

SECTOR IN-DEPTH

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Digital Economy – Cross Region

Brazil's fast-evolving digital finance landscape will expand financial inclusion

Central bank digital currencies¹ (CBDCs) remain a key priority in the agenda of monetary institutions against the backdrop of a fast-evolving landscape with multiple innovations in the fields of payments and savings. These affect both economic and financial matters, but also individuals' rights such as privacy. In this report, we continue to analyze the ways in which the adoption of a CBDC can affect sovereign credit quality.

- » **Wholesale CBDC projects to accelerate.** Interest in wholesale central bank digital currencies (wCBDCs) has increased significantly in recent years, as several central banks have launched experiments or pilots to explore the potential benefits of digitalizing their currencies. By using distributed ledger technology² (DLT) or other digital platforms, wCBDCs could enable faster, cheaper, and more transparent transactions among the participants, as well as facilitate the integration of new financial services and products. The main use cases for wCBDCs include interbank payments and delivery versus payment in financial security settlements. By contrast, the number of central banks responding that they are likely to issue a retail CBDC (rCBDC) has declined globally over the past three years, suggesting that wide-scale adoption will take longer than many market participants initially expected.
- » **Brazil's thriving digital ecosystem to expand financial inclusion and offer new innovation opportunities.** Ranking among the 10 countries with the highest crypto adoption, [Brazil](#) (Ba1 positive) has a vibrant digital finance environment, with several exchanges, startups, and projects that offer various services and solutions based on blockchain and other technologies. Instant payment system PIX has gained widespread popularity and usage among the population since its inception in 2020, fostering financial inclusion by allowing previously unbanked people to access online transactions. In parallel, Brazil's central bank wCBDC, the DREX Project, is being developed to facilitate financial institutions' ability to offer innovative financial products to customers and lower product and service costs.
- » **Ensuring privacy, a precondition to ensure support for retail CBDCs.** When discussing the prospects of a retail CBDC, privacy ranks high among the concerns expressed by future potential users. Despite practical drawbacks, cash holders value the anonymity of bills and coins. Against this backdrop, Project Tourbillon seeks to strike a balance between the need to ensure adequate privacy for payers and maintain a high degree of control for anti-money laundering and combating the financing of terrorism (AML/CFT). This balance is achieved through modern cryptographic techniques such as hashing and blinding. Fostering buy-in for rCBDC projects would support the effective implementation of a digital currency.

Why we're publishing a CBDC monitor

In a fast-moving environment with rising digitalization in everyday life, central banks have been actively engaged in the conception of central bank digital currencies (CBDCs). Work has been broad-based, ranging from theoretical considerations to operational choices as some CBDCs went live.

With this new publication, we want to provide our assessment regarding progress on development, implementation, and adoption of CBDCs across countries. The focus will be on specific CBDC projects around the world, as well as cross-border initiatives to ensure their interoperability. In our 2022 foundational piece, we identified several transmission channels to sovereign creditworthiness including economic strength (reducing financial transaction costs, fostering financial inclusion), institutions and governance strength (monetary policy credibility, fiscal policy effectiveness) and susceptibility to event risk (banking sector risk). The monitor will refer to these channels in light of developments in various countries.

Wholesale CBDCs in focus to reap the benefits from digital finance growth

The interest in wCBDCs has increased significantly in recent years, as several central banks have launched experiments or pilots to explore the potential benefits of digitalizing their currencies, according to a [recent survey](#) by the Bank for International Settlements (BIS). For instance, Bangko Sentral ng Pilipinas (the [Philippines'](#) (Baa2 stable) central bank) is working on Project Agila, while the Swiss ([Switzerland](#), Aaa stable) National Bank is advancing with Project Helvetia Phase III. Additionally, the Monetary Authority of [Singapore](#) (Aaa stable) is testing the feasibility of a digital Singapore dollar, and the European Central Bank ([European Union](#), Aaa stable) is experimenting with new technologies for settlement in central bank money. These jurisdictions initiated or announced wCBDC projects with the aim of enhancing cross-border payments as well as domestic payments efficiency and security of interbank payments and settlements.

Unlike rCBDCs, which are intended for general public use, wCBDCs are restricted to a limited group of participants, such as banks and financial institutions, that can access the central bank's reserves. By using DLT or other digital platforms, wCBDCs could enable faster, cheaper, and more transparent transactions among the participants, as well as facilitate the integration of new financial services and products. According to the BIS, nine central banks could issue a wCBDC by the end of the decade (in four to six years), whereas only six could issue retail CBDCs during that period.

The main use cases for wCBDCs include interbank payments and delivery versus payment according to the BIS, which could reduce settlement risks and costs in financial security transactions. For instance, wCBDCs could allow for the simultaneous exchange of securities and cash, eliminating the need for intermediaries and clearing houses. Additionally, wCBDCs could improve cross-border payments by enabling direct and real-time settlement between different jurisdictions, avoiding correspondent banking fees and delays although several other hurdles would need to be resolved. [Those include ensuring interoperability between different national systems and navigating the diverse regulatory frameworks across countries.](#)

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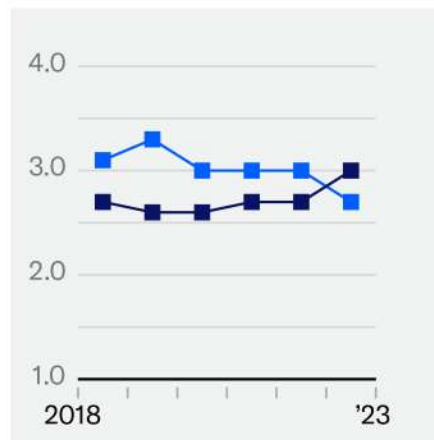
Exhibit 1

Motivations for issuing a wCBDC

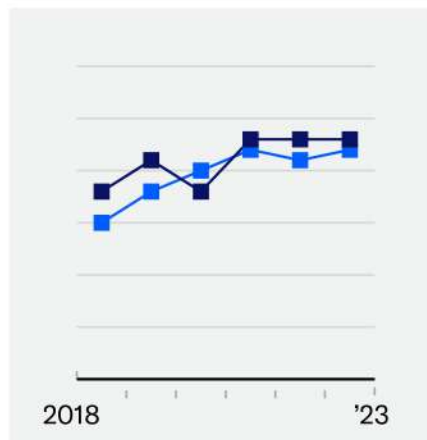
Average importance, 1 (not so important) to 4 (very important)

■ Advanced economies ■ Emerging market and developing economies

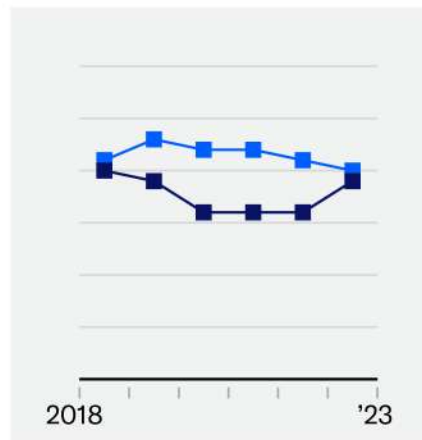
Payments efficiency (domestic)



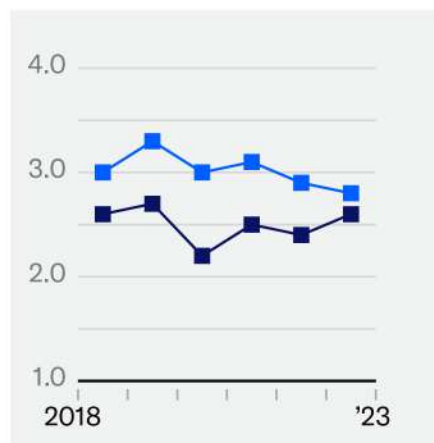
Payments efficiency (cross-border)



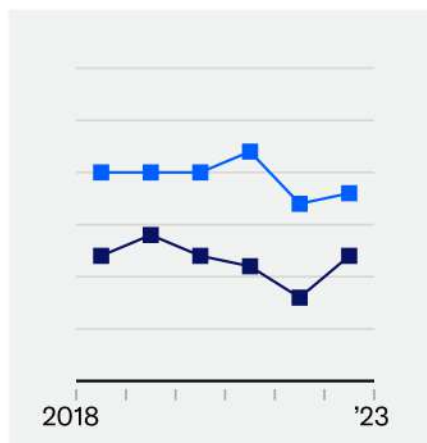
Payments safety/ robustness



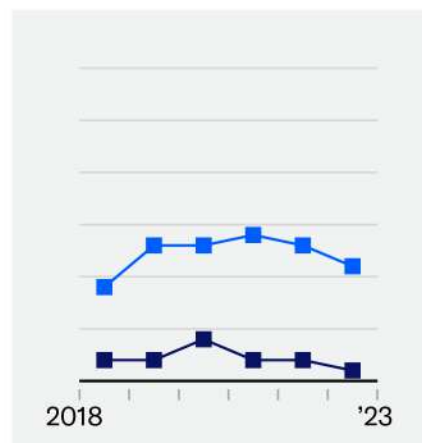
Financial stability



Monetary policy implementation



Financial inclusion



Source: Di Iorio et al (2024) ³

On the retail side, the interest in rCBDCs remains high, with several initiatives underway in various stages of development. [China](#) (A1 negative) and [Cambodia](#) (B2 stable) are among the countries that have already piloted rCBDCs, while others such as [Sweden](#) (Aaa stable), [Japan](#) (A1 stable), and [Canada](#) (Aaa stable) are conducting research or testing. Four jurisdictions – the [Bahamas](#) (B1 stable), the Eastern Caribbean, [Jamaica](#) (B1 positive) and [Nigeria](#) (Caa1 positive) – already have live retail CBDCs. However, the number of central banks responding that they are likely to issue a rCBDC has been revised down globally over the past three years according to the BIS, suggesting that wide-scale adoption will take longer than many market participants initially expected. This might reflect the inherent complexities of a rCBDC, including the interaction with critical public policy choices (holding limits, deposit remuneration, risk of bank disintermediation, privacy etc.). Moreover, demand for rCBDCs may depend on the availability and attractiveness of alternative digital payment solutions, such as e-money or stablecoins.

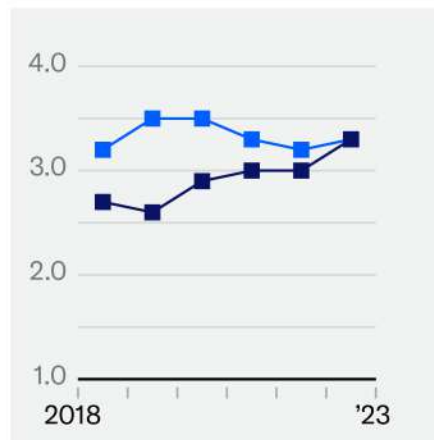
Exhibit 2

Motivations for issuing a retail CBDC

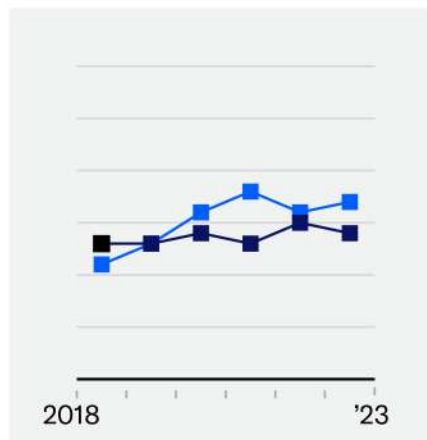
Average importance, from 1 (not so important) to 4 (very important)

■ Advanced economies ■ Emerging market and developing economies

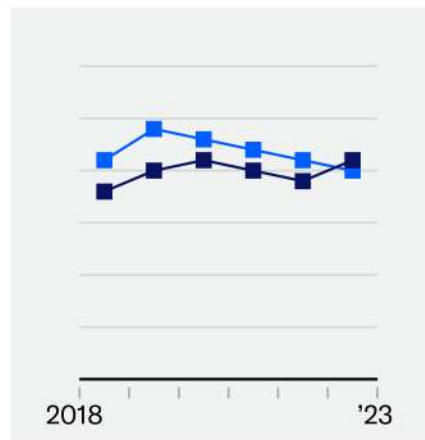
Payments efficiency (domestic)



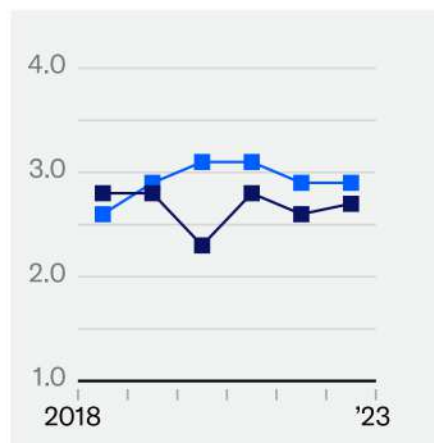
Payments efficiency (cross-border)



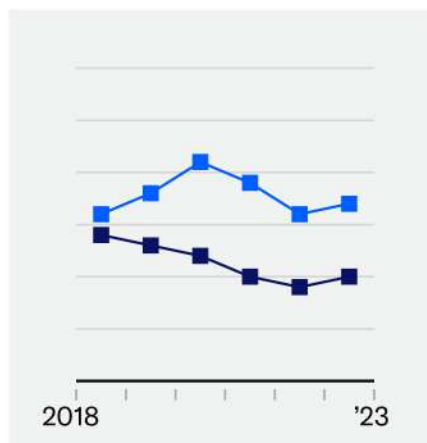
Payments safety/ robustness



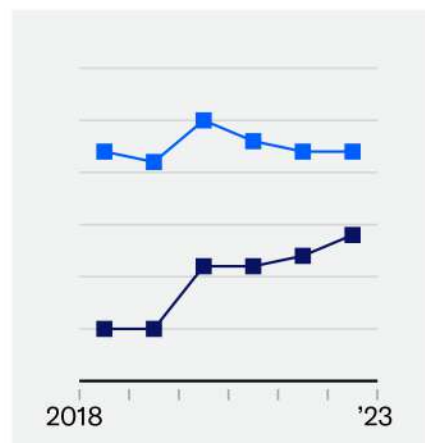
Financial stability



Monetary policy implementation



Financial inclusion



Source: Di Iorio et al (2024) ⁴

The sovereign credit implications of CBDCs, whether wholesale or retail, are focused on economic strength and event risk (banking sector risk, government liquidity risk). A more efficient payment system, either via CBDC or a digital payment solution, has the potential to support economic growth over time, although we expect the impact to be limited. Similarly, the disintermediation risks for banks are limited by design (wCBDC) and central bank choice (rCBDC): on the former, monetary institutions have made it clear that they will favour a two-tier system, leaving a prominent role to commercial banks; on the latter, caps on holdings will be a key tool to steer individuals' ability to move bank deposits to digital cash.

On government liquidity risk, increased liquidity and fractional ownership could offer some opportunities for debt management offices, as they could tap into a wider pool of investors and lower their borrowing costs. However, these benefits may be offset, at least during the initial phase, by the difficulties of ensuring interoperability and security of the digital platforms and tokens.

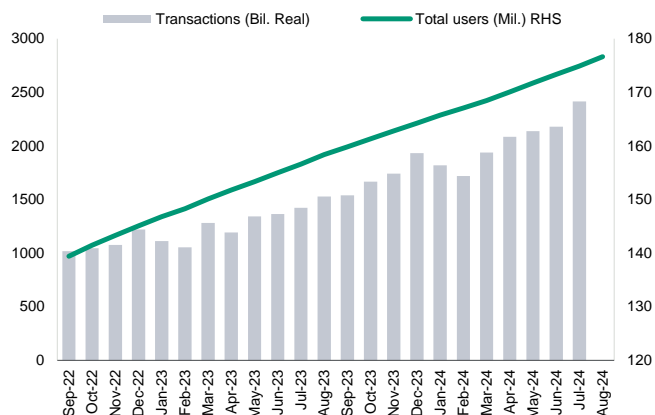
Brazil's thriving digital ecosystem will expand financial inclusion and offer new innovation opportunities

Brazil is one of the most active and innovative countries in the field of digital finance, with a large and diverse population of users and providers. The country has a vibrant crypto environment, with several exchanges, startups, and projects that offer various services and solutions based on blockchain and other technologies. According to a [report](#) by Chainalysis, Brazil ranked ninth in the world in terms of crypto adoption in 2023⁵. Market participants in Brazil have also shown a strong interest in exploring the possibilities and complex effects of new digital finance technologies, such as stablecoins, digital identity, and regulatory sandboxes.

One of the most notable developments in the Brazilian digital finance ecosystem is PIX, the instant payment platform hosted by the central bank, Banco Central do Brasil (BCB). PIX was launched in November 2020, and has since then gained widespread popularity and usage among the population, including basic day-to-day transactions such as grocery shopping and payments in the informal economy. PIX is mainly used by younger generations, with a third of users aged under 30, and more than 60% under 40, more than amplifying Brazil's young population structure. PIX allows users to make and receive payments in real time, 24/7, through QR codes, phone numbers, email addresses, or tax identification numbers⁶.

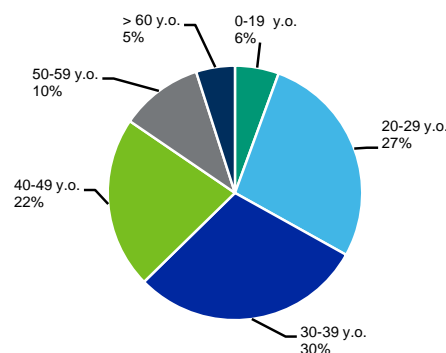
PIX is free for individuals and has low fees for businesses, making it more attractive and accessible than traditional payment methods such as credit and debit cards, wire transfers, or cash. According to the BCB, as of April 2024, more than 80% of the population has used PIX, and transactions on the platform outpace those of credit and debit cards in volume. PIX is also integrated with other digital finance initiatives, such as open banking, and with the Brazilian Payment System (SPB). PIX is not, however, a retail CBDC, because users hold private money through a PIX participant, which can be a financial institution or a payment provider⁷.

Exhibit 3
PIX usage has grown substantially in recent years, both in terms of users and transactions



Source: Banco Central do Brasil, Moody's Ratings

Exhibit 4
Age distribution of PIX users, 2024



Source: Banco Central do Brasil, Moody's Ratings

In parallel, another major initiative in the Brazilian digital finance ecosystem is DREX, the wCBDC project that the BCB aims to launch by 2025 to allow for instant settlements. DREX will pave the way for both incumbents and new participants to innovate, supported by smart contracts. Commercial banks will be able to use the system's distributed ledger technology (DLT) and tokenization capabilities to offer innovative financial products (credit, investment, insurance, etc.) to customers and lower administrative costs. As an illustration, Brazil could require in the future all brokers to register contracts on a blockchain, paving the way for future fully digitalized buying and selling transactions.

The aim is also to develop a solution that incentivizes institutions to use the local currency, rather than foreign currencies or stablecoins, for cross-border payments and trade finance. DREX differs from PIX, which is a payment system that transfers private money from one point to another, in that DREX is a digital representation of the sovereign currency that will be issued and backed by the BCB, and not available to individuals. [The Digital Real will add to the list of the central bank's innovations](#), including setting up

different layers of digital infrastructure, the PIX implementation, and this DLT-based wholesale CBDC, limiting the risks related to lack of oversight and fragmentation of the settlement ecosystem.

From a credit perspective, both PIX and DREX have implications. PIX has improved financial inclusion, a credit positive, by allowing previously unbanked people to access online transactions. It has also changed the nature of theft risks by lowering the need to hold cash, but raising the risks related to digital scams⁹. Stronger competition in the banking sector has also lowered costs for consumers, with the open sharing of transaction information a key development supporting the provision of cheaper payment services. The success of PIX means that the prospect of a rCBDC in Brazil is distant, highlighting the varieties of channels through which digital finance can affect payment activities. For DREX, the aim is to further foster innovation and competitiveness in the financial system, as well as to enhance the role of the Brazilian real in regional trade.

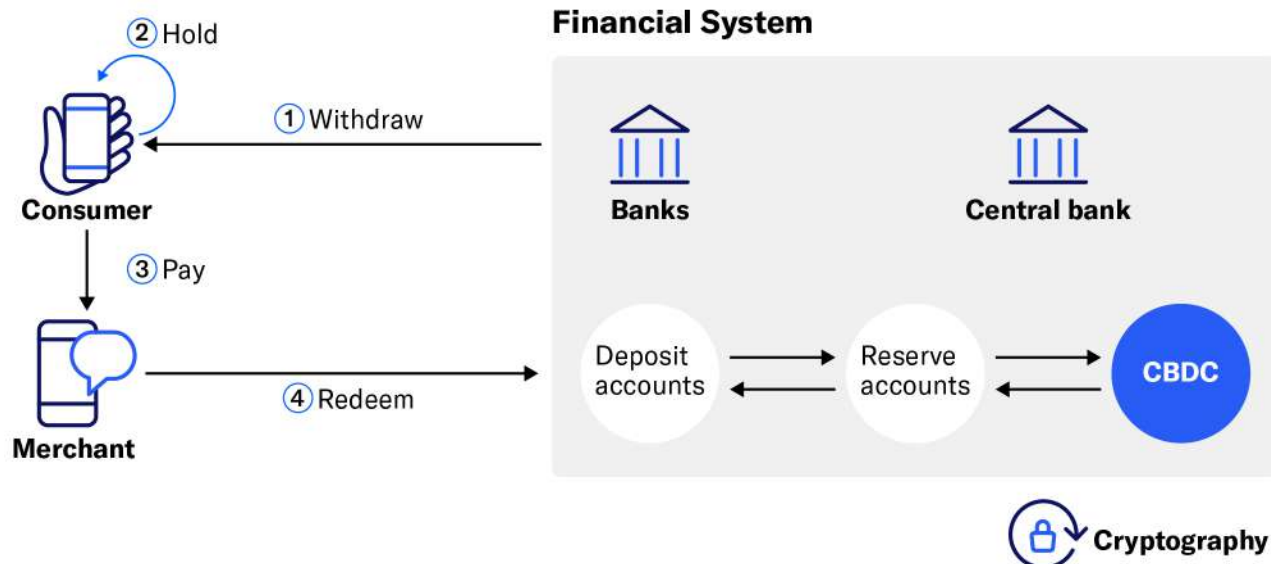
Ensuring privacy, a precondition to ensure support for retail CBDC

As rCBDC projects advance, policymakers face several implementation hurdles. A key topic regularly flagged in central bank surveys is the sensitive question of payment privacy for the end user. Cash payments, which are generally declining, face several drawbacks, including the need to regularly visit ATMs and handle different notes and coins, sometimes in different currencies. However, cash holders often value their anonymity, which is only possible because parties to an all cash transaction cannot be identified⁹. This feature serves both legal concerns, such as the desire to protect privacy when conducting transactions for goods and services, and criminal objectives, such as evading taxes or engaging in illicit activities.

Against this backdrop, policymakers seek to strike a balance between the need to ensure adequate privacy levels for payers and maintain a high degree of control for anti-money laundering and combating the financing of terrorism (AML/CFT). [Project Tourbillon](#) was designed to find a potential means to reconcile these seemingly conflicting needs, while also addressing rCBDCs' security and scalability. Tourbillon allows the payer in the transaction to maintain anonymity, but not payees (merchants), whose identity is disclosed to their banks, where it remains confidential. The high-level principle behind Tourbillon's design draws from familiar types of transactions. Just as in a physical transaction where consumers visit the ATM to withdraw cash and then use it to pay at a point of sale, in the Tourbillon model payers would virtually withdraw their digital cash, the rCBDC, through their bank, to proceed with the payment. The merchant would then redeem its digital cash with its bank, whose reserve account would then be credited by the central bank after verification of the authenticity and validity of the CBDC. The commercial bank would, in turn, credit the merchant's deposit account. Privacy would be ensured via cryptographic techniques, namely hashing and blinding. Hashing is a function to convert digital data into alphanumeric characters, and blinding allows the consumer to obtain a signature from the central bank on each digital coin without revealing the unique identifier to the bank or central bank.

Exhibit 5

Project Tourbillon's high-level architecture



Source: Bank for International Settlements (BIS) Innovation Hub and Swiss National Bank (2023)

From a credit perspective, addressing privacy concerns will be key for both central banks and public authorities. Fostering buy-in for rCBDC projects would support the effective implementation of a digital currency from both an institutional and a political perspective. Along with other dimensions, such as ease of access, comfort about privacy concerns would favour adoption among the population.

Endnotes

- 1 A CBDC is a digital liability of a central bank that can be used for payments. CBDCs are managed on a digital ledger, which can be a blockchain but does not have to be. Retail CBDCs are available to the general public, whereas wholesale CBDCs are only available to eligible participants, usually banks.
- 2 Distributed Ledger Technology (DLT) is a collection of systems recording transactions in multiple places almost simultaneously.
- 3 A Di Iorio, A Kosse and I Mattei, "Embracing diversity, advancing together – results of the 2023 BIS survey on central bank digital currencies and crypto," BIS Papers, no 147, June 2024.
- 4 A Di Iorio, A Kosse and I Mattei, "Embracing diversity, advancing together – results of the 2023 BIS survey on central bank digital currencies and crypto," BIS Papers, no 147, June 2024.
- 5 The ranking is the following: India, Nigeria, Vietnam, the US, Ukraine, Philippines, Indonesia, Pakistan, Brazil and Thailand.
- 6 A PIX payment settles in three seconds on average against two days for debit cards and 28 days for credit cards.
- 7 In addition, PIX is not a DLT solution.
- 8 In addition, predefined limits on PIX are in place for security reasons, such as the BRL 1,000 cap (around USD 180) at night.
- 9 According to a [report by central banks](#), there are two other levels of privacy including (i) confidential, where only trusted parties see personal information (such as credit card payments) and (ii) pseudonymous, where identifiers or public addresses can be used to identify an individual (such as transactions on a blockchain).

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