

Vlastimir Vuković\*

## **CBDC as a Solution for Billions of Unbanked People**

Discussion Paper, No. 2, Central Bank Money *Research*, October 2021

‘Central Banks may bring about their own demise by incompetence; they will be comparatively immune to technological innovation.’

Charles Goodhart (2000)<sup>1</sup>

### ***Abstract***

*An eruption of CBDC projects was started in June 2019 when Facebook disclosed its intention to issue its own global stablecoin. Understandably, most central banks have been focusing on retail CBDC for public. After two years of pushing research and testing, deafening silence apparently occurred while expecting some tactical moves from the two most powerful central bank systems – Federal Reserve System and ECB Eurosystem. Due to divergent opinions and lack of clear objectives, one can make a conclusion that most of CBDC projects have lingered in a cul-de-sac since then. However, central bank money for public cannot avoid its digital destiny, since the problem of a billion unbanked people all over the world needs a solution. Such a solution is CBDC as electronic transferable cash, similar to the newly launched Digital Bahamian Dollar. This is an efficient and straightforward solution, without imposing unbanked people transaction accounts with commercial banks (so called Basic Bank Account in EU and the UK or Free/Low-Cost Checking Account in the US). Anachronistic measures, such as obliging merchants to accept cash ('cash rule' in Denmark) would become redundant.*

**Key words:** *central banks, CBDC, means of payment, cash, transaction accounts, retail payments, PBOC, ECB, the Fed, Sand Dollar, unbanked/underbanked people, electronic transferable cash.*

### **Introduction**

CBDC battlefield is currently astoundingly quiet. The reports from central banks about the improvement and development of their individual and joint projects are reduced. ECB published its *Report on a digital euro* in the early October last year. *Sveriges Riksbank* published its final report about *E-krona pilot Phase 1* in April this year. People's Bank of China (PBOC), which is conducting the most ambitious testing of digital RMB, traditionally supports limited information about the advancement. Publishing of the Fed's discussion paper on CBDC announced for this summer (The WSJ)<sup>2</sup> hasn't been published to the date of publishing this paper. Three reports of the Group of central banks and BIS on CBDC, which have just been published on 28<sup>th</sup> September

---

\* Central Bank Money *Research*.

with the three obligatory foundational principles, are prolonging the expectations without a foreseeable end.<sup>3</sup>

Why is this so? Most central banks are calmly waiting in their trenches on the CBDC battlefield awaiting tactical moves of the most powerful monetary armadas. Strategy towards developing CBDC looked unquestionable. However, the Fed questioned not only the strategy, but the whole purpose of issuing CBDC: '[...] a simple question: What problem would a CBDC solve? Alternatively, what market failure or inefficiency demands this specific intervention? After careful consideration, I am not convinced as of yet that a CBDC would solve any existing problem that is not being addressed more promptly and efficiently by other initiatives.' (Waller, p. 1). This is not the opinion of just one member, but most of the members of the Board of Governors including its chairman Jerome Powell (see Section 5). Intriguing, but understandable, all of the CBDC advocates remained silent about these disqualifications.

To understand divergent opinions and turbulent circumstances related to CBDC, it is necessary to bear in mind the initiators of the idea about it and motives of central banks 'comparatively immune to technological innovation' (Goodhart, 2000, p. 31). The attitude and motives of the Fed, as a dominant factor in the world of central banking, are especially important. The Fed's Board of Governors initial stand was the question 'What problem would a CBDC solve?', which is a good starting point. However, saying 'that a CBDC not would solve any existing problem' is inaccurate. It is enough to point out that millions of unbanked Americans have harder and harder access to payment services.

Therefore, CBDC found itself in some sort of blind alley. Although central bank money for public cannot avoid digital destiny even with 'minimally invasive technology' (Auer and Boehme, 2021). The problem of billions of unbanked people all around the world is in need of a solution, which does not just involve *Financial Literacy Training* and *Free/Low-Cost Checking Account* (in the US), or *Basic Bank Account* (in the EU). One solution is electronic transferable cash, without imposing transaction accounts with commercial banks. Using this simple solution and a wide network of payment providers, central banks would free themselves from the constraints of physical cash and gain necessary experience for the arising challenges in retail payments. The time is running out since the world of digital money and cryptography is already at risk at the beginning of quantum computing era.

The rest of the paper after this Introduction (1) is organised as follows: CBDC ideas and euphoria (2), Motives of Central Banks (3), Development of CBDCs (4), Fed refused CBDC (5), Problems and solutions (6), and Possible solution (7).

## **CBDC ideas and euphoria**

Widespread opinion is that Bitcoin and other cryptocurrencies inspired the idea of CBDC. However, this statement is incorrect. Most of the people have probably forgotten that e-money rose and advanced in the 1990s. The pioneer was a company called DigiCash, which launched

innovative e-cash. ‘David Chaum invented the software-based form of e-money called e-cash. [...] The second pioneer **Mondex** invented the real **electronic purse**, ecash on chipcards with the possibility to make payments between cardholders without the necessity of clearing and settlement in old money between the banks. Real e-money was born.’ (Godschalk and Krueger, p. 4). It is called digital money today, while the electronic purse is renamed into a digital wallet. Who still remembers David Chaum and his DigiCash, Avant smart card in Finland or Danmont - Danish e-purse scheme? Mondex still reminds of these times, although it was acquired by MasterCard a long time ago.

Although there were numerous innovations and initiatives in the EU, regulators choked e-money. ‘Thus, regulators are following a ‘preventive approach’ – regulating e-money before it has any market relevance’ (ibid, p. 2). It is well-known admitted in the preamble of the new Directive 2009/110/EC on electronic money institutions.<sup>4</sup> Even after this Directive, Directive electronic money institutions were still marginal factors on retail payments market, leaving the banks the largest share of e-money transactions.

Bitcoin already appeared then and other cryptocurrencies after it after a while. It became evident that they cannot efficiently serve as means of payment due to their base concept and consequently instable market value. Cryptocurrencies could multiply for several years without influencing the operations of central banks.

In the attempt to resolve the problem of instable value of cryptocurrencies, the idea about stable coins rose. It disturbed technologically passive central banks and not because of the possibility of stabilization of their volatile value, but because of their promoters – the biggest tech platforms with billions of members or users.

The alert started when Facebook published its White Paper in 2019, announcing its stable coin called Libra, later renamed into Diem. Formally, it is an independent Libra/Diem Association as **not-for-profit** membership organization, founded in Geneva, Switzerland (*White Paper*). Essentially ‘[...] each platform now serves as a **gatekeeper** over a key channel of distribution. By controlling access to markets, these giants can pick winners and losers throughout our economy’ (U.S. House Judiciary Committee, p. 6). The number of users and the total revenue are tremendous. ‘Facebook reported in July 2020 that its platform includes 1.79 billion daily active users, 2.7 billion monthly active users, and an average revenue per person of \$7.05’ (ibid, p. 132).

Only then the threat to the monetary sovereignty and a caution that ‘Central Banks may bring about their own demise by incompetence’ (Goodhart, 2000) were realized. Soon after CBDC projects start flourishing, although the idea about CBDC has been analysed in the scientific papers since second half of the last decade. BIS Survey of 60 central banks testifies about this in the late 2020. ‘Central banks are moving into more advanced stages of CBDC engagement, progressing from conceptual research to experimentation. About 60% of central banks (up from 42% in 2019) are conducting experiments or proofs-of-concept, while 14% are moving forward to development and

pilot arrangements. [...] The central banks not currently involved in any CBDC work are primarily in smaller jurisdiction' (Boar and Wehrli, p. 6).

In this utter euphoria, *Sveriges Riksbank* started its *e-krona project* in 2017 in the attempt to prevent the disappearance of their banknotes and coins from circulation and unblock the access of the unbanked citizens to payment services. A similar problem of unaccepting cash spread to other developed countries. 'Many shops and restaurants in New York will not take US dollar banknotes, whilst those in London refuse to accept British pounds. Interestingly, unlike the Riksbank, the Federal Reserve System and the Bank of England didn't react to their products being rejected by the payments market. When it did, the response came from non-monetary authorities.' (Vuković, 2020a, p. 3-4). The same is happening with CBDC; the Bank of England is visibly reserved, while the Fed openly questions a digital dollar and its public purpose.

## Motives of Central Banks

Motives of central banks for the implementation of CBDC can be expressed in the form of four basic motives: 1) global currency competition, 2) duopoly or oligopoly market structure, 3) the dominance of foreign payment providers and 4) declining of cash in circulation. Certain banks are led by all motives, most are encouraged by two to three motives, while the Fed isn't encouraged by any of them.

The initiating motives of central banks account for their attitude concerning CBDC. Primary goals of central banks - stable national currency, financial stability and payment system security and efficiency – are in the background of these motives. These primary goals are often interpreted as the motives, which deforms the vision of the true initiators of CBDC projects (compare BIS Survey).<sup>5</sup>

All four motives are effective in the cases of the ECB and the national central banks which constitute the Eurosystem. The most important is obviously the third motive – 'Visa and Mastercard, two US-based companies, enable cross-border card payments in Europe and also process national card payments in most Euro countries today. More than two-thirds of all payments with cards issued in the EU were handled by Visa or Mastercard in 2016' (May, p. 3-4). Global currency competition represents the second most important motive, while the substitution of cash and the protection of competition are additional motives. Therefore, 'An important political goal is Europe's sovereignty, which is to be strengthened through the digital euro as a **payment system under European control**' (ibid).

The protection of competition in the payment market represents the key motive of PBOC. 'Such considerations, among others, are behind the Chinese central bank's decision to roll out a digital yuan and **break up the duopoly of Alipay and WeChat in mobile payments** by allowing banks and other competitors to offer wallets for the digital yuan issued by the central bank.' (May, p. 5). This has been recently confirmed by the Governor of the PBOC: '[...] **payment institutions** started to provide insurance, micro credit, fund management and other financial products, and

possible **market monopoly** as well as lower efficiency in innovation due to the winner-takes-all effect of large fintech companies' (Yi Gang, 2021).

The Fed does not have a single motive. The US dollar is a dominant global currency and abundance of providers – banks and non-bank – portrays the competitive structure of domestic retail payment market; Visa and Mastercard are American companies, as well as big giant tech companies led by Facebook. The lack of motives caused the indifferent attitude of the Fed to the CBDC initiatives.

Other central banks consider not only Facebook, but all other big tech conglomerates as a threat. 'Big tech firms' involvement in finance started with payments, where they have reached a substantial market share in some jurisdictions' (Crisanto et al, p. 2). High profitability provides the answer why all big tech companies offer only payments from all other financial services (ibid, p.3). Each of them has hundreds of millions of active users with the largest two to three billion, which makes them a huge potential threat to the monetary sovereignty of every country and the United States as well. Rising global stablecoins of big tech companies with potentially demolishing monetary effects extremely encourage central banks and their interest in CBDC.

## **Development of CBDCs**

Considerations CBDC development worldwide must begin with China, since PBOC has gone the farthest in the research and pilot programmes compared to all other central banks of largest economies. PBOC's definition of its own digital currency reflecting the final design is extremely broad.

'E-CNY is the digital version of fiat currency issued by the PBOC and operated by authorized operators. It is a value-based, quasi-account-based and account-based **hybrid** payment instrument, with legal tender status and loosely-coupled account linkage' (PBOC, p. 3). It is confusing that the term '**account**-based/linkage' is repeated three times, which implies the circulation of money online, while cash circulates exclusively offline? It is unclear what 'loosely-coupled account linkage' means, even more unclear what 'variable face value' as its feature or 'settlement upon payment', contrary to finality that cash owns (ibid, p. 7). Some other confusing parts are the questions whether 'e-CNY is a substitute for M0 or a part of M1? At the end, the question of all questions is whether 'two-tier operational system' means that the bank operators could use e-CNY holder, as in the case of other transaction accounts or will they have a custody treatment status as a M0 monetary aggregate?

Separating *software wallets* (based on mobile payment apps and other devices) and *hardware wallets* (based on security chips and other technologies) implies that e-CNY could be stored in both *e-CNY wallets* and smart cards (ibid, 9). Therefore, it can be implied that e-CNY can circulate even without a mobile phone or internet in **offline** environment or situations such as electricity blackouts or natural disasters.

The Swedish e-krona is perhaps technologically the most ambitious project – in pilot phase 1 'token-based in a distributed network based on blockchain technology' was tested (Sveriges Riksbank, 2021). Compared to the Chinese e-CNY, this pilot is 'developed in a closed test environment' and it has some similar and some specific features. For transactions, it is 'necessary to have a **digital wallet** linked to a payment instrument in the form of a mobile app or a card; requires that the payer can communicate with the **e-krona network** [...] through participants in the network; the network is decentralized; a token can only be used once; only the Riksbank can create and destroy e-kronor' (ibid, p. 6-7). Interoperability of e-krona is especially questionable, because 'the **network is parallel** (?) and thus does not use the current existing infrastructures for payments using digital money' (ibid). It is unknown if offline payments are supported since this feature has not been tested in the phase 1. Other perplexities are related to the design, interest on the e-krona, a balance cap on wallets, how e-kronor are stored and integration with the existing POS terminals. Too many dilemmas even for the phase 1.

The only CBDC in circulation is the Digital Bahamian Dollar or *the Sand Dollar*, retail and wholesale, but exclusively for domestic usage. The key features of the retail *Sand Dollar* are: interoperability, near instantaneous validation of transactions, mobile app or payment card to access, non-anonymous, protects user confidentiality, "offline functionality" in case of communication interruption, point of sale support, monitoring for fraud detection, zero transaction fees for individuals and two tiers of individual wallets. **Tier 1:** \$500 eWallet holding limit, with a \$1,500 monthly transaction limit. Identification is not required. Cannot link to a bank account. **Tier 2:** \$8,000 holding limit, \$10,000 transaction limit. Identification is required. Can be linked to a bank account (Central Bank of the Bahamas). These solutions are similar to the Chinese ones, including tiered eWallet. Therefore, an answer is rising on the fundamental question of CBDC design: *Currency or platform?* (Vuković, 2020b).

The examples of China and the Bahamas show that there is a solution despite the standstill in the CBDC projects. There are some inspirational joint studies of central banks gathered around BIS Innovation Hub primarily aimed to cross-border payments (*six CBDC-related proofs of concept and prototypes*, Coeure). Asian central banks have shown a great initiative and innovation in this.

## **Fed refused CBDC**

The Fed were the first central bank that publicly rejected the idea of CBDC. 'Finally, there is **no** compelling demonstrated need for a Fed-issued digital currency' (Brainard, 2018, p. 6). During a certain period of time, members of Board of Governors have persistently asserted new arguments against *Fed-issued digital currency*. Randal Quarles summarized the prevailing opinion of the Board by the end of June this year. 'To summarize then, the **dollar is already highly digitalized**. The Federal Reserve provides a digital dollar to commercial banks, and commercial banks provide digital dollars and other financial services to consumers and businesses. This arrangement serves the nation and the economy **well** [...] In brief, the potential **benefits** of a Federal Reserve CBDC

are **unclear**. Conversely, a Federal Reserve CBDC could pose **significant and concrete risks**' (Quarles, 2021, p.2-3, 10).

The final confirmation of the Board's opinion was announced by the chairman Powell. 'Our key focus is in whether and how a CBDC could improve on an already safe, effective, dynamic, and efficient U.S. domestic payments system' (Powell, p. 2). The question is how to improve payment system with such extraordinary performance? Therefore, there is a huge interest in the announced Fed's *discussion paper*.<sup>6</sup>

The official Fed sources differently estimate domestic retail payment system. 'In fact, among the many countries that have either developed or are in the process of developing instant payment capabilities, the vast majority have done so with the direct operational involvement of their central banks. This progress means that **the U.S. retail payment system lags behind systems in other countries**' (Federal Reserve System, 2021a).

The estimates of numerous American researchers are even more unfavourable: 'the system is slow and expansive: payments take an average of 1-3 days to settle, and card processing fees eat up half of retailing profit margins' (Mookerjee, 2021, p.8). Comparison to China by the American experts is frustrating. 'While Americans tend to still use plastic cards and billions of paper checks to pay, cash has all but disappeared in Chinese cities as mobile phone base quick response (QR) code payments displaced paper money and cards' (Chorzempa, p. 2). Additional problem represents the price of using plastic cards and paper checks. 'American retail payments cost many times more than they do in China' (ibid, p. 15).

These internal and external estimates are opposite to the official opinion of the Fed's Board of Governors 'on an already effective and efficient U.S. domestic payments system'. Therefore, it is necessary to provide a thorough analysis of the problems that are apparently common for the payment systems worldwide and possible solutions by designing appropriate CBDCs and their responsible circulation (*see next Section*).

Despite rejecting CBDC, Board of Governors of the Federal Reserve System is a member a Group of central banks, together with the BIS, which are working together to explore CBDCs for the public. Since this Group has just published three reports, a year after the first one, it is indisputable that they express the opinion of the Board. The essence of these reports is that they immensely constrained CBDC projects by setting *Foundational principles and core features* (Report no 1, October 2020), analysing *System design and interoperability* (Report no 2, September 2021), *User needs and adoption* (Report no 3) and *Financial stability implications* (Report no 4).

In this way, initiatives and innovations are choked, as done with the predecessors – EU regulators - 'following a 'preventive approach' – regulating e-money before it has any market relevance'. The Fed was more liberal in the 1990s and 2000s, since private companies were the subjects of innovations and which were taken over by banking industry at some point. Preventive approach to CBDC is in accordance with the Fed's official attitude. Therefore, CBDC projects of most Group

members and other central banks have got stuck in a blind alley, excluding the Fed which considers this project useless for the United States.

American Bankers Association decisively turned down the digital dollar in its *Statement* last year (ABA, 2020). ‘Consumer and merchant value *choices*, from cash to mobile payments, and displacing those choices with a **so-called digital dollar would be a costly solution in search of a non-existent problem**. [...] In fact, given **our advanced payments system**, there is little compelling reason to believe that any vague benefits would outweigh the clear costs’ (ibid, p. 2-3). Rejecting CBDC was confirmed by the Statement from June this year. ‘CBDC should only be pursued as a final option to meet clearly-defined public policy goals that cannot be achieved through payments innovations that leverage **existing digital dollars**. As of today, those use cases have not emerged’ (ABA, 2021, p. 14). These statements have a special impact because ‘the ABA is the voice of the nation’s banking industry’ (ABA, 2020). ‘Under current law, commercial banks are the legal owners of the twelve regional Federal Reserve Banks, and they control two-thirds of the seats on the boards of directors of each regional Fed’ (Levin, 2016).

### ***Problems and solutions***

‘Existent problems’ in the ‘advanced payments systems’ are numerous. The most obvious problem is a harder access to payment services for the millions of unbanked citizens in the developed economies. There are more than eighteen million unbanked Americans among them.

‘An estimated 5.4 percent of U.S. households were “**unbanked**” in 2019, meaning that no one in the household had a checking or savings **account at a bank** or credit union (i.e. bank). This proportion represents approximately 7.1 million U.S. households’ (FDIC, 2020, p.12).

Difficult access to payment services is a problem not only for unbanked but for underbanked Americans as well, but their number, structure and means of payment have not been followed statistically since 2019? Of course, statistical disregard does not mean that the problems have vanished.<sup>7</sup>

‘An additional 18.7 percent of U.S. households were „**underbanked**“ in 2017, meaning that the household had an account at an insured institution but also obtained financial products or services outside of the banking system. [...] Approximately 24.2 million U.S. households, composed of 48.9 million adults and 15.4 million children, were underbanked in 2017’ (FDIC, 2018, p.1). According to these data, it can be estimated that 80 million of Americans, adults and children are unbanked or underbanked!?

Similar problems are present in other, richer economies, but relatively smaller scale.<sup>8</sup> The UK had unbanked adults ‘just below 1 million in 2018-19’ (HM Treasury, 2020, p. 14), while there are no estimates for the underbanked British. According to the latest available World Bank indicators, there were only seven developed countries that had no unbanked adults, since they had account ownership i.e. 100% - Australia, Canada, Denmark, Finland, Netherlands, Norway, and Sweden.



Another ten countries have also reached total financial inclusion of *adults with an account* Belgium, Germany, Luxembourg, and New Zealand with 99%, Austria, Estonia, Japan, Singapore, Slovenia, and Switzerland with 98%. The UK and the US had a clearly visible lag with 96% and 93% (World Bank, 2018, p. 123-126).

However, at the first glance, it is clear that *the indicators, drawn from survey data*, obtained using *randomly selected, nationally representative samples*, are not reliable.<sup>9</sup> Simply, no country no matter how well developed cannot have 100% of adults with an account. It is sufficient to state four *vulnerable groups of people*: over-indebted, homeless, people with disabilities /illness / mental capacity limitations, and prison inmates (Jerusalimi et al, p. 8-14). Due to this, it is inaccurate that the ‘account ownership is nearly universal in high-income economies’ (World Bank, 2018, p. 4). In rich countries, according to the above mentioned data, there are more than 10 million of unbanked and over 70 million of underbanked adults.

‘Globally, about 1.7 billion adults remain unbanked – without an account at a financial institution or through a mobile money provider’. Understandably, most of unbanked adults live in the *developing world*, almost half of them in the following seven countries: Bangladesh, China, India, Indonesia, Mexico, Nigeria and Pakistan. These are the most populated countries in the world and therefore in 2017, China with 80% of adults with an account had the most unbanked people 225 million, then India with the same percentage had 190 million of unbanked people (ibid). Simultaneously, India and China individually have more banked adults than all developed economies together!

A strict application of statistical methodology additionally distorts the rate of unbanked people. Extraordinary number of unbanked and even greater number of underbanked adults does not comprise enormous and critical group for the future of every country – children under 18 years old. Including this group, that has growing needs for payment services since schooling period, there is a staggering figure of unbanked people that certainly surpasses 1/3 of the world’s population.

All of these people without an account face everyday difficulties in performing simple micro payments. In cashless environment, typical for advanced economies, these difficulties are becoming insurmountable obstacles. So ‘[...] in Stockholm and all across Sweden, most shops, restaurants, even churches, continued to reject the Riksbank’s krona notes. Only public healthcare facilities were in the meantime required to accept cash’ (Vuković, 2020a, p. 6). Cashless environment is not difficult only for unbanked people in Sweden and Scandinavia, but in other rich countries as well, which has been already emphasized before (ibid).

This kind of cashless environment causes problems of costly alternative means of payment. For example, in 2019 in the United States, prepaid cards as the one of the most common alternatives had 69% larger fee per transaction than non-prepaid debit cards 0.49 to \$0.29). If it is compared to the fee as percent of transaction value (1.39% to 0.75%) this difference is even higher 85%

(Federal Reserve System, 2021, p. 27). ‘However, unlike checking accounts, prepaid cards are not always federally insured against an institution’s failure. Prepaid cards often have a monthly maintenance fee and other particular service fees, such as for using an ATM or reloading cash’ (Cooper, 2020).

The position of unbanked and underbanked Americans has been worsening since the 1980s when there was ‘[...] the decline of free/low-cost accounts in the United States. [...] Compared to that earlier era, there are fewer institutions offering low-minimum, low-fee accounts and retail deposit and transaction products are more differentiated based on balances, with the associated fees hitting lower-balance customer hardest’ (Berre et al, 2021)

Hence, it is completely clear why *possible policy responses* in the US are mainly reduced to *regulations which encourage banks to increase access to bank accounts, financial education programs* and other similar measures (Cooper, 2020).

In the EU and UK, the position of unbanked and underbanked people is more favourable thanks to the *Basic bank account*, introduced by the Directive 2014/92/EU. It is ‘an account that **covers standard transactions**: making deposits, withdrawing cash, receiving and carrying out payments. [...] It should also **include a payment card**. [...] In some EU countries, a bank might still charge an **annual fee** for this basic payment account. This fee should remain reasonable’ (Bank accounts in the EU, *Your Europe*, 09/03/2020). These accounts do not support fee-free basic services, although the recommendation from the Directive 2014/92/EU is to offer ‘particularly advantageous terms, such as free of charge’.<sup>10</sup> Basic bank account have significantly facilitated payment transactions for the vulnerable groups of people, but they cannot solve the problem of unbanked people, who have an insurmountable obstacle in the process of opening a bank account. Considering ‘[...] measures that support of education of the most vulnerable consumers’ it can be concluded that they are unable to support help in this case.<sup>11</sup>

There are similar or even bigger problems in all of the developing countries. These problems have been slightly alleviated by the enormous expansion rate of mobile payments since the half of 2010s (legendary M-Pesa in Kenya and similar models in other countries). However, this method of payment has not removed the barrier of opening payment accounts. The proof is evident – tremendous number of unbanked adults in Asia, Africa and Latin America. Simply, all of the countries, including the most developed ones have millions of unbanked people who simply cannot or do not want to open a bank account even though being offered a low-cost basic payment account (EU, UK). Therefore, unbanked people are unable to access most of the basic payment services, except those where they can perform payments by cash. Extremely limited possibilities of cash payments are getting reduced additionally, which leads the people without a bank account into a deadend situation.

Refusing to accept cash is an unstoppable process due to the network effect. This process cannot be slowed down by any legal requirements. The example of this is the Danish ‘cash rule’ by which

'[...] a payee who accepts payment instruments, such as payment cards, must accept cash as payment in connection with staffed sales (Payment Services Act). [...] The cash rule is included in the Danish Payment Services Act as a special Danish provision' (Danish Payments Council, p. 5-6). However, this rule has not influence on all domestic cash payments. 'Denmark and the other Scandinavian countries have more card payments and fewer cash payments per capita than most other countries' (ibid). The explanation is apparently simple – *cash involves costs*. 'The physical nature of cash means that it is costly to handle for banks and retailers alike' (ibid).

At the end, it is evident that all of the analysed solutions – from *basic bank accounts* to *mobile payments* – consider obligatory to have a payment account, which is becomes a barrier for all of the unbanked people. '*Cash rule*' is an anachronous term (introduced in 1984), which shows inefficiency of administrative coercion on the market. This is the reason why it is inevitable to consider the solutions for cashless payments that do not require *an account at financial institution or a mobile money provider*.

## **Possible solution**

The solution for cashless payments of unbanked people without using transaction accounts is electronic transferable cash (ETC). Since it is the simplest version of CBDC for public, central banks must issue ETC. Storing of this sort of cash can be done using so called ***hardware wallets***: smart cards and other mobile devices. It is important to be easily transferrable for offline and online payments in a cashless environment (POS terminals), including the withdrawal of money from an ATM. Offline payments even involve person-to-person money transfer. Other features include finality, availability, convertible, unconditionality, interoperability, instantaneity, security, stable face value, anonymity, week/monthly payment/holding limit, individually transaction limit, cost-free or low-cost and most important convenience.

Every citizen, including children of school age would have the right to one ETC card or other mobile device. The same right should be enabled to the non-residents – foreign students, businessmen, tourists and asylum seekers. ETC cards would be bought and topped up at the existing, licensed and supervised intermediaries. In order to prevent individuals to own more of these cards, some basic identification could be done during the taking over. Excluding initial identification, all data about money holding and transactions must remain anonymous due to privacy protection, even during online payments. Thanks to the rigorous multiple limits ETC would be accorded to the regulations in the AML/CFT area.

Due to its offline circulation without payment account, ETC is non-interest, such as the case of coins and banknotes. It is especially important to use the existing payment channels and institutions, so that new parallel networks and financial institutions would not be needed. Today's disposable technology enables implementation of all features and interoperability of ETC, online and offline, which gives it the character of a hybrid payment instrument.

Having all these features, ETC would give access to payment services for the most of the unbanked people, offline and online and facilitate their financial inclusion. It would reduce costs to their humble budget at the same time. This solution would make payments easier for the unbanked and banked people who live in remote and rural communities, as well as mountain and desert areas, so called 'banking desert' (see Morgan et al, 2018).

It is evident that the electronic cash would contribute to *anchoring value and promoting confidence in the monetary system*, besides physical cash, which is currently '[...] the only risk-free form of money available to households and non-financial business' (Bank of England, p. 23).<sup>12</sup> Influence of ETC to monetary aggregates M0 (MB) and M1 would be negligible due to the sharp programmed transaction/holding limits, so it could not be used as a store of value. Dependency from transactional demand would at the same time warn about the problem of disintermediation in the banking sector.

Essentially, ETC is similar to the first proposal of the ECB: 'Electronic money is broadly defined as an **electronic store of monetary value** on a technical device that may be widely used for making payments to undertakings other than the issuer **without necessarily involving bank accounts** in the transaction, but acting as a **prepaid bearer instrument**' (ECB, 1998, p. 7).<sup>13</sup> By the legal inauguration of 'electronic money institution' as authorized issuer and 'electronic money' as the claim on the issuer, the initial idea has been abandoned and 'electronic money' has been degraded to the level of insignificant prepaid card.<sup>14</sup> Insignificance of 'electronic money' and 'electronic money institution' represents the biggest failure of the ECB Eurosystem after the breakdown of European Exchange Rate Mechanism (i.e ERM I) in 1992.

It is interesting that the current ECB proposal for the digital euro has the same traits as the before mentioned (ECB, 2020). There is still hope that the history of 'electronic money' will not repeat again.

The functionality of ETC in practice has been proven by the only CBDC currently in circulation, which has very similar characteristics – the Bahamas retail *Sand Dollar*, Tier 1: interoperability, near instantaneous validation of transactions, mobile app or payment card to access, non-anonymous, protects user confidentiality, "offline functionality" in case of communication interruption, point of sale support, monitoring for fraud detection, zero transaction fees for individuals and two tiers of individual wallets. Special features **Tier 1**: \$500 eWallet holding limit, with a \$1,500 monthly transaction limit. Identification is not required. Cannot link to a bank account (Central Bank of the Bahamas). The applied solutions are similar to the Chinese ones including tiered eWallet.

The Chinese e-CNY predicts the possibility of full anonymity, which by its name – *the least privileged wallets* – implies the biggest limitations in payments. 'The **least-privileged wallets** can be opened **without providing identities** to reflect the principle of anonymity' (PBOC, p. 9). Therefore, there is a possibility of payments without opening a transaction account, so this sort of

e-CNY could be marked as electronic transferable cash. If there were *hardware wallets* (based on security chips and other technologies), e-CNY from **least-privileged wallets** could circulate without mobile phone and internet, in **offline** environment or in case of electricity blackouts or natural disasters. This pilot project confirms the feasibility of ETC as a hybrid payment instrument primarily for the needs of unbanked and underbanked people.

The suggested solution fulfils all *common principles* and *core features* determined by the Group of seven central banks and the BIS. Three **foundational principles**: “*Do no harm*” (central bank’s mandate for monetary and financial stability), *Coexistence* (with different types of money) and *Innovation and efficiency* (the supply of payment services to create a safe, efficient and accessible system). Four **instrument features**: *Convertible* (exchange at par with different types of money), *Convenient* (should be easy for using), *Accepted and available* (ability to make offline transactions) and *Low cost* (should be at very low or no cost to end users). *System features* and *Institutional features* are fulfilled by definition, since the suggested CBDC variation would have already used the existing payment system and its infrastructure with the implementation of *legal framework* and *regulatory standards* relevant for prepaid cards (Group of central banks & BIS, 2020, p.10-11).

*First published on <https://centralbankmoneyresearch.com/>*

## ***References***

ABA (2020), **Statement for the Record On behalf of American Bankers Association before The Committee on Banking, Housing, and Urban Affairs**, June 30, 2020.

ABA (2021), **Statement for the Record On Behalf of American Bankers Association Before the Subcommittee on Economic Policy Of The Committee on Banking, Housing, and Urban Affairs**, June 9, 2021.

Auer, Raphael and Rainer Bohme (2021), Central bank digital currency: the quest for minimally invasive technology, *WP 948*, Bank for International Settlements, June 2021.

Bank of England (2021), New forms of digital money, *Discussion paper*, 07 June 2021.

Berre, Stein, Kristian Blickle, and Rajashri Chakrabarti (2021), Banking the Unbanked: The Past and Future of the Free Checking Account, *Liberty Street Economics*, FRB of New York, June 30, 2021.

Boar, Codruta and Andreas Wehrli (2021), Ready, Steady, Go? – Results of the third BIS survey on central bank digital currency, *BIS Papers No. 114*, January 2021.

Brainard, Lael (2018), Cryptocurrencies, Digital currencies, and Distributed Ledger Technologies: What are We Learning? *Speech*, Board of Governors of the Federal Reserve System, May 15, 2018.

Central Bank of Bahamas (2019), Project Sand Dollar: A Bahamas Payments System Initiative, December, 2019.

Chorzempa, Martin (2021), China's Pursuit of Leadership in Digital Currency, *Statement*, Peterson Institute for International Economics, April 15, 2021.

Coeure, Benoit (2021), Central bank digital currency: the future starts today, *Speech*, Bank for International Settlements, 10 September 2021.

Cooper, Cheryl (2020), Financial Inclusion: Access to Bank Accounts, *In Focus*, Congressional Research Service, August 27, 2020.

Crisanto, Juan Carlos, Johannes Erhentraud and Marcos Fabian (2021), Big tech in finance: regulatory approaches and policy options, *FSI Briefs No. 12*, Bank for International Settlements, March 2021.

Danish Payments Council (2016), Report on the Role of Cash in Society, August 2016.

Demirguc-Kunt, Asli, Leonora Klapper, Dorothe Singer, Saniya Ansar, and Jake Hess (2018), *The Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution*, World Bank Group.

ECB (1998), Report on electronic money, European Central Bank, August 1998.

ECB (2020), Report on a digital euro, European Central Bank, October 2020.

FDIC (2018), FDIC National Survey of Unbanked and Underbanked Households, *2017 FDIC Survey*, Federal Deposit Insurance Company, October 2018.

FDIC (2020), How America Banks: Household Use of Banking and Financial Services, *2019 FDIC Survey*, Federal Deposit Insurance Company, October 2020.

Federal Reserve System (2021), 2019 Interchange Fee Revenue, Covered Issuer Costs, and Covered Issuer and Merchant Fraud Losses Related to Debit Card Transactions, Board of Governors of the Federal Reserve System, May, 2021.

Federal Reserve System (2021a), FedNow Frequently Asked Questions, Board of Governors of the Federal Reserve System, September 24, 2021.

Godschalk, Hugo and Malte Krueger (2000), Why e-money still fails, paper prepared for the Third Berlin Internet Economics Workshop, May 26-27, 2000.

Goodhart, Charles (2000), Can Central Banks Survive the IT Revolution? *Special Paper 125*, LSE – Financial Markets Group, August 2000.

Group of central banks & BIS (2020), Central bank digital currencies: **foundational principles and core features**, *Report no 1*, Bank of Canada, European Central Bank, Bank of Japan, Sveriges Riksbank, Swiss National Bank, Bank of England and Board of Governors Federal Reserve System, Bank for International Settlements, October 2020.

Group of central banks & BIS (2021a), Central bank digital currencies: **system design and interoperability**, *Report no 2*, Bank of Canada, European Central Bank, Bank of Japan, Sveriges Riksbank, Swiss National Bank, Bank of England and Board of Governors Federal Reserve System, Bank for International Settlements, September 2021.

Group of central banks & BIS (2021b), Central bank digital currencies: **user needs and adoption**, *Report no 3*, Bank of Canada, European Central Bank, Bank of Japan, Sveriges Riksbank, Swiss National Bank, Bank of England and Board of Governors Federal Reserve System, Bank for International Settlements, September 2021.

Group of central banks & BIS (2021c), Central bank digital currencies: **financial stability implications**, *Report no 4*, Bank of Canada, European Central Bank, Bank of Japan, Sveriges

Riksbank, Swiss National Bank, Bank of England and Board of Governors Federal Reserve System, Bank for International Settlements, September 2021.

HM Treasury (2020), Financial Inclusion Report 2019-2020, Department for Work & Pensions, November 2020.

Jerusalmy, Olivier, Paul Fox, Nicolas Hercelin and Lin Mao (2020), Financial exclusion: Making the invisible visible - A study on societal groups encountering barriers to accessing financial services in the EU, Finance Watch, March 2020.

Levin, Andrew (2016), Reforming the Federal Reserve to Ensure Accountability, Transparency, and Good Governance, Dartmouth College, April, 2016.

Libra (2019), An Introduction to Libra, *White Paper*, From the Libra Association Members, June 2019.

Libra (2020), Cover Letter, *White Paper.v2.0*, From the Libra Association Members, April 2020.

May, Heike (2021), The digital euro: Political ambitions and economic realities, *EU Monitor*, Deutsche Bank Research, July 12, 2021.

Mookerjee, Ajay (2021), What If central Banks Issued Digital Currency? *Harvard Business Review*, October 15, 2021.

Morgan, Donald, Maxim Pinkovskiy, and Davy Perlman (2018), The 'Banking Desert' Mirage, *Liberty Street Economics*, FRB of New York, January 10, 2018.

People's Bank of China (2021), Progress of Research & Development of E-CNY in China, Working Group on E-CNY Research and Development of PBoC, July, 2021.

Powell, Jerome (2021), Message on Development in the U.S. Payments System, *Final Transcript*, Federal Reserve Board of Governors, May 20, 2021.

Quarles, Randal (2021), Parachute Pants and Central Bank Money, *Speech*, Board of Federal Reserve System, June 28, 2021.

Sveriges Riksbank (2021), E-krona pilot – Phase 1, April 2021.

U.S. House Judiciary Committee (2020), *Investigation of competition in digital markets*, Majority staff report and recommendations, Subcommittee on Antitrust, Commercial and Administrative Law, United States.

Vuković, Vlastimir (2020a), How Money Disappears, *Paper 1*, Central Bank Money Research, April 2020.



Vuković, Vlastimir (2020b), CBDC: Currency or Platform? *Paper 6*, Central Bank Money *Research*, April 2020.

Waller, Christopher (2021), CBDC: A Solution in Search of a Problem? *Speech*, Board of Governors of the Federal Reserve System, August 5, 2021.

---

<sup>1</sup> Charles Goodhart (2000), p. 31.

<sup>2</sup> *The Wall Street Journal*: ‘Fed to Publish Paper on Digital Currency This Summer’, by Paul Kiernan, May 20, 2021.

<sup>3</sup> ‘This report cannot be conclusive and is not a statement of policy. [...] this report provides a framework for further work as the current financial system evolves and design options are explored and refined’ (Group of central banks & BIS, 2021c, p. 2).

<sup>4</sup> ‘(2) In its review of Directive 2000/46/EC the Commission highlighted the need to revise that Directive since some of its provisions were considered to have **hindered** the emergence of a true single market for electronic money services and the **development** of such user-friendly services’ (Directive 2009/110/EC of 16 September 2009, OJL 267, p. 7, 10.10.2009).

<sup>5</sup> ‘**Main motivations** of CBDC work – Retail CBDC: Payments safety/robustness, Payments efficiency (domestic and cross-border), Financial inclusion, Monetary policy implementation and Financial stability’ (Boar and Wehrli, p. 10).

<sup>6</sup> ‘Our **forthcoming paper** on the evolution of digital payments is intended – [...] – to advance the objective of ensuring that the payment system and the economy work for all Americans’ (Powell, p. 2).

<sup>7</sup> ‘Before 2019, the survey was named *FDIC National Survey of Unbanked and Underbanked Households*. The new survey name describes the content of the survey, which asks a nationally representative sample of U.S. households about their use of banking and financial services.’ (FDIC, *How America Banks: Household Use of Banking and Financial Services*, October 2020, p. 1).

<sup>8</sup> ‘All countries face challenges in achieving full financial inclusion, but the United States is relatively unusual among richer countries in the size of its unbanked and underbanked population.’ (Stein et al, 2021).

<sup>9</sup> ‘The indicators in the 2017 Global Findex database are drawn from survey data covering almost 150,000 people in 144 economies – representing more than 97 percent of the world’s population [...] using randomly selected, nationally representative samples’ (Demirguc-Kunt et al, 2018, p. 4).

<sup>10</sup> ‘(46) In order to ensure that payment accounts with basic features are available to the widest possible range consumers, they should be offered free of charge or for a reasonable fee. To encourage unbanked vulnerable consumers to participate in the retail banking market, Member States should be able to provide that payment accounts with basic features are to be offered to those consumers on particularly advantageous terms, such as free of charge’ (Directive 2014/92/EU of 23 July 2014, L 257/223).

<sup>11</sup> ‘(49) Member States should promote measures that support the education of the most vulnerable consumers, providing them with guidance and assistance in the responsible management of their finances’ (ibid).

<sup>12</sup> ‘The Bank recognize the importance of central bank money not only for those who want to use, but also for its unique role in anchoring value and promoting confidence in the monetary system. [...] In the form of cash, it is the only risk-free form of money available to households and non-financial business’ (Bank of England, 2021, p. 23)

<sup>13</sup> ‘**Stored-value products** are generally prepaid instruments in which a record of funds owned by or available to the customer is stored on an electronic device in the customer’s possession. The amount of stored “value” is decreased or increased, as appropriate, whenever the customer uses the device to make a purchase or other transaction, without necessarily involving a personal bank account’ (ECB, 1998, p. 7).

<sup>14</sup> ‘Article 2 (1) ‘**electronic money institution**’ means a legal person that has been granted authorization under Title II to issue electronic money. Article 2 (2) ‘**electronic money**’ means electronically, including magnetically, stored monetary value as represented by a claim on the issuer which is issued on receipt of funds for the purpose of making payment transactions [...]’ (Directive 2009/110/EC of 16 September 2009 [...] on the business of electronic money institutions [...]).