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SOVEREIGN DIGITAL CURRENCIES: CENTRAL BANKING OF THE FUTURE OR ECHOES FROM THE PAST?

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SOVEREIGN DIGITAL CURRENCIES: CENTRAL BANKING OF THE FUTURE OR ECHOES FROM THE PAST? °

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Le criptovalute c.d. sovrane, precisamente sulle valute digitali emesse dalle banche centrali, rappresentano un'idea suggestiva ed intrigante nel quadro dei prodotti del mercato europeo. Il saggio segue il dibattito scientifico che si è sviluppato intorno ad esse, come evoluzione dell'esperienza della moneta elettronica e prodotto in forte comeptizione con i servizi di pagamenti digitali.

This paper analyzes a specific type of monetary developments instigated by the digitization of the EU payment environment over the last decade – sovereign digital currencies. Namely, the combination of fast-paced technological advancements and regulatory responses lagging behind, have resulted with a noticeable increase in privately issued digital monies. Free-riding on similarities with innovative money formats (such as e-money), privately issued digital currencies compete with digital payment solutions in retail transactions. The competition is taking place in an increasingly cashless payment environment, in which de facto digital monies constitute the majority of the broad money aggregate. In this respect, the idea of sovereign digital currencies – labeled as "central bank digital currency" (CBDC) appears as an intriguing proposal. With this in mind, this paper gives further insight on the public debate on the promises that privately issued digital currencies hold for the future of central banking and the financial system overall.

Sommario:

° Double blind peer-reviewed paper.

1. Introduction

Over the last decade there has been a considerable increase in the number and volume of privately issued digital currencies (PIDCs) worldwide designed as fierce competitors of the more innovative formats of sovereign-established *fiat* currency. Resulting from important technological advancements and the exponential growth of complex virtual communities the development comes at a time of low public confidence in traditional actors within the money-creating sector (primarily banks) and outright skepticism toward technocratic governance of central banks[1], uplifting the debate on the promises and pitfalls of alternatives to publicly issued money. Privately issued digital currencies can broadly be defined as electronically transferrable, digital representations of value, which are not issued by a central, public authority or "attached to a *fiat* currency", and that are nevertheless accepted as means of exchange between users (be it natural or legal persons)[2]. What is evident is that forms of PIDCs borrow various features from different money formats primarily from publicly issued digital money formats such as e-money. They also borrow properties from different types of commodities, which complicates PIDCs' description and categorization[3]. For instance, the speculative use of PIDCs "free rides" on their affinity with traditional securities, while their use for transactional purposes relies on their resemblance with traditional currencies[4].

At the same time however, incidents related to PIDCs can negatively affect the confidence of consumers in the efficiency of innovative money formats evolving in an ecosystem of digitized payments. There are many forms that PIDCs can take, from asset-backed virtual currencies to crypto-currencies. There are as many methods in which they can be obtained, stored and transacted electronically[5]. The use of crypto-currencies in particular has

[1] See: GOODHART - LASTRA, *Populism and Central Bank Independence*, in *Open Economies Review*, 2018, 49-68.

[2] This definition is based on the European Banking Authority's definition of virtual currencies whose broadness allows it to encompass various forms of privately issued digital currencies in terms of the manner in which they can be obtained, transacted and stored. See in EBA, *EBA Opinion on 'virtual currencies'*, EBA/Op/2014/08, 2014, 7.

[3] DONG et Al., *Virtual Currencies and Beyond: Initial Considerations*, IMF Staff Discussion Note SDN/16/03, 2016, 7 and 24.

[4] LASTRA - ALLEN, *Virtual currencies in the Eurosystem: challenges ahead*, Monetary Dialogue-ECON Committee, PE 619.020, 2018, 23.

[5] Depending on their level of convertibility for fiat currencies (non-convertible and convertible virtual currencies) or the model in which they operate (e.g. centralized,

increased over the years because of concrete transactional advantages to their users[6]. Competent authorities, primarily central banks, have added further momentum to this development, since they have been slow in keeping up with market advancements with targeted policy responses. Arguably, the regulatory *lacuna* maintained in this area of payments has been beneficial to the advancement of PIDCs. Indeed, various types of crypto-currencies are emerging as alternatives to traditional and/or innovative money formats, issued by sovereign-established authorities, anticipating the dawn of a new era for central banking – that of open competition among privately and publicly issued monies.

In this respect, the idea of sovereign digital currencies often labeled as "central bank digital currency" (CBDC), and considered by several central banks around the globe and within the EU as well has been an intriguing proposal. On the one hand, CBDCs seem to announce the future of central banking in an increasingly cashless environment. Central bank digital currencies would compete with privately issued monies enjoying a privileged position of a sovereign-backed, credible currency, fostering financial system's efficiency and inclusiveness. At the same time, however, CBDCs echo proposals from classical monetary economics such as the one to end fractional reserve banking suggested by the 1930's "Chicago plan". But such profound and radical implications to monetary policy and commercial banking would reverberate across the financial and political system, with serious implications for central bank societal legitimacy[7] and to financial stability. With this in mind, and considering that the benefits and uncertainties of PIDCs are still unfolding, it is important to debate and examine substantial issues sovereign digital currencies entail for central banking. Thus, the paper directly contributes to the fast developing scholarship on the evolution of (digital) currencies and the future of central banking[8] as well as on the literature

decentralized, hybrid). See more in DONG et Al., *Virtual Currencies and Beyond: Initial Considerations*, 8.

[6] Still, they currently lack the "critical mass" in terms of users, which impedes them to fulfill their economic potential. What is significant from the perspective of virtual currencies' extension to the "real world" is that they can be exchanged for some of the main representatives of *fiat* currencies (e.g. euro, US dollar) through virtual trading platforms or even automatic teller machines located across EU member states.

[7] LASTRA - ALLEN, *Virtual currencies in the Eurosystem: challenges ahead*, 34.

[8] See for instance BROADBENT, *Central Banks and Digital Currencies*, 2016, available at http://www.bankofengland.co.uk/publications/Documents/speeches/2016/speech886.pdf; OFFICE OF THE COMPTROLLER OF THE CURRENCY, *An Introduction to Electronic Money Issues*, unpublished manuscript, 1996, available at http://www.occ.gov/topics/bank-operations/bit/intro-to-electronic-money-issues.pdf; HAYEK, *Denationalization Money: The Argument Refined*, The Institute of

exploring monetary and legal challenges raised by new frontiers of financial activity.[9] At a time when competition among various money formats intensifies whilst public appreciation of central banking business seemingly lowers, the arguments presented in this paper add further insight on the ongoing debate about the opportunities that privately issued digital monies hold for central banking.

2. Privately issued vs. sovereign digital currencies

From a purely legal perspective, PIDCs cannot be considered "currency", "legal tender" or "money" even in the broadest sense. Firstly, the term currency denotes minted forms of money, which nowadays circulate in the form of banknotes and coins with no (or very little) intrinsic value other than the trust of users in their issuer that is typically represented by a sovereign-established central authority[10]. Privately issued digital currencies fall short of complying with the qualities of legal tender, which refers to a currency that is based on a country's legal framework and entitles «*the debtor to discharge monetary obligation with the currency through its mandatory acceptance within the relevant jurisdiction*»[11]. Furthermore, to determine whether PIDCs can be considered money, we must also consider their economic aspect in addition to legal considerations. In this respect privately issued digital monies again fail to meet fundamental properties, since they do not fulfill the three core economic functions of money that have to coexist simultaneously: means of exchange, storage of value and unit of account. Because of currently low levels of general acceptance, PIDCs fulfill only the medium of exchange function, and even that within the limits of specific virtual communities.[12]

Economic Affairs, 1990; MEANING ET AL., *Broadening narrow money: monetary policy with a central bank currency*, Bank of England - Staff Working Paper No. 724, 2018; WINKLER, *Fedcoin: How Banks Can Survive Blockchains*, *Konzept* 6, 2015.

[9] See for instance GOODHART - LASTRA, *Border Problems*, in *Journal of International Economic Law*, 705-718; HOEGNER (ed), *The Law of Bitcoin*, iUniverse, 2015; JOHNSON - POST, *Law and Borders- The Rise of Law, in Cyberspace*, in *Stanford Law Review*, 1996, 1367-1402.

[10] Hence, the term *fiat* or *fiduciary* currency. See: ECB, *Virtual Currency Schemes - a further analysis*, February 2015, 33.

[11] DONG et Al., *Virtual Currencies and Beyond: Initial Considerations*, 16.

[12] ECB, *Virtual Currency Schemes - a further analysis*, 23. However, there is no denying that virtual currencies' resemblance to different money formats (e.g. electronic money) paired with their transactional convenience and certain technological advancements in the future, makes them serious competitors of *fiat* currency in the sector of payments. Indeed the essential motivation behind virtual currencies and Bitcoin in particular was to bypass the banking industry and other intermediaries in settling payments. See:

All PIDCs share the same intellectual premise – to eliminate the usual "middle-men" or intermediary in the traditional money-issuing process, which is typically represented either by a sovereign-established authority (*i.e.* central bank) or by a specifically licensed and monitored financial intermediary (*i.e.* bank). By so doing PIDCs openly challenge traditional legal and political paradigms of state controlled monetary systems, fuelling the competition between the private and public provision of money.[13] If we consider Bitcoin, for instance, this is a PIDC that directly challenges the central banking system of the Euro area in its money creation and monetary policy role «*by providing an alternative form of currency to central bank liabilities (circulating as currency) and commercial bank liabilities backed with fractional reserves of central bank money (circulating as book-money in non-cash payment systems)*»[14]. Arguably, in a cashless environment, PIDCs have the potential to erode the role of traditional stakeholders in the money creation sector with unforeseen consequences for systemic and financial stability[15]. However, because all private forms of digital monies advance important and yet undecided legal issues, various forms of *fiat* currencies retain their prevalence within monetary systems for the time being[16].

At the same time, intensifying competition suggests new opportunities for central banks in a heavily digitized payment environment and where the monopoly of central banks over the money creation process is not as absolute as it appears. Namely, the majority of money in circulation today, or broad money, is created by commercial banks through the well-established processes of deposit taking and credit multiplication. Therefore, in a sense, the majority of the money in circulation is actually "privately issued" although the ultimate content of this "bank money" is central bank currency[17]. Moreover, since deposit money is

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NAKAMOTO, *Bitcoin: A Peer-to-Peer Electronic Cash System*, 2008, Available at: https://bitcoin.org/bitcoin.pdf (Retrieved on 4.11.2018.)

[13] DONG et Al., *Virtual Currencies and Beyond: Initial Considerations*, 6 and 12.

[14] LASTRA - ALLEN, *Virtual currencies in the Eurosystem: challenges ahead*, 23.

[15] *Ibidem*.

[16] The majority of concerns originate from their uncertain legal characterization. Other relate to risks arising from the complex nature of the blockchain technology backing privately issued digital currencies. For instance, the risk of "double-spending", which refers to the lack of trusted, third party (e.g. master ledgers) that process third party payments and validate adjustments in the balances of users' accounts accordingly, thorough robust and practical protocols. Such master ledgers are a staple of traditional, centralized payment systems. For a detailed insight see: ATHANASSIOU, *Impact of digital innovation on the processing of electronic payments and contracting: an overview of legal risks*, ECB Legal Working Paper Series No. 16, October 2017, 16.

[17] However, since commercial banks keep fractional reserves as central bank money on special accounts with the central bank, there is still a direct connection between broad money

predominantly digital, transactions using this money format rely on the use of bank electronic databases stored on servers (or *ledgers*) that are almost identical to technologies backing the development of privately issued digital currencies. In this respect deposit money that we know and use everyday *is* digital money[18].

Although the digitization hype has *de facto* seeped into the money aggregates, central banks have remained true to hard, *fiat* currency opting not to offer digital alternatives to banknotes and coins. Though digitization of cash can be seen as a logical development within modern payment systems, no central bank in the world currently creates and issues CBDCs[19]. But in an increasingly virtual ecosystem should central banks worry about missing-out on opportunities?

Central bank digital currency can broadly be defined as: «an electronic, *fiat* liability of a central bank that can be used to settle payments or as a store of value»[20]. Similar to banknotes and coins, CBDC would be a central bank liability insofar as it would be backed by central bank assets, supported by its public authority and the authority of the rule of law that maintains central bank builds its credibility[21]. Considering this, CBDCs would probably gain the upper hand in the competition with privately issued digital monies since PIDCs are burdened by legal and governance uncertainties. This would surely set in motion radical transformations of commercial banking business and financial intermediation overall, initiating a disintermediation trend in the long term. *In ultima linea*, this could lead to the "narrowing" of the banking system since the deposit-taking function would transfer to the central bank

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and the sovereign-established public authority of central bank. In addition, the whole process of creating credit money is completely supervised by several public authorities. See: LASTRA - ALLEN, *Virtual currencies in the Eurosystem: challenges ahead*, 33 ff. Also see: PICHLER - SUMMER, *Digital Money, Cryptocurrencies and Central Banks*, in GNAN - MASCIANDARO (eds.), *Do We Need Central Bank Digital Currency? Economics, Technology, and Institutions*, SUERF Conference proceedings 2018/2, 2018, 92.

[18] See: PICHLER - SUMMER, *Digital Money, Cryptocurrencies and Central Banks*, 93.

[19] At the same time several central banks around the world have disclosed projects on the introduction of central bank digital currency (for instance, Sweden, Canada, Uruguay). Among them, the central bank of Uruguay even began testing a pilot, mobile-based transfer of funds application ("e-Peso") however, the technology backing it is quite different from the one used by cryptocurrencies. See more at: http://www.laht.com/article.asp?ArticleId=2443586&CategoryId=23620 (Retrieved on 25.3.2019.) See also: GNAN - MASCIANDARO (eds.), *Do We Need Central Bank Digital Currency? Economics, Technology, and Institutions*, 24.

[20] See: MEANING ET AL., *Broadening narrow money: monetary policy with a central bank currency*, 4.

[21] PANETTA, *21st Century Cash: Central Banking, Technological Innovation and Digital Currencies*, in GNAN - MASCIANDARO (eds.), *Do We Need Central Bank Digital Currency? Economics, Technology, and Institutions*, 24.

that would now have a direct relationship with CBDCs' end-users[22]. With this in mind, CBDCs appear to be an "*avant-garde*" and concerning proposition in terms of overall financial system stability. But the actual competition between sovereign and privately issued currency we are witnessing has been anticipated by a long-standing debate among scholars on whether central banks should give in to competition at all.

As previously mentioned, CBDCs seem to revive ideas from monetary past, such as the so called "Chicago plan" that was introduced and examined in the early 1930s by several renowned intellectual[23]. Therefore, the following section examines several outstanding questions related to CBDC keeping in mind that nowadays central banks should carefully revisit past monetary ideas when envisaging the future of central banking business.

3. Envisaging CBDCs beyond the "Chicago plan"

At this point it is difficult to determine whether high financial risks and societal disadvantages associated with PIDCs, could be the decisive push factor for central banks into the direction of digitization[24]. Certainly, what supports this perception is the emergence of nearly cashless societies such as

[22] PANETTA, *21st Century Cash: Central Banking, Technological Innovation and Digital Currencies*, 13.

[23] Briefly explained, the "Chicago plan", which dates back to the time of the Great Depression in the United States, was a proposal on how to modernize the banking system as well as boost public confidence, put forward by several renowned monetary economists from the University of Chicago (hence the moniker). Their basic proposition was the complete separation of the monetary and credit functions within banking, achieved firstly, by abolishing fractional reserve banking and replacing it with a "100% reserves" system, where banks should keep full coverage on demand deposits. Secondly, banks not be allowed to create money through credit expansion, since financing of new bank credit could happen solely on the basis of retained earnings in the form of sovereign money. Therefore, money creation would be an exclusive prorogative of the central bank. See more in: BENES - KUMHOF, *The Chicago Plan Revisited*, IMF Working Paper WP/12/202, 2012.

[24] See: AGUR, *Central bank digital currencies: an overview of pros and cons*, in GNAN - MASCIANDARO (eds.), *Do We Need Central Bank Digital Currency? Economics, Technology, and Institutions*, 114. Economic and legal challenges associated with crypto-currencies are still unfolding, but recent events of risk-materialization suggest that they come with great social costs. For instance, in 2014 when 'Mt. Gox' - one of the largest Bitcoin trading exchange at that time, bankrupted, more than 24 000 customers were left with losses in crypto assets and in cash worth hundreds of millions of dollars. In addition, the orderly resolution of this case is proving to be 'a legal twilight zone' for customers who have filed claims. See more in: HARNEY - STECKLOW, *More than three years after the demise of the Mt. Gox exchange, it's customers still haven't received a crypto cent. Here's why*, *Reuters*, 16 November 2017.

Denmark or Sweden[25]. One of the often-cited arguments in favor of CBDCs is the fact that this money format could improve inclusiveness and efficiency of the financial system, since it would allows access to digital payments for "unbanked" citizens[26]. CBDCs could also increase public confidence in the monetary system because of a direct communication between the central bank and depositors that would lower costs of cash transactions. At the same time, CBDCs raise important outstanding questions primarily with respect to the conduct of monetary policy that would now be implemented in the context of complete central bank monopoly over the money creation process. This brings about important uncertainties about the future of financial intermediation and business prospects of commercial banking as we know it.

From the perspective of monetary policy, an important consideration to keep in mind is that distributed ledger technology, which would underpin CBDCs' creation, could allow central banks to exert stringent control over the money creation process. This, however, depends on the variant in which the central bank decides to issue digital currency – whether it opts for the centralized or decentralized manner. In the first option, CBDC could be issued as a variant of central bank digital deposits that conceptually would be considered as an extension of central bank reserves to the general public besides financial institutions. From a technological viewpoint, existing real-time gross settlement mechanisms could back such CBDCs[27]. The second variant would entail the use of distributed ledger technology where CBDC could be issued in a decentralized manner, similar to how cash is distributed[28]. Arguably, the first option appears to be more in central bank interest, since it allows central banks more control over financial stability, because users would be more inclined to hold CBDC as store of value but also to use them as a means of payment, instead of other types of privately issued monies such as bank deposits that are not as risk-free. In addition, by appropriating the technology they are forced to compete with, central banks could gain even more control over monetary policy. This is because central banks would retain monopoly over banknotes and reserves, while committing to an "algorithmic rate" of CBDC creation and adjustments that would also envisage contingency

[25] See: AGUR, *Central bank digital currencies: an overview of pros and cons*, 115.

[26] However innovative mobile payment systems (such as the M-Pesa in Kenya) show that inclusiveness can be achieved without resorting to *avant-garde* central banking.

[27] MEANING et Al., *Broadening narrow money: monetary policy with a central bank currency*, 5.

[28] ENGERT - FUNG, *Motivations and Implications of a Central Bank Digital Currency*, in GNAN - MASCIANDARO (eds.), *Do We Need Central Bank Digital Currency? Economics, Technology, and Institutions*, 57.

plans dependent on economic cycles[29]. In a similar line of thought, it can be argued that CBDCs open new possibilities for monetary policy following the quantitative easing strategies, and in an environment of extremely low interest rates. As interest rates approach the almost-negative territory, the existence of cash limits the scope of negative interest rates in monetary strategy since arbitrage leads to cash hoarding as interest rates lower. CBDCs open new possibilities in this context[30]. However, the idea is very unlikely to materialize, since cash is still in demand by the general public worldwide, and thus its practical implementation would exert pronounced regional effect[31]. Another important consideration is that this idea would require the elimination of cash and also some sort of capital control in order to prevent arbitrage in favor of foreign currencies. But this type of "financial repression" [32] is unthinkable nowadays (particularly from the perspective of the EU and its fundamental freedoms and rights).[33]

Turning to CBDCs' repercussions to the business of commercial banking and overall financial intermediation, it is evident that digital central bank money would directly impact bank funding and credit provision. Since bank deposits are typically kept for income earning, wealth safekeeping and transactional purposes, CBDCs would fulfill all of these functions with an additional advantage – being risk free[34]. It is therefore very probable that users will prefer to invest in CBDCs. At the same time, it is unlikely that bank deposits will be completely abandoned since this financial asset is typically linked with a range of bank products and services (*e.g.* loans, investment advice) that would otherwise be unavailable to citizens. In the event of CBDCs banks are likely to strengthen the association between its obligations and assets even more. Another important consideration, with direct implications for financial stability, is that CBDCs would impact lending interest rates to

[29] RASKIN - YERMACK, *Digital currencies, decentralized ledgers, and the future of central banking*, NBER Working Paper Series, WP No. 22238, 2016, 11.

[30] DE LIS, *Central Bank Digital Currencies: Features, Options, Pros and Cons*, in GNAN - MASCIANDARO (eds.), *Do We Need Central Bank Digital Currency? Economics, Technology, and Institutions*, 50.

[31] That would prove problematic for the EU, for instance, where member states have a very varied preference toward cash.

[32] See: REINHART, *The return of financial repression*, CEPR Discussion Paper No. DP8947, 2012. *Ibidem*, 51.

[33] ENGERT - FUNG, *Motivations and Implications of a Central Bank Digital Currency*, 61.

[34] *Ibidem*, 68.

offset losses in funding, as well as venture into riskier assets to compensate for lower profitability[35].

4. Preliminary conclusions

This paper examined the topic of sovereign issued digital currencies, typically labeled as CBDCs, through the lens of monetary competition between sovereign-established authorities and private entities in light of increased digitization of payments and the mainstreaming of the idea of "greater diversity in the money supply"[36]. Although the debate on whether central banks should give in to monetary competition is long-standing and often backed with arguments established within a specific strand of classical monetary economics (the so-called "Chicago plan" of the early 1930s) prior to the emergence of privately issued digital currencies and the exponential rise of cryptoassets, central banks haven't felt compelled to rethink their role within the money creation sector. Not wanting to miss out on opportunities several central banks around the world have proposed the idea of CBDCs, advancing arguments in favor of their development at the same time attempting to offset disadvantages of their monopole on the money supply and the resulting "narrow banking" phenomenon.

Although CBDCs do present advantages in terms of monetary policy effectiveness – particularly in the post-crisis environment of limited maneuver space in monetary strategy, the current societal circumstances are not favorable to a quantum leap in central banking. Disincentives as to the development of CBDCs are likely to come from the banking industry as well, who still strives to increase assets' profitability, consolidate their business and regain pre-crisis levels of confidence. When paired with the fact that central banks face increased public skepticism toward their technocratic modes of doing business, it is highly unlikely that in the foreseeable future monetary authorities will engage with CBDCs beyond a purely research scope.

[35] *Ibidem*, 69.
[36] LASTRA - ALLEN, *Virtual currencies in the Eurosystem: challenges ahead*, 34.