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The political economy of central banking in the digital age

It is a great pleasure to be at this conference, which has prompted me to try to pull together my thoughts on how the new technology might affect central banks: what central banking is and what central banks do. I am glad to have that opportunity because quite some years ago, in 2004, I aired the possibility of the Bank of England issuing e-money at an annual strategy meeting.¹

Since leaving central banking, my preoccupations have been less with substance than with the political economy of unelected power, of which today's post-crisis central banks are, of course, the epitome.² I am therefore going to try to put the substantive issues raised for your community by the new technology into a political-economy framework. By those lights, it is vital that the purported boundaries to any central bank e-money ventures or other new services be credible.

I will start out, in section 1, by outlining a conception of central banking as it is (or could be) practiced now, just as society starts to grapple with the new technology. I shall then ask, in section 2, whether and how the new technology challenges or even undermines that broad conception. Perhaps surprisingly, the big picture answer is that it will not, unless central banks move into providing banking services for everyone, which would make them more like a latent state-credit bank. An important qualification to "things stay the same" is that central banks will need to re-engage with the integrity

of the deep plumbing of the financial system. They must, though, be vigilant in not taking on roles that give them excessive power or which don't fit with their core purpose of maintaining monetary system stability.

1 A conception of late-20th/early-21st century central banking

In setting out a conception of central banking, I shall ask why they exist; what their purpose is; what they do; and whether they are too powerful for comfort in our constitutional democracies.

Why central banks exist: the pivot of a monetary economy

Towards the end of the 18th century, Francis Baring, the founder of the English banking dynasty, described the role of the Bank of England in the following terms. It was, he said:³



"The centre or pivot, for enabling [the monetary and credit] machine to perform its functions".

¹ With thanks to Steve Cecchetti for comments on an earlier draft.

² Forthcoming in a book, contracted to Princeton University Press, with the working title *Unelected Power: Central Banking, the Regulatory State, and Democratic Legitimacy*. This paper draws heavily on some of that material.

³ Baring, F. 1797. *Observations on the Establishment of the Bank of England. And on the Paper Circulation of the Country*.

Today we would make the same point by saying that central banks are issuers of the economy's final settlement asset.

Two types of central bank money

From then until now, there have been two types of central bank money: physical notes circulating amongst households and firms, and balances held by banks in accounts (today often called *settlement accounts*) with the central banks. It is important to remember that it was not always grasped that those balances were money.

In 1844, Prime Minister Peel personally took through the Westminster Parliament legislation that split the Bank of England in two accounting identities: into an *Issue Department* that issued notes and held gold as backing for them, representing the privately owned Bank's public functions; and a *Banking Department* that acted as banker to the banks, purportedly representing its continuing private or commercial functions. This, of course, was an egregious error. Not only were those bankers' balances central bank money, but the deposits held with the banks themselves were a form of privately issued money.

This is a monetary morality tale for our times, but one which needs some unpacking.

A tiered payments-monetary system

One vital point is that the payments system, and hence the monetary system, is tiered. Most people hold most of their money in accounts with private banks, some big, some local and small. Since we do not all BANK with the same bank, those banks need to settle

claims amongst themselves. Smaller banks might do so by holding accounts with a bigger bank (*clearing banks* in Britain, *money center banks* in America). Those bigger banks in turn settle amongst themselves across the central bank's books, and so in central bank money.

We, households and businesses, might be able to overdraw our bank accounts, and similarly the smaller banks might be able to borrow from the bigger banks. But the big banks would have to overdraw with the central bank if they did not hold enough reserves there to settle up with their peers. The central bank is, then, the lender of last resort, a sentiment first captured by Baring when referring to Threadneedle Street as the *dernier resort*.

Another vital point is that monetary liabilities of the private banking system are partly created by their lending. They do not arise simply from members of the public or small shopkeepers going to their bank and handing over bank notes. More important, in terms of scale, is banks' lending: every bank loan creates a deposit liability somewhere in the system.⁴ When a bank's deposits are no longer accepted as money, it cannot function. When the whole of the banking system is no longer trusted, bank lending ceases.

Three things are striking about this set up. It takes for granted:

- that private banking inevitably exists,
- that, in consequence, the economy's money system and its credit system are unavoidably intertwined, and
- that that calls into the existence a central bank as a monetary institution and liquidity reinsurer.

It also implicitly assumes that only banks will have access to the central bank's facilities. That is a big deal, and we should therefore take a brief look at the two *existence* assumptions, precisely because the new technology makes each of them moot.

Banning central banking

A generation after Baring and on the other side of the Atlantic, President Andrew Jackson's conviction that a national bank would threaten the country's welfare prompted him to veto renewal of the charter of the Second Bank of the United States, the descendent of Alexander Hamilton's First Bank. Ever since, this has provided inspiration for the *free banking* movement, which wants to abolish central banking. Deprived of their liquidity backstop and forced to compete, bankers would, it is maintained, be driven to prudence, and so the economy could operate without the social costs of boom and bust.

Over the course of the 19th and early 20th centuries, weaknesses in this line of argument were exposed. First and foremost, it assumes that the legislature and elected executive are somehow themselves deprived of the right to bailout ailing banks: by the middle of the 19th century, the U.S. Federal government was effectively guaranteeing privately issued bank notes, giving depositors an incentive to switch into notes at the first sign of trouble. Surely, in today's full-franchise democracies the *moral hazard* problem is not sourced solely in central banking. Indeed, central banking creates the possibility of separating liquidity reinsurance for fundamentally sound intermediaries from the political question of whether to rescue fundamentally insolvent firms.

Second, it assumes that banks are sufficiently homogenous and monitorable for an improvident note-issuer to

be spotted and excluded from the *clearing house* via which they would settle their obligations to each other. But, in contrast to that club-like world, today's banks are so complex and heterogeneous that the dynamic would just as likely be towards a collective slide towards over-issuance.

Third, and in a quite different register, free-banking also implicitly assumes that society could live with even more power than now being in the hands of private bankers.

So, as the world is currently organized, the existence of central banks is no surprise.



To ban or permit fractional-reserve banking?

What about private banking itself? Between our continent's two world wars, Chicago economists launched the other line of attack on the place of banking within a monetary system. Under the *Chicago Plan*, fractional-reserve banking itself would be banned, leaving only what are today known as "narrow banks" wholly invested in government bonds or central bank reserves (with central banks in turn invested in government bonds).

Why wasn't that taken up? I think the best explanation is that we, society, value the liquidity insurance provided

⁴ A 2014 article by my former colleague Ryland Thomas has been welcomed in parts of the U.S. scholarly community as overturning orthodoxy about the very nature of the monetary system. This is, frankly, weird (not a word often used of central banking debates). The article is very good, but what Thomas describes was orthodoxy at the Bank of England well before I joined in 1980. McLeay, Radia and Thomas, *Money creation in the modern economy*, *Bank of England Quarterly Bulletin*, 2014 Q1.

by banks, including through committed credit lines. It reduces the need for households, businesses and other financial intermediaries to self-insure against liquidity risk by holding stocks of liquid securities, releasing resources for use in the risky enterprises that can help to generate growth and prosperity.⁵



It is also worth recalling that, rather amazingly, some of the strongest support for the 1930s *Chicago Plan* came from advocates of government deciding how to allocate *credit* in the economy. As Senator Bronson Cutting put it at the time, “private financiers are not entitled to any profit on credit”.⁶ A project that academics saw as immunizing money from credit was, in political eyes, a means of getting the price mechanism out of credit allocation. It is something to ponder: credit-creation in the hands of politicians, pandering to

popularity, doing favours for friends, or approximating a planned economy. I do not find that especially attractive, but it does have lessons for central banking e-money innovations, as discussed below.

Irrespective of whether those arguments are persuasive, in the wake of the 2008-09 phase of the crisis, the issues were debated, to different degrees in different countries.⁷ Rightly or wrongly, the universal decision was not to make what would have amounted to a massive change in the constitution of money. The costs of transitioning from one set up to a radically different one were too unknowable for it to be taken seriously by elected politicians. For better or worse, the world has persevered with fractional-reserve banking, subject to redesigned regulatory constraints.

What central banks are for: monetary system stability

The crisis did, however, prompt reconsideration of what central banks are for: what social purpose they serve. The older amongst you here will probably recall the siren words of Paul Volcker’s valedictory lecture to his international peers:⁸

“I insist that neither monetary policy nor the financial system will be well served if a central bank loses interest in, or influence over, the financial system.”
(Paul Volcker, 1990)

⁵ If the likelihood of deposit withdrawals and credit-facility draw-downs are not highly correlated, the aggregate benefits increase. Kashyap, Rajan and Stein. 2002. *Banks as Liquidity Providers: An Explanation for the Coexistence of Lending and Deposit-taking*. *Journal of Finance* 57/1. 33–73.

⁶ Phillips, Ronnie J. 1992. *The Chicago Plan and New Deal Banking Reform*. *The Jerome Levy Economics Institute of Bard College Working Paper* 76. June.

⁷ In the UK this was given oxygen when the then Governor Mervyn King expressed interest in the ideas in John Kay’s *Narrow Banking*. This led the government to establish a review of structural reforms of banking chaired by John Vickers, which came down against narrow banking (and against Glass Steagall separation of “commercial” and “investment” banking), but recommended ring-fencing any material retail banks within wider banking groups, after which the ‘narrow banking’ debate subsided. UK Independent Commission on Banking. *Interim Report*. 97–100.

⁸ Volcker, Paul. 1990. *The Triumph of Central Banking? The 1990 Per Jacobsson Lecture*, Per Jacobsson Foundation.

After more than a decade in the wilderness, that wisdom is re-established as orthodoxy. Banking stability is *integral to monetary stability*. The public policy objective of preserving a stable financial system, able to provide the core services of payments, credit and risk insurance in all weathers, is not completely separable from monetary stability, because it is largely the stability of the private part of an economy’s monetary system, the banks, that is at stake.

Indeed, we should think of *monetary system stability* in this broad sense as having two components:⁹

- stability in the value of central bank money in terms of goods and services; and also
- stability of private-banking system deposit money in terms of central bank money.

The latter does not mean that no bank can be allowed to fail but, rather, that the supply of payments services from the system as a whole must be maintained.

A Money-Credit Constitution

The world I have described requires not a *monetary constitution* of the kind once advocated by the late James Buchanan but, instead, a *Money-Credit Constitution (MCC)*. By that, I mean joined-up rules of the game for banking and central banking designed to ensure broad monetary system stability.

This notion would have been familiar to our 19th century and early-20th century predecessors. Their money-credit constitution comprised: the gold standard plus a reserves requirement for private banks (an indirect claim on the central bank’s gold pool) plus the lender-of-last-resort function celebrated by the mid-19th century British journal-

ist Walter Bagehot. That package was deficient in so far as it did not cater explicitly for solvency-crises as opposed to liquidity-crises. Worse, as our economies moved to embrace fiat money during the 20th century, policymakers relaxed the connection between the nominal anchor and the binding constraint on bank balance sheets so comprehensively that it became non-existent.

At a schematic level, a *MCC* for the world as we know it (i. e. today’s familiar technology and public expectations) might have five components:

- a target for inflation (or some other nominal magnitude);
- a requirement for banking intermediaries to hold reserves (or assets readily exchanged for reserves) that increases with a firm’s leverage/riskiness;
- a liquidity-reinsurance regime for fundamentally solvent banking intermediaries;
- a resolution regime for bankrupt banks and other financial firms; and
- constraints on how far the central bank is free to pursue its mandate and structure its balance sheet.

We need five rather than three because one (resolution) was missing in the 19th century set up and because, in a world of fiat money, the nominal anchor does not of itself (seriously) constrain the size and composition of central banks’ balance sheets. In other words, banking institutions should be forced to self-insure against liquidity risk; and the legal system should be able to reconstruct failed intermediaries so as to combine continuation in the supply of services with losses falling on equity investors and bondholders. We are going to be interested in whether FinTech challenges the need for or composition of the *MCC*.

⁹ This fed into the UK’s post-crisis reforms: Tucker, Paul. 2009. *Remarks at the Turner Review Conference*. Bank of England. London. March 27.

What central banks do: manage the state's consolidated balance sheet, and constrain banking system balance sheets

Before getting to that, we need to be clear about what a canonical central bank (with some regulatory functions) does and/or should do under the conception of the monetary system I have described. Basically, it frames and implements the various components of an implicit or explicit *MCC* in pursuit of the two pillars of monetary system stability.

Monetary policy and LOLR: Managing the state's consolidated balance sheet

In doing so, it is useful to think of the central bank as conducting financial operations that change the liability structure and, potentially, the asset structure of the state's consolidated balance sheet in pursuit of the goal of nominal stability.

If a central bank buys (or lends against) only government paper, the structure of the state's consolidated liabilities is altered, with monetary liabilities substituted for longer-term debt obligations. If it purchases (or lends against) private-sector paper, the state's consolidated balance sheet is enlarged, its asset portfolio changed, and its risk exposures affected. In either case, any net losses flow to the central treasury via reductions in seigniorage income, entailing either higher taxes or lower spending in the longer run (and conversely for unexpectedly large net profits). That leaves plenty of room for competing visions of central banking.

A minimalist conception would restrict the proper scope of central bank interventions to open market operations (OMOs) that exchange monetary liabil-

ities for short-term Treasury Bills (in order to steer the overnight money-market rate of interest). The lender of last resort (LOLR) function would be restricted to accommodating shocks to the aggregate demand for central bank (base) money, and so plays no role in offsetting temporary problems in the distribution of reserves amongst banks in the private money markets.¹⁰ Further, at the effective lower bound for nominal interest rates, the only instrument available to the central bank would be to talk down expectations of the future path of the policy rate (what has become known as "forward guidance").

At the other, maximalist end of the spectrum, the central bank would be given free rein to manage the consolidated balance sheet, buying and lending against instruments of all kinds, and being a seller in some phases of the so-called credit cycle.

Stability policy: regulatory constraints on banking

In framing and pursuing the other pillar of monetary system stability, the central bank would put constraints on banking balance sheets.

Broadly, those constraints take the following broad shape:

- $x\%$ of the face value of short-term liabilities (S) to be covered by holdings of liquid assets, discounted to the value attributed to them by the central bank (d . LA);
- Residual assets ($(1-d)$.LA plus assets ineligible at the central bank) to be funded in prescribed minimum proportions by common equity (K) and debt that can be converted into equity without disruption (known as bail-inable debt, B), plus any "uncovered" short-term liabilities ($(1-x)$. S).

- K and B could be higher, the riskier or lumpier the asset portfolio.
- Where x is set at 100%, this delivers full liquid assets cover for short-term liabilities.¹¹

Given that the fragilities inherent in fractional-reserve banking are not confined to *de jure* banks and, furthermore, given endemic regulatory arbitrage and legion financial-system interconnections, the focus would be on the economic substance of *banking* (maturity transformation, leverage, and credit intermediation) rather than on the legal form of *banks*. In other words, both the central bank's liquidity reinsurance facilities and the corresponding constraints would extend to banking-like organisations, structures and vehicles.

The problematic power of central banks

The problem, of course, is that that is a lot: a lot to do; a lot to explain and defend; and, critically, a lot of power.

The underlying problem is whether it is possible to balance the welfare advantages of the credible commitment that central banks can deliver against the loss of majoritarian control.

One question is how to keep central banks on the "right side" of a blurred line between monetary policy and fiscal policy. Another is how far central banks should be able to write the rules of the game for finance.

I will leave those questions hanging, because my purpose here is to explore whether the new technology makes them go away or exacerbates them.



2 Central banking under the new technology

I hope, it will be apparent how that exegesis sets up a series of questions, challenges or threats, according to your taste, posed by the new technology. They are, staying with the structure I employed:

- Will central bank money still be the final settlement asset?
- Will fractional-reserve banking continue: i. e. will the money system and the credit system be coterminous, or
 - could they become separate, and
 - should the authorities push things in that direction?
- Will only banks need to bank with the central bank or could anyone?
 - and if banking with the central bank is not compulsory, what form would the intermediaries take?
- Will central banks still shape the state's consolidated balance sheet?
 - and if so, will the regime move towards the minimalist or maximalist conception of central bank balance-sheet operations?

¹⁰ Tucker, Paul. 2014. *The Lender of Last Resort and Modern Central Banking: Principles and Reconstruction*. BIS Papers 79. Bank for International Settlements.

¹¹ An idea first floated in the Bank of England as a contingency plan by David Rule when, before the Great Financial Crisis, we were thinking about how to cope with a 9/11-type disaster. A permanent facility of this kind is advocated by Mervyn King, *End of Alchemy*. Under such a 100%-cover scheme, ongoing industry lobbying (and associated political pressure) would be directed at the definition of "short term liabilities", the population of eligible instruments, and the level of haircuts.

- Will the core of the macro/micro-prudential function remain essentially the same?
 - or will it extend to a much larger population of intermediaries?
 - and will it revolve around integrity against cyber attacks as much as around constraining intermediaries' balance sheets?
- Will central banks become more or less powerful?

Needless to say, I don't know the answer to any of those questions. But I will offer a few thoughts by way of testing whether two hundred years of central banking as we know it is approaching its denouement. I will start with a vision where that's just how things turn out.



Markets without money: clearing houses as the new pivot

If bundles of (a defined set of) financial assets were routinely accepted in settlement of payment obligations, we might dispense with money as a medium of exchange. And if everyone could meet everybody else, however distant, across a system that enabled real-time credit checks, we might dispense with banks as payment and settlement intermediaries. This is the kind of futurology opened up by things like *blockchain*.

Crucially, the bundles we exchanged with each other would have real worth, rather than being like the *fiat* counters we use at present. This is not Bitcoin; it is more fundamental.

The preconditions for such a transformation are not merely technological. The integrity of the markets in each of the assets eligible to be a component in a payments bundle (eligible instruments) would matter hugely. In particular, the market infrastructure – the plumbing – would be vitally important. Some key infrastructural standards would, of necessity, morph.

In today's world of money, the standards applying to intermediaries, reflecting work by my generation in the late-1980s and early-1990s, include real-time Payment versus Payment (PvP) in the currency markets and Delivery versus Payment (DvP) in asset markets. In the new world, there would no P in money. Wholesale intermediaries and possibly individuals would sometimes exchange an equity directly for, say, a bond. One key standard would, therefore, be real-time finality in Delivery-versus-Delivery in eligible instruments: DvD.

For each of the eligible assets, there would still be financial and other transactions for deferred or future settlement, and so there would still be counterparty credit exposures. Indeed, left in a simple state of nature, the system of financial intermediation would, as now, be rendered fragile by the complex interlinkages created by chains of counterparty credit exposures. Clearing houses, possibly backed by central counterparties, which are really devices for mutual insurance, would accordingly be crucial to the system's resilience. They would, in effect, control entry to and handle orderly exit from the markets in eligible instruments;

and they would set the terms (collateral haircuts and margins) designed to keep the system of credit in each market on an even keel.¹²

As such, for each key market, the clearing house would be the pivot connecting the market in the underlying assets with the system of counterparty-credit-risk control.

Continuous liquidity in the markets for the eligible instruments would be similarly vital. The system would not require a conventional Lender of Last Resort capable of creating money at will, but instead a Market Maker of Last Resort which insured against unwarranted or contagious liquidity crunches in core capital markets.¹³ That MMLR might be government or might be delegated to the clearing houses, which would become public authorities.

Within the market community, the leaders of these clearing houses might, plausibly, enjoy the status of a 21st century Montagu Norman or Benjamin Strong, the human pivots on which all in international finance turned. As time passed, standards for inclusion in the settlement bundle would no doubt erode, until eventually this world needed its equivalent of Paul Volcker to restore a standard of stability (and they would, no doubt, in turn, find themselves succeeded by a phase of 'science' during which some core truths would be marginalised, as in our time).

FinTech and monetary revolution

I have been describing a world with no monetary instrument; where anyone can settle with anybody else in bundles of eligible financial assets; and in which

financial intermediaries make continuous markets in those instruments. Are we on the brink of such a world?

It seems unlikely. Today, transactions in even the most liquid equities and bonds are settled only after a lag of a few days, so using bundles of securities as the medium of exchange is hardly within reach.

Nevertheless, you might think some lesser revolution is upon us given the excitement set off by FinTech. At times, the mental spaces opened up by Bitcoin and *blockchain* make almost anything seem possible. At the revolutionary end of the spectrum, there are two broad scenarios:

- The numeraire becomes separated from the medium of exchange
- Private issuance of a final-settlement instrument that acts as numeraire

Unbundling the numeraire from the medium of exchange

The clearing-house world described above is an extreme case of a class of systems in which control of the numeraire (unit of account) is separated from supply of the medium of exchange (the final settlement asset). Such systems leave the official-sector controller of the unit of account in a strange position.

Most obviously, it would not be able to supply more money in the face of surges of demand other than by changing the measuring rod (the equivalent of adding 000s to notes today).

In a similar vein, while the supplier of the medium of exchange could attempt to impose the inflation tax (by suddenly increasing the amount of money in circulation), the numeraire-

¹² *Futurology aside, this matters for today. Tucker, Are Clearing Houses the New Central Banks?, Over-the-Counter Derivatives Symposium, Chicago Fed, 11 April 2014. <https://chicagofed.org/~media/others/events/2014/annual-over-the-counter-derivatives-symposium/tucker-clearinghouses-new-central-banks-tucker-2014.pdf>.*

¹³ *A possible need for a MMLR can also arise in monetary economies (Tucker, BIS 2014, op. cit. but, I suspect, would be unavoidable in a system without a central monetary authority.*

controller could in theory take offsetting action. In practice, doing so might be reasonably straightforward when the monetary injection was massive and abrupt, but might be harder in the face of more gradual shifts in the money supply as it would be necessary to judge how far money demand had shifted *parri passu*. To the thought that we coped well enough under the classic gold standard during the 19th century, when governments could not easily control the discovery and circulation of gold, I would observe simply, first, that the gold standard was not infrequently suspended; and, second, that since the shift to full-franchise democracy, the people have become less tolerant of swings in real economic activity and jobs.

Even if the private money supplier did not actively pursue actions against the public interest, any official macro-economic stabilisation policy would require regular changes in the numeraire. That is a slightly odd way of providing a measuring rod.

A new final-settlement asset?

Against that rather abstract background, it becomes easier to evaluate Bitcoin, which simply represents the latest attempt to create a private monetary settlement asset, and has no intrinsic worth. I think it unlikely that governments will allow their own fiat money to be displaced. Not only because of their interest in seigniorage, but also because the identified difficulties in unbundling the numeraire from monetary exchange mean that the final settlement asset is, in effect, a public good. Constraining the power of issuing that instrument, making it ours, played no small part in our long path to liberal democracy.

That does not rule out an evolution towards the real-asset-bundle settlement-instrument described above. But, however much it was used in private transactions, I find it difficult to envisage a world in which governments do not require taxes to be paid in an instrument they issue or directly control or where delivery of that instrument did not suffice to settle a private debt (legal tender).

If that is correct, there will be residual use of central bank money for some time. But that does not, of itself, entail an unchanged monetary-system structure.

What central banks do (1): who has access?

The big question becomes who can hold central bank money, and on what terms.

At first sight, the answer is obvious: everyone. Today, everyone can own and use banknotes issued by the central bank. In the future, we, citizens, could acquire specific quantities of central bank money loaded into cards or into phones or whatever. That is what I was thinking of in 2004. In terms of the economics, nothing profound is involved: merely a substitution of a physical card or a digital store for paper as the manifestation of a monetary property right.

That is well short of the vision aired by Ken Rogoff: of e-money that pays interest, and which could therefore open the way to negative interest rates.¹⁴ Rather than discussing here the through-the-looking-glass world of negative rates, I am interested in the structure of the monetary system. The world conjured by Rogoff is a world in which the new technology leads to much wider, even universal, access to accounts at the central bank.

Universal access to accounts at the central bank

If, technologically, the public could bank with the central bank, then why not allow everyone to do so in order to reap various efficiencies from de-layering the payments system and, more politically, to spread the privileges associated with access to the central bank?

In the limit, this would be a world with a central bank but *without private monetary institutions*, i.e. without commercial banks as we have known them over the past two to three hundred years. Credit intermediaries (CIs) would, no doubt, still exist, but they would fund themselves in the capital markets and, crucially, without the state guaranteeing repayment of deposit liabilities. In law, all CIs' liabilities would be risky.

One principled objection to this course is that it might give everyone access to loans from the central bank. The case for lending to an account holder who had run out of money would not rest, as now, on the social costs to third parties of not lending to temporarily illiquid but sound banking intermediaries: the negative externalities associated with banking distress. Rather, it would be driven by the political costs of neglecting private hardship. This is a world where the central bank becomes part of the redistributive fiscal state.

It is very easy to say that central banks could commit not to lend to households and small businesses, but that is glib. Any such rule could be broken. History shows that what would matter would be the second-order rule: i. e., what counts as "exceptional" and how far it is factored into the behaviour of economic agents (otherwise known as people).

Short of introducing a deeply entrenched constitutional bar on such lending, allowing citizens access to central bank

accounts would be the end of central banks' insulation from quotidian politics. This would be (or could be driven towards) "state banking", not central banking as we know it. That is the lesson of the U.S. Senate's debate on the Chicago Plan.

Separately, exploiting the new technology to bring everyone into a direct relationship with the monetary institution would have the perverse effect of cutting off the incentives for innovation in the payments system. For all of its faults, the tiered public/private structure of today's monetary system has been a driver of change over the decades, leading to cheques, ATMs, debit cards, telephone banking, and now online payments.



Beyond banks as we know them?

But if there are arguments against universality, they don't make a case for the status quo.

Already central banks have been considering whether the post-crisis clearing houses should have access to central bank liquidity insurance given their super-systemic status. In a similar spirit, some monetary authorities have granted broker dealers access to the discount window. FinTech potentially transforms the options: why not grant access to payments companies, peer-to-peer lenders, and so on.

¹⁴ Rogoff, Ken. 2014. *Costs and Benefits to Phasing Out Paper Currency*. NBER Working Paper 20126. May.

The stakes are high. As British economist R. G. Hawtrey observed nearly a century ago:¹⁵

“Anyone who can borrow from the central bank can thereby procure legal tender money.”

This is penetrating on account of its corollaries:

- Anyone who can procure legal tender can offer private monetary liabilities.
- Anyone who can offer monetary liabilities should be regulated as a monetary institution.

But, and this is the point, at the level of principle that has nothing to do with the new technology. Hawtrey’s insight could usefully have guided policy over the past quarter century, and should frame the so far inconclusive debate about *shadow banking*. Basically, if an intermediary is likely *ex post* to gain access to central bank credit, then it would be well to anticipate that in the regulatory framework.

FinTech under the Money-Credit Constitution

Thought of in that way, the significance of FinTech for central banks is that, at the least, it provides another opportunity to make clear what is within and what outside the monetary system. But unlike previous episodes, where the opportunity was fatally missed – money market funds in the 1980s, broker dealers in the 1990s, SIVs in the 2000s – it might demand such clarity. That would be a good thing.

What central banks do (2): beyond constraints on intermediary balance sheets

There is another element in all this, which also has its precursors.

If the purpose of central banking is to maintain monetary system stability, since the 2007–09 crisis we have come to think of this as, pre-eminently, constraining banking balance sheets. But that takes for granted the operational and legal integrity of the infrastructure that undergirds the monetary system.

Over the course of the past two centuries, amongst many other things that has meant clarifying the law for negotiable instruments (bills of exchange and cheques), anti-forgery protections for banknotes, and delimiting a banker’s duty of confidentiality. During my own career, it meant designing what we then called a dematerialised system of settlement for money-market instruments after a Messenger, as they were called, was mugged and robbed of a sack of paper instruments in the vicinity of Lombard Street.

That wave of infrastructural innovation, which led to the Depository Trust & Clearing Corporation (DTCC) in the U.S.A. and electronic transfers of title in Euroclear and Clearstream, necessitated changes in the law. Potential changes spurred by *blockchain* and similar technology would likewise require firm legal foundations. It is all very well providing for confidentiality and anonymity, but property rights cannot be enforced unless it is possible for an adjudicator (the courts) to verify ownership and transfer of title.

As the City theft incident a quarter of a century ago illustrates, legal foundations are necessary but not sufficient. For individual users, trust in the system demands a warranted conviction that assets will not be stolen or lost. For the society as a whole, there is a normative expectation that the system of exchange won’t collapse or break. Unless the financial-services industry retreats to being

a small-scale club, government regulation inevitably plays a big part in this.

Cyber-integrity is in that sense merely the latest in a long line of challenges, but on a scale rarely contemplated before. Some years ago Philip Bobbit impressed upon the guests at a dinner held by Mervyn King the prospect of warfare via cyber attack: “We have shut off your peninsula. Here are our terms.” Central bankers must today engage with the possibility of their financial infrastructure – the wholesale payments system, the clearing house, trading platforms – being switched off or fatally corrupted.

After 9/11, common wisdom was that “best practice” contingency plans included real-time, continuous back-up of data to a physically distant server site. In a world of cyber-attacks, continuous back-ups might flip to being “worst practice”, because the attacker can infect the reserve as well as the prime system.

After 9/11, policy makers focussed on disaster recovery at the expense of standard boom and bust risks. Over the past decade, the effort to contain those risks might have deflected attention from cyber crises. The most fundamental change brought by FinTech is less likely to be in the economic structure of our monetary system than in the very conditions for its survival.

Obviously, this is not a field where central banks can always lead. Alongside finance ministries, they will find themselves engaging with the security and intelligence services more than ever before. The gravity of central banking concerns and demands for the operational integrity of the monetary

system’s basic infrastructure will need to be clear. Sometimes they will be part of the solution, marking the return of the central banking plumber.

Back in the 1980s and into the 1990s, central banks led on many core-infrastructure projects, developing settlement systems and sometimes operating them. The *monetary institute* moment rejected or neglected that orientation, just as it neglected or rejected an interest in the soundness of individual banks. A decent *Money-Credit Constitution* for tomorrow will, I suspect, have to re-embrace the plumber just as it has already embraced the prudential supervisor.

The core of banking will remain prudent balance-sheet management

The commercial counterpart of that thought is commonplace amongst FinTech entrepreneurs and consultants today. It is not unusual to hear people say that technology and delivery systems will be more important to the future of banking than balance-sheet management. I think, I have even heard it said that balance-sheet management is an artefact of the old technology.

That thought is, let’s be clear, utter rubbish. The technology of banking has changed radically more than once over the past two hundred and fifty years. It seems likely to do so again. But so long as the underlying economic service is liquidity transformation and credit supply, the changes in technology will not alter the public interest in prudent balance sheet management and as resilient monetary system. Anyone who holds otherwise – and some do – should be a doubtful candidate for a banking licence.

¹⁵ Hawtrey, R. G. 1922. *The Genoa Resolutions on Currency*. *The Economic Journal* 32/127. 290–304.

Conclusions

Here then are my current answers to the questions posed at the beginning of section 2:

- Central bank money will survive as the final settlement asset
 - as such central banks will remain the pivot, but it is a role they could eventually share with central-counterparty clearing houses.
- Fractional-reserve banking will continue, so the money and credit systems will remain inter-twined
 - But many more types of intermediary involved in payments services, clearing or liquidity-insurance might gain access to the central bank.
 - If so, that should be recognised formally rather than stumbled into in the midst of crisis.

- As such, the regulation and oversight of private monetary institutions is likely to become broader.
- Central banks will continue to conduct financial operations that reshape the state's consolidated balance sheet
 - But they are more likely to find themselves acting as Market Makers of Last Resort, so they will not be at the minimalist end of the spectrum.
- The central banker as plumber is likely to be resurrected.

As such, in answer to my final question, far from withering away, the central banks are likely to be even more powerful. The challenge is to minimise the scope and depth of their role, and to ensure that it enjoys wide public and political support. That might end up being a greater challenge than technological change itself.

