

# The Art of Central Banking in a Centrifugal World

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## I. Introduction

It is a privilege to give the 2021 Andrew Crockett lecture.

Today I would like to paint a picture of central banks in the next decade. I choose that metaphor because central banking is an art as well as a science. The value of money is not simply the product of formulas, rules or algorithms. As a social convention, money is more of an art grounded in values of trust, resilience, dynamism, solidarity and sustainability. Central banks are its curator.

This role of central banks is being challenged in the wake of intensifying centrifugal forces, including an increasingly multi-polar global economy, the growing weight of market-based finance, and, my primary focus today, the emergence of crypto assets and distributed finance.

In response to these developments, central banks should pursue a deliberate, values-based strategy to deliver their core mandates of monetary and financial stability. Central banks will have to look very different to support the resilience that our economies need while realising the promise of the Fourth Industrial Revolution.

## II. The Art of Money

The physical manifestations of the art of money are found on bank notes. Their history tells the moral of this lecture: most private monetary innovations over the centuries fail, but a few change the nature of money for the good because they serve the evolving nature of commerce *and* because they establish an effective relationship with public money.

The first-known banknotes were developed in seventh-century China to allow merchants and wholesalers to avoid carrying heavy copper coins for large commercial transactions. After Marco Polo introduced the concept to Europe in the thirteenth century, notes became increasingly common in the seventeenth and eighteenth centuries. Private bank notes, like other private forms of money through the ages, were prone to debasement, including, as the BIS has documented, the earliest stablecoin, the Bank of Amsterdam.<sup>1</sup>

In the UK during the 18<sup>th</sup> and 19<sup>th</sup> centuries, the failure of note-issuing banks was commonplace. Consider the contrasting fortunes of the Austen siblings. The celebrated author, Jane Austen, currently graces the UK £10 note.<sup>2</sup> This is fitting because £10 is what she was paid for *Pride and Prejudice*, the equivalent to about £1000 in today's money. This is not, however, the first time that the Austen name has appeared on a banknote. Jane's brother Henry set himself up as a banker with interests in Hampshire and London at a time that many banks were small and issued their own banknotes.

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<sup>1</sup> Frost, Jon; Hyun Son Shin and Peter Wierts. 2020. "An early stablecoin? The Bank of Amsterdam and the Governance of Money." BIS Working Papers No. 902.

<sup>2</sup> See annex 1

Unfortunately, although Jane Austen wrote that “when a man has once got his name in a banking house he rolls in money”, that turned out not to be the case for her brother Henry. Banking was for a time profitable, but unwise lending led to the collapse of Henry’s bank and his personal bankruptcy. Depositors, including Jane Austen herself, were left out of pocket.

In the 19<sup>th</sup> century United States, a similar tale was taken to extremes. At the apex of the ‘wild cat banking’ era, private bank notes represented 90% of the notes in circulation, were of variable quality, and traded at different rates. As James Bullard has cautioned, this period of highly inefficient, unregulated currency competition serves as a warning of the potential problems if the most recent explosion of private monies is allowed to go mainstream.<sup>3</sup>

Before heeding this warning, let’s turn back to the art of money.

A few years ago, the characters on the Bank of England’s £20 note transitioned from Adam Smith to JWM Turner.<sup>4</sup> From economist to artist.

Amongst his many contributions to economic thought, Smith defined the three functions of money—functions that are now being unbundled. Smith also underscored that economic capital cannot be divorced from its social twin—just as the value of money cannot be separated from the values that underpin it.

Of the many Turner masterworks that could have graced the new £20, the Bank chose the *Fighting Temeraire*. The painting depicts the end of the Age of Sail and the rise of the Age of Steam—a technological breakthrough that had widespread impacts on commerce, society, and geopolitics. The final bank note transition during my time as Governor captured an even greater technological transformation, as the Bank replaced the engineering heroes of the Industrial Revolution, Boulton and Watt, with Alan Turing.<sup>5</sup> Turing’s many contributions included path-breaking war-time cryptography as well as being the father of modern computing and artificial intelligence—three technologies that are now fundamentally changing the nature of money.

It was a different monetary innovation—fractional reserve banking—that financed the industrial revolution that Boulton and Watt helped to unleash. This new form of banking broadened the efficiencies of Smith’s invisible hand at the price of greater risks to financial stability. To maintain the value of money, central banks had to become increasingly active as supervisors of the private banks and, *in extremis*, as their lenders of last resort.

Based on the experiences of private banks issuing notes based on ‘their good name’, most observers, including Milton Friedman, agree that *laissez-faire* is not a good foundation for sound money.<sup>6</sup> There have been two approaches to maintaining public confidence in money: i) backing by a commodity, principally gold, and ii) backing by institutions led by independent and accountable central banks.

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<sup>3</sup> Bullard, James. July 19, 2019. Presentation. "[Public and Private Currency Competition](#)," Central Bank Research Association 2019 Annual Meeting, Columbia University and Federal Reserve Bank of New York, New York, N.Y.

<sup>4</sup> See annex 2 and 3

<sup>5</sup> See annex 4 and 5

<sup>6</sup> Friedman, Milton. 1960. *A program for Monetary Stability*. Fordham University Press.

### Which brings me back to art.

A few years ago, as he reflected on the 5,500 tonnes of gold lying in the Bank of England's vaults, the sculptor Antony Gormley thought of the futility.<sup>7</sup> The raw ore scraped from the depths of the four corners of the earth, then refined, assayed, and shipped across the oceans to be brought through the Bank of England's Lothbury gates only to be buried once again.

Gormley conceived of returning both the gold and the observer to their roots by creating a sculpture made from the gold left *in situ* in the vaults, a golden human figure sedimented into the earth from whence it came. I put it to him that it was unlikely to be seen, given security requirements. He was relaxed because he understood the true nature of value. It would add to the irony. The value was in the creation. In the act not the witness.

The gold at the Bank of England is a vestige of a bygone era when gold backed money and an even earlier time when gold was money. The story of how gold lost its crown reveals how the values underpinning money reflect those of society. A lesson which should guide determinations of the future of money.

For a time, confidence in money can be supported by a simple rule such as the strict convertibility of the gold standard. But credibility and trust cannot be maintained without institutional backing and political support. This in turn requires public understanding, built through transparency and accountability, and it requires public *consent* grounded in *solidarity* including in the fair sharing of the burdens of economic adjustment. The value of money is based on shared values.

There have always been incentives to relax 'temporarily' monetary strictures and disciplines. In the absence of a strong social consensus, these pressures will eventually overwhelm. Trust in the gold standard could be maintained only as long as the social, political and economic conditions resembled those when it came into being. As conditions changed, the ability of the authorities to honour their commitments waned and the breakdown of the system became inevitable.

By the end of the 19<sup>th</sup> century, the global economic power was becoming more dispersed making the gold standard tougher to manage. As financial systems grew more complex, the self-equilibrating nature of the system weakened. Central banks were increasingly conflicted between their responsibilities as lenders of last resort to growing fractional reserve banking systems and their commitments to convertibility.

Political pressures began to emerge as suffrage was extended, labour began to organise, and political parties representing the working classes gained popularity. A single-minded focus on convertibility to the exclusion of the impacts on the domestic economy, particularly on wages and employment, became increasingly untenable. This undermined the credibility of the system, underscoring that the gold standard was "a socially constructed institution whose viability hinged on the context within which it operated."<sup>8</sup>

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<sup>7</sup> See annex 6 and 7

<sup>8</sup> Eichengreen, Barry. 1996. *Globalizing Capital: A History of the International Monetary System*. p. 30

The original gold standard had been adopted before the development of paper bank notes and fractional reserve banking. It pre-supposed a political setting in which governments were shielded from political pressure to direct policy to other ends, such as domestic activity, wages, or financial stability. In short, it had been created in a climate in which governments could value currency and exchange rate stability above all else.

The system finally broke down with World War One. Efforts to resurrect it ultimately failed because the changes that had been underway before the war had only accelerated, and more fundamentally, because the values of the gold standard had become inconsistent with those of society.

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Modern money is backed by a series of institutions, mostly housed in central banks. Its value rests on confidence. The value of money requires not just the belief of the public at a point in time but, critically, the *consent* of the public at all times. That dictates not just what the central bank does to maintain the value of money but how it does it and how it accounts for its actions. When it comes to money, the consent and trust of the public must be nurtured and continually maintained.

Central banks have a primordial responsibility to act as the guarantors of trust and confidence in money given of their status as monopoly issuers of currency. This gives them control over the quantity of money and interest rates – monetary policy. An essential part of financial stability policy – acting as lender of last resort to private financial institutions at times of financial stress – also falls to them. And most central banks are responsible for preventing the build-up of vulnerabilities in the first place. That requires maintaining the safety and soundness of banks. And it means safeguarding the stability and resilience of the financial system as a whole by managing the financial cycle and addressing structural risks in financial institutions, markets, *and payments systems*.

So it is that, although the vast amount of money in circulation is private money, it is anchored in public money. Commercial banks hold accounts at their central bank, settle transactions electronically between themselves in central bank money, and can borrow from the central bank to meet liquidity shortfalls including in times of stress. Systemic payments infrastructure is generally subject to similar oversight and backstops.

The paradigm of strict banking regulation and supervision with central banks overseeing the financial system has proven the most effective way thus far to avoid the instability and high economic costs associated with the proliferation of private and public monies. It would be hubris, however, to think that the current model represents the end of monetary history.

Through trial and many errors, we have found a ‘partnership’ in which the private sector – banks – create most of the money but in which central banks use the price of money to control the demand for money creation to ensure that the growth in the stock of monetised obligations is in line with what the economy can actually produce. We learned at great cost that a fixed stock of money (gold standard) is out of line with a dynamic and growing economy and that unconstrained money creation destabilises money itself.

If on balance, people have confidence in the money they use, this is due to the credibility of this institutional framework, including arguably the public’s recognition that the central banks at the core of the system, are on their side.

But we should never take this trust for granted. The financial crisis was a reminder that money is “in the end a social convention that can be very fragile under stress.”<sup>9</sup> Moreover, technological change is widening inequalities<sup>10</sup> and, through social media, contributing to the polarisation of public opinion. To many, the necessary monetary stimulus of the past decade is perceived to have widened wealth inequalities putting further pressure on public consent. Into this heady mix comes competition from a burgeoning array of new private currencies that threaten to disrupt monetary and financial stability.

### III. Technological Change Drives the New Money

Our economies are now undergoing two great re-wirings: the digital revolution and the sustainable transformation.

Economic relationships are reorganising into distributed peer-to-peer connections across powerful networks – revolutionising how we consume, work and communicate. As commerce moves online, work is dispersing across geographies.

In parallel, and at the eleventh hour, the sustainable revolution has finally begun in earnest. The transition to a Net Zero economy will involve every region, every sector, and every company. The scale of investment required is enormous, with estimates of energy infrastructure investment needs ranging from \$3.5 to \$5 trillion every year for decades (more than double the present rate).<sup>11</sup> Investment on this scale can only come from mainstreaming private finance, underscoring that in the new financial system every decision must take climate change into account.

The climate transition will require enormous and rapid structural change. And if it’s similar to previous periods of profound technological innovation, the Fourth Industrial Revolution will lead to a long period of difficult adjustment and rising inequality long before the benefits of increased productivity, wages and jobs are widely felt. Adding to the sense of disruption, the Covid crisis has accelerated these transformations - while deepening existing inequalities.

During times of great change, the relative weight that societies place on certain core values— resilience, dynamism, solidarity, and sustainability—is revealed. History teaches that realising the gains from major technological transitions eventually requires the overhaul of virtually every institution from education to finance. This includes central banks and the underpinnings of money.

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Now is a time for deep reflection and principled, determined action, because as money is unbundled and repackaged, the role of central banks will once again shift fundamentally.

Money *can* change because of fundamentally transformative innovations, such as advances in cryptography and artificial intelligence, as well as the powerful network effects in social

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<sup>9</sup> Cunliffe, Jon. May 2021. “Do We Need Public Money? *Bank of England*.”

<sup>10</sup> See: ‘The Future of Work’ 2018 Whitaker Lecture, Central Bank of Ireland, available [here](#)

<sup>11</sup> ‘Climate Finance Markets and the Real Economy’, BCG and Global Financial Markets Association, December 2020.

media. More fundamentally, money *needs* to change to serve the new economy.

The new economy is placing new demands on finance. Consumers and businesses increasingly expect transactions to be settled in real time, checkout to become a historical anomaly and payments across borders to be indistinguishable from those across the street. Major efforts are underway to organize money and payments to exploit the potential of smart contracts that improve the efficiency of existing processes (such as trade finance) and enable new transformative innovations (such as a distributed green grid) but potentially at the cost of fragmenting money to the point that it loses its ‘moneyness.’

### **Private money is created to close gaps in the payments system**

The core role of money is to facilitate market-based exchange, and private monies spring up when there are areas where that is not happening.

Some of these innovations to close gaps in the payments system are **good** such as new forms of distributed finance that drive efficiencies in securities settlement and innovations that reduce the cost of cross border payments. Some are **bad** such as the use of crypto currencies, like Bitcoin, for ransomware, money laundering and terrorist financing. These are gaps that we never want filled.

And some of the use cases of new forms of money are **truly innovative** such as the emerging deployment distributed ledger technology to track greenhouse gas emissions, green electrons, and carbon offsets as well as the ability of NFTs to open up ownership of digital assets.<sup>12</sup>

This brings me to my last bank note, one created outside a central bank—a virtual fusion of the digital and the physical, of art and money.

Last week, I visited at a studio where the artist Damien Hirst has created a currency the form of 10,000 ‘unique multiple’ paintings. The buyers have the option of taking delivery of either the physical painting or an NFT, but not both. Ownership can be actual or virtual. Once sold, the paintings will be traded in a dedicated market. The art explores both the nature of value and money’s role as a store of value and medium of exchange.<sup>13</sup>

While impressive in its imagination, Hirst’s work is modest in its scale. Other innovations unbundle money, focusing on the means of payment roles exclusively. They target very large scale and seek to capture very new forms of value. This private money is being created to integrate payments data into data-driven services provided by technology companies. Money’s role as a means of payment will be used to feed the flywheel.

In this way, large technology companies could become major providers of private money. And although they do not wish to become credit providers themselves, they could become central to credit intermediation as conduits for white-label financial institutions. As some have suggested, this could invert the hierarchy in financial services.<sup>14</sup> As part of broader changes, it *will* help change the nature and funding of credit intermediation, have

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<sup>12</sup> Couere, Benoit. June 2021. ‘Digital Rails for Green Transformation.’  
<https://www.bis.org/speeches/sp210622a.htm>

<sup>13</sup> See: <https://www.artnews.com/art-news/news/damien-hirst-palm-nfts-1234588165/>

<sup>14</sup> Brunnermeier, Marcus K.; Harold James; and Jean-Pierre Landau. 2020. ‘The Digitisation of Money.’

ramifications for domestic regulation well beyond the payments system, and even change the structure of the international monetary and financial system.

#### IV. The Principles of Money in a Distributed Age

The new financial system must meet several requirements.

New forms of money and payments must be as **resilient and trustworthy** as the existing system while offering better services to customers. When economic shocks hit, the new money should hold its value (monetary stability) and all the institutions that touch it should remain reliable (financial stability). Money must be scalable, operationally robust to unusual events, and never prone to technical outages.

New money must be **accountable and transparent** by protecting privacy and preserving customer data sovereignty. Cash is anonymous, and there is an expectation that private banking details will remain private, within the constraints of the laws that guard against money laundering, the financing of illicit activities or terrorism. New electronic forms of money will need to define the boundary between anonymity and customer-sanctioned access to private information in order to provide improved services.

**Money should be inclusive and promote solidarity.** New forms of money and payments must make good on their potential to democratise financial services by opening access to all. That means dramatically lowering the costs of payments, banking and cross-border transactions including remittances. And it means promoting competition for customer services. The network externalities of the new forms of money should benefit the public not the provider.

Promoting **solidarity** means never going back to forms of money, like the gold standard, where the burden of adjustment falls most heavily on one class, labour. Rather, it means taking full advantage of new technologies to create a more flexible economy that makes more regular, smoother adjustments, instead of building large imbalances and vulnerabilities that are then brutally resolved. This is the fundamental stabilizing role of modern money that lifts the liquidity constraints of individuals in a downturn, and of financial institutions in a crisis.

The new money must be operationally efficient and environmentally **sustainable**. With every industry undertaking fundamental transformations on the path to net zero emissions, the new monetary system should be more carbon efficient than the one it replaces. It is unthinkable that it would be dramatically worse.

New forms of money must support economic **dynamism** by offering new services and providing cheap, efficient and secure payments. New services could include pooling data for more efficient access of small business to growth capital, integrating with smart contracts to improve efficiencies from finance to commercial trade and making cross-border commerce indistinguishable from domestic activity.

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Against these criteria, the new forms of private money create several public policy issues, including:

- The potential to recreate the inefficiencies and volatility of earlier eras with the circulation of a host of currencies of varying quality;
- Concerns over resilience of the monetary system given operational risks in the broader crypto ecosystem;
- Issues with the quality of the backing of stablecoins and the risks of creating a modern Bank of Amsterdam at the heart of the payments system;
- A range of issues around anonymity, data privacy and the financing illicit activities; and
- The abhorrent environmental footprint of some cryptocurrencies, most notably Bitcoin, and the massive opportunity cost of solving it (in a world that already needs to build the equivalent of the world's largest solar field every day by the end of this decade).<sup>15</sup>

It is possible to have a steady state in which both public, commercial bank money and new forms of private monies circulate as media of exchange, with the private currency facilitating transactions that would not otherwise occur. The key questions are whether these transactions are desirable and, if they are, whether they could be more effectively facilitated by public money.

At a minimum, for the new system to maintain the values of sound money, central banks should continue to provide a series of public backstops. Specifically, that means securing underlying money in the form of (electronic) cash or the unit of account; ensuring finality of payments; providing liquidity support for scalability in times of stress; and overseeing the payments system as a whole.

To extent that there are new private monies in circulation, central banks should be as open to them as to traditional players, with equal access to key central bank facilities like real-time wholesale payments systems, the ability to place deposits and to access short-term liquidity. The *quid pro quo* should be the same regulation for the same activities, irrespective of whether the provider is primarily a bank, a non-bank financial services company or a tech company. This would ensure new money is as secure, reliable and trusted as traditional forms of money have become. This is the type of institutional change that can be hard to imagine at the start of technological transformation but that is absolutely vital to realise its promise.

## **V. Towards a new Settlement: Central Banking in a Centrifugal World**

The potential basis of this new relationship between public and private monies is well summarised by the BIS in its Annual Report<sup>16</sup> and the platform model of the Bank of England in its CBDC Discussion Paper.<sup>17, 18</sup> The main components are privately provided payments interfaces, or wallets, that would have the relationship with the customer and provide them

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<sup>15</sup> International Energy Agency. May 2021. *Net Zero: A Roadmap for the Global Energy Sector*.

<sup>16</sup> BIS Annual Report. June 2021

<sup>17</sup> Bank of England *Discussion Paper on New Forms of Digital Money*. June 2021.

<sup>18</sup> See annex 9



with value-added payment services. The central bank would provide the core ledger, and APIs would provide connectivity between the layers. This architecture with a CBDC with API connectivity will be an essential backbone of an open finance environment, which serves broader social objectives such as competition, innovation, privacy etc.<sup>19</sup>

I will concentrate on market structure and adjustment mechanisms, leaving important operational considerations, such as the relative merits of tokens versus accounts, for another day.

The core question is what hangs off the platform, namely where in the chain between the end user and the central bank does the private sector take over. Wherever the line between public and private is drawn, the roles of money are unbundled into store of value and medium of exchange.

The options include a publicly accessible retail CBDC, wholesale CBDCs in private wallets, and private stable coins. If and only if they are credibly backed, private stablecoins could be either the equivalent of Scottish banknotes (branded by sponsor or use case) or indistinguishable to the public from other private monies. Transactions within stablecoins would be settled in real time in wallets or the native application. Transactions across stablecoins would be settled in real time at the central bank.

As is the case today, any (systemic) private money must link to public money at core of the system. The ability to convert on demand, private money – such as a bank deposit—into public money, issued by the central bank, in the form of cash, is a foundation of confidence in money and payments. It promotes the understanding that different types of money are uniform and makes them substitutable. More generally, the ability to access central bank money acts as an anchor for value, given cash is a universally available and accepted safe asset. The fact that holders have the right to convert their commercial bank money into public money (cash) contributes to the widely held view that it is all just the same money.<sup>20</sup>

This link to public money is a necessity for systemic stability, and it is a privilege for any private payments system that has it. Given the broader issues that the new money raises (from privacy to competition), authorities beyond central banks should shape the decisions about which private options get the possibility of that access, while the central bank will always be the final arbiter of who is able to draw upon it.

In other words, central banks set necessary but not sufficient conditions for access to their balance sheets. Governments may have additional conditions based on privacy and competition grounds. These considerations are relevant for the consent of the public for the system over the long term, so central banks should care deeply about them and encourage them to be decided *ex ante* to avoid lock in. In this regard, the apparent mismatch between current timetables for the potential launches of CBDCs and private retail-focused stablecoins is concerning.

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<sup>19</sup> For comprehensive insights on these and other issues connected with CBDCs, stablecoins and the future of payments see an interview with Benoit Coeure in *Central Banking*. 25 May, 2021

<sup>20</sup> Cunliffe 2021. *Op cit*.

I agree with those, such as the Riksbank, who argue that the public should have access to central bank money in the form of a retail CBDC.<sup>21</sup> The risks of digital bank runs suggest some limitations on holdings of digital cash and/or differences in how it is remunerated. This will dampen the disciplining effect of cash on commercial banks, though arguably the shift to greater reliance on market-based financing will more than compensate (particularly if bank resolution is a credible option).

It should be noted that a potentially large proportion of digital money will be programmed in some way either to enable contingent payments or to prevent the re-bundling of the medium of exchange and store of value functions—a re-bundling that would come with costs to financial stability and *in extremis* the fragmentation of money.

It is reasonable to expect that, because it will be cheap, robust and instantaneous, payments will be principally conducted in digital money distinct from commercial bank money. As the BIS observes, existing bank-based payment rails are expensive, even if those costs are not visible to consumers.

Commercial bank money will therefore largely be used as a remunerated store of value. This will have implications for bank funding, credit intermediation and oversight of market-based finance—issues to which I will return in a moment. But to be clear, these higher funding costs should not dissuade central banks from pursuing reforms that offer the public greater choice and better service. Banks are a means to an end—not ends in themselves—and they will have to adapt to a much more competitive environment.

Private digital money is a systemic payments system. And any systemic payments system must be overseen by a central bank and have final settlement option in public money.<sup>22</sup> In this spirit, the regulatory model for stablecoins must offer equivalent protections to those for commercial bank money. The model should include: legal claim to be paid in fiat on demand, capital requirements, liquidity requirements, eligibility for support from a central bank during a stress, and a separate backstop to compensate depositors in the event of failure.<sup>23</sup>

Authorities should be humble about how much risk to accept in private systemic stablecoins, and they should learn from their (in)ability to oversee money market funds through stress. There have been two systemic crises in little more than a decade. In baseball, it's three strikes and you're out. In cricket, it's only one. And for systemic payments, one is too many. If that means, as it must, very rigorous oversight and rules for private stablecoins, what would then differentiate them from a CBDC?

Moreover, we should be wary of path dependence and locking in existing advantages of tech companies via the payments system. There are powerful network effects in both social

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<sup>21</sup> Riksbank staff memo, 2021: Can digital central bank currencies function as cash?

<sup>22</sup> As consistent in *The Principles for Financial Markets Infrastructure*.

<sup>23</sup> Bank of England *Discussion Paper on New Forms of Digital Money*. June 2021.

networks and money. If combined, these could be mutually reinforcing.<sup>24</sup> Convenience once established may be hard to unwind, in the *Uberisation* of money.

If society doesn't want to risk such lock in, it follows that oversight will ensure that a very basic common, indistinguishable set of stablecoins run off the platform into various wallets. It is not clear why a single CBDC wouldn't perform better.

The potential superiority of CBDCs from a public interest perspective is reinforced by the undesirability of currency competition at heart of the system. Stablecoins have the potential to fragment the liquidity of the monetary system and to detract from the role of money as a coordination device. As the BIS observes, to the extent that the purported backing involves conventional money, stablecoins are ultimately only an appendage to the conventional monetary system and not a game changer.<sup>25</sup>

With respect to crypto, only the niche will survive. With limited use cases, crypto assets will, by definition, be not that valuable, unless they are the winners of the coordination game of searching for extrinsic value in 'digital gold'. Ultimately, crypto either has such extrinsic value without a use case, or has a use case as an NFT that perfects ownership (which is niche by definition in that it is non-fungible). NFTs would link to the payments ecosystem by exchangeability into CBDCs. This creates ability to create new portfolios of a dramatically wider set of intangible assets.<sup>26</sup>

That is not to dismiss either NFTs or decentralised finance, quite the contrary. The scope of the application of both is exceptionally broad. It is to stress, however, that tokens at the heart of programmable networks, will have to remain just that, of token value. Value will be exchanged through CBDCs that link such networks to the broader financial system. Any native crypto currencies of sufficient scale will be dominated by CBDCs (or tightly regulated stablecoins) for reasons of systemic stability.

In sum, the most likely scenario is a two-tier system, with CBDCs at the core. This would reduce the risks of digital money and leave to a more competitive private sector the consumer-facing functions including screening, on-boarding, off-boarding, servicing, and the building and maintenance of technology platforms. CBDCs would enable an alternative payment rail that maintains the properties of a digital bearer instrument with greater programmability and offline functionality.

### **Funding implications**

Whatever the dividing line between the public and private in the provision of new digital means of payment, the new system will entail some loss of bank funding with the unbundling of money (potentially substantial proportion outside of their Intra wallet settlements). Lost funding will be recycled either riskily through the assets that back private stablecoins or risklessly through the central bank. In both scenarios, the portfolio balance effect will encourage displaced private investors out the risk spectrum. In equilibrium,

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<sup>24</sup> In these respects, stablecoins are different from Scottish banknotes whose issuance is determined by cash demand of customers of banks whose relationship with that bank is driven by other factors (deposit and lending relationships).

<sup>25</sup> BIS Annual Report. June 2021.

<sup>26</sup> Citi. June 2021. *The Industry Revolution Part IV*.

commercial banks will still be funded albeit at a higher cost and potentially with greater volatility. Banks will have to improve liquidity management policies accordingly.

Banks will become more reliant on non-banks for credit provision. With banks more vulnerable to a deterioration in sentiment in wholesale funding markets, lending rates could be more volatile overall for those borrowers unable to access other sources of financing. There could also be implications for money markets given the large-scale reallocation of cash around the financial system.

The scale of these effects is uncertain, but they underscore the importance of addressing the unfinished business of reforms to market-based finance which will be ever more important as a direct and indirect (via bank funding) source of credit to the real economy.

The growth in market-based finance is a fundamentally positive development, bringing welcome diversity to the financial system. However, more than \$30 trillion of assets are now held in open-ended funds that offer short-term redemptions while investing in longer-dated and potentially illiquid assets. This liquidity mismatch creates an advantage to investors who redeem ahead of others, particularly in stress. This “first mover advantage” could prompt a destabilising rush for the exits, not only in the market where problems first occur, but also across markets with analogous risks. Fund suspensions, a widely available tool, exacerbate the issue.

Charts 1 and 2 (see annex) illustrate that the outflows from open-ended funds are indeed more sensitive to fund performance when funds hold more illiquid assets, and when market conditions are worse.

To reduce the first-mover advantage, greater consistency is needed between the liquidity of a fund’s assets and its redemption terms. To achieve this, funds should apply a pricing tool, a notice period, or a combination of both that reflects the liquidity of their underlying assets (Charts 3 and 4).

In parallel, central banks should recognise the importance of market-based finance to the new monetary system and extend access to their liquidity facilities to more systemic institutions at the heart of this system. Central banks developed over centuries their formal roles as lenders of last resort to banks to prevent temporary liquidity shortages from turning into solvency crises. Every central banker learns Bagehot’s dictum, “to avert panic, central banks should lend early and freely, to solvent firms, against good collateral and at a high rate.”<sup>27</sup> Were that it was so simple.

A central banker encounters several challenges putting Bagehot into practice. The first is whether a firm is solvent, not least because the market can be wrong about a bank’s solvency longer than a bank can stay liquid. The second is that central banks traditionally operated in the shadows. Emergency lending on the sly is inconsistent with democratic accountability, but disclosure can bring on the very risk of a bank run that emergency liquidity is designed to avoid.

The third challenge is that banks tend to hoard the liquidity they receive. What may look to be sufficient liquidity in aggregate can prove too little when it is asymmetrically distributed

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<sup>27</sup> *Lombard Street*.

across institutions. This exacerbates market swings, which then prompt extraordinary central bank interventions including outright purchases of corporate and high yield debt. These create moral hazard, impair price discovery, and contribute to public perceptions that central banks ‘bail out’ the market. As market-based finance become more important, a lender of last resort function that serves only banks increasingly will not serve society.

This suggests that central banks should widen access to their balance sheets to a broad range of financial market participants including asset managers. The prospect of digital currencies reinforces this imperative. Indeed, new issues will arise if tokenisation takes off, potentially dramatically impacting the market structure of the T-bill market and the role of custodians.

### **International ramifications**

A major advantage of CBDCs is that they could materially lower the costs and improve the speed of cross border payments. A potential concern, however, is that their ease of use might exacerbate the risks of currency substitution, with negative impacts on the monetary stability, financial stability, and even fiscal revenues of vulnerable countries. The combination of account-based CBDCs and digital IDs could mitigate these risks, provided there is sufficient cross border cooperation. In this respect, G20 efforts towards mutually recognising national ID credentials is promising, as are multi-CBDC arrangements that make CBDCs interoperable across borders.<sup>28</sup>

Even if these efforts are successful, however, by reinforcing the role of market-based finance, the new monetary order will exacerbate risks to cross border capital flows at a time when they need to scale dramatically to address the needs of climate change. In recent years, investment fund flows to emerging market economies have accounted for around one third of total portfolio flows, compared to around one tenth pre-crisis, as well as for the vast majority of the increase in foreign lending since the crisis (Chart 5, see annex).

These funds are particularly pro-cyclical. Bank of England work has found that redemptions by emerging market bond funds (those with larger structural mismatches) in response to price falls are five times those for emerging market equity funds (those with less structural mismatch). In turn, emerging market equity funds are twice as responsive as advanced economy equity funds.

While the shift to market-based finance has increased global capital flows to emerging markets, it has also amplified spikes in Capital Flows-at-Risk. Moreover, market-based finance flows are particularly sensitive to push shocks, especially in extreme scenarios (Chart 5).

Estimates suggest that the growing shares of FX-denominated debt, market-based intermediation and, within that, the increasing role of investment funds, have increased the sensitivity of Capital Flows-at-Risk by 50% since the crisis (second bar, Chart 7). By 2030, this sensitivity could triple (fourth bar, Chart 7), which would fully cancel out the positive impact of domestic reforms in EMEs over the past two decades (grey distribution, Chart 8).

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<sup>28</sup> Auer, Raphael; Philip Haene and Henry Holden. March 2021. “Multi-CBDC arrangements and the future of cross border payments.” Discussion Paper No. 115

While such calculations should be taken with a grain of salt, they suggest that a new world order that combines new forms of money, growing market-based finance and the growing asymmetry at the heart of the international monetary financial system<sup>29</sup> will mean that even fast-reforming emerging markets could be running to stand still in their quest for sustainable capital flows.

These risks underscore the importance of shoring up the global financial safety net. While there are many aspects, one specific challenge is the absence of an international analogue to the liquidity support proposed above under a holistic approach to market-based finance. A special purpose lending vehicle, the Liquidity and Sustainability Facility (LSF), could fill this void while supporting market access at lower rates for emerging market, developing countries and other vulnerable sovereigns.<sup>30</sup>

Developed market issuers generally benefit from well-functioning repo facilities which enhance liquidity and lower borrowing costs. In contrast, emerging market issuers of hard currency debt experience higher borrowing costs than warranted owing to the lack of effective repo markets. Even where emerging market debt issuers do have access, the markets for repo are short term and highly variable. This decreases private sector demand and increases the borrowing costs of sovereign issuers. These vulnerabilities will only be reinforced by the advent of digital money.

The BIS, the IMF and central banks should examine how best to address this gap in our international architecture. A structural shift in the nature of capital flows and the drivers of their volatility should not be addressed *ad hoc* by emergency swap lines, but rather by standing facilities anchored in multi-lateral institutions. This need is reinforced by imperative of enormous cross-border finance needed to finance the transition to net zero.

## VI. Conclusion

In 1926, the Governor of the Bank of England, Montagu Norman, helped convince the Chancellor of the Exchequer, Winston Churchill, to return sterling to its pre-war parity with gold. This decision plunged the UK into deflation and a deep recession. The old policy was not well suited to the new, post-war normal, and by the time the UK abruptly abandoned the peg in 1931, unemployment had doubled to 15% and the economy had not grown since ‘the policy’ was re-adopted.

Today, the choice is not as binary—the question isn’t whether or not to peg the currency—but the stakes are nearly as high. The world is changing rapidly: it is less hegemonic and more multi-polar; less analogue and more digital; less destructive and more sustainable; less bank and more market; less centralised and more dispersed. The old normal of cash, bank-based finance and bank payments rails is crumbling.

With a pallet that includes a new form of public money linked to a plethora of new dispersed private networks, central banks can paint a new finance that will make payments significantly cheaper and faster, open up new forms of ownership and asset classes, power

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<sup>29</sup> Carney, Mark. 2019. “The Growing Challenges for Monetary Policy in the Current International Monetary and Financial System.” Speech. Bank of England.

<sup>30</sup> <https://www.uneca.org/stories/eca-launches-lsf%2C-a-vehicle-for-debt-management-and-fiscal-sustainability>

contingent payments and distributed finance, and integrate decentralised networks that track and help reduce carbon emissions.

By being resilient, dynamic, inclusive and sustainable, the new art of money can serve everyone across this new world.

**Annex**

**(1) Bank of England Jane Austen £10 Note**



**(2) Bank of England Adam Smith £20 Note**



**(3) Bank of England JMW Turner £20 Note**



**(4) Bank of England Matthew Boulton and James Watt £50 Note**



**(5) Bank of England Alan Turing £50 Note**





**(6) Bank of England's Gold Vault**



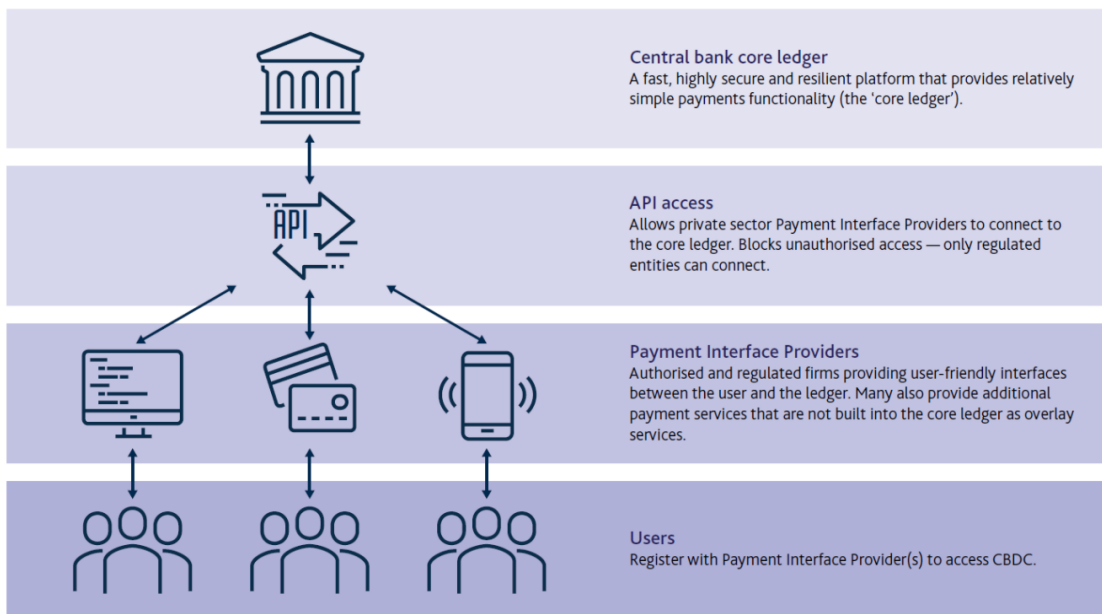
**(7) Sculptor Anthony Gormley's 'Angel of the North'**



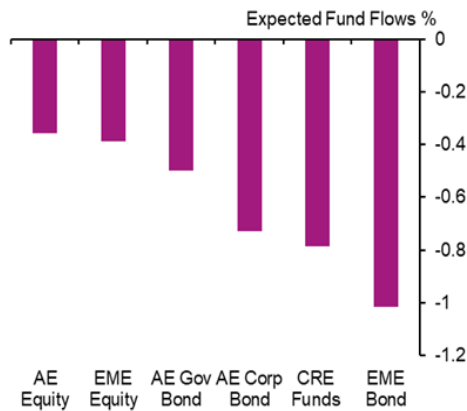
**(8) Damien Hirst's 'The Virtues' prints from his Cherry Blossom series**



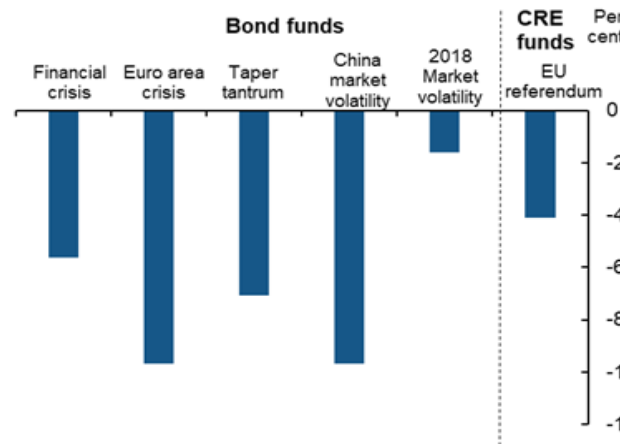
**(9) Platform model for CBDCs**



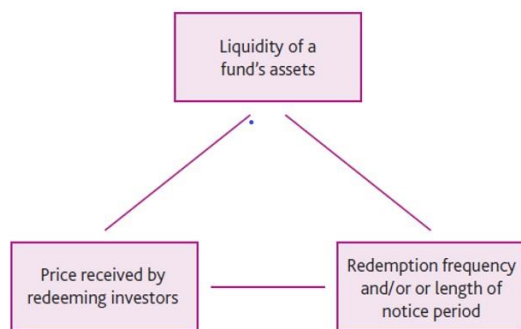
**(10) Chart 1: Outflows from open-ended funds more sensitive for greater holdings of illiquid asset**



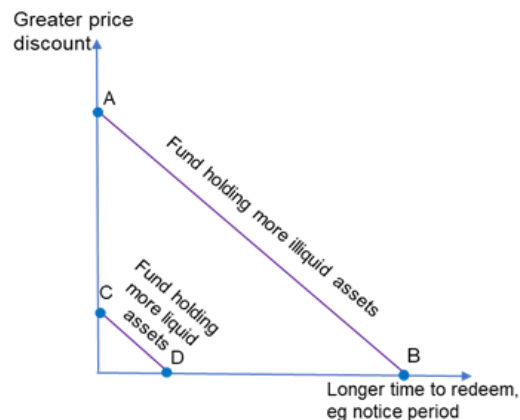
**(11) Chart 2: Outflows from open-ended funds more sensitive when market conditions are worse**



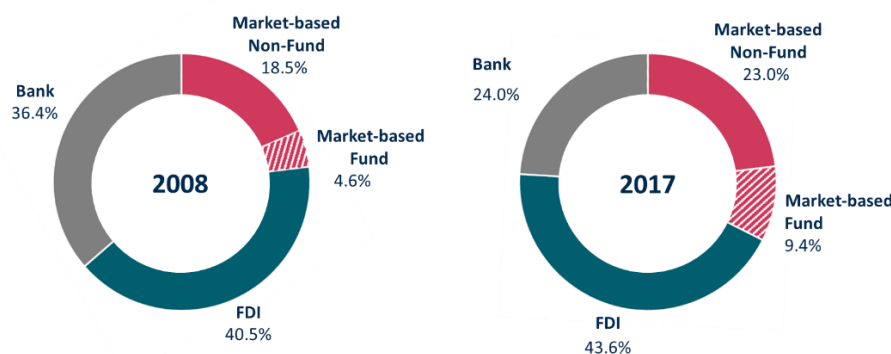
**(12) Chart 3: The FPC's principles for fund design to deliver consistency**



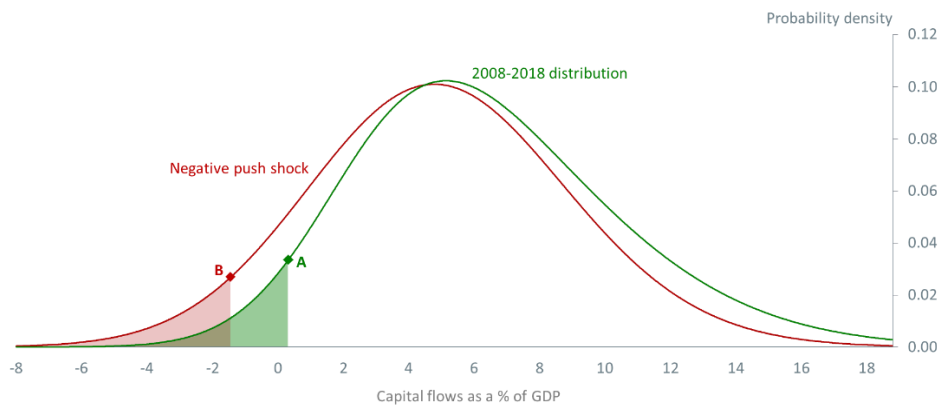
**(13) Chart 4: Stylised combinations of price discounts and notice periods needed to reduce incentives to redeem ahead of others**



**(14) Chart 5: Market-based finance accounted for all the increase in foreign lending to EMEs since crisis as bank lending has declined**



**(15) Chart 6: Push factors weighed more heavily over the past decade, offsetting some of the improvement in pull factors**



**(16) Chart 7: Structural changes in the global financial system are increasing Capital Flows-at-Risk**

