

Digital Currency (DC) – Retaining or Overcoming the Bankmoney Regime? Design principles that make the difference

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Introduction. Meaning of digital currency (DC)

This paper undertakes an assessment of central bank digital currency issued into public use in coexistence with bankmoney. The guiding question is whether introducing digital central bank money into general use serves to stabilise and thus retain the present bankmoney regime based on fractional reserve banking, or whether digital currency can be seen as a step towards a future sovereign money system. The answer to that question depends on the extent to which a number of decisive design principles are going to be implemented.

As to the terminology, *central bank digital currency* is also addressed here simply as *digital currency (DC)*. *Digital* means that the money comes in a digital form and is handled electronically, in contrast to solid cash on hand. The term *currency* supposes the money to be originated from a central bank that is the monetary authority of a sovereign nation-state or community of nation-states, or a currency area's treasury or other state body. If this is the case, DC represents *sovereign money*.

Bankmoney, by contrast, can certainly be referred to as *digital money* or *electronic money*, not however as *digital currency*, because *currency*, besides referring to the monetary unit of account, traditionally has the meaning of sovereign coins and central bank notes, or, in a now modernised sense, the *general meaning of sovereign money in any form*.

Current system designs

Crypto coin or deposit money?

The discussion about DC has emerged since 2013/14. First design studies of DC were put forward by Barrdear and Kumhof of the Bank of England, the Swedish Riksbank and the Basel Bank for International Settlements, and were also presented at an early stage by monetary reformers and other economists.¹ The number of central banks and international monetary institutions that have expressed an interest in DC denominated in the respective national unit of account has been steadily growing.²

Initially, DC was imagined in the form of a cryptocurrency based on distributed ledgers and blockchain technology. Expressions such as *Fedcoin* or *IMFcoin* or *RSCoin* clearly were meant that way.³ Various announcements by the Bank of England suggested that

¹ Barrdear/Kumhof (BoE) 2016 3–18, Kumhof/Noone (BoE) 2018 4–22, 35–37, Sveriges Riksbank 2017, 2018, Ingves (Sveriges Riksbank) 2018, Dyson/ Meaning (BoE) 2018, BIS 2015, 2018, Bech/Garratt (BIS) 2017, Niepelt (Swiss National Bank) 2015, 2018. Pioneering inputs from monetary reformers inputs were made by Dyson/Hodgson 2016, Wortmann 2016, Yamaguchi/Yamaguchi 2016, Huber 2017a 188–190, 2018 [2014]. Other economists supporting DC include Bordo/Levin 2017, Bordo 2018, Eichengreen 2017, Roubini 2018. Skeptical statements on the part of central banks by Kumar/Smith 2017, Thiele 2017, Cœuré/Loh 2018.

² Recent studies include IMF 2018 and Central Bank of Iceland 2018.

³ For Fedcoin see Andolfatto 2015, Koning 2014, Winkler 2015. IMFcoins were considered by IMF director Chr. Lagarde.

RSCoin, followed by the concept of *Central Bank Issued Digital Currency (CBDC)* were about a special type of cryptocurrency to be issued by the Bank.⁴

On the other hand, it was stated that CBDC is intended as a new kind of money to counter the potential challenge of cryptocurrencies without, however, being cryptocurrency itself. CBDC might also come in the form of an 'account-based solution', that is, non-cash central bank money-on-account in general public circulation, thus an extended form of central bank account balances, deposit money beyond the conventional so-called reserves (the latter used in interbank transactions only). The expression *Fedwire for all* clearly refers to a system of accounts for transacting DC in the form of central bank deposit money.⁵ The Swedish Riksbank's project of an electronic currency dubbed *e-krona* is explicitly conceived of as an account-based system.⁶ Subsequent releases by the Bank of England (BoE) left open whether CBDC would be crypto coin or deposit money (i.e. money-on-account).⁷

Some scholars deem it possible to have DC as central-bank deposit money and as cryptocurrency at the same time.⁸ For a number of reasons, however, DC is unlikely to be realised in the form of cryptocurrency anytime soon, let alone cryptocurrency to replace money-on-account. Among related problems is the high volatility of cryptocurrencies, due to their being used as speculative casino tokens rather than a means of payment. Transferring cryptocurrencies is not fast enough for now, is much too energy-intensive and is thus comparatively expensive. Crypto trading platforms are vulnerable to hacker attacks. There is no guarantee of safeguarding, and legal questions of liability and identifiability are unsettled.⁹ For implementing DC, tried and tested ways of managing accounts and payments from and to accounts are fully suited.¹⁰

A. Grym, who is in charge of digitisation at the Bank of Finland, considers the idea of central bank cryptocurrency to be a chimera. If at all, DL/blockchain technology will be used as an alternative, cryptographic way for managing conventional accounts and payments. In this sense, the Dutch National Bank (DNB) experimented in 2015 with *DNBcoin* for the internal accounting of conventional assets and liabilities.¹¹ Monetarily and economically there was no change: 'When money is digital, it takes the form of account balances. ... Central bank digital currency would practically mean bank accounts at the central bank'.¹²

⁴ RSCoin is the concept of a cryptocurrency developed for the Bank of England. See Simonite 2016, Danezis/Meiklejohn 2016.

⁵ Andolfatto 2015. *Fedwire* is the payment system of the U.S. Federal Reserve System.

⁶ Sveriges Riksbank 2017, also applying to Central Bank of Iceland 2018.

⁷ For example Broadbent 2016, Carney 2018 5.

⁸ IMF 2018 4, 8.

⁹ Also see Kieler Institut 2018 5, 22.

¹⁰ Cf. Scorer 2017.

¹¹ Dutch central bank presents results of cryptocurrency experiments, *coindesk*, 23 Jun 2016, by Michael del Castillo.

¹² Grym 2018 1, 13. Also Thiele 2017.

DC variants of the Bank of England

Barrdear/Kumhof from the Bank of England (BoE) presented the concept of *Central Bank Issued Digital Currency (CBDC)* in 2016, further elaborated in Kumhof/Noone 2018.¹³ Originally, CBDC was defined as 'a universally accessible and interest-bearing central bank liability, implemented via distributed ledgers, that competes with bank deposits as medium of exchange ... granting universal, electronic, 24/7, national-currency-denominated access' to the central bank balance sheet. CBDC are considered as a way of implementing Tobin's incidental idea for 'deposited currency accounts' from 1987.¹⁴

In the follow-up version from 2018, 'the use of distributed ledger technology is not assumed'. More importantly, **CBDC is available as a universal means of payment only in one out of three variants. The other two variants restrict access to CBDC to financial institutions.**¹⁵

Variant 1. *Financial institutions access.* In this variant CBDC is used exclusively by monetary and non-monetary financial institutions. Other firms, private and public households are excluded. Banks and other financial institutions are on equal terms as far as CBDC is concerned, however, not with regard to conventional interbank reserves and refinancing at the central bank, which still is the privilege of banks.

Variant 2. *Economy-wide access.* This variant grants access to CBDC to all actor groups in the economy, regardless of their institutional status.

Variant 3. *Financial institutions plus CBDC-backed narrow bank access.* This scenario combines variant 1 (exclusive access to CBDC for financial institutions) with a 100%-CBDC-reserve on customer deposits in special accounts. These accounts would be provided by banks and other CBDC-payment services. Entries in such accounts do not represent CBDC, or, as the authors say, they represent 'indirect CBDC' in that a respective bank promises to keep a 100%-CBDC-reserve on such deposits. It is not explained how the envisaged 100%-CBDC-coverage would be ensured operationally, or why falling back on the approach of 100%-banking from the 1930s would be a good idea rather than consistently keeping up the present sovereign money approach (CBDC *is* sovereign money) by facilitating direct customer access to a CBDC account.

All three variants use CBDC in a new account and payment infrastructure separate from the continued and unchanged split-circuit two-tier circulation of central bank reserves and bankmoney. CBDC accounts are transaction accounts only, no giro accounts for crediting bankmoney. Whether interbank circulation must entirely be carried out in reserves or can also use CBDC remains unclear.

¹³ Barrdear/Kumhof 2016 3–18, Kumhof/Noone 2018 4–22, 35–37. Prior to these Ali/Barrdear/Clews/Southgate 2014a+b, Broadbent 2016.

¹⁴ Barrdear/Kumhof 2016 3–18. Kumhof/Noone 2018 4–22, 35–37.

¹⁵ Kumhof/Noone 2018 pp.18.

The three variants of the BoE's CBDC model feature the following design principles.

- a) CBDC accounts and reserve accounts are kept apart in two different infrastructures. CBDC transactions are thus equally kept apart from the existing fractional reserve banking and RTGS payment systems.¹⁶ CBDC and reserves, even though representing the same kind of central bank deposit money (money-on-account), are not fused into one common circuit. They are not even convertible into each other.
- b) Non-bank money users can possibly change bankmoney for CBDC, but they have no formal right to have done such a swap. Banks are not obliged to offer CBDC accounts. Central banks are free, anyway, to accommodate demand for additional CBDC or not to do so.
- c) CBDC are interest-bearing, in that the central bank pays a deposit interest on them. This may include positive, zero, and negative interest rates.
- d) The central bank issues CBDC exclusively to financial institutions by purchasing securities from them, particularly sovereign bonds.

Compared with the first version of the CBDC concept, the latter has come out rather complicated. It is not exactly obvious how things would improve in a system which adds still more complications on top of the already quite complicated split-circuit reserve system, or even graft a partial full reserve system onto the continued fractional reserve system. The additional complications in question are attributable to the obvious intention to keep the existing bankmoney regime largely unchanged, and, in a way, even protect it against CBDC. Introducing CBDC for widespread public use and making sure at the same time that CBDC has a preferably small circulation among only a few actors, is a blatant contradiction in itself – the more so as principle d) puts the decision on the market penetration of CBDC primarily into the hands of the banking sector and other financial institutions. What would they do with CBDC, if at all, other than putting the major part of it into non GDP-contributing financial transactions? And why would they be interested in granting access to CBDC to a wider public?

Principles a) and b) aim to impede mass migration from bankmoney to CBDC, or CBDC-covered deposits, respectively. CBDC thus cannot credibly claim to compete with bankmoney. Apparently, there are fears that bankmoney might soon fall out of favour if there is the alternative of CBDC. Therefrom, CBDC is offered as anything but the sovereign money in general use which it basically ought to be. The notion of sovereign money includes its universal availability as legal tender in general use. This excludes complicated restrictions on its availability to particular actor groups, limitation of its quantity in relation to other means of payment, and delimitation of its uses according to particular interests.

¹⁶ RTGS = Real-Time Gross Settlement Systems. Payments (transfer of balances) are carried out immediately rather than cleared and settled at the end of the day.

As regards the variable interest yield of CBDC, according to the authors this aims at clearing the market at the respective point of equilibrium¹⁷ – whoever believes to know what and where in practice this ideal-world point actually is. In contrast, it is clear that the interest on CBDC is aimed at controlling the ratio between bankmoney and CBDC. It is less clear, which interest rate is supposed to re-adapt to the other: the deposit interest on bankmoney set by the banks reacting to the interest on and amount of CBDC; or the deposit interest on CBDC set by the central bank reacting to the interest on and amount of bankmoney?

The e-krona concept of the Swedish Riksbank

The e-krona concept was published by the Riksbank, the Swedish central bank, in September 2017. It was conceived of from the beginning as a 'register-based e-krona', i.e. an account-based approach.¹⁸ The 'register' is a current account at the Riksbank, with individual accounts for each holder of e-krona. These accounts are a position on the central bank's balance sheet, accessible day after day around the clock (24/7). The accounts, nevertheless, are envisaged as a new infrastructure for managing e-krona balances and transactions, in addition to the existing account infrastructure and payment system of the central bank. Interbank payments would still be carried out by circulation of reserves. Conversion of reserves and e-krona into each other would however be possible. Analogous to cash, e-krona are not interest-bearing.

The project was triggered by the fact that the decline of cash is well advanced in Sweden. The Riksbank, however, feels obliged to provide the nation with central bank money for public use, if no longer in the form of solid cash, then in the form of e-krona, that is, electronic or digital sovereign money-on-account. Equally desirable, of course, is the perspective of conventional instruments of monetary policy becoming more effective again as the share of e-krona in the money supply would grow in relation to bankmoney.

As a supplement to e-krona accounts, provision is made for a 'value-based solution' by way of swipe cards or mobile phone apps.¹⁹ This allows offline payment with the help of reading devices when there is no online connection or for persons who cannot or do not want to maintain a currency account. The balances on the cards or mobile apps are supposed to be usable like prepaid balances in mobile phones or travel cards in public transport. If the card or mobile is lost, the e-cash is gone just as if a purse is lost or stolen. The e-krona balances available via cards or apps are limited according to existing limits for making payments in cash. In Sweden this is an amount equivalent to 250 Euros.

¹⁷ Kumhof/Noone 2018 pp.8.

¹⁸ Sveriges Riksbank 2017 5, pp.19. The 'e' in e-krona stands for electronic; the krona is Sweden's national currency unit.

¹⁹ Sveriges Riksbank 2017 19, pp.21. Similar concepts are now being developed elsewhere too, for example, e-franks for Switzerland, on which the government has commissioned a study in summer 2018.

The central bank undertakes to supply e-krona accounts to everyone who wants to open one, or rather, it obliges the banks to do so; one reason for this is also because of the low population density in extensive parts of the country. Conversion of bankmoney into e-krona, and vice versa, is legally ensured. The central bank as account and payment system provider as well as the banks and other payment service providers as system users continue to act as a trusted third party, not, however, as bankmoney intermediaries by way of interbank reserve circulation, but as fiduciary e-krona account managers of their customers, whereby e-kronas are *directly* transferred from payer to payee.

E-kronas are meant to be used primarily by private households and small firms, thus for retail rather than wholesale payments. Putting a ceiling on the amount of payments, though, is not considered. Only the balances on swipe cards or mobile apps would be limited.

The basics model of the Bank of England

Staff of the BoE have presented yet another concept paper whose design reconnects to the original, basic CBDC concept of the BoE.²⁰ This, say, basics model is based on, or at least overlaps with, variant 2 in the above CBDC concept by Kumhof/Noone. The approach is account-based. CBDC would be a universal means of payment, available for all actor groups in the economy without particular ceilings on the quantities available. Rather than being seen as an equivalent to cash, CBDC are introduced as a reserves-like means of payment in general public use. Reserves and solid cash as well as bankmoney would be convertible into CBDC at par, or vice versa. CBDC enter into circulation through the central bank paying in CBDC for open-market purchases of securities, primarily sovereign bonds. CBDC are interest-bearing.²¹ Negative interest rates are briefly discussed in the paper as a motive for introducing CBDC, but are neither recommended nor rejected.

The project paper stresses the importance of CBDC for strengthening monetary policy. The reference rate of interest, as is supposed, would be the interest on CBDC rather than, respectively, the base rate on reserves or the interbank rate. The interest on CBDC as the general point of reference would improve transmission of central bank rates on banking, finance and the economy, because the CBDC rate immediately affects a greater number of actors, not just the fractional refinancing of banks.²² The effectiveness of CBDC interest policy depends on the degree of market penetration of CBDC. The more widespread CBDC and the higher the share of CBDC in the money supply become, the more an improved transmission can be assumed.

Another aspect the authors bring up for discussion again, is helicopter money, this time as a channel for the issuance of CBDC. Unconventional measures of quantitative

²⁰ Meaning/Dyson/Barker/Clayton 2018, Dyson/Meaning 2018.

²¹ Meaning/Dyson/Barker/Clayton 2018 2–8.

²² Meaning/Dyson/Barker/Clayton 2018 pp.15, pp.21.

easing (QE) promise to be much more useful than QE just for finance, as helicopter money directly feeds into the real economy.²³

Advantages of DC

Some authors imagine the introduction of DC side-by-side with bankmoney to be a smooth process, as a moderate alternative to what is seen as the radical approach to sovereign money reform by abolishing the bankmoney privilege overnight. In actual fact, however, the coexistence of bankmoney and non-cash central bank money in public use poses a number of questions which are virtually absent in a complete reform. First, however, for the advantages, applying primarily to the Swedish e-krona concept and the basics model of the BoE, not or less so to variants 1 and 3 in Kumhof/Noone.

Safety, trust and acceptance

With regard to the safety of DC there is no difference between a gradual and a radical approach. Central bank issued DC is as safe as cash, even more so with regard to loss, theft and technical liability for existing account balances. In today's split-circuit payment systems there is still some counterparty risk, whereas this does not exist in DC transactions directly from payer to payee, much as with payments in cash.²⁴

The introduction of DC realises a special aspect of the Currency School principle of separating money and credit, that is, more specifically, separation of the customers' money from a bank's or service provider's own means. To the extent to which the money supply consists of 'unvanishable' sovereign digital currency, banks need not be rescued in a crisis. The more DC, the more trust in the safety, stability and functionality of the money system.

Against this background there is no doubt about public acceptance of DC. Firms and people would chose to maintain a bank giro account, or a currency account or both side by side. Acceptance would be the same as is the case with government coins and central bank notes. Acceptance would also be restored where taking cash is refused today, for example at the tax office.

Comfort and costs

Regarding comfort and costs, there is also no difference to be expected between a partial or full sovereign money supply. Over time, DC might even prove to be cheaper than bankmoney, because with direct transfer of DC from payer to payee the costs of intermediary reserve circulation are eliminated.

The willingness to pay for safe money varies with economic sentiment. In times of crisis and increased uncertainty, actors, particularly those with large liquid money balances, are prepared to pay extra for more safety. In times of unworried normal mode, however, safety is less urgent and cost sensitivity comes to the fore. The result

²³ Meaning/Dyson/Barker/Clayton 2018 pp.24.

²⁴ Winkler 2015 10, IMF 2018 4, 8.

might be an accordingly changeable preference for bankmoney or central bank money. Under extreme conditions this might pose a problem, but not normally, much as a cyclical degree of liquidity preference is not normally a real problem.

Another cost aspect relates to the funding costs of a growing supply of DC. A growing amount of bankmoney converted into DC means a continued extremely low fractionality of reserves, but on a shrinking share of bankmoney, and at the same time full funding of the growing share of DC, thus higher funding costs – which, however, are stretched over time and distributed across all banks. By and large, the funding costs involved would be of a same amount as if people were increasingly paying in cash again rather than making cashless payments. Handling DC, though, is less cost-intensive than handling coins and notes. Around 1900, banks had no problem at all in dealing with a cash-to-bankmoney ratio of about 60:40. Why should they have problems when over time the ratio of DC to bankmoney would come closer again to 50:50 rather than the present ratio of 5–10% solid cash to 90–95% bankmoney?

Enhanced effectiveness of monetary policy

Another advantage of the general circulation of DC is improved effectiveness of conventional instruments of monetary policy as set out above. Today, the supposed transmission of base rate policy onto finance and the real economy has become rather weak. With a growing share of DC in the stock of money, the quantity lever of interest rate policy would increase, too. This alone is reason enough to introduce DC.

Increased seigniorage

An advantage of sovereign money-on-account particularly for the public purse is an increasing amount of seigniorage, in proportion to the share of sovereign money in the money supply. No matter how DC enters circulation – like cash today in the Swedish e-krona model, or against sovereign bonds as in the English CBDC concept, or through public expenditure as is one option in the basics model of the BoE – banks will have to finance that money in full. Even under conditions of still predominant bankmoney this will result in an increased amount of seigniorage.

Starting point for asset-side accounting of central bank money

The introduction of DC would be a suitable opportunity to change accountancy for sovereign money on a central bank's balance sheet. The change would be to enter sovereign money into the books as an asset only, thus not only coins as is the case today, but also notes and reserves, and in addition now also central bank DC. Notes and, respectively, reserves and DC would no longer appear to be a liability of the central bank which in fact has become obsolete under conditions of pure fiat money. The change requires a few modifications in central bank accountancy.²⁵

²⁵ See www.sovereignmoney.eu/central-bank-currency-register-for-accounting-for-sovereign-money.

Real and false problems with the coexistence of bankmoney and DC

Continued bankmoney creation as a major source of instability

Any coexistence of central bank money and bankmoney comes with a fundamental problem, which poses itself by the continued existence of the bankmoney regime as such. Pro-active bankmoney creation and split-circuit fractional reserve banking continue to exist, including all sorts of problems and self-escalating dynamics related to it, such as persistent overshoot of money, credit and debt, recurrent financial market failure and ensuing proneness to crisis, the inherent non-safety of bankmoney, not to forget the centrifugal distribution of income and wealth. Digital central bank money in important volumes can mitigate those dynamics, but not stop it, the more so when it is not the central bank, but the banks who in the first instance decide on whether and how much money is created.

Technical compatibility of bankmoney and DC

Different means of payment from different originators have coexisted throughout the times, normally without technical complications. This has certainly been the case with regard to the coexistence of sovereign cash and bankmoney. It will not be different with regard to the future coexistence of DC and bankmoney.

Central bank system designers are still of two minds about a number of questions, such as, for example, whether to keep DC separate from or integrated with reserve circulation; or whether access to and the stock of available DC should be restricted in some way or left unrestricted in an open market process. Independently, and in a purely technical sense, running bank giro accounts side by side with accounts for holding and transacting DC – in brief, currency accounts – is not a concern.

For the banks and other payment service providers, carrying out payments between customer currency accounts is neutral. The money is transferred directly from a payer's currency account to the recipient's currency account, without involving any intermediation by reserve circulation. A transfer from currency account to bank giro account is made in the same way as transfers are made today from a government (= non-bank) reserves account at the central bank to a customer bank giro account at a bank: the payee's bank receives the reserves, while the payee's giro account is credited the same amount in bankmoney. In a transfer in the opposite direction, from giro account to currency account, the payer's bank giro balance is debited, and thus deleted, while the amount involved is transferred from the bank's central-bank reserves account to the payee's currency account.

The reserves a bank receives in payments from currency accounts to giro accounts are not entirely disposable for that bank, for it needs reserves of about the same amount for carrying out payments in the opposite direction from its customers' giro accounts to currency accounts. On balance of current outflows and inflows of reserves, a significant surplus or deficit is unlikely to occur. Outgoing and incoming payments offsetting each other is one mechanism behind fractional reserve banking, others, for

example, include the fact that at any point in time bankmoney is used by only a subset of customers, to only some partial quantity, and at different times. Should some deficit occur nonetheless, it is financed by intraday overdraft in the central bank's RTGS payment system or by taking up money at the interbank market. Thus far, payment transactions come with neither an advantage nor a disadvantage to the banks.

Impaired ability of banks to lend and invest?

A concern occasionally expressed is that with a growing share of DC 'deposit-funded bank credit might be undermined'.²⁶ However, such an argument about banks lending out customer deposits misses the point. Under split-circuit reserve banking, deposits are not loanable funds and banks are not financial intermediaries, but creators, de- and re-activators and finally extinguishers of bankmoney.²⁷ Banks may attract additional reserves by drumming up external customers. This comes with a temporary financing advantage, but does not directly affect bank credit extension. Balances in a giro account are not taken from somewhere, but created in the moment they are entered into the books, as they are deleted when the account is debited. Caring about fractional refinancing of transactions, as far as necessary, is the business of a different banking department. This invalidates the assumption that 'with too widespread a CBDC, it might threaten the banks' lending activity, if banks cannot use deposits for that purpose'.²⁸ DC does not threaten banks' lending, because – besides the fact that DC can be borrowed and lent - split-circuit reserve banking continues to exist, thus the bankmoney privilege to pay out a loan to nonbanks, or pay for a purchase from nonbanks, with self-created bankmoney – which in fact is a fundamental problem, in that it recurrently produces monetary and financial overshoot and crises.

With DC, contrary to bankmoney, banks can actually borrow currency account balances from their customers, as loanable funds indeed. The more there is DC in circulation, the more banks can finance business to be done in DC through pertinent channels: reflux of principal and sales receipts of various kinds (which alone provides for much of the means necessitated), short-term borrowing of DC from customers (savings or time contracts or other), issue of bonds and other bank debentures, borrowing at the money market, and finally also central bank credit made out in DC.

The only problem which may arise is a temporary shortage of central bank-eligible securities, if too much bankmoney has to be converted into DC in too short a time, for example, if too many borrowers ask for bank loans to be paid out in DC rather than bankmoney. Structurally, this is about the same problem as a bankrun, that is, the problem of basically insufficient bank liquidity in any bankmoney regime based on fractional reserves, the problem posing itself as soon as there is a deviation from the normally-distributed mode of operation.

²⁶ Niepelt 2015.

²⁷ Huber 2017a pp.59, 2017b, Jakab/Kumhof 2018.

²⁸ Broadbent 2016 5.

Risk of bank runs

Not surprisingly, the biggest fear of DC designers is mass migration from bank giro accounts to currency accounts, thus a veritable bankrun. This remains a standing problem indeed – not, however, a problem of DC (i.e. central bank money, thus sovereign money in most cases), but the fundamental problem of bankmoney, which is unavoidably inherent in fractional reserve banking and the false identity of money and credit. The bankrun is bankmoney's fateful writing on the wall, always shining through from the background of that system which recurrently needs new auxiliary supports so as not to be constantly threatened with collapse. It is revealing with regard to the biased problem perception of most statements on this issue that systemic instability of the coexistence of bankmoney and DC is attributed to the introduction of DC rather than to the continued existence of bankmoney.

The possibility of a bankrun apparently serves as a cause-reversing excuse for refraining from an unreserved, market-led introduction of CBDC. The pretext reflects the prevalent identification of most central bankers with the existing bankmoney regime, still believing it is them, the central bankers, who lead the system rather than the banks who actually do. Therefrom, and contrary to own rhetoric, most central bankers today are rating the banks' interest in conserving the bankmoney privilege higher than the public interest in safe money and more stable finances.²⁹

At this, the potential for bankrun is unduly exaggerated. It is well known that bankruns do not occur in a situation of business as usual. They only occur when an individual bank or many banks enter a state of crisis. Sovereign money and bankmoney have coexisted for over 300 years, at first as private banknotes existing side by side with precious metal coins, later on until today as bankmoney-on-account (deposit money) existing side by side with central bank money (cash). What would be different if that coexistence continues with bankmoney side by side with DC? Not too much in the first place, maybe more over time as DC would spread, while banking and financial crises, too, will continue to occur, including the threat of bankruns and the continued constraint to bail out systemically relevant banks.

In a landslide migration from bankmoney to DC, the banking sector would hardly be able, in the short run and in a regular way, to procure enough eligible securities for taking up enough money so as to fulfil its largely 'empty' promise to convert bankmoney into DC. Such a situation would be destabilising for the banking sector and finance in general. Central banks would have little choice but to resort to QE again. However, with currency accounts being available they could do it in a more effective and sensible way than has been the case with QE for finance during the 2010s.

Firstly, central banks should pursue policies of QE for real economy, for example through helicopter money for public expenditure or a citizens' dividend. Secondly, central banks should stabilise banks and finance not by trying to stop the bankrun, but:

²⁹ Also see Bjerg/Nielsen 2018.

by supporting the process. To this end, they should grant special credit to banks for the conversion of bankmoney into DC. In a state of financial emergency this would have to be unsecured book credit, involving a heightened risk for the central banks as far as banks would go bankrupt. At the same time, however, the measure by itself would effectively help prevent banks from going bust.

In an emergency, special conversion credit can be granted at zero percent interest, on condition the principal be paid off with priority as soon as there are re-conversions of DC into bankmoney; or else, in the absence of re-conversions, to substitute regular interest-bearing central-bank credit for the special conversion credit step by step according to a long-term schedule defined by the central bank.

The special conversion credit would have to be budgeted maximally to an amount equal to the remaining stock of bankmoney, even though not necessarily be realised to that amount. The sum involved would represent only about a quarter or a fifth of the vast sums of QE for finance during the 2010s. The banks would be rescued once again, not however for the sake of rescuing them and their bankmoney and maintaining payment transactions in general, but for supporting a growing stock of DC that would not have to be rescued thenceforward.

Deposit interest on DC to control its ratio to bankmoney

In the English concept variants, DC is interest-bearing. In the Swedish concept, by contrast, the e-krona does not yield interest. Why after all would DC be interest-bearing? Interest is paid on credit and debt positions, or more generally, on promissory items. DC, however, is *not* a promissory item. It *is* positively existing sovereign fiat money in its own right and in full, high-powered base money that does not need coverage by another kind of money or collateral.

What then is the reason for DC be interest-bearing? One reason given is 'to clear the market'.³⁰ Empirically, a supposed Market equilibrium is hard to substantiate. It is clear enough, though, what deposit interest *on DC* in fact can do, namely, complementing the deposit interest *on bankmoney* that banks are likely to pay.

Under conditions of business as usual it is not clear to which extent the public would actually change from bank giro accounts to currency accounts, or have currency accounts in addition to bank giro accounts. Banks will certainly not fail to react to a shift towards currency accounts. For example, banks can be expected to offer high-enough deposit interest (as was formerly paid on private banknotes) to prevent deposits from draining away. Furthermore, bank giro accounts might be offered free of charge, while currency accounts would be run at a cost-covering or even profitable price.

With the same method, to counter a shift towards currency accounts, the central bank would set a rate of deposit interest on DC below the deposit interest banks are paying

³⁰ Kumhof/Noone 2018 pp.8.

on bankmoney. If, conversely, a central bank wants to support a shift from bankmoney to DC, the latter would fetch higher deposit interest than deposits on bank giro accounts. This kind of interest rate policy would to a degree certainly allow for exerting influence on the proportion between bankmoney and DC in a side-by-side constellation.

State warranty of bankmoney

Irrespective of the question of interest payments on DC, governments will have to decide on whether or not to continue with standing bail for bankmoney. From an ordoliberal point of view, public guarantees of private money are unacceptable, as is tolerating private money denominated in the national currency. Among the fundamental auxiliary constructions for stabilising the inherently unstable bankmoney regime are government guarantees of bankmoney, the extensive implementation of the central banks' role as *lenders of last resort* for the banking sector, as well as the state's predominant use of bankmoney rather than reserves and cash. As long as these crutches are maintained and banks pay high-enough deposit interest on bankmoney combined with low or no account fees, there is, under conditions of business as usual, no urgent need for customers to switch accounts. It thus remains unclear under such conditions whether a significant shift from bankmoney to DC would take place at all.

The situation becomes different when there is a sense of uncertainty and crisis. The safety of money is then valued higher or even given top priority. Hence the phenomenon of a cyclical shift from money and purely financial assets into real assets. With the alternative of DC available, a more or less pronounced run on bankmoney and its conversion into DC can be expected – despite state guarantees and central bank support for bankmoney, which in the eyes of many an actor are not entirely convincing anyway, and despite higher deposit interest on bankmoney which, given changed priorities, would not thwart a flight from bankmoney.

Parity of bankmoney with DC. A new type of Gresham situation?

A further question relates to the parity of bankmoney with sovereign money. With DC coexisting with bankmoney, would the present 1:1 parity of bankmoney with central bank money endure? During the last 100–150 years of bankmoney backed by the central bank and government that question did not arise anymore, but had always been a relevant issue prior to that state of affairs.

Today, the 1:1 parity between coins, notes and reserves arises from the fact that all of these monies stem from the central bank, residually from the treasury, and are issued into circulation as legal tender, 1:1 accounted for by the central bank and exchanged for one another. What, however, about the parity between bankmoney and central bank money? One reason given for their 1:1 parity is that in the split-circuit reserve system a transfer of bankmoney is accompanied by a transfer of reserves of the same amount. Whether that reasoning really holds can be doubted in face of the extreme fractionality of the reserves base, the more so in a crisis. Moreover, a central bank

cannot exchange its own DC against bankmoney. A more obvious reason is the governments' and central banks' promise to support the bankmoney and stand bail for it. Moreover, cash and bank deposits have so far been taken 1:1 for the suggestive fact that bankmoney is denominated in the national currency. If, however, there were to be no more or significantly reduced state guarantees, and at the same time the alternative option of DC, this might in fact open up the perspective of a new Gresham situation.³¹

Gresham's law dates back to the 16th century and states that bad coins with reduced silver content were driving good coins out of circulation. People tried to get rid of bad coins while keeping the good ones. As a result, coins of a same face value circulated at unequal parity. It was difficult even for well informed merchants to keep track of the different rates. Today one would say that transaction costs in a Gresham situation are much higher than in a system of 1:1 parity.

As far as safety of modern money is concerned, bankmoney is of the 'bad' sort because of its inherent risk in comparison to safe and secure 'high-powered' central bank money. People could thus try to be paid in DC while making their own payments in bankmoney, using the 'good' currency also as a store of value.

Limited access to DC as well as limitations in its quantity and intended uses as conceived of in current CBDC concepts serve to keep down demand for DC or even block a potential bankrun – which, however, is exactly what fosters a new Gresham situation, because it is that sort of exclusiveness of DC which contributes to its appreciation against bankmoney.

As a result, bankmoney might circulate below par to DC. Hedge funds might speculate on it as Soros once did against the pound.³² But things here are not as obvious as it would appear. In Chile, for example, many goods are sold at a higher price when paid in cash, and, respectively, cheaper when paid in bankmoney via credit cards or bank transfer. In any case, the economy is likely to get along with unequal and even variable parities, as it is able, after all, to cope with highly volatile foreign exchange rates. Particularly 'efficient' is neither one.

There is the model of a general trilemma of monetary policy, inspired by, but different from, the special Triffin dilemma of the U.S. dollar as the world lead currency. The general trilemma is based on three goals: free cross-border capital mobility, free exchange rate of the currency, and autonomous monetary policy. The trilemma assumes that at most two out of the three goals can be attained at any one time, while the third has to be given up. This means, for example, that under conditions of free cross-border capital mobility and free currency exchange rate, the only thing left to a central bank is to accommodate what market dynamics demand and forgo any other

³¹ The problem of parity between different monies from different originators, especially parity between bankmoney and sovereign money, is discussed in much detail in Bjerg 2017 and 2018 6ff, 9ff, 18.

³² Bjerg 2018 14ff.

policy goals and measures – or take measures to restrict capital mobility and influence or even administer the exchange rate, so that these are no longer free.

O. Bjerg has applied the monetary policy trilemma to the coexistence of bankmoney and DC.³³ The three target dimensions are

- 1:1 parity between bankmoney and DC
- unrestricted mutual convertibility of the two kinds of money
- autonomy of a respective central bank's monetary policy.

How far the trilemma involved here is absolute remains open to question. It appears to be plausible, however, that the more one or two of the three goals are to be attained, one has to cut back on the remaining one or two. If a central bank wants to exert control over the ratio of bankmoney to DC, it cannot completely decontrol their convertibility. Restricted convertibility or limited access to DC put at risk the 1:1 parity of bankmoney, and it cannot be taken for granted that state guarantees of bankmoney can fully eliminate that risk. If, to the contrary, free mutual convertibility of bankmoney and DC shall be ensured, the central bank has little choice but to accommodate the ensuing demand for DC or reserves.

How acceptable or unacceptable such trade-offs would be depends on the interests involved. A central bank has control just over its own money, not, however, over bankmoney. But if the market is demanding the substitution of DC for bankmoney and the central bank accommodates rather than deters that demand, and be it through unconventional measures of quantitative easing, the central bank will over time achieve what it ought to achieve: control over domestic money creation and the ability to effectively readjust the stock of money.

Design principles that make the difference

After having discussed the advantages, problems and false problems of a parallel existence of bankmoney and DC, it can now be identified which design principles would maintain the perspective of DC gradually leading towards a sovereign money system rather than conserving the present bankmoney regime.

Securing countrywide access to DC devices and DC accounts. No restrictions on access to and relative quantities of DC

The first of those design principles is committing the central bank to provide a general supply of DC, or rather, the central bank committing banks and other payment service providers to do so. In particular, currency accounts must be offered countrywide on demand. This can be achieved, as in the Swedish e-krona model, by building up an infrastructure for the management of currency accounts and making payments in DC. The central bank or an operating company on behalf of the central bank would run the

³³ Bjerg 2017 29ff, 2018 7.

system, that is, be the system provider, while banks and other payment service providers would be system users.

In most proposals put forward thus far, DC is rightly intended to be a *universal* means of payment. DC best serves its function as public money-on-account when it is unrestricted, a universally accessible and usable means of payment, regardless of particular actor groups or volumes of payment, for the settlement of all sorts of private and public debt.

In contrast to this, access to DC is reserved for financial institutions only in one model variant.³⁴ In an earlier concept paper, the quantity of DC was restricted to 30% of GDP.³⁵ In the Swedish concept, the use of e-kronas is not expressly limited, but only DC devices would be available at the beginning of the process (mobile apps, DC cards), and these are subject to the legal ceilings on cash payments in Sweden, currently at a maximum equivalent to about 250 euros (285 dollars) for each transaction.³⁶ This means restricting the use of DC to small retail transactions. It is even considered to waive the obligation to accept e-krona if the latter is granted the status of legal tender.³⁷ The status of legal tender is self-evident if DC is introduced as a successor to central bank cash. Why would it make sense to restrict the use of digital legal tender? Qui bono?

Limits and restrictions clearly contradict the claim of DC to be a universal means of payment. Should the non-financial public even be excluded from using DC, the whole project would in fact be pointless.

Merging DC and interbank reserves into one circuit

Keeping reserves and DC apart from one another, as is suggested in the models discussed, is not plausible and unlikely to be sustained over time. No matter in which function – as a fractional base for transferring bankmoney, or as DC in public circulation – either way it is about the same kind of central bank money-on-account. The terms 'reserves' and 'digital currency' do express different functions and owners, but there is no difference regarding the form and quality of the non-cash central bank money involved.

The design principle is thus to link bank reserves to non-bank DC, thereby creating a single circuit. Reserves and a bank's DC ought to be interchangeable or reciprocally transferable. This does not mean blurring the difference between a pure transaction account (such as state bodies have today, and firms and private persons would have in the future) and a bank's transaction account which at the same time is also a refinancing account for doing business with the central bank. Today's excess reserves

³⁴ Kumhof/Noone 2018 pp.18, where, as quoted above, three model variants are discussed: (1) access for financial institutions (FI) only, (2) economy-wide access for everyone, and (3) FIs only combined with narrow banking based on DC.

³⁵ Kumhof/Noone 2018 pp.18, Barrdear/Kumhof 2016 3, 50.

³⁶ Sveriges Riksbank 2017 21.

³⁷ Sveriges Riksbank 2018 22.

can nevertheless be treated like general DC. This does not impair monetary policy. Simply, the question does not arise of whether there would be a different interest rate on reserves and DC, and which one would be more important.

Independently, a minimum reserve requirement may still exist, or not. Minimum reserves should in fact be abolished on this occasion, as financially more advanced countries have done for a longer time (among them the countries of the British Commonwealth, Hong Kong, Denmark and Sweden. Belgium and Luxemburg, too, did not require minimum reserves prior to the introduction of the euro).

Full convertibility between bankmoney and DC

A subsequent principle is full convertibility between bankmoney and DC. Bankmoney must be freely convertible into DC, and vice versa. This poses no problem in a technical sense, as can be seen in the example of bank-mediated payments between the central-bank transaction accounts of state bodies and bank giro accounts of nonbanks.

Convertibility of bankmoney into traditional cash was, and essentially still is, a prerequisite for the acceptance of bankmoney and its parity with central-bank money.³⁸ This will also apply to the conversion of bankmoney into DC, particularly as both monies offer the ease of cashless payment.

Another generally stabilising element in this regard might be support for the emergence of payment service providers exclusively specialising in the management of DC transactions and other payment services, while not being active in other types of banking activities.

Issuance of DC not only via the banking sector

The Swedish and English concepts discussed above continue the practice of issuing central bank money (hitherto reserves and cash, now then also DC) by way of credit against collateral. In this way, money creation continues to be entirely determined by the banking sector's pro-active credit extension and fractional demand for reserves.

Supposing the share of DC would grow over time, this might sooner or later result in frictions with regard to the available volume of eligible securities, particularly sovereign bonds, needed as collateral. Therefrom, it might be unavoidable to resort to said unconventional measures, for example, even though not necessarily, the special central-bank conversion credit granted without collateral. Furthermore, in a sovereign money perspective, issuance of DC can and ought to be equally possible in a direct way bypassing the banks. That direct way would include measures like helicopter money or QE for real economy in combination with revising Art. 123 (1) and (2) TFEU, also known as the Lisbon Treaty. In its present form this article is on the prohibition of direct monetary financing, while permitting it indirectly.

³⁸ Ingves 2018 2 [9].

Public bodies to use currency accounts

Payment transactions of public bodies are carried out today for one part via transaction accounts with the central bank, the other part via bank giro accounts. It is among the absurdities of the present bankmoney regime that state bodies require to be paid in private bankmoney rather than in the sovereign currency of the state's central bank. Public bodies should thus be obliged to transact via currency accounts rather than bank giro accounts. It has to be considered, however, that the state's acceptance of bankmoney is a key pillar in the state's warranty of bankmoney. Should that pillar be taken away too fast, with public expenditure at 35–55 per cent of GDP depending on the country, bankmoney would be undermined in a way similar to a run on bankmoney.

Public bodies across the board could nevertheless begin to maintain currency accounts in addition to bank giro accounts, slowly but steadily increasing their use of DC. That would contribute to ensuring the circulation of DC to an important extent. It then depends on the course of things whether and how far public bodies would end using bank giro accounts over the years, shifting all payments, in particular taxes and social security contributions, to DC.

For private money users (financial institutions, firms, households) the choice for bankmoney or DC, or both of them, remains generally optional. This presupposes transfers between bank giro accounts and currency accounts to be possible in both directions.

Withdrawal, at least substantial reduction, of state warranty of bankmoney

Central bank support and state guarantees of bankmoney are major pillars of the bankmoney regime. This of course also applies to bankmoney in a side-by-side constellation with DC. The support relates to the preparedness of central banks to refinance banks at any time and at any amount deemed necessary, 'whatever it takes' according to the now proverbial statement by ECB President M. Draghi in 2012. Governments on their part tend to recapitalise systemically important banks if need be. Moreover, governments stand bail for huge amounts of bankmoney, up to 100.000 to 200.000 euros for each customer bank account, depending on the country. In a medium-sized country of between 50 to 150 million people, this might potentially sum up to several billion euros. If ever really tested, a national government and parliament would be unable to muster such sums in a short period of time. A central bank, however, is able to.

As long as such guarantees are kept up, combined with basically unrestricted proactive bankmoney creation, one cannot seriously expect the introduction of DC to eventually lead to a sovereign money system. Therefrom, another design principle is to cancel state guarantees of bankmoney, or at least significantly reduce them.³⁹

³⁹ The pivotal role of state guarantees for bankmoney as a decisive system element is particularly emphasised in Wortmann 2016, 2017a+b. Equally emphasised is cancellation of those guarantees as a precondition for establishing a sovereign money system.

Independently, existing legal requirements for deposit insurance or a deposit protection fund, can remain in force. Otherwise, bankers might be tempted to rely too much on the visible hand of their central bank president.

The bigger the share of DC has become, the more the state guarantees of bankmoney can be withdrawn. Immediate cancellation would not by itself trigger a run on bankmoney, but in a pertinent situation it would certainly add to the proneness to a run and the extent of it. Full cancellation at once might also contribute to threaten the 1:1 parity of bankmoney with DC. So, regarding state warranty of bankmoney, one will think of a gradual implementation.

Deposit interest on DC equal to deposit interest on bankmoney

Using deposit interest on DC as a tool for influencing the ratio of DC to bankmoney may be tempting. However, as explained above, paying interest on holdings of base money is not substantiated. (That's why the Bundesbank prior to the euro has refused to pay deposit interest on bank reserves).

If, however, there would be deposit interest on bankmoney, but none on DC, this would importantly contribute to an undesirable effect of pro-cyclical fluctuation: into safe DC in times of heightened uncertainty, back to interest-bearing bankmoney in times of business-as-usual. In this regard, paying deposit interest on DC can be a neutralising measure if the rate on DC is equal to the rate on bankmoney. This will create a level playing field and counteract the undesirable pro-cyclical shifting back and forth.

Ruling out 'negative interest'

The question of negative interest is not specifically related to DC, but is also relevant to DC.⁴⁰ The problem here is that abstract arithmetic does not necessarily fit the real world. For example, 'real interest' is commonly defined as the actual interest rate minus the inflation rate. The result may be positive or negative. Either way, however, it is a matter of combining two different classes of operands. This certainly makes sense when considering the actual-versus-nominal purchasing power of various kinds of income (earnings, interest, transfers), but it does not make the inflation rate an interest rate.

Seen from another perspective, an individual can have a greater or lesser income, or no income at all, but not a negative income; less than nothing does not exist. Breaking through below the 'lower bound' is possible in the world of numbers, but not in the real world. What in fact can happen, for example, is a loss of purchasing power and wealth, or even incurring debts. Hence, as has been said often enough, negative interest is an unnatural concept. It refers to something which does not in fact exist.

⁴⁰ Among those who see DC as a suitable vehicle for imposing negative interest are, for example, Bordo/Levin 2017 3, Bordo 2018 3. The IMF study on DC also states that DC 'would eliminate the effective lower bound on interest rate policy', even if the central banks surveyed in the study declared negative interest not to be a reason for introducing DC (IMF 2018 4, 29).

You pay interest to someone who has lent you money, but you do not agree to pay interest to someone who has borrowed from you. Similarly, it would be nice to go shopping and to have the shopkeeper pay you the purchase. Apparently, this would be turning the real world upside down.

Negative interest is an inappropriately expanded and hence distorted measure of conventional interest rate policy, in a desperate attempt to regain the latter's effectiveness which has largely been lost in the present bankmoney regime. What actually happens when 'negative interest' is imposed is as follows:

Negative interest payments *on bankmoney* reduce the liabilities of banks to their customers and result in higher balances of a bank's profit account. This is tantamount to an illegal private tax on deposit money to the benefit of the banks. At the same time, the stock of bankmoney is reduced.

The removal of liabilities from the banks' balance sheets, that is, deletion of bankmoney, would certainly contribute to reducing the existing overhang of money that is the inheritance of the bankmoney regime. However, a reduction in this way is wrongly targeted, as it hits the mass purchasing power in the form of the income and savings of the middle classes.

Similarly, using present accountancy rules, negative interest *on DC* would reduce the central bank's liabilities and thus far the available stock of DC. The resulting profit in terms of the central bank's equity would be paid out annually to the treasury, adding to the public purse. Negative interest would then indeed be a tax on holdings of DC; without therefore becoming more sensible economically.

It needs to be seen that negative interest misses its aim of stimulating expenditure that would result in demand-induced growth, on the grounds of trying to evade negative interest by spending the money as soon as possible.

It remains open to question under what conditions this kind of economic policy by a hybrid of monetary and fiscal policy might be reasonable. The approach relies on the under-consumption theory of the business cycle from the 1910–30s. Even then, however, the intervention was meant to be a temporary measure to get out of recession or depression, not a permanent growth stimulus regardless of the current state of the economy, less so in times of widespread mass consumption and ecological limits to growth.

Independently, most people react in different ways. Negative interest, rather than spurring faster or additional expenditure, is also likely to trigger compensatory spending cuts. If money is confiscated from people, they do not hurry to spend what is left, but try to make up for what has been taken away (except under conditions of runaway inflation). Negative interest is a technocratic folly born from unworldly model economics.

Negative interest is sometimes interpreted as a surcharge on top of the service fees for managing accounts and payments. An additional service fee of, say, 3–6–9% p.a. (less would be ineffective), would clearly be seen as a case of extortionate pricing, unlikely to be generally accepted.

Imposing negative 'interest' is actually neither about interest nor fees; it is about the overt expropriation of money if imposed on bankmoney, and is an unwise tax if imposed on reserves and DC. As an instrument of monetary and economic policy, negative interest is counter-productive and unjust, perhaps even unlawful, and should thus generally be ruled out, also in connection with DC.

Concluding remarks

The above discussion of advantages and problems of bankmoney and DC existing side-by-side, and the choice of design principles shaping their relationship, has raised quite a number of questions. Watertight answers can, for the most part, not be given yet. But it is not strictly necessary to know all details in advance. The modern world has been living for 300 years with the conflicting situation bankmoney coexisting alongside sovereign money, or central bank money, respectively. The conflicting situation constituted by bankmoney and DC side-by-side will basically not be too different from that.

When comparing a full sovereign money approach, including the definite end to the bankmoney privilege, with the partial and gradual introduction of modern sovereign money in the form of DC side by side with bankmoney, which way is the better one? In view of the complex conflict situation of a coexistence of bankmoney and DC, this allegedly less radical and politically more connective option of 'monetary reform light' turns out to be the more complicated one, still inherently unstable and prone to crisis. The reason is the continuation of the bankmoney privilege and the mode of functioning of the bankmoney regime. In a complete transition from bankmoney to DC at a set date, most of the problems discussed above would not even occur in the first place. The unavoidable collision of interests and the related political and scientific debates are much the same either way.

Pragmatically speaking, introducing DC in parallel with bankmoney, in whatsoever variant, is at all events a smaller or bigger step forward, coming with the advantages explained above. The problems inherent to the present near-complete rule of bankmoney are still much bigger than problems with a growing share of DC might be.

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