

Initial steps towards a central bank digital currency by the Central Bank of Brazil

Fabio Araujo¹

Abstract

This note shortly discusses the development of a central bank digital currency (CBDC) by the Central Bank of Brazil (BCB). Considering specific features of the Brazilian payment system, the digital Brazilian real is shaping up as the main element of a platform for smart payments, adding to the facilities composing the Brazilian payment system, such as a real-time gross settlement service (available since 2002), e-money mainly available through payment service providers (since 2013), and an instant payment service (since 2020).

Introduction

In the case of Brazil, gains may arise from the implementation of a CBDC as the foundation of a smart payment platform. This note discusses some aspects leading to this conclusion. Nonetheless, it is important to stress that the digital Brazilian real would not be the only means of liquidity available on this platform, promoted in an arrangement that would preserve the successful public-private partnership between central banks and commercial banks for providing liquidity that has been working for more than a century.

The power of creating money granted to central banks is already very extensive. Mixing that power directly with daily operations of families and businesses may tempt policymakers to mingle their actions with fiscal and credit provision policies, not always with the best interest of the population in mind.² Therefore, such a platform should be designed after careful consideration of the impact on the economy and also on the conduct of economic policy.

Main objectives of introducing a CBDC in Brazil

Brazilian payment systems are already quite modern. A solution for real-time gross settlement (RTGS) has already been available for 20 years. An e-money system, operated by a diverse ecosystem of payment service providers (PSPs) – or payment

¹ Central Bank of Brazil, Project leader of the Digital Brazilian Real Initiative.

² An all-powerful benevolent policymaker would be able to implement first-best policies. But an all-powerful policymaker would not remain benevolent for long. The principle of separation of powers, a cornerstone of democratic regimes, allows for checks and balances and also seems to be important in the formulation of the economic policy.

institutions, as they are known in Brazil – has been operational for almost a decade. And, finally, an instant payment system – Pix – went live in November 2020 and has been very well received by the public, with more than 330 million individual keys (aliases) in operation.³ In a period of 12 months, Pix was the channel for the first ever digital money transfer for 45 million people, an important step towards financial inclusion.

These modernising initiatives are part of a broader process of digital transformation in our society. Financial markets are getting reorganised to better deal with the flow of information generated by our daily routines. In this convergence of technologies and services, the use of payment information brings up potential for financial innovation, for the provision of new services, and for increasing the efficiency of currently available services.

In Brazil the main objective of the introduction of a CBDC is to provide entrepreneurs with a safe and reliable environment to innovate through the use of programmability technologies, such as programmable money and smart contracts. In the context of a modern payment system, already available to the Brazilian population, a full-fledged CBDC must enable new functionalities, beyond those brought by an instant payment arrangement. Therefore, the innovation tool for which the BCB envisions the greatest potential is the development of a platform for smart payments.

Technologies available for smart payments, as seen in the cryptoassets ecosystem, open up space for new business models and are better suited to meeting the population's demand for natively digital means of settlement. Asset tokenisation and the issuance of digital assets is a reality. It is up to regulators to provide a safe environment so that entrepreneurs can propose innovations and a larger base of citizens can benefit from these technologies, without exposure to the uncertainties of an unregulated financial environment (as stated in BCB (2021c)).

The potential for financial inclusion of these technologies is clear when associated with other actions promoted by central banks. As discussed in Schär (2021), technological features available in the cryptoassets ecosystem, such as standardisation and interoperability, reusability of protocols, and composability of financial services, may result in new products that reach their target audience in a shorter period, are better suited to people's needs, and are able to operate at lower average tickets than currently possible. At the same time, such features allow for a high degree of auditability, traceability, and transparency, providing the necessary tools for supervision.

Nonetheless, a mature governance is a fundamental aspect of stable financial and payment systems. Although innovations based on smart payment technologies are being used in the decentralized finance ecosystem, their current governance devices fall short of the requirements compatible with the level of integrity essential to the operation of financial and payment systems. Thus, as observed in Aramonte and Schrimpf (2021), a fully decentralized environment is most likely not achievable under current integrity requirements. Therefore, incorporating

³ The current arrangement in the Brazilian e-money market provides a synthetic CBDC (sCBDC) as defined in Soderberg (2022), and the instant payments system, Pix, can be seen as the final step in providing such an instrument to the general population.

such innovations into central banks' regulatory perimeter will imply important changes in the governance of these new technologies.

Guiding principles of CBDC design and architecture

Taking the time necessary to discuss possible CBDC designs is an important step towards a safe and stable financial environment. In general, implementation of CBDCs for wholesale purposes has implications that are easier to grasp, as countries where RTGS systems are in operation give a quite faithful guideline for the expected effects of such implementation. Retail applications, however, will lead to much broader and unmapped developments.

In BCB (2021a) and BCB (2021b), the BCB presented guidelines for the digital Brazilian real, in short:

- Focus on technology to foster innovative business models that can increase financial market efficiency;
- Use in retail, alongside bank accounts, payment accounts, cards and cash;
- Online operation with seamless integration to currently available payment systems;
- Offline payments are also under consideration, although not a mandatory initial feature;
- Two-tiered distribution model, with the BCB issuing the digital Brazilian real and with access provided through custodians in the payment system;
- Non-interest-bearing instrument, as the BCB does not intend to use a CBDC as an additional monetary policy tool;
- Compliance with bank secrecy, the General Data Protection Law (LGPD) and other applicable legal and regulatory provisions, which equates transactions with the digital Brazilian real to other transactions currently carried out by the payment system;
- Mechanisms to prevent money laundering, terrorist financing and the financing of the proliferation of weapons of mass destruction;
- For cross-border payments, it is essential to keep the local system open to the possibility of adopting internationally agreed standards, seeking interoperability solutions with other countries' central banks;
- Finally, resilience to cyber attacks must be comparable to that adopted in the critical infrastructures of Brazilian financial markets.

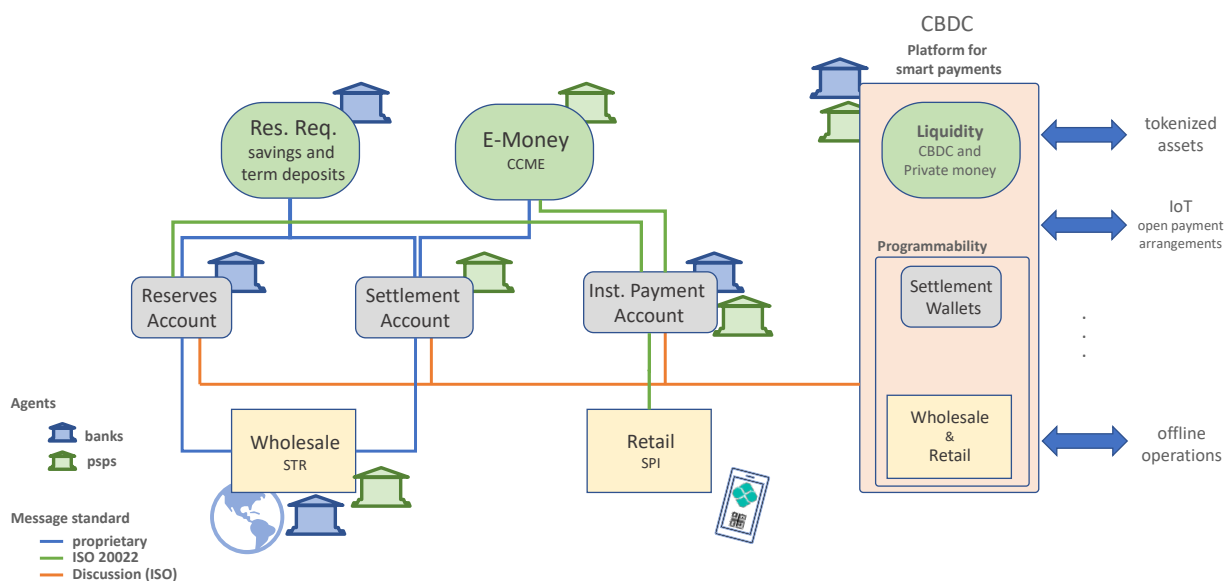
These features would qualify the digital Brazilian real as a hybrid CBDC, in the sense of Auer and Böhme (2021).

It is important for a CBDC platform to be interoperable with other available payment systems. As an infrastructure for smart payments, the digital Brazilian real system would connect conventional sources of liquidity, provided by authorised agents, to digital asset ecosystems, as illustrated by Figure 1. With the regulation of those spaces, new business models could be incorporated into the regulatory perimeter, with potential benefits for the population.

Moreover, the risk of currency substitution is larger if national central banks are not able to fulfil the demand of the population for digital financial and payment services. Improved efficiency in providing services demanded by the population, whether provided by a CBDC or by regulated stablecoins denominated in local currency, is likely to curb threats of currency substitution. On the other hand, privately issued unregulated stablecoins denominated in foreign currencies, which could be a threat in the absence of a CBDC, would remain used at the margin of society.

CBDC as a smart payment platform and interoperability

Figure 1



Another important aspect is that central banks should maintain the partnership with the private sector in providing liquidity to the market. Therefore, the BCB envisions coexistence between the digital Brazilian real and private money issued by institutions regulated by the BCB on the intended smart payments platform. Individuals could transform their deposits, with both banks and PSPs, into tokens⁴ capable of accessing services provided on this new platform, under a commitment by banks and PSPs to convert such tokens into CBDC on demand.⁵ Tokens of deposits with commercial banks would inherit all applicable regulation and features from their originating assets, such as fractional reserve requirements and backstops. In the same way, tokens of deposits with PSPs would inherit their features, such as the full reserve requirements.

⁴ As the decision regarding the use of a token-based solution for the digital Brazilian real has not been reached yet, with other more centralised architectures still under consideration, the term token is used loosely here in order to simplify the presentation. Whatever the platform chosen for the issuance of a CBDC, private money issued by institutions regulated by the BCB will be available to the public, offering the same sort of technological functionality. This is similar to the environment proposed by McLaughlin (2021).

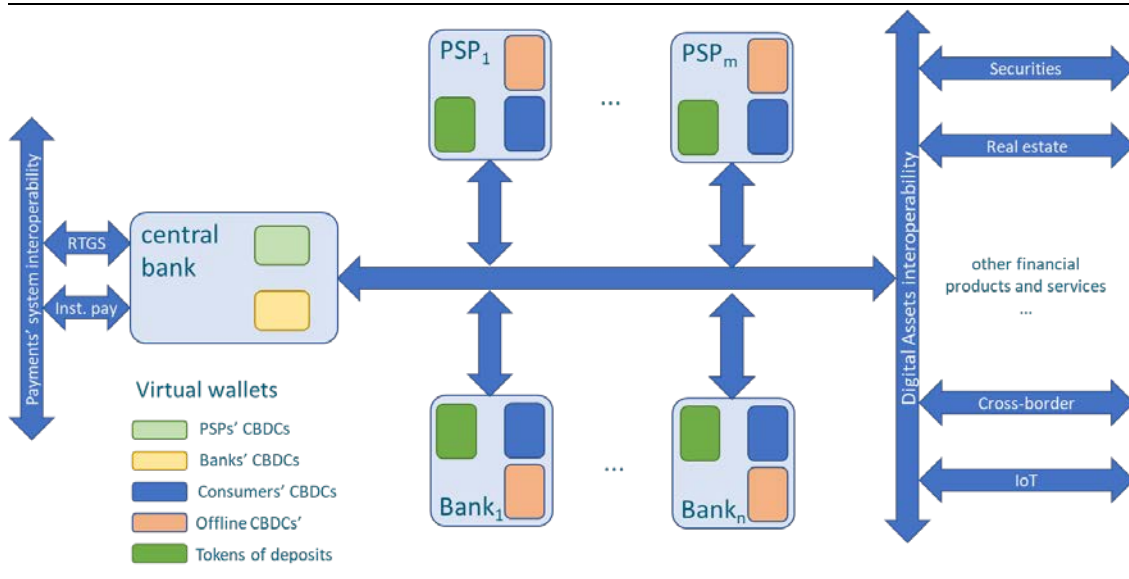
⁵ Here, the expression "on demand" needs qualification. In the next section, dealing with financial stability issues, it will become clear that this commitment should be fulfilled only under certain criteria.

This strategy would give rise to two kinds of regulated stablecoins in the Brazilian economy, and others could be added to the portfolio. Tokens issued by PSPs would fit the basic description of a stablecoin, with deposits fully backed by reserves held at the central bank. These tokens would play the important role of fostering innovation and contestability of financial markets. Fintechs willing to provide new products could opt for using a PSP token to reach their public, with a simplified regulation allowing them to focus efforts on the development of their business models.⁶ On the other hand, incumbent banks could participate in the market by issuing their tokens. The regulatory constraints on liquidity, portfolio risk and backstops would render their stablecoins effectively stable – in the same way that such requirements make stable the parity between bank deposits and fiat currency.⁷

Avoiding regulatory asymmetry between existing platforms and the intended smart payments platform is an important guideline to curb inefficient flows between payment environments. One concern worth noting, raised by this architecture, is the fragmentation of reserves held by authorised agents. Currently, each agent has its reserves divided between two accounts: i) instant payment account; and ii) reserve account or settlement account in the case of banks and PSPs, respectively. With the creation of yet another payment platform, their resources would be divided into three accounts, with the requirement for CBDC holdings in order to assure liquidity in their operations on the CBDC platform.

Regulated liabilities network – coexistence between CBDC and private money

Figure 2



⁶ The PSP market in Brazil is very contestable, with a large number of active service providers and simplified authorisation processes.

⁷ Concerns about financial instability and supervision would continue to be an important area for central banks. Suptech would become even more of a need given the possibility to assess, in real time, stability indicators of authorised entities operating in such an environment, rendering artificial intelligence indispensable.

Dealing with financial intermediation and financial stability

A regulated liabilities network could prevent forceful financial disintermediation. The architecture proposed in Figure 2 allows the coexistence of private money, provided by regulated entities, and a CBDC. One valid question in that context is whether people would demand a source of liquidity that carries credit or operational risk – such as a token issued by a bank or PSP – when a risk-free equivalent – such as a CBDC – is available. In the case of Brazil, where the CBDC held by the general public will not bear interest, if risk perception is limited, the preference for a CBDC can be offset by rewards offered by banks or PSPs in order to generate demand for their tokens. Such rewards could, for instance, be a small yield on those holdings.

Bank runs could be averted by backstops and constraints on conversion flow from and to CBDCs. Backstop mechanisms for deposits with banks and PSPs work to break coordination in bank runs. By inheriting these mechanisms, tokens issued on the regulated liabilities network would be stable. One source of concerns, though, is the speed at which private tokens could be converted into CBDCs, which could restore coordination mechanisms. To avoid such undesirable flows, large conversions could only be available if scheduled in advance and constraints on daily conversions could be set.⁸ In addition to that, circuit breaker mechanisms could be automatically applicable when the continued draining of tokens from any specific institution would render it vulnerable.

CBDCs and financial inclusion

The main challenges for financial inclusion in Brazil stem from two sources: inadequate broadband coverage and financial illiteracy. In that sense, a CBDC would, most likely, lead to little improvement in financial inclusion of the unbanked population. The Brazilian instant payment system (Pix) and its use during the pandemic helped to reach what probably is the limit of inclusion of that population given the current level of broadband internet access in Brazil. Through Pix, in its first year of operation, more than 45 million people made their first digital transfer ever.

Nonetheless, the inclusion provided by Pix was mostly restricted to payment services, and that is only the first step towards deeper financial inclusion. An increase in operational efficiency could boost the offer of other financial services. Moreover, the ability to offer tailored solutions is very important in a country as diverse as Brazil, with such large income inequality among its citizens. Therefore, when allied to actions of financial education, smart contract capabilities may provide the gains in efficiency and composability needed to serve underbanked populations. An infrastructure making available standard financial product protocols would reduce the compliance burden on small financial enterprises, enabling niche markets to be reached.

⁸ In analogy to what happens today with physical cash in Brazil. Apart from addressing financial stability concerns, these measures increase users' safety, prevent fraud, and work as AML devices.

References

Aramonte, S, W Huang and A Schrimpf (2021): “DeFi risks and the decentralisation illusion”, *BIS Quarterly Review*, December, pp 21–36.

Auer, R and R Böhme (2021): “Central bank digital currency: the quest for minimally invasive technology”, *BIS Working Papers*, no 948, June.

Banco Central do Brasil (2021a): “BC apresenta diretrizes para o potencial desenvolvimento do real em formato digital”, 24 May, www.bcb.gov.br/detalhenoticia/548/noticia.

——— (2021b): “Banco Central do Brasil releases general guidelines for a Brazilian CBDC”, 24 May, www.bcb.gov.br/en/pressdetail/2397/nota.

——— (2021c): “Apontamentos do Presidente Roberto Campos Neto - 7º Webinar sobre Real Digital”, 30 November, www.bcb.gov.br/detalhenoticia/17579/nota.

McLaughlin, T (2021): “The regulated internet of value”, available at www.citibank.com/tts/insights/articles/article191.html.

Schär, F (2021): “Decentralized finance: on blockchain- and smart contract-based financial markets”, *Federal Reserve Bank of St Louis, Review*, Second Quarter 2021, vol 103, no 2, pp 153–74, <https://research.stlouisfed.org/publications/review/2021/02/05/decentralized-finance-on-blockchain-and-smart-contract-based-financial-markets>.

Soderberg, G (2022): “Behind the Scenes of Central Bank Digital Currency: Emerging Trends, Insights, and Policy Lessons”, *International Monetary Fund, Fintech Notes*, 2022/004.