Digital Money and Finance: What's New?

Fintech and Digital Currencies RPN Webinar

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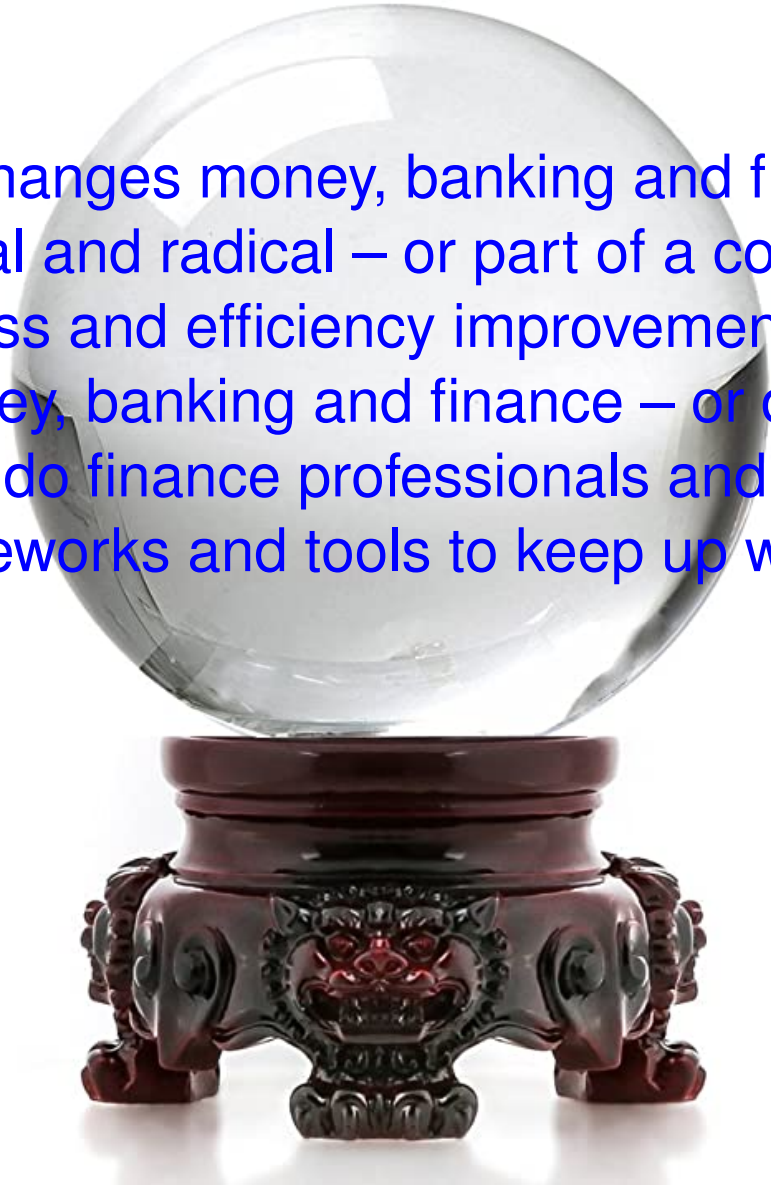
The Future



Digitisation rapidly changes money, banking and finance. Are these changes fundamental and radical – or part of a continuous process of technological progress and efficiency improvement? Do academics have to re-think money, banking and finance – or do conventional theories apply? And do finance professionals and regulators need to re-assess their frameworks and tools to keep up with the transformation?

The Landscape

- Privately issued cryptocurrencies:
  - Bitcoin: since 2008. Nakamoto paper.
  - New technology: the blockchain.
  - Today: 10.000+ active cryptocurrencies. 300 million users.
  - Entry by "big players". FaceBook-Libra failed, but won't be the last.
- "Traditional" means of payments:
  - Cash, Deposit accounts.
  - Credit cards. ApplePay.
  - PayPal.
  - Fast retail payment systems. Venmo, Pix (in Brazil), ...
- Retail Central Bank Digital Currencies or rCBDC:
  - Gov. Chris Waller: "a solution in search of a problem".
  - Response to the competition of private cryptocurrencies.
  - Go with the times, make things digital!
  - Financial inclusion. Enhance banking competition.
- Privacy vs criminal activity. No clean resolution.
  - KYC, "know your customer".
  - Cryptocurrencies offer a way out. Should they? Tornado cash.
  - Respect desire for privacy! Anon movie: "*It is not that I have something to hide. I've got nothing I want you to see.*"

Bitcoin Price

Source: https://coinmarketcap.com/currencies/bitcoin/

Bitcoin Price in logs

Source: https://coinmarketcap.com/currencies/bitcoin/

Schilling - Uhlig, "Some Simple Bitcoin Economics"

Key Questions:

1. What determines the Bitcoin price Q_t? NPV(Dividends) $= 0$.
2. Can Bitcoin serve as medium of exchange, despite price volatility?
3. What are monetary policy implications?

Key Insights:

1. A **novel model** of an endowment economy with two intrinsically worthless currencies (Dollar, Bitcoin) as medium of exchange.
2. "Fundamental pricing equation".

$$Q_t = E_t[\mathcal{M}_{t+1} Q_{t+1}] / E_t[\mathcal{M}_{t+1}]$$

   Special case: **Bitcoin price Q_t is martingale**;
   KAREKEN AND WALLACE (1981), MANUELLI AND PECK (1990).
3. **"No speculation" theorem**. Why "hodl"?
4. **Volatility does not invalidate medium-of-exchange function.**
5. **Monetary policy implications:**
   - **Bitcoin block rewards are** not a tax on Bitcoin holders: they are **financed with a Dollar tax**: $(D + QB)V = PY$.

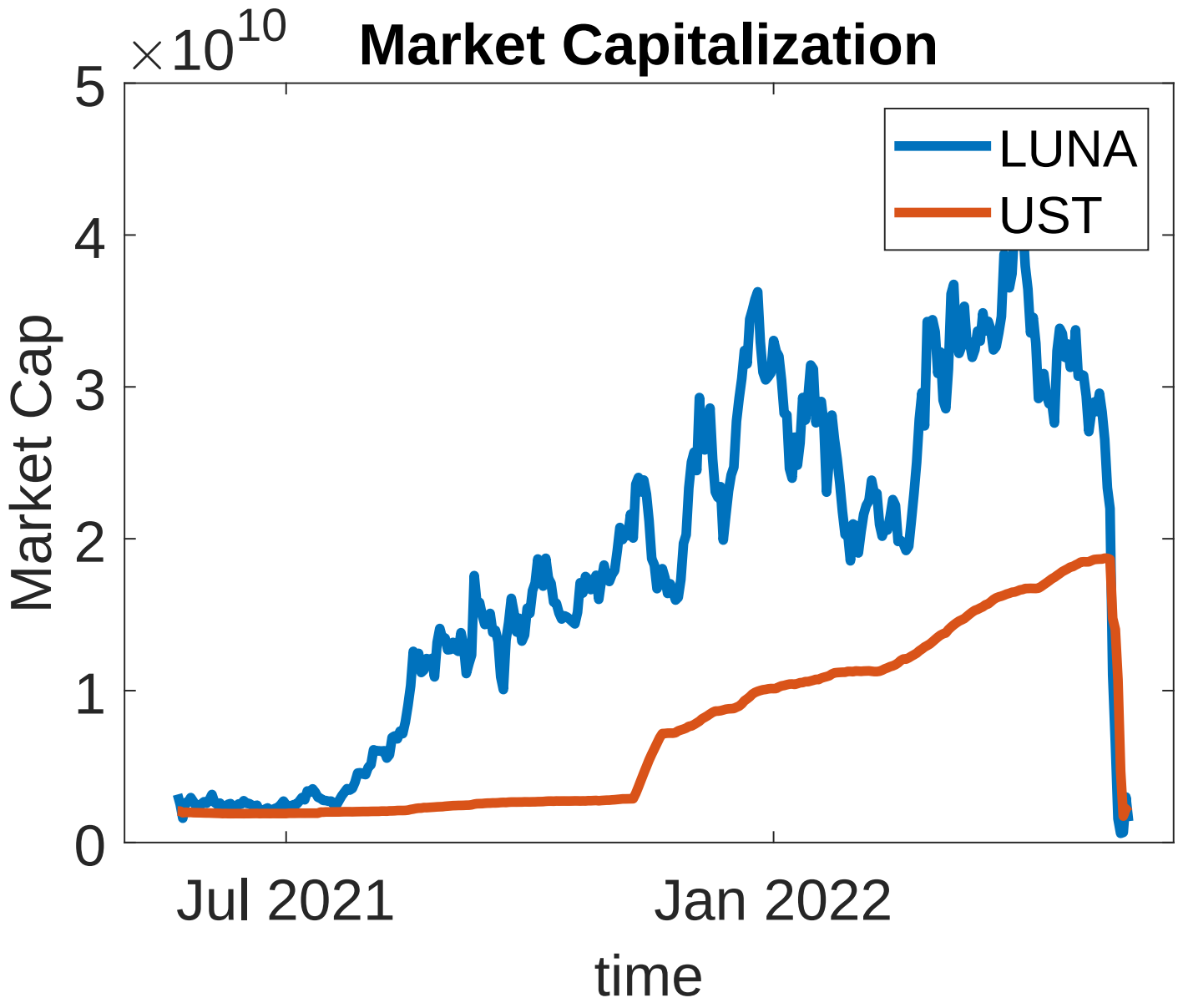
Digital currency: private competition to central banks.

- Benigno - Schilling - Uhlig, "Cryptocurrencies, Currency Competition, and the Impossible Trinity,", JIE 2022.
  - 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.
  - **C**rypto-**E**nforced **M**onetary **P**olicy **S**ynchronization or **CEMPS** .
  - 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.

DeFi, Smart Contracts and Stablecoins

- DeFi: “Decentralized Finance”.
  - “Smart contracts”: automatic execution of contractual arrangements encoded on a blockchain.
  - Ethereum. Solidity is “Turing complete”. ERC-20 tokens.
  - Key issue: making payments in Dollars or equivalent.
- Stablecoins
  - Stablecoins arrangements:
    - as narrow banks
    - as money market funds
    - Algorithmic stablecoins
  - Terra-Luna crash in May 2022 wiped out (or better: redistributed) 50 Billion to 600 Billion US Dollars. Celsius Network.
- Policy
  - Threats to Financial Stability? Consumer Protection?
  - Stablecoin regulatory discussions in EU, US. Biden proposal.
  - Wholesale CBDC, CB-run blockchain as solution?
  - Better: a supportive regulatory framework, enabling innovation as well as backstops for those that wish to pay for it.

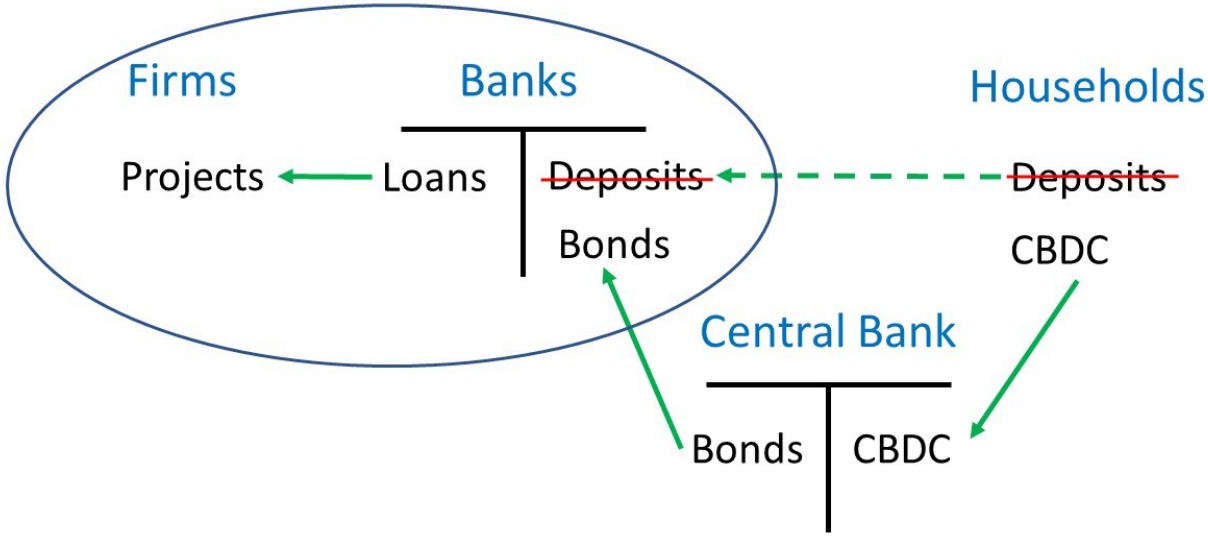
LUNA and TERRA UST market cap



Source: Uhlig, “A Luna-tic Stablecoin crash”, BFI WP 2022-95.

Central Bank Digital Currency or CBDC

- A CBDC is an (interest bearing) account held by households at the central bank. (Barrdear and Kumhof, 2016)
- Likely to be introduced widely. Already in Bahamas, others.
- "Financial inclusion": good!
- But Disintermediation Threat: if HH hold CBDC rather than deposits, banks cannot fund firms ...
  1. ... unless HH re-invest CBDC at banks (Duffie, others) or ...
  2. ... Central Bank re-funds banks or projects (Brunnermeier-Niepelt).
- **Schilling - Fernández-Villaverde - Uhlig, "Central Bank Digital Currency: When Price and Bank Stability Collide":** 2nd option.



The CBDC Trilemma

In our model: Only HH, CB, projects. CB is financial intermediary.

Key Mechanism

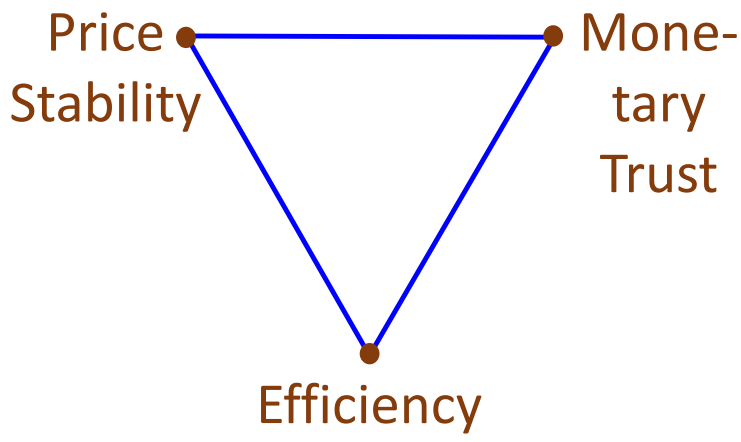
- Nominal Diamond-Dybvig (1983) model for a CB and its CBDC.
- Central bank can always deliver on its nominal obligations.
- But: CB runs can happen: "spending run" on available goods.

Three competing objectives:

1. Traditional CB objective: commitment to **Price Stability**
2. Social optimum, optimal risk sharing: **Efficiency**
3. Absence of runs, financial stability: **Monetary Trust**

Key Result: **CBDC Trilemma**

Of the three objectives,
the central bank
can only achieve two.



An Assessment

- The currency landscape is changing dramatically.
- Crypto market cap is one trillion US$. Can't ignore.
- 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.
- Ecosystem and technological possibilities:
  - NFT: non-fungible token. Apps exist.
  - DAO: decentralized autonomous organization.
  - DeFi: decentralized finance.
- Challenges to monetary policy, financial stability and regulation.
- Challenges to research. Many new answers.
- But: do not be afraid! This will improve our lives.