Commodity, Fiat and Crypto: What does history tell us?

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My talk is in three parts

- First, I provide an historical perspective on the evolution of currency.

- Second, that history leads me to an analysis of stable coins.

- And, third, that analysis of stable coins leads me to a discussion of the cases for and against central bank digital currency.
  - I like to think that there is a logic for the three parts, but you be the judge…

History

- We currently see a proliferation of private crypto monies.

- Yet this decentralization of currency emission rests uneasily with historical experience.

- In fact, history shows a tendency for currency and coin issuance to be increasingly *concentrated* in the hands of the central or federal government.

- There are two ways of rationalizing this tendency.

  - First, there is a national defense rationale: the central government needs control of currency creation (and of seigniorage) in order to mobilize exceptional resources in emergencies.

  - Second, there are efficiency advantages of a uniform currency, which is something that only a central authority can reliably provide.

Once upon a time, many polities meant many currencies (and, in practice, coins)

- Early modern polities were fragmented.
- Prior to the Peace of Westphalia (in 1648), for example, the European Continent was fragmented into more than 500 polities.
- It was hard for rulers to govern and control large swathes of land.
- But it was also hard for small states to control their borders.
- Multiple currencies (and coins) therefore circulated across borders.
- In Medieval France, for example, each feudal lord operated his own mint.
- Coins varied in purity (fineness) and traded against one another at variable rates.

After 1648, with the emergence of the modern state system…

- …Rulers were able to control larger swathes of land with help of modern military technology.
    - Philip Hoffman, *Why Did Europe Conquer the World?* (Princeton, 2013) refers to this as "gunpowder technology."
- Standing armies became more important but also more expensive.
- These centralized states controlled the mint (or granted it a royal monopoly), partly in order to be able to raise extraordinary resources in emergencies.

To be sure, that central control was rarely complete

- **It was complete neither politically nor monetarily. In the case of money:**
  - Scottish banks issued notes alongside the Bank of England (still do).
  - Prior to 1897, Swedish commercial banks were allowed to issue notes alongside the Riksbank.
  - In the US, where there was abiding hostility toward overweening federal power, including over money, a wide variety of monies circulated.

US case

- After independence, foreign monies (such as famous Spanish pieces of eight) were the dominant form of circulation.

- State-chartered banks were then permitted to issue their own bank notes.

- These provided only a reasonably uniform circulation when there existed a Bank of the United States to enforce discipline, but not otherwise.

- And after 1846 there no longer existed a Bank of the United States.

- After 1836, free bank notes circulated at varying discounts, giving rise to much contemporary dissatisfaction and inefficiency (although exactly how much is disputed).

US case

- The Civil War then catalyzed the shift to a National Banking System, which made for a more uniform circulation.

    - It placed a prohibitive tax on note issuance by state banks and required national banks to hold treasury bonds as backing to ensure convertibility.

    - This was essentially an example of the national defense imperative for creating a single currency.

- The Crisis of 1907 then prompted Federal Reserve Act.

    - The crisis pointed up the inefficiencies of this system (requiring the emission of clearinghouse certificates, in effect multiple private monies that circulated at discounts and premia against one another).

    - It finally made note issuance a government monopoly.

    - This, in contrast, was essentially an example of the economic efficiency (uniformity) argument for creating a single currency.

So how do I read this history?

- History shows a tendency for currency and coin issuance to increasingly be concentrated in the hands of the central or federal government.

- There's a national defense argument for this.

- There's also an economic efficiency argument.

- Insofar as modern financial systems give governments alternative means, other than debasing the coinage or printing currency, to finance expensive wars, I would argue that the latter is the rationale that increasingly dominated over time and that dominates today.

- Thus, the argument for government monopoly of money issuance, either de facto or de jure, thus must rest on the economic efficiency of a currency that is both uniform (because there is only one issuer) and stable (because it is issued in economically appropriate amounts, for example by an independent central bank with a politically-assigned mandate to pursue price stability).

- A uniform currency minimizes transaction costs. It substitutes for information, in the sense that it is not necessary to have information about the creditworthiness of each and every issuer, there being only one.

- Information being costly to produce, the information insensitivity of government money minimizes these costs (Dang, Gorton and Holmstrom 2015, Berentsen and Schär 2018).

- Thus, the digital payment services provided by Visa and Mastercard are attractive because they are information insensitive. The credit card companies provide the end user with protection from default, and a dollar credit on one's Visa account is convertible into dollars one-to-one.

- It follows that the costs of producing and obtaining information about changes in the actual and prospective value of privately-issued digital currencies is an obstacle to their wider utilization.

Plain-vanilla cryptocoins are highly information sensitive

- Their value fluctuates day to day. Holders therefore require information about not just their current price but also their prospective future prices.
  - Limiting their store-of-value and unit of account functions.
  - Which in limits their means-of-payment function (willingness of agents to accept them in payment).
    - There may also be other technological limits on the means-of-payment function, but I leave these aside.

From this flows the argument for stable coins, which are information insensitive

- You don't need information about their issuer and contingent characteristics in order to accept them, assuming of course that they are really stable.
- Four types of stable coins can be distinguished, with different implications for the future of money and the future of digital money in particular.
  - Fiat fully collateralized
  - Crypto collateralized.
  - Partially collateralized
  - Uncollateralized

Fiat fully collateralized

- Tether is an example of a U.S. dollar-linked fiat fully collateralized stable coin.

- But this type of stable coin is expensive to operate. The issuer must immobilize substantial amounts of collateral in low-yielding liquid form. This gives reasons for doubting that the model is scalable, since large amounts of additional capital would be required.

- Think of it like this. Assuming that the costs are borne by the end user, there is no difference between holding a certain number of dollars in one's commercial bank account and using that account to pay bills and receive wire transfers from one's customers, on the one hand, and using Tether for transactions, on the other – aside from the fact that a conventional bank account may permit one to engage in a larger volume of transactions at lower cost, given the current state of blockchain technology.

  - The crypto alternative is attractive only to those seeking to avoid scrutiny.

- In addition, the search for profitability may encourage issuers to cut corners.

Crypto collateralized

- In this case another cryptocurrency is held as collateral to back the stable coin. This variant frees the issuer from having to deal with, inter alia, Taiwanese banks.

- The problem with this model is that the value of the collateral will fluctuate, since the collateral is not a stable coin. Since the value of the collateral can fall, crypto collateralized stable coins, to be credible, must be generously overcapitalized, making them even more expensive to operate than fiat collateralized stable coins on average.

  - Dai, the leading crypto collateralized stable coin, has a purported collateralization ratio of 300 per cent.

- And, overcapitalization notwithstanding, because nothing prevents the value of the collateral from falling below the par value of the coin issuance, over-collateralization notwithstanding, these coins are vulnerable to bank-run-like problems.

Partially collateralized

- Saga is an example.

- The platform sells and buys Saga tokens in return for Etherium (another cryptocurrency) and invests the proceeds in the fiat currencies making up the SDR basket. Initially the protocol holds 100 per cent reserves in these currencies, essentially replicating what Tether does (or purports to do).

- Over time, however, Saga's reserve ratio will be reduced.

- But just how much is not specified in the Saga white paper, which states only that the reserve ratio will decline "as inherent value becomes less volatile."

- Herein lies the problem. As the white paper notes, "…inherent value is derived from a combination of factors: market confidence, usefulness as means of exchange, sentiment, and future prospects."

- Confidence, as any central banker experienced in operating a currency peg can tell you, is fragile. It is in the eye of the beholder.

- And questions about confidence can become self-fulfilling when the reserve ratio is only fractional. If some holders of Saga tokens develop doubts about the convertibility of their tokens into fixed numbers of SDRs, they will seek to cash out. Other holders, not wishing to be at the end of the queue, will scramble to do likewise before the reserve cupboard is bare. The platform's fractional reserves could be exhausted by the resulting run.

Central banks faced with this situation generally respond in two ways

- First, they devalue the currency, which reduces their ratio of liabilities to reserves. In the present context, this would not be consistent with the stable-coin rationale; it would not be good for confidence and market share.
  - One devaluation would likely create expectations of another.
- Second, they impose capital controls, effectively limiting the access of investors to their reserves. But limiting the convertibility of the crypto token into fiat currency in this way would again be inconsistent with the rationale for creating a stable coin and therefore for with future prospects.

Uncollateralized

- Most interesting, but also most ridiculous.

- Here *smart* contracts are used to manage the supply of the digital coin with the goal of maintaining its value against, inter alia, the dollar.

  - Monetary policy by algorithm….

- The platform issues both digital coins and digital bonds, and sells bonds for coin (coin for bonds) when the price of the latter dips (rises) in terms of dollars.

- Bonds are less liquid than coin, come in larger denominations, and are less useful for transactions, but investors have an incentive to hold them because bondholders are promised interest payments ("dividends") in the form of digital coin when additional quantities of the latter are issued (that is, when the price of the token threatens to exceed $1).

- Dividends are funded out of the commission (seigniorage) taken by the platform when selling additional coin.

- The viability of such schemes obviously depends on success at growing the platform, for without additional stable coin holders/users, there will be no additional issuance with which to pay bondholders.

  - Can you say Ponzi scheme?

- And even if the platform is growing, doubts about its future growth may undermine stability now.

- Doubts about whether the platform will be able to generate sufficient seigniorage in the future to pay the bondholders what they are promised may cause investors to reduce their bids for new bonds, making it even more expensive for the platform to take excess coin out of circulation (increasing the value of claims on dividends relative to remaining circulating coin), which will only heighten preexisting doubts – with good reason.

- It is not hard to imagine a self-reinforcing spiral where investors are unwilling to purchase additional bonds at any price and the platform is therefore unable to prevent the price of the stable coin from collapsing.

- Again, the problem will be familiar to anyone conversant in the literature on speculative attacks on pegged exchange rates.

Out to lunch....

It follows that the only reliable way of creating a stable-value digital currency is for the central bank to issue it

- 90+ central banks are exploring the possibility.
- Individuals could maintain electronic accounts at the central bank.
- Alternatively, the central bank's digital unit could circulate in a distributed fashion (held in mobile wallets or on electronic smart cards).
- Could be usable only for wholesale payments by businesses, or it could beused more widely.

Downsides

- Rich target for hackers and terrorists.
  - If CB's digital network goes down, the vast majority of cash transactions may be halted.

- Increases the danger of runs on conventional banks.
  - Some observers (National Bank of Denmark 2016) have suggested that this risk could be mitigated by limiting the volume of such transfers or limiting the overall size of central bank digital accounts. But this would give rise to the situation where central bank money traded at a premium relative to accounts held at commercial banks, reintroducing all the complications of a non-uniform currency.
    - Shades of 1830s-stye free banking….

So I conclude

- Strong economic justification for a uniform circulation.
- The only entity capable of credibly providing a uniform national circulation is the national government.
  - Because stable coin schemes are unlikely to succeed.
- That leaves us with the alternative of central bank digital currencies.
  - On which the jury remains out.

- Thank you.