

The future of money: a possible role for central bank digital currencies and their implications

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Introduction

I would like to begin by thanking the Eastern Caribbean Central Bank and Central Banking for inviting me to speak at this conference. It is an honour to be among esteemed colleagues, sharing insights and knowledge on topical issues. Furthermore, I would like to extend my warmest congratulations to the ECCB on their remarkable work of serving the governments and people of the Eastern Caribbean for the past 40 years.

Central bank digital currencies, or CBDCs, could have far-reaching implications for the monetary system. A decade ago, the idea of CBDCs was not yet being discussed. But in the last few years, CBDCs have drawn the attention of policymakers, academics and the general public. Indeed, CBDCs give central banks the unique opportunity to improve the features of central bank money in the digital economy. The way we pay and store value is evolving, and CBDCs hold the promise of addressing several pressing challenges in our payment systems – such as increasing efficiency and fostering financial inclusion. At the same time, their issuance requires substantial efforts, and depending on their design they could challenge the foundations of monetary economics.

Today, I will shed light on the vital role that CBDCs could play in the ever-evolving financial landscape. I will start by elaborating on the benefits that digital payments, in general, can offer to society. Next, I will discuss the role of CBDCs in supporting policy objectives. I will look at the pioneering work of central banks in the Caribbean and across the Americas, and at some related policy initiatives that could hold lessons for CBDCs. To conclude, I will provide an overview of the role played by the BIS in supporting central banks across the globe to leverage digitalisation and to meet their public policy goals.

Digitalisation and benefits for society

In recent years, we've witnessed a digital revolution in finance. Digital payments are growing fast in the Americas, driven by private sector innovation. Debit cards, credit cards and electronic or mobile money have seen particularly rapid growth (Graph 1.A). The benefits of this wave of digitalisation

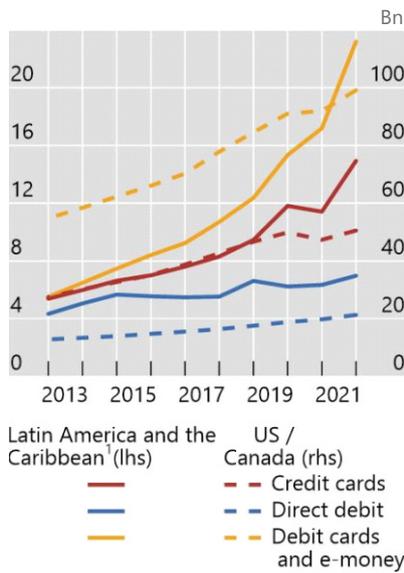
¹ The views expressed are my own and not necessarily those of the BIS. I thank Jose Aurazo and Carolina Velasquez for their input, and Cecilia Franco and Rafael Guerra for research support.

can be important, given the policy challenges currently in payment systems across the region. While digital payments are taking off, the costs of domestic payments are still high. In Latin America, consumer credit card fees are, in total, over 1% of GDP. Similarly high fees prevail in many Caribbean countries, and in the United States and Canada (Graph 1.B). Additionally, in many countries in the Americas, access to transaction accounts is still limited and use is low (Graph 1.C).

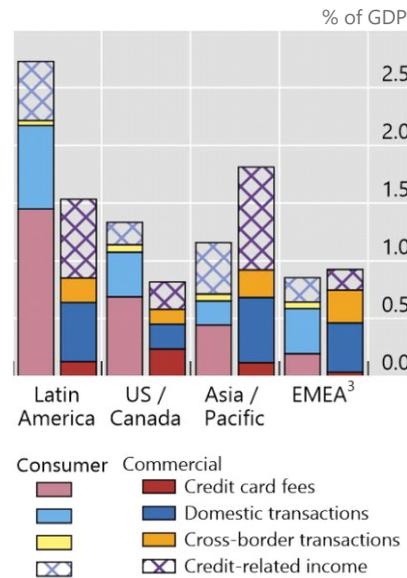
Digital payments are taking off across the Americas, but high costs and financial inclusion remain key challenges

Graph 1

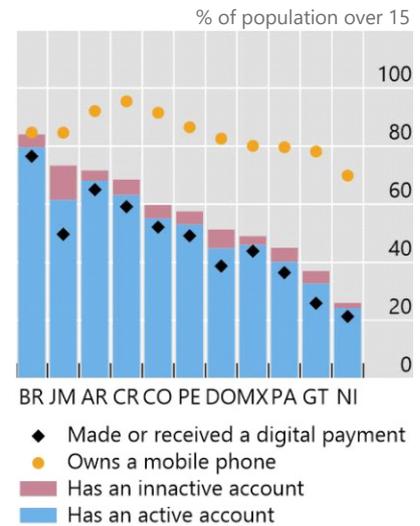
A. Digital payments are growing fast¹



B. Payment revenues are high²



C. Financial inclusion is a key issue in Latin America and the Caribbean³



¹ Sum of AR, BR and MX. ² The regional GDP equals the sum of individual countries' GDP. ³ For Mexico, data from 2022; for the rest of the countries, figures correspond to 2021.

Sources: McKinsey & Company (2021); World Bank, The Global Findex Database; BIS, Red Book statistics.

This is the situation at the domestic level, but payments across borders show even greater challenges. To focus on one key area of cross-border payments, the cost of remittances remains stubbornly high – some 4–6% on average, when sending USD 200 (Graph 2.A). Existing digital payment options are cheaper than cash, and new digital providers are cheaper than banks (Graph 2.B). But these costs are still far too high. Moreover, remittance payments can be slow, untransparent and difficult to access for low-income senders and recipients, for whom such payments are particularly important.²

Digitalisation offers a viable solution to the policy challenges in payments, and they can have benefits for the economy as a whole. First, digital payments offer greater efficiency, reducing costs associated with handling cash and making transactions swifter and more secure. Second, they serve as an essential entry point to the formal financial system for the unbanked and underbanked

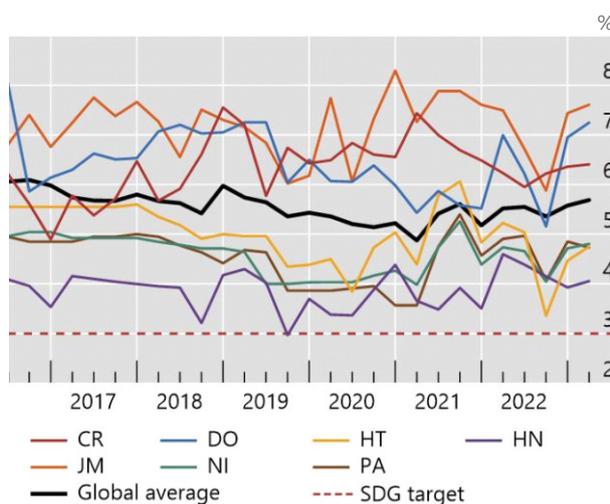
² See Feyen et al (2021).

populations. Concretely, digital payments can support economic growth and development by encouraging financial inclusion and improving access to credit. Third, more widespread use of digital payments may encourage unbanked households to open a bank account and enter the formal financial sector. Fourth, greater engagement with the formal financial sector should facilitate borrowing by previously credit-constrained actors. The adoption of digital payments could plausibly affect the informal sector. A widespread use of digital payments may create a “data trail” and help to formalise informal sector firms, thus supporting scale, access to credit and investment. Finally, the use of digital payments for payroll may also help to formalise informal workers, further promoting productivity.

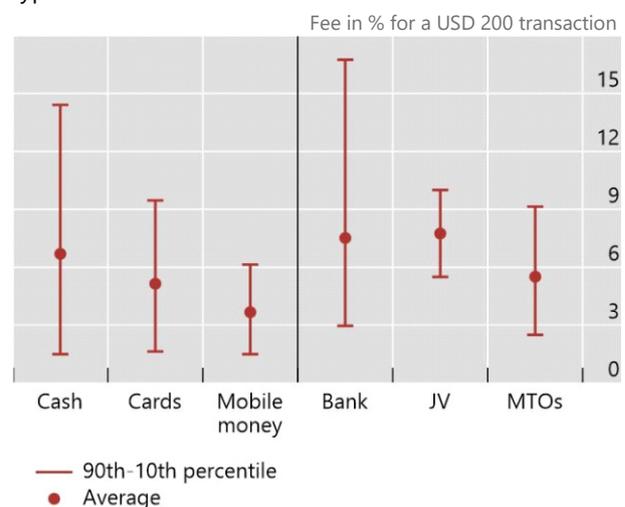
In term of cross-border payments, technology has also helped to reduce costs of sending remittances, but they are still very high

Graph 2

A. Remittance costs of sending USD 200¹



B. Remittance costs by payment instrument and firm type in Latin American and the Caribbean



CR = Costa Rica; DO = Dominican Republic; HT = Haiti; HN = Honduras; JM = Jamaica; NI = Nicaragua; PA = Panama; SDG = sustainable.

¹ Average cost reported in the correspondent period. USD 200 is the reference value used in the World Bank’s database on Remittance Prices Worldwide. The database tracks the cost of sending a USD 200 remittance for different providers along major remittances corridors.

Source: World Bank, Remittance Prices Worldwide.

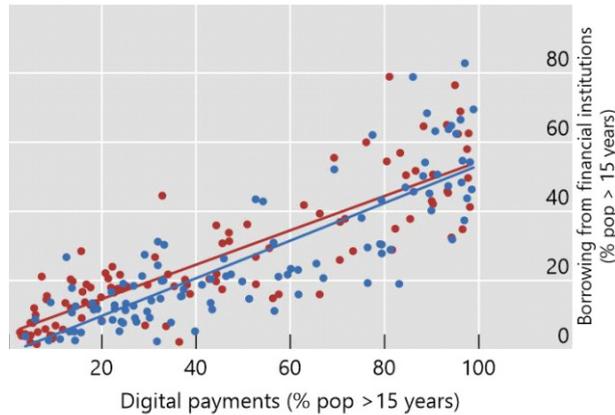
Indeed, in new research by Ana Aguilar, Jon Frost, Rafael Guerra, Steve Kamin and myself, we find that digital payments are associated with greater access to credit (Graph 3.A). Digital payments are also linked to lower informal labour shares (Graph 3.B). A 1 percentage point increase in digital payments use is linked to a 0.06 percentage point fall in the informal labour share, and a 0.10 percentage point increase in GDP growth.³

³ Aguilar et al (2023).

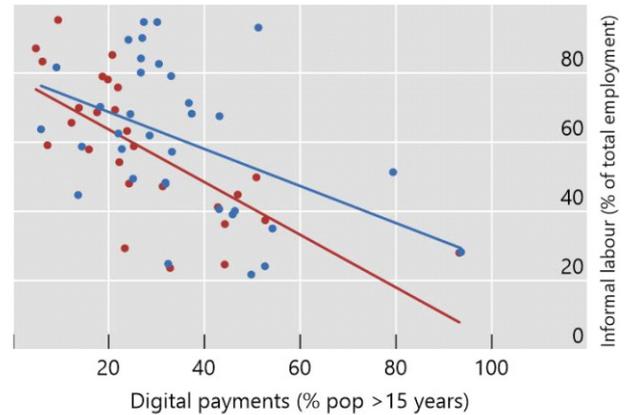
Digital payment use is associated with greater credit access and less informality¹

Graph 3

A. Digital payments vs access to credit



B. Digital payments vs informal labour



¹ Red dots denote countries in 2014, blue dots in 2017.

Source: International Labour Organization; World Bank; BIS.

How can CBDCs support policy goals?

So far, we have been talking about digital payments in general. But now let's turn to the specific role of CBDCs. Central banks have not been passive bystanders in the digital revolution in finance. In countries around the world, they have proactively built on their role of providing the foundation for the economy by issuing money and overseeing payment systems. The exploration and adoption of CBDCs is a concrete example of the importance placed on digital payments to achieve central banks' policy objectives.

Notably, Caribbean central banks have been pioneers in this area. The Central Bank of the Bahamas marked a significant milestone with the launch of the world's first live CBDC, the Sand Dollar, in 2020. The ECCB joined this journey in March 2021 with DCash. This initiative offers a novel payment option aimed at enhancing financial inclusion and modernising payment systems across its member countries. The Bank of Jamaica, meanwhile, launched JAM-DEX in July 2022. Together with the eNaira, launched in Nigeria in October 2021, these CBDC initiatives are key examples that are relevant for central banks all around the world.

Elsewhere in the Americas, there has also been groundbreaking work on CBDCs. We have seen several important examples of research and exploration. For example, the Bank of Canada's Project Jasper explored the use of distributed ledger technology (DLT) for wholesale payments,⁴ and more recently there has been substantial research on a digital Canadian dollar. In the United States, the Federal Reserve Bank of Boston and the MIT Digital Currency Initiative conducted Project Hamilton, a research project on the technical feasibility of a potential

⁴ See Bank of Canada, Payments Canada and R3 (2017).

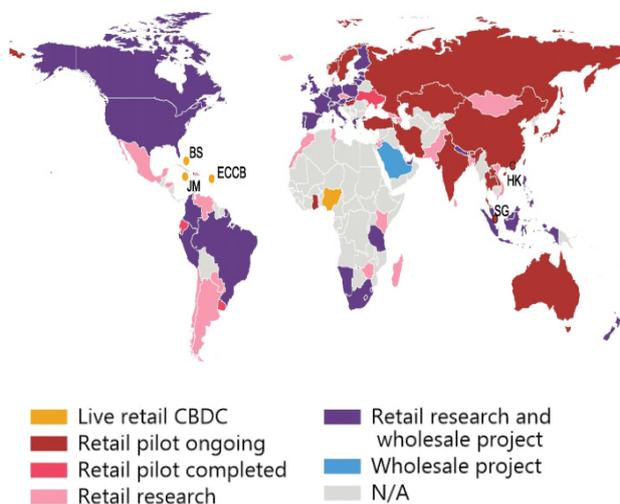
CBDC.⁵ The Central Bank of Uruguay ran a pilot on a potential e-peso.⁶ And recently, the Central Bank of Brazil has been conducting significant work on the digital real, or DREX, for wholesale use. Across the entire Americas region, it is evident that virtually all major central banks are actively engaged in research and initiatives related to CBDCs (Graph 4.A).

In parallel, since late 2018 we have seen an increasing number of positive mentions by Governors and board members regarding both retail and wholesale CBDCs (Graph 4.B). Sentiment has turned as central banks have become more confident that they can harness the benefits of CBDCs while mitigating some of the risks and challenges, to which I will return later.⁷

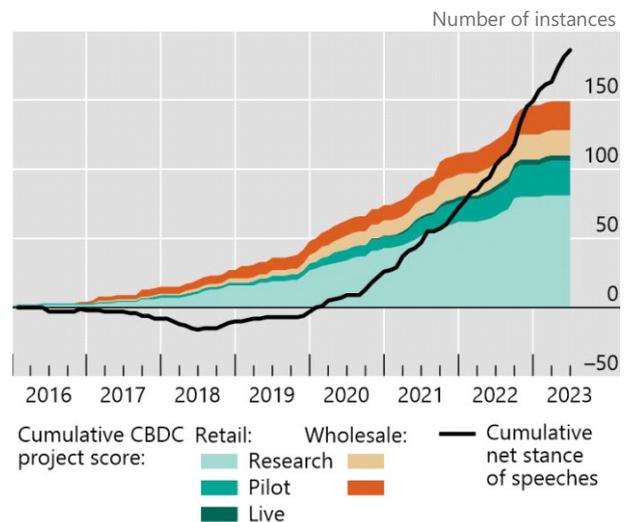
Exploration and adoption of CBDCs by central banks

Graph 4

A. Caribbean countries as pioneers in the global work on CBDCs



B. More central banks have CBDC projects, and central bank speeches are increasingly positive



BS = The Bahamas; ECCB = Eastern Caribbean Central Bank; HK = Hong Kong SAR; JM = Jamaica; SG = Singapore. The use of this map does not constitute, and should not be construed as constituting, an expression of a position by the BIS regarding the legal status of, or sovereignty of any territory or its authorities, the delimitation of international frontiers and boundaries and/or the name and designation of any territory, city or area. Updated as of July 2023.

Source: Auer et al (2023).

The motivations behind central banks' endeavours related to CBDCs vary across regions. A survey of central banks conducted in 2022 by the BIS Committee on Payments and Market Infrastructures (CPMI) showed that in advanced economies, central banks are researching CBDCs to promote safety and robustness or domestic payments efficiency. In emerging market economies, financial inclusion is an important motivation (Graph 5).⁸ I understand that here in the Caribbean,

⁵ See Federal Reserve Bank of Boston and MIT Digital Currency Initiative (2022).

⁶ See Sarmiento (2022).

⁷ See Auer et al (2023).

⁸ See Kosse and Mattei (2023).

that is a particularly frequent response.

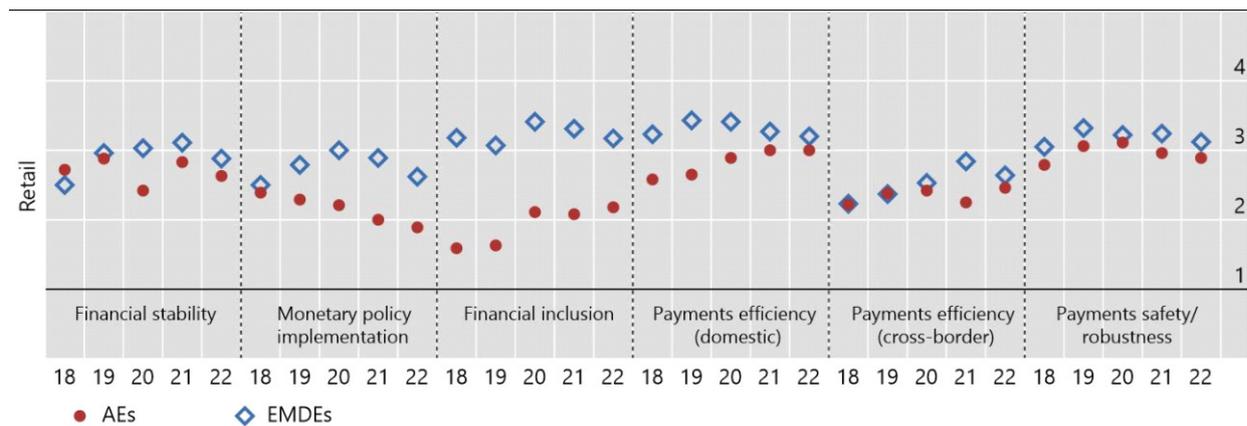
Before we go further, let me give a precise definition of a CBDC. CBDCs are a digital payment instrument, denominated in the national unit of account, that is a direct liability of the central bank. They can be either wholesale CBDCs only accessible to financial institutions, or retail CBDCs which are accessible to households and businesses for general purposes.⁹

In this last case, CBDCs can be thought of as a new type of central bank liability, alongside traditional central bank-issued cash and reserve accounts (Graph 6). Similar to physical cash, a CBDC entails a direct claim on the central bank, which means it is fully backed by the issuing central authority. However, unlike traditional banknotes and coins, CBDCs exist in digital format, which makes them accessible and transferable through electronic means.

Financial inclusion and payments efficiency and safety are the main motivations for issuing retail CBDCs in emerging market and developing economies

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

Graph 5



AEs = advanced economies; EMDEs = emerging market and developing economies.

Source: Kosse and Mattei (2023).

While CBDCs offer a promising future for the world of payments, they may come with challenges. These are the focus of work by central banks in the region, coordinated by our office. For instance, a task force of the BIS Consultative Council for the Americas (CCA) Consultative Group on Risk Management, or CGRM, has worked on risk management aspects of CBDCs, and will be publishing its report in the coming weeks. Risks and challenges of CBDCs include potential for financial disintermediation, or a crowding out of bank deposits. CBDCs can also risk digital bank runs, as they could become a destination for funds leaving banks in trouble.¹⁰ There could be reputational risk to central banks in the case of an operational incident or a data breach. Finally, there could be challenges with adoption of a CBDC. If CBDCs are issued but not widely adopted,

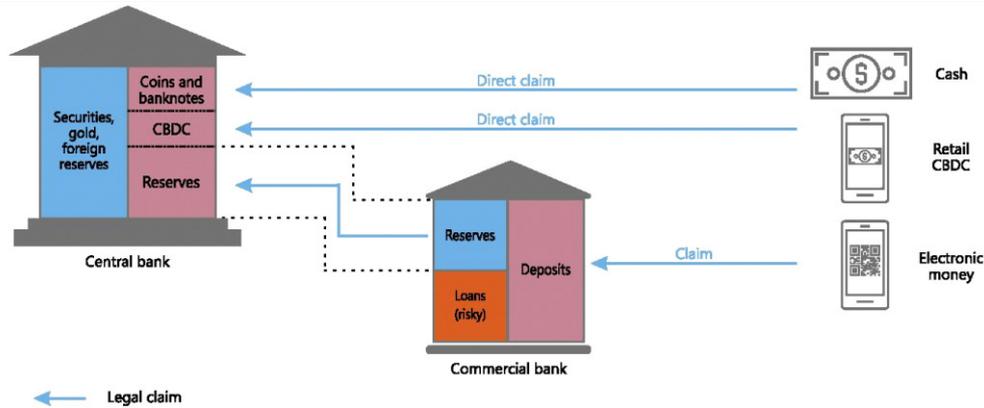
⁹ See Group of Central Banks (2020).

¹⁰ See Group of Central Banks (2021).

this could limit the effectiveness of the endeavour.

Retail CBDC as a new form of central bank liability

Graph 6



Source: Auer et al (2022).

To overcome such challenges, design features can play a vital role. To limit disintermediation and digital runs, transaction limits can be important. I understand that those are a feature of DCash, the Sand Dollar and JAM-DEX. To manage reputational risks, sound engagement with central bank risk managers and cyber specialists can help. To promote adoption, work on user-friendliness, data protection and the level of fees can play a vital role. For this, central banks will need to expand their expertise beyond their traditional roles, and work together with the private sector, focusing on areas like product design, user interface development and data privacy, to design robust CBDC systems. We know from existing digital payments and from other past innovations that network effects are crucial, and that it can take time for these to kick in.¹¹ Ultimately, the success of a CBDC will depend on the size of the network of individuals and merchants on board, but it may take a few years for this to reach critical mass.

In the meantime, for many jurisdictions there is uncertainty about central banks' legal power to issue a CBDC. Addressing this could mean the need to amend the central banks' legal framework. This, too, may take time.

For CBDC adoption, collaboration will be key. The 2022 CPMI survey showed that 87% of central banks engaged in some form of CBDC work are considering using private intermediaries to distribute the potential CBDC to end users (Graph 7). In this regard, the private sector can onboard clients, and fulfil know-your-customer (KYC) and anti-money laundering/combating the financing of terrorism (AML/CFT) procedures. Other key areas for private intermediaries are the provision of digital wallets, user interfaces and other front-end user services. I understand that DCash is a good example of private intermediaries fulfilling these functions.

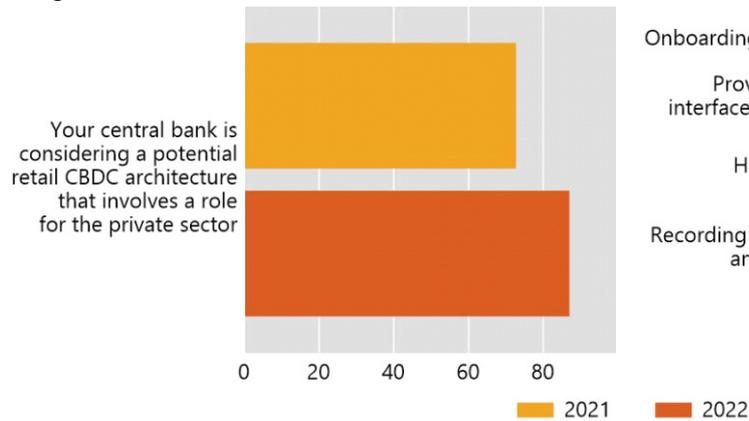
¹¹ See Frost (2020).

The private sector will play a vital role in CBDC adoption

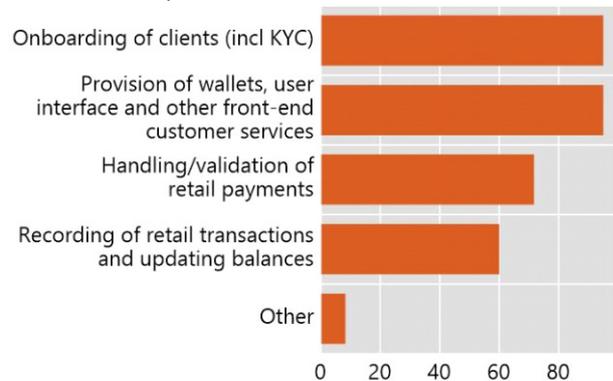
As a percentage of respondents

Graph 7

A. Agreement with statements¹



B. Role for the private sector²



¹ The panel shows the share of respondents who agreed with the statement after removing those for whom the statement was not applicable. ² The question could be answered only by central banks that are considering a potential retail CBDC architecture which involves a role for the private sector.

Source: Kosse and Mattei (2023).

Collaboration also holds immense promise in the context of cross-border payments and the development of multi-CBDC arrangements. Linking CBDCs across borders could help to simplify cross-border payments (Graph 8). Compared with today's correspondent banking network, such multi-CBDC arrangements could streamline the cross-border payment chain and reduce frictions. Depending on their design, arrangements to link CBDCs can make transactions faster, more cost-effective and accessible to a broader audience.¹² Yet cooperation to achieve these types of agreements may require the engagement of many central banks, and of key private sector stakeholders. In the Eastern Caribbean, you have a head start in this area as you already have a currency union between eight countries; by design, DCash already facilitates cross-border payments.

¹² See Auer et al (2021).

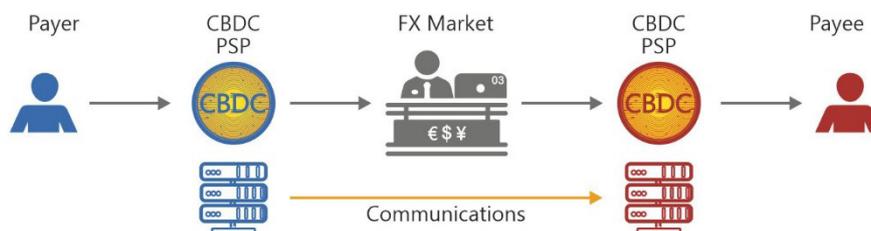
Multi-CBDC arrangements could simplify the cross-border payment chain

Graph 8

Today's arrangement



mCBDC arrangement



mCBDC = multi-CBDC; PSP = payment service provider.

Source: Auer et al (2021).

Because CBDCs are relatively new, there is not yet much cross-country evidence to work with. The work of the ECCB is contributing to the global experience. Yet there are other policy initiatives by central banks that could serve as a useful reference for CBDC work, as well. These can show both the power of digital public infrastructures in payments, and how sound design and policy support can promote adoption and improved outcomes for the economy and end users.

Fast payment systems: a key initiative in the policy toolkit

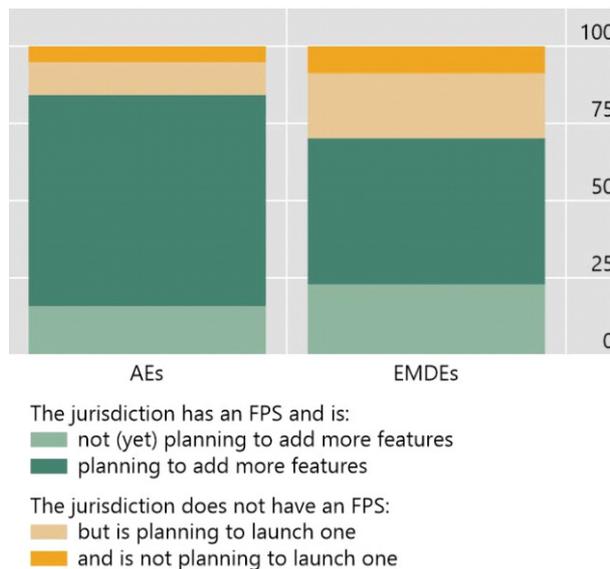
Particularly relevant in this light is the work on retail fast payment systems, or FPS. A large number of countries around the world have an FPS, or are planning to introduce one (Graph 9.A). Like CBDCs, FPS represent an avenue through which central banks can harness the benefits of digitalisation. Many central banks see retail CBDCs and FPS as complementary choices, working hand in hand (Graph 9.B). All the bars shown in blue entail that respondents see value in having both retail CBDC and FPS in their toolkit. By enabling real-time, secure and low-cost transactions, FPS can coexist harmoniously with CBDCs, serving as a useful bridge for wider adoption. Moreover, CBDCs may offer unique features such as programmability and offline payment capabilities. There is a smaller group of central banks, shown here with light or dark red bars, that see no value in having both.

Central banks see retail CBDCs and FPS as complements

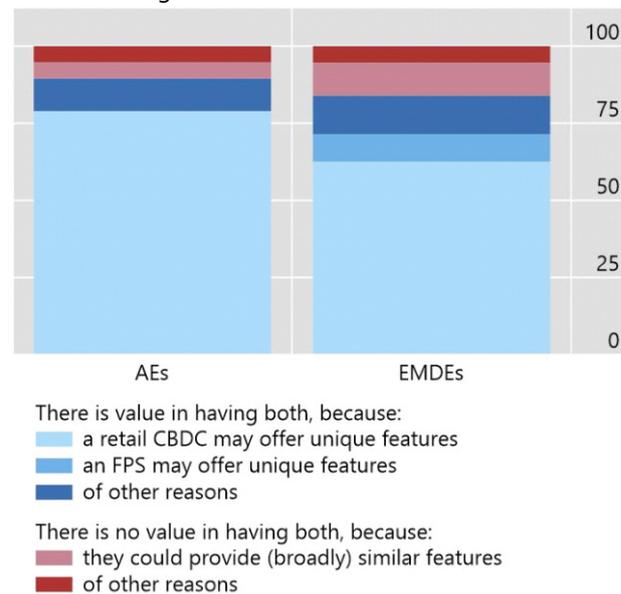
As a percentage of respondents, 2022

Graph 9

A. Applicable statements



B. Central banks' assessment of whether there may be value in having both an FPS and a retail CBDC¹



AEs = advanced economies; EMDEs = emerging market and developing economies.

¹ Central banks were asked to answer the question regardless of the design of the existing or planned CBDC and/or FPS (if any).

Source: Kosse and Mattei (2023).

Let's look at some of the cases of retail FPS, and what insights we can draw from them. In Brazil, for example, the central bank launched the FPS Pix in November 2020. This initiative has contributed to greater efficiency and competition and encouraged the digitalisation of the payment market as a whole. Since its launch, Pix has seen remarkable growth (Graph 10.A). In its first year alone, over 67% of the Brazilian adult population either made or received a Pix transaction. Pix transactions quickly surpassed those of credit and debit cards. But notably, other forms of digital payments have kept growing, as these substitute for cash (Graph 10.B).¹³

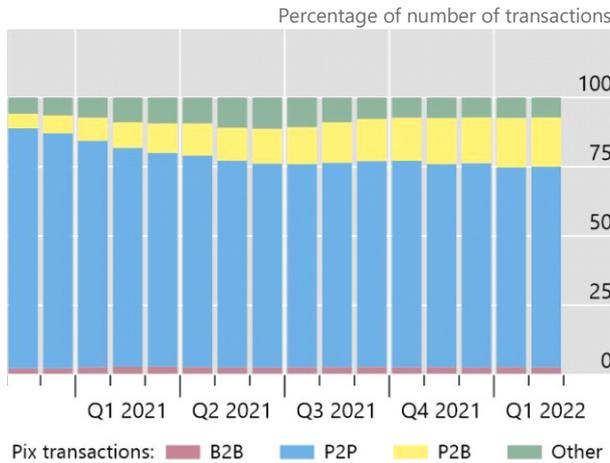
Pix has also contributed to greater financial inclusion. After its launch, the number of total bank clients increased by over 40 million in two years. In addition, the share of person-to-business (P2B) payments has also risen (Graph 11.A). And Pix has lowered the cost of payments. Indeed, peer-to-peer payments are free of charge. For merchants, Pix payments have an average cost of just 22 basis points. This compares with fees of 2.2% for credit cards and 1.1% for debit cards in Brazil. Internationally, it compares with 1.7% for credit cards in the United States, 1.5% in Canada and 0.3% in the European Union (Graph 11.B).

¹³ See Duarte et al (2022).

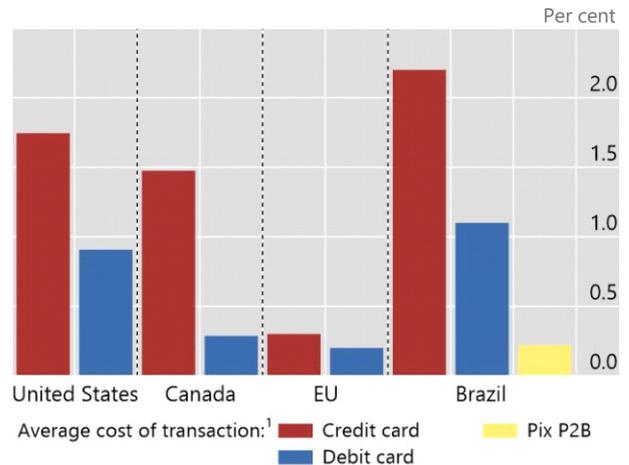
There are other examples of successful FPS led by central banks across the Americas region. In Costa Rica, the central bank launched SINPE Móvil in 2015, and this became widely adopted since

Merchant payments are becoming more common, and are much cheaper on Pix Graph 11

A. P2P payments still dominate, but P2B are growing



B. Average costs to merchants by payment method

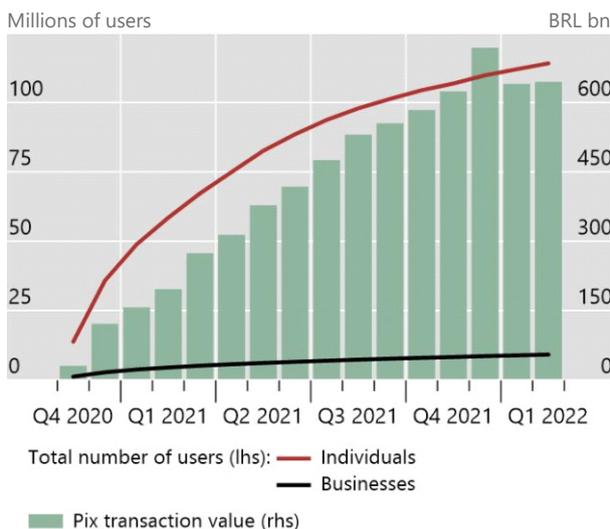


¹ P2B = person-to-business; P2P = person-to-person. For the United States, Canada and EU, average of interchange fees on credit and debit cards. Total cost to merchants may be higher.

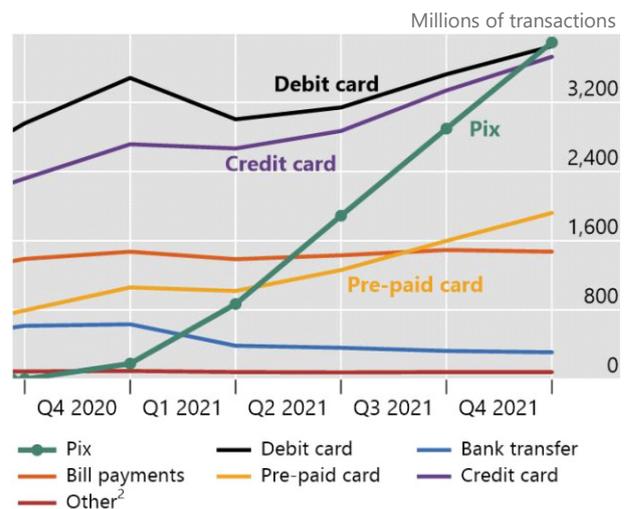
Source: Duarte et al (2022).

In just over a year, Pix has witnessed dramatic growth Graph 10

A. Users and transaction value have risen rapidly



B. Pix is gaining market share rapidly in a growing digital payments market¹



¹ Number of transactions for each payment instrument, excluding recurrent utility payments. ² Includes cheques.

Source: Duarte et al (2022).

2020. In the United States, FedNow was launched in July 2023, and in Canada, the Real-Time Rail will launch in 2024. These experiences can help to inform the design and operation of CBDCs.

Some central banks are working on both FPS and CBDCs. For instance, the Central Bank of Brazil is working on DREX alongside its work on Pix. This shows that there is potential for the two initiatives to serve different use cases and to complement one another.

The role of the BIS

In this context, central banks may rightly have questions about which initiatives to follow, how to design them and what lessons can be drawn from work by their peers. This is where the work of our institution, the Bank for International Settlements, comes into the picture.

The BIS, as the bank for central banks, stands ready to support central banks worldwide on digital innovation issues. A first way we can do so is through platforms like the CCA, which brings together the Governors of nine BIS shareholder central banks across the region. The CCA has discussed CBDCs and FPS on various occasions, most recently in April of this year. Reporting to the CCA is the CCA Consultative Group on Innovation and the Digital Economy (CGIDE). This group fosters collaboration, knowledge-sharing and the exchange of best practices among central banks in the Americas. The CGIDE currently has a task force, led by the Bank of Mexico, working on the design of a functional CBDC architecture. This aims to serve as a basis to develop CBDC solutions, potentially serving as a reference for central banks in the Americas. And as mentioned before, the CGRM has been working on CBDCs from a risk management perspective. This, too, may have relevance to central banks beyond our region.

A second way we support central banks is through policy-oriented research. Current research projects in the Americas Office aim to evaluate the impact of digital payments, FPS and CBDCs on financial systems and economic outcomes. A project with World Bank co-authors is comparing the design and impact of FPS and CBDCs. And a project with co-authors from central banks in the Caribbean and China is looking at the experience of early adopters of retail CBDCs.

A third way we support central banks is through the BIS Innovation Hub, which was launched in 2019. The Innovation Hub has taken a pioneering role in executing experimental projects on CBDCs and other public goods, aiming to enhance the functioning of the financial system. Project mBridge, for example, experiments with cross-border payments using a common platform based on distributed ledger technology, in which different central banks can issue and exchange their respective CBDCs.

More recently, the BIS and the Inter-American Development Bank (IDB) signed a memorandum of understanding aimed at exploring new technologies for financial market infrastructures in Latin America and the Caribbean. The agreement seeks to enhance regional cooperation and integration and to develop innovative technologies to support payment systems and enable settlement solutions. It will start with Project FuSSe, which stands for fully scalable settlement engine, which aims to create a scalable infrastructure for CBDCs, FPS and other infrastructures. With endeavours like this, we reaffirm our commitment to assisting central banks in the region in navigating the opportunities and challenges posed by emerging technologies.

From these various efforts, we have seen exciting possibilities for what CBDCs and digital technology can achieve. We have seen that it is possible for central banks and the private sector to

promote more efficient payments and financial services, to foster financial inclusion and to contribute to prosperity for societies as a whole. Working together, we can learn from one another's experience and contribute to better outcomes not just in one jurisdiction, but across our region and beyond. In this spirit, I welcome the discussions here today, and the chance to continue engaging in dialogue with you on these critical issues in the digital economy.

Let me stop here. I look forward to your questions and comments.

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