Digital Money and Finance: What’s New?

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The question

“Do we need to rethink money, banking and finance? Or do conventional theories apply?”

My answer: both

Digital innovation is raising many new issues/questions

- what determines the value of something like bitcoin?
- should stablecoins be regulated? how?
- should central banks issue digital currency? With what features?

A narrow interpretation of Dirk’s question:

- do we already know the answers?
  - is it just a matter of finding the right book or article?

I think we clearly do not know the answers; much work is needed
A broader interpretation of Dirk’s question:
- do we need a complete rethink?
- do we need design a new “digital economics” and “digital finance” that applies to this new digital economy?”

I would argue: no

Digital money and finance is largely about finding new ways of solving fundamental economic problems
- examples: how to transfer ownership of assets (including money)
- how to provide liquidity while financing investment, etc.

Existing theories and models focus on these fundamental problems
- provide a solid foundation for answering new questions

Let me give three illustrative examples
1) Bitcoin

- In some ways, Bitcoin is quite revolutionary
  - an asset not backed by anything or anyone; ownership can be transferred in a decentralized way

Q: What determines the value of such an asset?
- much work in monetary economics on exactly this question

- Diamond (1965) provides answers in a particular environment
  - interpretation of the asset: govt debt → currency → bitcoin?
  - subsequent literature: value of a “bubble” asset is fragile, can collapse, exhibit sentiment-driven volatility (Shell, 1977; Azariadis 1981)
  - exchange rates between two assets are indeterminate (Karaken & Wallace, 1981), can be highly volatile (Manuelli & Peck, 1990)

- Models where asset is a medium of exchange show similar results
  - literature following Kiyotaki & Wright (1989), Lagos & Wright (2005)
The recent crypto-related literature builds on these insights

- Garratt and Wallace (2018): OLG model to study bitcoin pricing
- Schilling and Uhlig (2019) study the “exchange rate” between bitcoin and the dollar (say)
- also: Choi & Rocheteau (2021), Biais et al (forthcoming), and others

There are new elements in these models

- ex: bitcoin is produced by miners who face costs, incentives

Point: at a fundamental level, bitcoin has familiar features

The literature that has studied these features in general settings:

- provides insights that also apply in the environment
- has proved to be a useful foundation for future research
2) Stablecoins

- Aim to provide a widely-accepted, blockchain-native form of money
  - in the process, perform maturity transformation (like banks, MMFs, etc.)

**Q:** How stable is the value of these coins?

- how can they be designed to maximize their usefulness ...
- and to avoid bad outcomes (self-fulfilling runs, collapse)?

- Green and Lin (2003) studied a version of the Diamond-Dybvig model of maturity transformation by banks
  - very explicit about information, feasibility and incentive constraints
  - result: following the efficient rule insulates a bank from self-fulfilling runs
    - this rule is complicated; value of a deposit adjusts dynamically

- Paper was criticized as being unrealistic
  - value of a dollar in the bank is fixed, not adjusting dynamically
The value of a stablecoin *does* change with market conditions

- model in Green-Lin is closer to a crypto coin than a traditional bank

Routledge & Zetlin-Jones (2022)

- modify the Green-Lin approach to study stablecoin design
  - implement their coin using smart contracts on Etherium
- Show: for a coin to be stable in a global sense ... (no self-fulfilling runs)
  - value needs to vary with demand; not perfectly stable in a local sense

Huang (2022, “Information and Financial Stability”)

- because stablecoins are on chain, transaction history is public
  - q: how does that affect stability of the coin?
- modifies the information structure in the Green-Lin model
- shows: this feature can help stabilize the coin; prevent runs
The point (again):

- Existing models of fundamental economics issues and tradeoffs ...  
  - such as Green & Lin, others on maturity transformation  
- ... are providing a solid foundation for understanding the new, digital incarnations of these issues
3) CBDC

- Should central banks issue digital currency?
  - lots of discussion; many issues to consider

- One issue: public money (CBDC) might crowd out privately-created money (bank deposits)
  - with implications for funding costs, investment, etc.

- Echoes a classic question in monetary economics: What is the optimal mix of *inside* and *outside* money?
  - Daniel Sanches and I were working on this issue (“Managing Aggregate Liquidity” 2017) ...
    - building on Lagos and Rocheteau (2008), others
  - ... when we realized a CBDC would raise exactly this type of question
  - result: “Should central banks issue digital currency?” (forthcoming)
Summary

- The digital transformation is raising new questions
  - including some pressing policy and regulatory concerns
  - there is much work to be done in providing answers

- But we do not need to start from scratch

- Digital money and finance are attempts to find new solutions to longstanding economic problems
  - as such, we are seeing familiar issues and familiar tradeoffs ...
  - ... arising in new settings

- To address these questions, we can build on a body of fundamental research that has been done over the years.