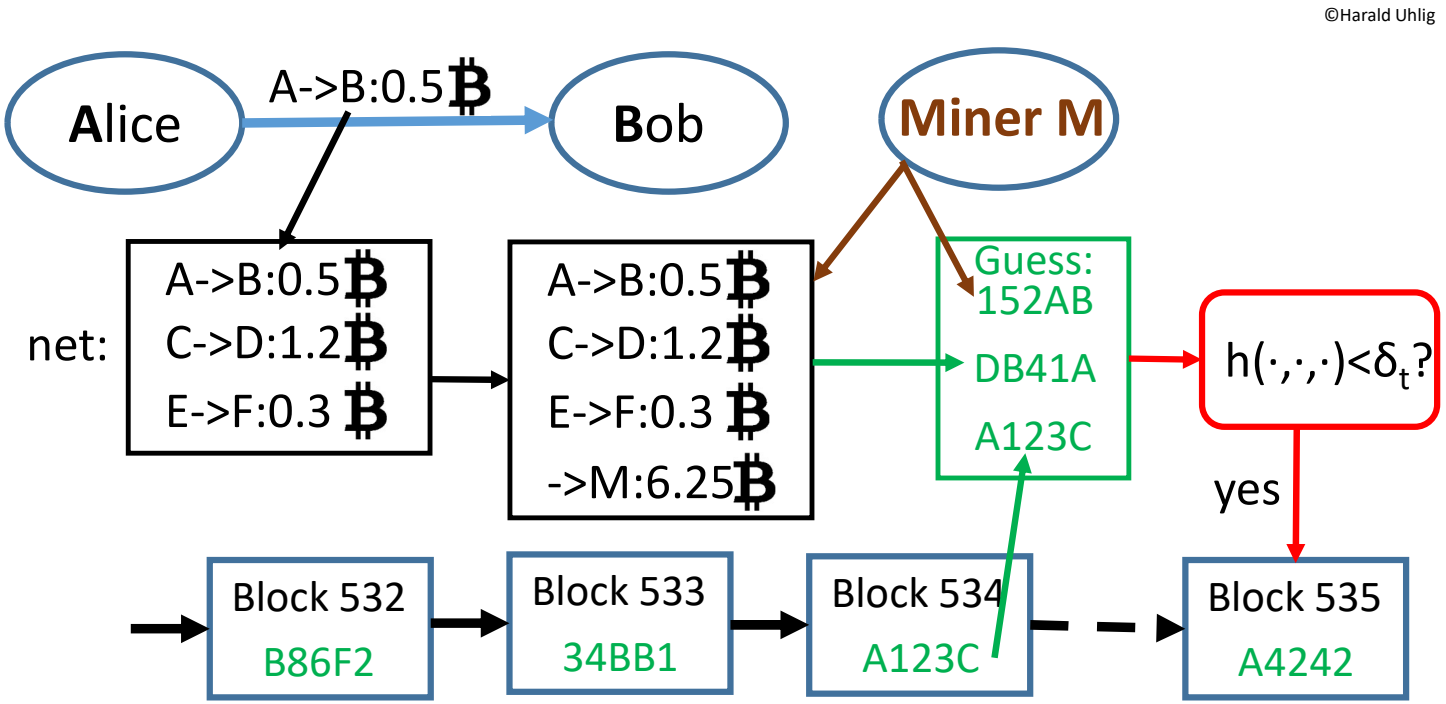
1. The battlefield.
2. Private cryptocurrencies:
   a. Bitcoin and Blockchains.
      - ★ Schilling-Uhlig, JME 2019, “Some Simple Bitcoin Economics”.
      - ★ Schilling-Uhlig, “Currency Substitution Under Transaction Costs”.
   b. The Crypto Currency Market Place.
   c. Big Players: e.g. Facebook.
      - ★ Benigno-Schilling-Uhlig, “... Impossible Trinity”.
      - ★ Uhlig-Xie, “Parallel Digital Currencies and Sticky Prices”.
3. Central bank digital currencies:
   - ▸ Pros and Cons.
     - ★ Fernández-Villaverde - Sanches - Schilling - Uhlig, “CBDC: Central banking for all?”
     - ★ Schilling - Fernández-Villaverde - Uhlig, “CBDC: when Price and Bank Stability Collide”.
4. An assessment.

1. The battlefield

- Privately issued cryptocurrencies:
  - Bitcoin: since 2008.
  - New technology: the blockchain.
  - Today: several thousand cryptocurrencies.
  - Entry by “big players:” FaceBook for now.
- Central bank digital currencies:
  - Response to the competition of private cryptocurrencies.
- Traditional means of payments:
  - Cash.
  - Deposit accounts.
  - Credit cards.
  - PayPal.
  - Fast retail payment systems.
- Key issue: privacy vs criminal activity. KYC, “know your customer”.

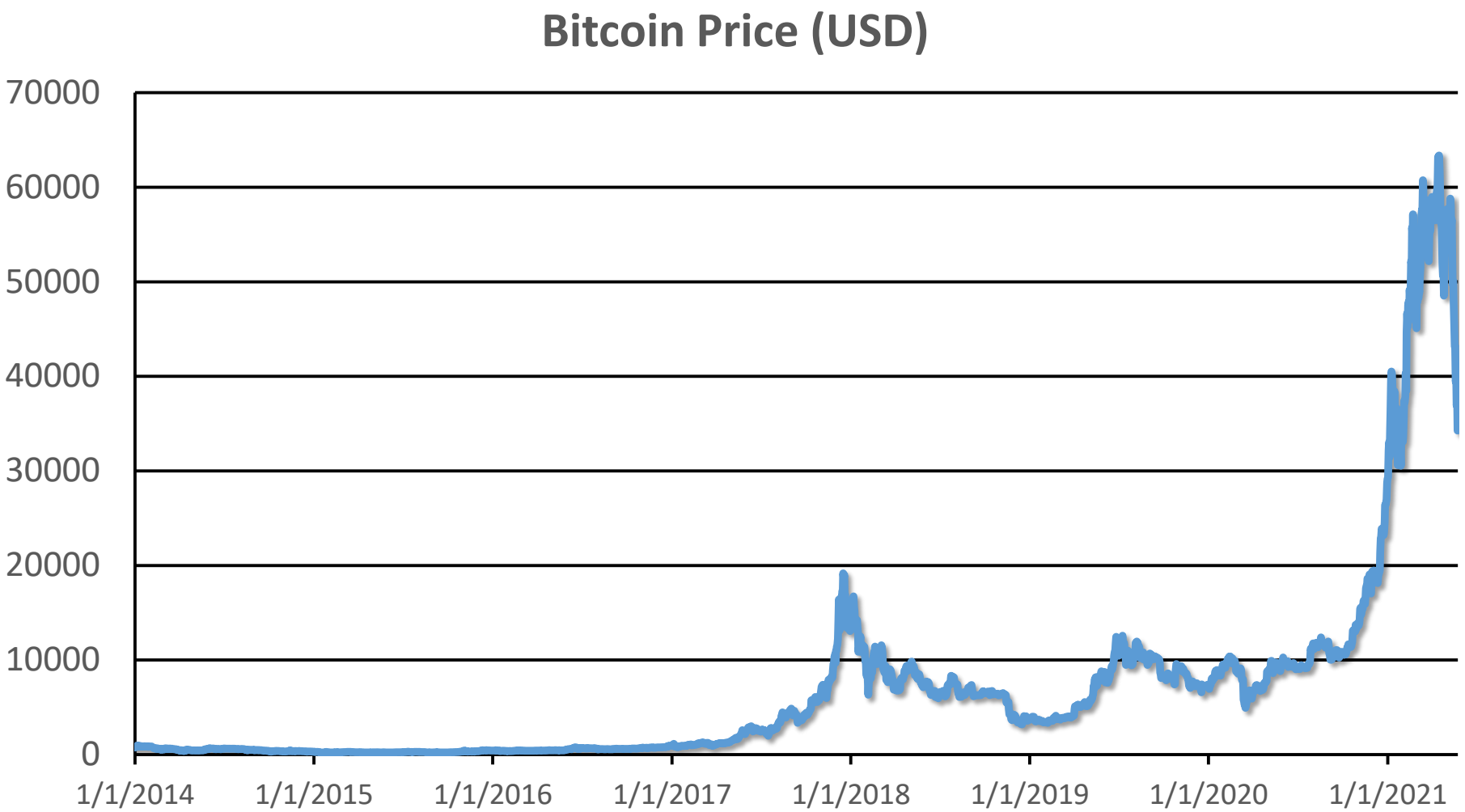
2a. Bitcoin and Blockchains.

Satoshi Nakamoto (2008), “Bitcoin: A Peer-to-Peer Electronic Cash System.



- “Proof of Work” (PoW). Alternative: “Proof of Stake” (PoS).
- **New technology!** Smart contracts, NFT (“non-fungible token”).

Bitcoin Price, US $, 2014-01-01 to 2021-05-23

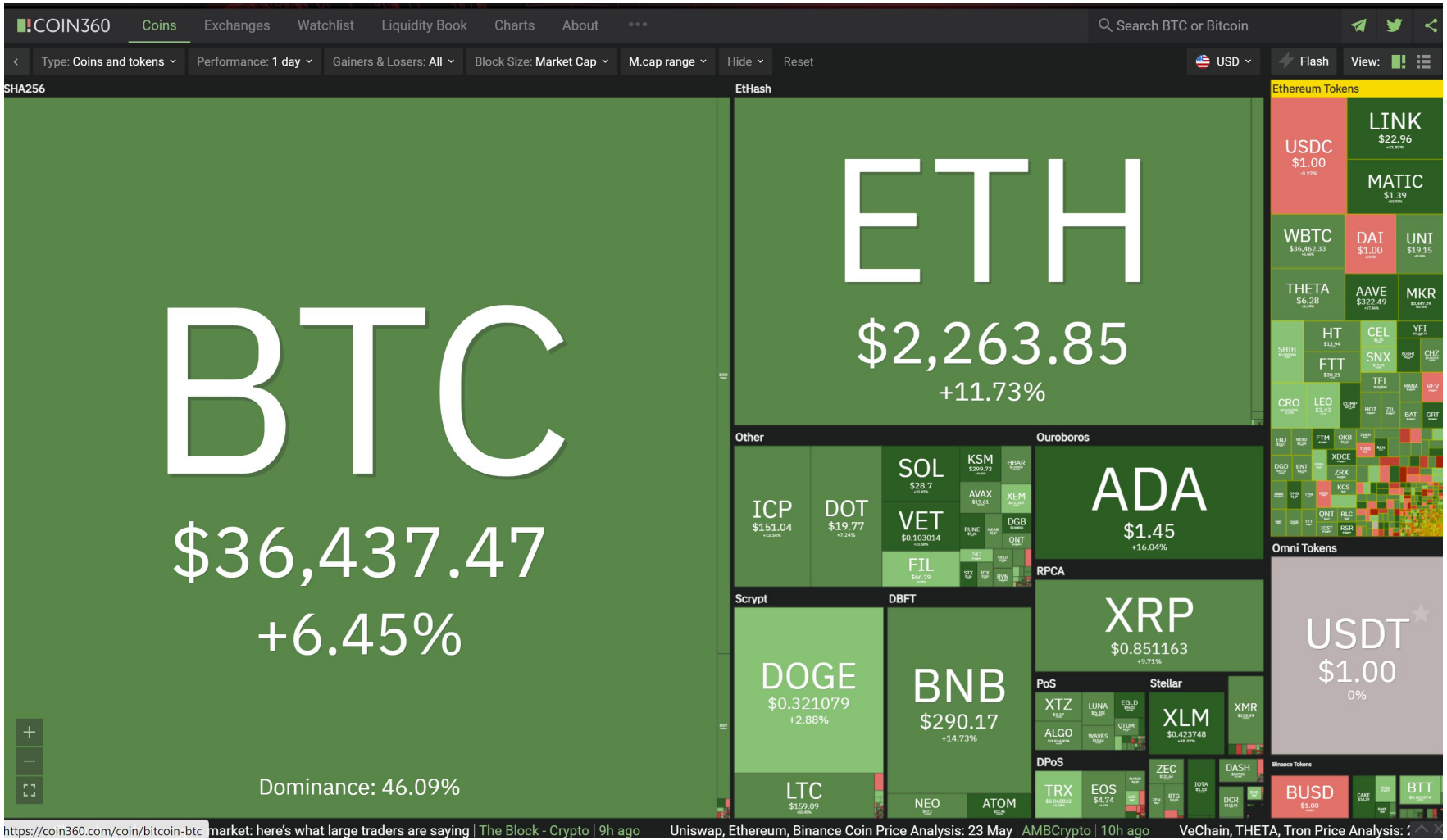


Data: www.coinmarketcap.com

What determines the Bitcoin price?

- Bitcoins are intrinsically worthless. But: useful for transactions.
- Just like fiat currency! "Bubbles": $P > NPV(Dividends) = 0$.
- Schilling - Uhlig, "Some Simple Bitcoin Economics", Journal of Monetary Economics, Vol. 106, Oct 2019, pp. 16-26.
  - Model of endowment economy with two competing, but intrinsically worthless currencies (Dollar, Bitcoin).
  - "Fundamental pricing equation". Special case: **Bitcoin price is martingale**, i.e. the expected future price is the current price.
- Schilling - Uhlig, "Currency Substitution Under Transaction Costs," AEA Papers and Proceedings 2019, vol. 109, pp 83-87.
  - Specific goods can be bought with Bitcoin, others with Dollar.
  - One benchmark: no exchanges between Bitcoin and Dollar. Now, exchange rate determined. Generally: martingale.

2b. The Crypto Currency Market Place: by Market Cap



Source: coin360.com, 2021-05-24

2c. Big Players: e.g. Facebook

- Libra:
  - Originally to be issued by a FaceBook-led consortium in 2020.
  - permissioned blockchain digital currency.
  - backed by a basket of financial assets: e.g. regular currencies (50% US $, 18% Euro, 14% Yen, 11% Pound Sterling, 7% Singapore $.) , U.S. treasuries.
  - Fierce resistance by regulators, and now “dead”.
- Diem (or Libra 2.0):
  - Moved from Switzerland to U.S. to get regulators on board
  - Dollar-backed stable-coin.
  - More sophisticated blockchain, phased approach.
  - Close competitors already exists: Tether, Paypal.

More players to come? JP Morgan, EIP? Amazon, Walmart? Probably.
Technology is simple and attractive. What can be done will be done.

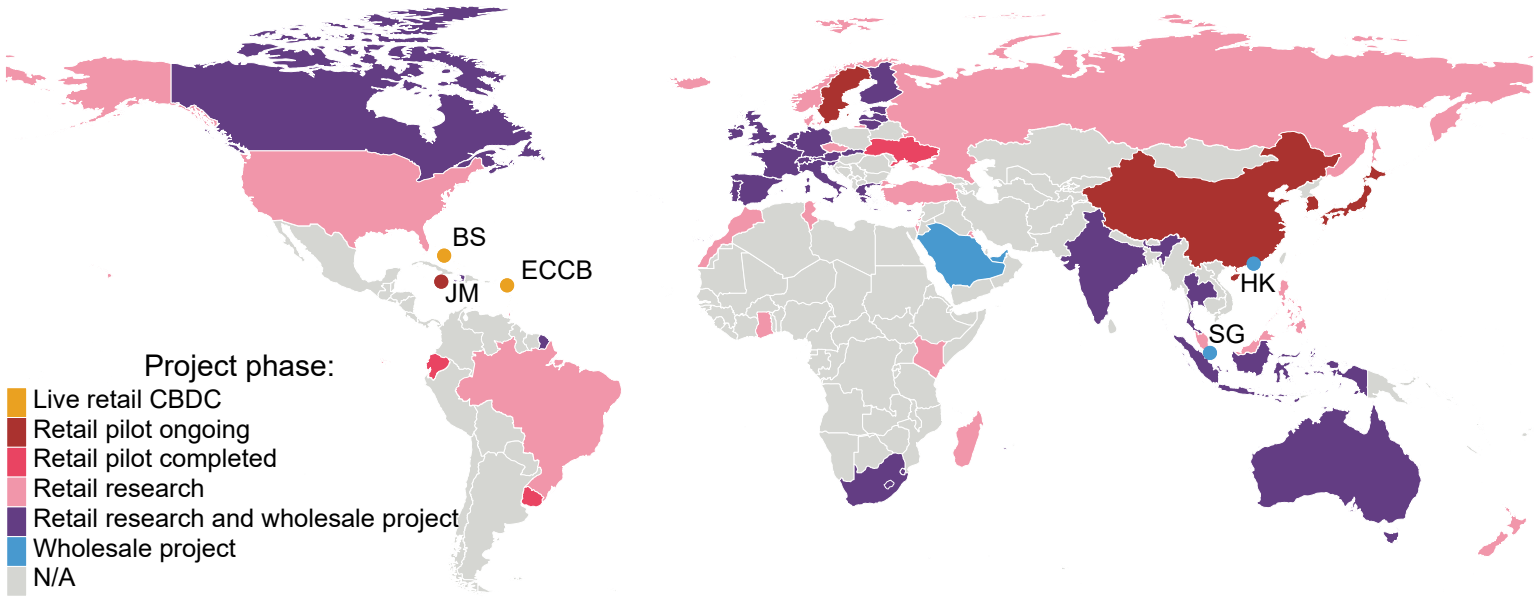
Digital currency: private competition to central banks.

- Benigno - Schilling - Uhlig, "Cryptocurrencies, Currency Competition, and the Impossible Trinity," draft.
  - Focus on "medium of exchange" role of money.
  - Bare-bones model of two countries and three currencies.
    - ⋆ two national currencies (n.c.), issued by the two central bank.
    - ⋆ One global currency (g.c.). Perfect substitute in either country to n.c..
  - If nat currency drops in value rel to global; it will not be used.
  - Main result 1: mon. pol. synchronization or n.c. is no longer used.
  - Main result 2: if g.c. is "asset backed," narrow range for mon pol.
- Uhlig-Xie, "Parallel Digital Currencies and Sticky Prices," draft.
  - Focus on "unit of account" role of money.
  - New Keynesian model, two currencies, one issued by central bank.
  - Firms set sticky prices in one of the two currencies.
  - Main result: martingale exchange rate fluctuations create new source of macro uncertainty. Challenge to central bank!
- **Upshot:** large privately issued cryptocurrencies will be competition and headaches for central banks.

3. Central bank digital currencies

Powell, May 20th, 2021: "*possibility of issuing a US CBDC*"

CBDC research and pilots around the world



BS = The Bahamas; ECCB = Eastern Caribbean Central Bank; HK = Hong Kong SAR; JM = Jamaica; SG = Singapore. The use of this map does not constitute, and should not be construed as constituting, an expression of a position by the BIS regarding the legal status of, or sovereignty of any territory or its authorities, to the delimitation of international frontiers and boundaries and/or to the name and designation of any territory, city or area.

Source: R Auer, G Cornelli and J Frost (2020), "Rise of the central bank digital currencies: drivers, approaches and technologies", *BIS working papers*, No 880, August.

BIS 2

Source: https://www.bis.org/publ/work880.htm

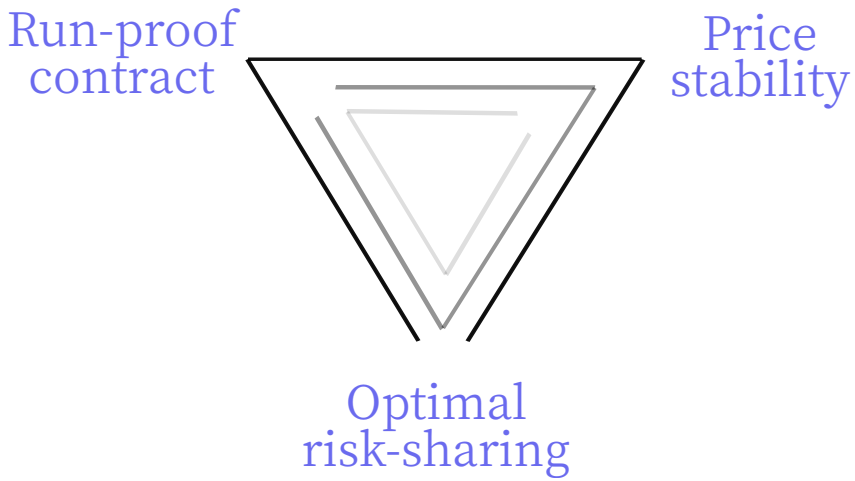
Central bank digital currencies

- Tokens or accounts? Hybrid or just CB? Coexistence with cash?
- Accounts: have happened before: In 1900, the (*Banco de España*), with 58 branches held 68% of total financial assets and 75% of all checking accounts in Spain.
- Households may no longer need retail bank deposit accounts.
  - Could be good! Financial inclusion. No bankruns.
  - BIS, Oct 2020: "*A CBDC could promote more resilient, efficient, inclusive and innovative payments.*"
- Disintermediation Threat:
  - Without deposit accounts, retail banks can no longer intermediate..
  - ... unless CB funds retail banks: "pass through", Brunnerm. - Niep.
  - With that, will versions of conventional bank run concerns return?
  - BIS, Oct 2020: "*Introducing a CBDC could have financial stability implications that would need to be assessed and managed carefully. ... potential for digital bank runs in times of stress and ... , longer-term consequences for bank funding.*"

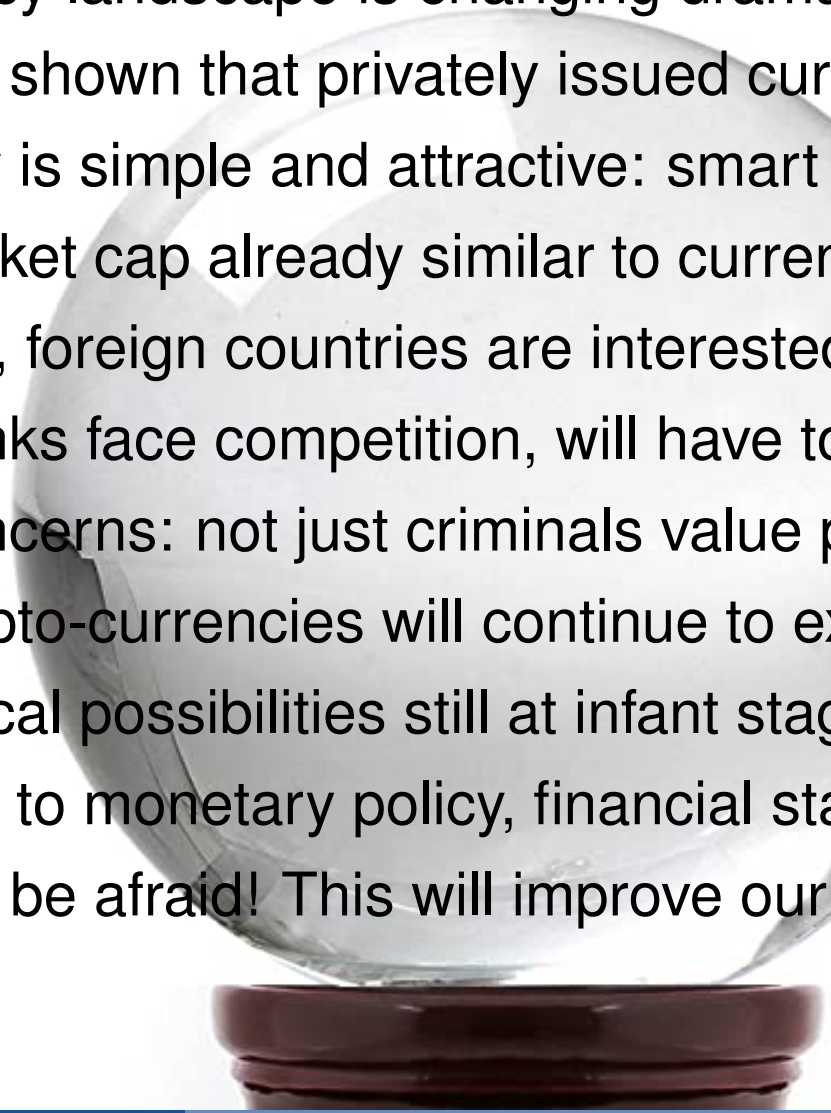
CBDC: Central banking for all and Spending runs

- Fernández-Villaverde - Sanches - Schilling - Uhlig, "CBDC: Central banking for all?" Review of Econ. Dyn., in print.
  - For CBDC to compete with private deposits, CB must indirectly engage in the same intermedation.
  - CBDC more attractive in a bank run. CB may become monopolist.
- Schilling - Fernández-Villaverde - Uhlig, "Central Bank Digital Currency: When Price and Bank Stability Collide", draft.
  - CB objectives: 1) Price Stability, 2) Financial Stability, 3) Efficiency.
  - Central bank can always deliver on its nominal obligations.
  - But: CB runs can happen: spending run on available goods.
  - Key Result: **CBDC Trilemma**

- ★ Implement social optimum, no runs, threaten inflation.
- ★ Keep prices always stable: no runs, inefficient ("Vollgeld").
- ★ Keep prices mostly stable: efficiency, but runs may happen.



4. An Assessment



- The currency landscape is changing dramatically.
- Bitcoin has shown that privately issued currencies are possible.
- Technology is simple and attractive: smart contracts, NFTs, etc.
- Crypto market cap already similar to currency in circulation for US.
- Big players, foreign countries are interested, will introduce.
- Central banks face competition, will have to act: CBDC.
- Privacy concerns: not just criminals value privacy.
- Private crypto-currencies will continue to exist and florish.
- Technological possibilities still at infant stage. NFT app, anyone?
- Challenges to monetary policy, financial stability and regulation.
- But: do not be afraid! This will improve our lives.