The BIS and Banco Central do Brasil relationship: lessons learned and challenges ahead[1]

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Abstract

The BIS has significantly bolstered its ties with central banks in the Americas since the establishment of the Representative Office for the Americas in Mexico City in 2002. We delve into the historical evolution of the BIS's collaboration with the Banco Central do Brasil (BCB), spanning two decades, highlighting the valuable lessons garnered during their interactions. These insights serve as building blocks for addressing the upcoming challenges in the next two decades. Looking ahead, we explore the evolving landscape post-recent shocks, emphasising structural changes that bring both uncertainty and opportunities to the macroeconomic arena. This article deliberates on the BIS's role in addressing these dynamics and sheds light on BCB's technological agenda, underscoring the BIS's role in advancing global and regional technological innovation.

Introduction

In 2002, the Bank for International Settlements (BIS) made an important contribution to strengthening its relationship with central banks in the Americas region with the opening of the Representative Office for the Americas in Mexico City.

This chapter begins by reviewing the history of the BIS's relationship with the Banco Central do Brasil (BCB) and presenting lessons learned over the last 20 years of interactions between the two institutions. Furthermore, the chapter shows how these lessons are important in helping to address the challenges of the next 20 years.

Section 2 begins by recalling the history of the BCB's relationship with the BIS. Although interactions with the BIS began in the late 1940s, it was only in 1996 that the BIS invited the BCB to become a BIS shareholder. This section presents the BCB's participation in discussions coordinated by the BIS on both macroeconomic and financial stability issues. Regionally, the exchange of experiences produced by the BIS Americas forums and committees, combined with the growing independence of central banks, has provided learning opportunities and examples for central banks to improve their institutional framework and governance. This section ends with a list of lessons learned from this exchange of experiences.

Section 3 looks to the future. After the recent successive shocks, important structural changes have been underway. While these changes have made the macroeconomic environment more uncertain and challenging, they have also provided some opportunities for the years ahead. This section discusses these

[1] I thank Arnildo Correa, Alexandre de Carvalho, Cristiano Duarte and Marcelo Xerez for their valuable collaboration and discussion on the drafting of this chapter.

challenges and opportunities and the role of the BIS in helping to address them. Finally, it presents the BCB's technological agenda and discusses the role of the BIS in promoting technological innovation both globally and regionally.

The BIS in the Americas and the policy debate

The BCB-BIS relationship

In 2022, we celebrated the 20th anniversary of the BIS Americas Office. In addition, the BCB completed 25 years of membership in the BIS. However, the BCB's relationship with the BIS began much earlier.[2] Contact between the institutions began in the late 1940s, when the BIS asked the predecessor of the BCB to organise a deposit of gold on behalf of the Bank of France. Fourteen years later, the BCB would ask the BIS to take custody of a deposit of gold in New York, which had been pledged as collateral for a loan that international banks were granting to Brazil.

From the 1970s onwards, the BCB's relationship with the BIS began to deepen, with the BCB becoming a regular customer of the banking operations offered by the BIS to central banks. The sovereign debt crisis of the 1980s further strengthened this relationship. In 1982, for example, the BIS was responsible for arranging a bridge loan of US$ 1.5 billion, in anticipation of an International Monetary Fund (IMF) programme that would be approved only in 1983.

However, Brazil's membership in the BIS would not be discussed until 1994. At the time, the BIS sought to increase the participation of emerging market economies (EMEs). The idea was to establish a gradual process of joining the BIS over the years, with countries chosen based on a set of criteria that included the size of a country's GDP and financial sector, good financial governance and the history of its relationship with the BIS, mainly as a customer of the financial services provided by the institution. In this context, in September 1996, the BIS decided to invite the BCB, together with the monetary authorities of eight other countries,[3] to subscribe to BIS shares. Due to the need for approval by the Brazilian National Congress, the accession of the BCB as an associate member of the BIS did not take effect until March 1997.

In the following years, the BCB became a member of the BIS's Markets Committee (MC) and the Committee on the Global Financial System (CGFS), increasing its participation and contributing regularly to the global debate on relevant economic and financial sector issues. Between 2006 and 2009, Brazil became a member of all major BIS committees, including the Basel Committee on Banking Supervision (BCBS) and the Committee on Payments and Market Infrastructures (CPMI).

In 2002, with the opening of the BIS Representative Office for the Americas in Mexico City, the BIS made an important contribution to strengthening its relationship with the central banks of the region, including the BCB. The regional office became a hub for promoting cooperation between central banks, carrying out research and

[2] See Pereira da Silva (forthcoming) for a historical perspective on the initial relationship between the BCB and the BIS.

[3] The People's Bank of China, Hong Kong Monetary Authority, Reserve Bank of India, Bank of Korea, Bank of Mexico, Central Bank of the Russian Federation, Saudi Central Bank and Monetary Authority of Singapore.

organising meetings and debates to discuss key issues in the region. Finally, we must point out the importance of the creation of the Consultative Council for the Americas (CCA) in 2008. The CCA brings together the central banks of Argentina, Brazil, Canada, Chile, Colombia, Mexico, Peru and the United States and has become an important forum for sharing experiences and debating key issues of policy importance for central banks in the Americas.

Starting in the 2010s, following the Great Financial Crisis, Brazil became part of the most important decision-making bodies of the BIS. The governor of the BCB at that time, Henrique Meirelles, became a member of the Board of Directors and the Economic Consultative Committee (ECC). He also chaired the CCA. Since then, the BIS-BCB relationship has become even stronger and the governors of the BCB have been members of the Board of Directors and of many other BIS committees, actively participating in debates and bringing to the BIS the perspective of an important emerging market economy such as Brazil. In January 2023, it was my pleasure to take over, from my colleague John Williams of the Federal Reserve Bank of New York, as chair of the CCA.

The macro and financial stability debate

The BCB's accession to the BIS in 1997 was important for Brazil from the beginning.[4] At that time, monetary stabilisation in Brazil was still a recent outcome of the Real Plan, which was implemented in 1994 and brought a long period of high inflation to an end. The monetary policy framework from 1994 to 1999 was mostly based on a crawling peg exchange rate regime. Taking part in Basel discussions enriched the debate regarding the problems associated with implementing monetary policy based on a currency peg as a nominal anchor. Furthermore, in the international economy, there were already signs of macro-financial imbalances in some Asian economies, which pointed to the emergence of a financial and exchange rate crisis that would affect EMEs.

After the January 1999 devaluation crisis, Brazil announced the forthcoming adoption of an inflation targeting regime. During the implementation process, the country benefited from the debate and interaction with other central banks and international organisations, including the BIS. Topics related to operationalising inflation targeting regimes were at the heart of the BIS's concerns in the field of monetary policy, including, for example, issues related to the importance of transparency and communication, managing a floating exchange rate regime, and the accumulation of international reserves.

The BCB also benefited from BIS membership in the financial stability arena.[5] The Basel Committee was created in 1974, reflecting the need for central bankers to discuss issues related to the supervision of institutions operating in different countries, as well as issues related to international financial stability. The discussions within the Basel Committee resulted in the 1988 Basel Accord on capital adequacy. In Brazil, the principles of the Basel Accord were formally adopted in 1994 through Resolution nº 2.099 issued by the National Monetary Council (CMN), so when Brazil joined the BIS in 1997, the country's prudential regulation was already aligned with the Basel Committee's international standards.

4 See Loyola (forthcoming).

5 See Damaso and Moura (forthcoming).

By that time, the Basel Committee was working on the Core Principles for Effective Banking Supervision, published in September 1997. The BCB contributed to this work through its participation in the Core Principles Liaison Group (CPLG). In fact, participation in the CPLG was the beginning of Brazil's formal involvement with the Basel Committee, although Brazil's actual entry into the Committee did not take place until 2009.

Since then, Brazil has participated in discussions on financial stability at the BIS and in working groups to address technical issues. More recently, the BCB actively participated in the design of the Basel III framework, influencing the discussions to adapt some of the framework's provisions to the reality of EMEs. Participating in the drafting of the rules allowed the BCB to share with the Committee concerns that are typical of EMEs.

The BCB's heavy involvement in the Basel Committee discussions was beneficial to the country's financial stability. The BIS is a privileged forum for discussing issues related to the financial system. It is responsible for working groups that include representatives of many central banks, which allows for the coordination of discussions and implementation of policies at the international level. The BCB's membership in the BIS also allowed numerous BCB employees to start receiving training through their interaction with the BIS.

Interaction with BIS in the Americas and the consultative groups

Regionally, the exchange of experiences in the BIS Americas forums, combined with the growing independence of central banks, has provided learning opportunities and examples for central banks to improve their institutional framework and governance. Regular interactions between CCA Governors have contributed to a greater convergence of monetary policies in the Americas region, so that one central bank benefits from the experience and credibility of others.

Through the CCA and the BIS Americas Office, productive interactions among central banks' representatives have taken place through five CCA consultative groups. These groups provide technical support to the Governors' meetings at the CCA and produce analytical output with real value for central banks in the region and around the world. The longest-standing groups are the Consultative Group of Directors of Operations (CGDO), which discusses conjunctural issues and the implementation of monetary policy; the Consultative Group of Directors of Financial Stability (CGDFS), which addresses risks to the stability of the financial system; and the Scientific Committee (SC), which brings together heads of research and organises the annual CCA research conference. Since 2020, the newest groups are the Consultative Group on Innovation and the Digital Economy (CGIDE), which coordinates hands-on work on issues of digital innovation, and the Consultative Group on Risk Management (CGRM), which brings together chief risk officers to discuss central banks' key risk management issues.

These consultative groups have benefited members by promoting debates and the exchange of experiences regarding central bank activities. The discussions and, in many cases, public reports have covered a wide set of strategic issues for policymaking, mainly on macroeconomics, financial stability, innovation and financial system development.

The CGDO held its first meeting in March 2014, with the aim of discussing issues related to market operations of common interest to the central banks participating in the CCA. This group has been an important forum for analysing the evolution of domestic financial markets, global market risks and the operations of central banks. Debates have been based on changes in global monetary conditions and their impact on the policies adopted by central banks in the region.

The BCB has been an active participant in the CGDO's activities, represented by the Deputy Governor on Monetary Policy. Regular teleconferences and meetings have been valuable in following more closely policymakers' perceptions of current developments affecting regional financial markets, as well as the strategic solutions that have been implemented by central banks to deal with new challenges. At these meetings, central bank authorities exchange views on the main macroeconomic developments, addressing issues related to the derivatives market, financial market volatility, liquidity provision, operating targets, monetary policy, inflation and FX markets. Interactions have involved not only top-level policymakers, but also specialised staff dedicated to central bank operations, including strategists, traders, analysts and researchers.

The importance of the CGDO and the other consultative groups for discussions of coordinated actions was highlighted during the Covid-19 pandemic in 2020–22. Throughout this crisis, central banks and governments had to act in a timely manner amid great uncertainty, implementing measures to alleviate the impacts of the pandemic on the economy, ensuring the proper functioning of financial markets and safeguarding market stability.

In the case of Brazil, the set of measures implemented by the government and the BCB was divided into four groups: (i) monetary and macro-financial measures, including liquidity and capital relief; (ii) credit lines; (iii) direct transfers of resources; and (iv) tax relief and tax deferrals. The liquidity and credit support measures adopted by the BCB in response to the crisis, which amounted to 17.5% and 20% of GDP in 2020, respectively, were the largest among EMEs. They had a positive impact on the credit market, propelling Brazil's economic recovery.

In this crisis context, economic authorities reacted using similar instruments, and coordination among policymakers was crucial to the success of policy responses. Such coordinated action made it possible to turn an expected severe recession into a moderate one. The discussions within the BIS and the BIS Americas contributed to this favourable result, although countries still need to deal with the consequences of large fiscal expansion, which is crucial for macroeconomic stability.

The CGDFS is another important forum that allows the BCB to share its vision on financial stability and to hear other jurisdictions' views, enriching analyses and broadening perspectives. Many of the participants of the CCA share similar characteristics, which contributes to the comparability of analyses and common interests. As a result, the lessons learned through CGDFS meetings are important in facing both present and future challenges in financial stability.

The topics discussed are also very diverse. Most recently, meeting discussions involved the impacts on financial stability of: (i) the war in Ukraine; (ii) cyber risks and heightened uncertainty; (iii) high inflation and higher domestic rates; (iv) persistent effects of the pandemic; (v) spillovers from the strong US dollar and tighter global financial conditions; (vi) higher commodity prices; and (vii) climate shocks and environmental degradation.

The BCB also participates in the Scientific Committee (SC), a consultative group comprising the heads of research from the CCA's central banks and the Head of the BIS Monetary and Economic Department. The SC is responsible for selecting papers from regional central banks and outstanding academics for the CCA's annual research conference. In 2021 and 2022, the themes of the annual conference were "The economics of the Covid-19 pandemic" and "Structural changes in inflation and output dynamics after Covid and other shocks", respectively. At the end of 2022, the SC launched a research network to study the macro-financial impact of climate change and environmental degradation.

The creation of the CGIDE in 2019 marked the introduction of a technological agenda to the BIS Americas Office's scope of activities. Since 2010, we have seen continuous growth in the BIS's publications and committees of discussions related to the use of new technologies in the provision of financial services and new business models in the financial industry. Issues such as fast payments, fintechs and big techs, cryptoassets and distributed ledger technology (DLT), decentralised finance (DeFi) and central bank digital currencies (CBDCs) have been increasingly debated by regulators and central banks, along with conventional topics such as monetary policy and prudential regulation.

This consultative group aims to promote discussion and cooperation among participants on topics linked to the digital economy and the use of new technologies in financial and payment systems. Over the past three years, the CGIDE has provided relevant discussions on topics related to the models and technical features of application programming interfaces (APIs) used in open finance models, as well as the technical requirements for CBDC projects. In addition, dozens of technical seminars have been held with representatives of monetary authorities and financial regulators from countries outside the region, the BIS's researchers, and the private sector. The focus is always on aspects related to the impact of the intensive use of technology in finance and payments.

Finally, the CGRM, established in 2021, facilitates collaboration on risk management issues. Techniques and policies for risk management may differ across central banks depending on several factors. As a leader among its peers in developing risk technologies and implementation procedures, the BCB became a member of the CGRM immediately after its creation.

The BCB actively participated in two of the CGRM's thematic studies, which took a task force format: (i) Business continuity planning at central banks during and after the pandemic, whose final report was published in 2021; and (ii) Incorporating climate-related risks into international reserves risk management framework, led by the BCB, whose final report was circulated among members and discussed at high-level conferences ahead of publication in 2022.

Both task forces were productive, and the work necessary to prepare these reports reinforces the importance of frequent interactions between central banks. Indeed, central banks usually face similar challenges and often operate at the frontier of knowledge regarding good practices and technical solutions to emerging problems. Within the CGRM, task forces change with time and depending on the chosen theme, which also brings the possibility of embracing new topics quickly.

In summary, the interaction between the BCB and the BIS Americas Office over the years has been very fruitful. Discussions with the BIS and peers have also yielded the following lessons:

(i) Coordination among central banks increases the effectiveness of their measures, as the pandemic has made clear;

(ii) a robust macroeconomic framework is a key element in achieving both price stability and economic growth;

(iii) a sound fiscal framework is crucial to macroeconomic stability; and

(iv) a macroprudential framework is conductive to financial stability.

Vision for the future

This section looks to the future, exploring structural changes in the global economy and the challenges that economies will have to face. We also present the agenda for innovation in the financial system that the BCB has been implementing and some transformations ahead. Finally, we explore the role of the BIS in such a scenario of intense transformation.

Macroeconomic outlook

After the successive shocks that hit the global economy, important structural changes have been made or accelerated. The shocks left the global macroeconomic scenario more uncertain, presenting many challenges but also some opportunities for the years ahead. Some of these structural changes are triggered by: (i) mismatches in the supply and demand of goods and services and their impact on energy markets and the green transition; (ii) geopolitical events and changes in trade and global value chains; (iii) the adoption of technology and its impact on labour markets; (iv) the significant increase in indebtedness; and (v) a time window with lower growth and higher inflation.

The Covid-19 shock caused a huge dislocation in the supply-demand balance of goods and services. Higher household income following government transfers and mobility restrictions drove households to consume more goods and fewer services. It was expected that, upon lifting restrictions, households would return to their previous consumption patterns, but this prediction was not entirely realised. Goods consumption has stayed above pre-pandemic levels, while services have recovered to pre-pandemic levels more gradually, despite some differences across jurisdictions.

Importantly, the rise in demand for energy to produce goods was not accompanied by an increase in energy supply. Capital expenditures in the energy and mineral commodities sectors have been limited for several reasons, such as increased uncertainty about future prices and demand, as well as countries' commitments to achieve reductions in carbon emissions. Accordingly, there has been an increase in prices in these industries without a corresponding increase in investments. The decrease in investments in these sectors may represent a more persistent bottleneck and an important source of risks for inflation and the supply of energy in the near future.

Moreover, investments in green energy have not increased at the scale and speed necessary to overcome the current imbalance in energy markets or the even broader challenge of achieving carbon neutrality. While there has been some shift back towards the use of fossil fuel sources in the short term, it is paramount that we keep sight of the green investments needed to address climate change and environmental risks. These risks could bring significant long-term consequences for the whole planet, requiring decisive actions from all stakeholders.

International trade is also undergoing significant structural changes. Especially after the 2000s, international trade was increasingly organised through global value chains (GVCs). GVCs improve efficiency in inventory management and maximise countries' comparative advantages. However, during the pandemic, this organisation of world trade did not work well. The disruptions in supply chains during this period raised new challenges to the GVC model. On the one hand, the problem of production of key products such as medical equipment being highly concentrated in a few countries became evident. On the other hand, there was a large and coordinated increase in global demand concentrated in these sectors. As a result, countries are once again producing goods in sectors where they do not have comparative advantages. In Brazil, for instance, there is already a discussion about the need to increase the production of fertilisers.

Furthermore, the war in Ukraine and higher geopolitical tension highlighted the importance of secure sourcing and large buffer stocks, reinforcing countries' trend toward producing more domestically or trading with specific partners to make production more resistant to external turmoil. In the case of US multinationals, for example, the relocation of production plants from China to Vietnam or Mexico ("near-shoring" and "friend-shoring") is noticeable.

These alternatives could redefine trade flows and convert GVCs to regional value chains based more on countries' geographical and political affinity than on an efficient allocation of resources. This redesign will probably result in lower global growth. It might also reduce technological innovation and diffusion, which had been key factors helping to keep inflation low in recent decades.

Another important dimension of structural change going forward is the shift to new technologies. The Covid-19 pandemic accelerated this path. Social distancing measures adopted during the most severe period of the pandemic made it necessary to adapt business and services for hybrid or remote working, adopt new digital technologies and rearrange the productive sector. Many of these changes are expected to become permanent and should affect labour markets and the structure of the economy in the next few years. As usual, there could be winners and losers in this process.

There are ongoing structural changes affecting the labour market. During the pandemic, several groups were hit particularly hard. Young workers who entered the job market during a recession might see their future income adversely affected, and long school closures could have an impact on students' long-term levels of schooling, qualification and productivity.

In addition, while activities that required greater qualification and used more technology with remote work were less affected, face-to-face activities felt a major impact from the pandemic. Numerous non-remote workers had to leave their jobs because they got sick, retired early, had to take care of relatives or were fired. Hence, while participation rates decreased, unemployment rates increased. After activities resumed, there was a rebalancing in such trends in many jurisdictions. However, in countries such as the United States, many workers have opted not to return to their previous jobs for several reasons (such as health, economic or personal conditions). As such, participation rates might not return to their pre-pandemic levels. This labour force shortage will probably continue to put pressure on wages and make it difficult to bring inflation towards targets.

There have also been shifts in demographic trends. The slowed pace of population growth in several countries means a lower population of adults available to join the labour force. Absent other alternatives, such as migration and automation, this demographic trend could reinforce labour shortages and pressure on wages. At the same time, increasing aging of the population could raise costs linked to these aging groups, such as health and personal care and pensions, also putting upward pressures on inflation for a more prolonged period.

Another crucial aspect of the structural changes produced by the recent crisis is the rise in public debt levels. During the pandemic, governments implemented sizeable fiscal measures to support economic activity, and there are still many social demands that need to be met. As a result, concerns about countries' long-term fiscal sustainability are becoming more pronounced. This aspect is particularly relevant for EMEs, since these countries are more vulnerable to macroeconomic instability. Recently, financial markets have started to show little appetite for expansionary fiscal measures, even in advanced economies (AEs), as observed in the United Kingdom in late 2022. In this context, Brazil, like other countries in the region, faces the challenge of implementing policy assistance while keeping the public debt sustainable. This leads to the next challenge, namely the continued implementation of growth-enhancing structural reforms, which is essential for fiscal sustainability and sustained growth.

Importantly, high levels of sovereign indebtedness interact with the adoption of technology and the socioeconomic displacement of people, creating a vicious circle that may have accelerated during the pandemic. The growth of technology naturally creates winners and losers. The displacement of people, which is generally not temporary, increases the need for policy assistance to soften the negative impact of these changes. However, during the Covid-19 crisis, this process became even faster and more disruptive. The speed and scale of these changes have increased. This will create demand for more resources for social policy and put additional pressure on public spending and sovereign debt.

That said, the current global macroeconomic circumstances add still more challenges to this situation. Countries may experience a stronger deceleration in economic activity, with inflation remaining at high levels for a longer time. This means that central banks will need to raise interest rates more, or keep them higher for a longer period, tightening financial conditions in order to control inflation.

A period of lower growth, higher and more persistent inflation, and tighter global financial conditions raises the risk of abrupt repricing in asset prices. This combination poses significant trade-offs for policymakers and central banks worldwide. EMEs are usually hit harder by inflationary pressures, as the weight of food prices in the consumption basket is greater in these countries. Furthermore, they are more vulnerable to changes in global financial conditions and tend to have more limited policy space to counteract these shocks.

Going forward, the BIS will be a relevant forum for discussions on all these topics and for sharing experiences across countries in its meetings and publications. The debate may shed light not only on the best ways to tackle these challenges, but also on the policies to be adopted in order to seize some of the opportunities that come with these changes. Certainly, the lessons learned over the last 20 years, mentioned in the previous section, will be valuable in facing these challenges.

Technological innovation and the Agenda BC#

The financial system has experienced a period of unprecedented technological innovation. In the wake of these developments, central banks of the region are advancing their innovation agendas. In this section, we discuss the main ongoing efforts of the BCB's technological agenda, and the role we see for the BIS Americas Office in promoting the positive impact of technological innovation in the region's financial and payment systems. As discussed below, the BIS Americas Office can be especially important in coordinating efforts aimed at integrating countries' payment systems and digital currency frameworks.

First, it is worth mentioning some elements of the technological innovation process that we are witnessing. In today's digital world, people are looking for ways to represent anything that might have value in a digital format. To this end, encrypted assets have been distributed on a ledger so that they become verifiable, transferable and divisible. This process of asset tokenisation allows us to extract value, in digital form, from different types of assets such as photos, art, properties, ideas and money. Even assets in virtual reality (VR) worlds are being tokenised.

This innovation process suggests that we are moving towards an increasingly tokenised economy, in which the negotiation of tokenised assets is the main transformation. In the financial system, this process tends to lead to a growing dichotomy between account-based and token-based entries on banks' balance sheets. Ultimately, these developments may lead to the creation of global, regulated, token-based and multi-asset networks.[6]

It is within this context of innovation that the BCB has sought to promote its financial innovation agenda. Over the last few years, the BCB has implemented several innovation projects in its agenda of structural reforms for the financial system, the Agenda BC#. These include the instant payment scheme (Pix) [7] in 2020 and Open Finance in 2021. There are also other projects underway, such as the modernisation of foreign exchange (FX) legislation and the implementation of the Brazilian CBDC, the Digital Real. All these actions are different parts of an integrated agenda for developing the financial system of the future, the goal of which is to make the Brazilian national financial system (SFN) more efficient and modern and to promote the democratisation of financial services through technology.

To date, Pix, the BCB's instant payment scheme, has far exceeded our expectations, and its use continues to increase month after month. Since 2020, many new features have been added to Pix, eg the ability to make payments on due dates or on a scheduled basis. It is also possible to withdraw cash from a retailer, which enormously increases the accessibility of withdrawal services. Furthermore, new accessibility and safety mechanisms are already in operation.

Various other innovations in Pix will come along. Customers will be able to acquire some financial services currently available from banks, such as credit, using Pix. Programmable operations with Pix will also be possible. These changes will bring substantial efficiency gains for customers. We also expect interconnections between Pix and other instant payment systems to be developed in Latin American countries, enabling Pix for international payments.

Another relevant initiative of the Agenda BC# is the Brazilian Open Finance, which is defined as the regulated environment for the sharing of data, products and services between regulated entities – financial institutions, payment institutions and other entities licensed by the BCB – at the customer's discretion. This initiative aims

[6] See Citibank (2021).

[7] See Duarte et al (2022).

to enhance the efficiency of Brazil's credit and payment markets by promoting a more inclusive and competitive financial system.

The Open Finance model implemented by the BCB is a global benchmark, the largest in scope and number of institutions involved. This project has been implemented in phases. After two years, we have achieved more than 800 participating institutions, more than 22 million customer data-sharing consents, an average of more than 350 million API calls per week and more than eight billion API calls in total.

The modernisation of foreign exchange legislation, in turn, will improve the business environment in Brazil as the result of the passage of a new law by the National Congress of Brazil in late 2021. The new regulatory framework, enacted by the BCB at the end of 2022, will facilitate the integration of Brazilian companies into international markets and increase the attractiveness of the Brazilian economy to foreign capital.

In the coming months and years, this process of innovation will lead to a financial system in which there is competition not only between products but also between channels. This process will bring together the four major initiatives of the Agenda BC#: Pix, Open Finance, the internationalisation of our currency and the Digital Real. We envision these four building blocks giving rise to financial aggregators, allowing customers to access information and services from different banks using the same applications. Ultimately, we will move towards a new, interoperable system, with all our initiatives interconnected on a single track.

This integration will serve as the basis for establishing our digital currency, the Digital Real. As a matter of fact, we believe that the benefits of a CBDC go far beyond improvements in wholesale and cross-border payments or enabling instant payments, some of the main motivations behind central banks' interest in CBDCs. Our view is that a CBDC is an important driver of new business models and innovation in the financial system. The challenge for the Digital Real is to enable uses beyond the payment solutions available today, taking advantage of this new financial ecosystem that is about to emerge.

The Digital Real will promote the provision of financial services based on tokenised deposits. The principle will be to transform deposits into tokens (akin to stablecoins) for the use by the public. These tokens will have the same value as a CBDC held by financial institutions and issued by the BCB. The fact that banks and payment institutions will be the issuers of the tokenised deposits will prevent financial disintermediation and problems on their balance sheets. As the Digital Real will not be interest-bearing, it will not interfere directly in monetary policy transmission or the macroeconomic framework, avoiding some of the concerns of other jurisdictions implementing CBDCs. At the same time, tokenised deposits will have the same regulatory principles as conventional deposits, ensuring the security of the financial system.

Furthermore, the Digital Real is expected to enable a more efficient trading chain of tokenised assets, strengthening the migration to a token-based world. Indeed, the same technology developed by banks and payment institutions to tokenise deposits can be used to tokenise a number of other assets. Other positive outcomes include using new technologies to enhance banks' internal controls and settlement processes.

We are currently assessing, through a BCB initiative called the LIFT Challenge Real Digital, the execution of projects on CBDC use cases proposed by banks, payment institutions and other market participants. These involve solutions for delivery versus payment (DvP), payment versus payment (PvP), the Internet of things (IoT) and decentralised finance (DeFi), among others. Our idea is to conduct a pilot project starting in March 2023. If everything goes as planned, the Brazilian CBDC could be up and running by late 2024 or the beginning of 2025.

Data monetisation is another important issue in our technology agenda. Today, it is very difficult for users of the financial system to monetise their data. As owners of their information, they should be able to do that. We are working to create ways to allow them to monetise their information. In this sense, the financial aggregator, within the Open Finance environment, could also be used as a data wallet, where the user could store data and choose the best way to monetise it. For this purpose, we need to track which data can flow in an organised and secure way.

In our view of the future, it is unreasonable to expect people to have to use different applications to access information and services from different financial institutions. Our concept is to have an integrated process that allows people to choose a single application that integrates information and services from various players. In addition to serving as a digital wallet, this app will make it possible to make payments, investments, transfers and asset purchases; conduct cash management; and acquire many other financial services from different institutions. It would allow both online and offline transactions.

The process of integration is divided into phases. First, we intend to combine Pix and Open Finance. After that, users will be able access other banking services, such as credit, using Pix. The next step will be the integration of Pix and the currency internationalisation, allowing customers to make instant international payments. Finally, the Digital Real will be included in this framework. Customers will be able to experience the integration of the four blocks using the financial aggregator and digital wallet holding tokenised deposits and other assets provided by banks and other providers. This process of integration is already underway, but we will work to advance it even further in the coming years.

The BIS's role in the development of technology

The BIS Americas Office, with the co-participation of other BIS committees and the newly announced BIS Innovation Hub in Toronto, can help further develop central banks' innovation agendas in the region and globally. An area where there is high potential for contributions is in the integration of CBDC frameworks and the interconnection of countries' payment systems.

Today, several central banks in the region intend to issue, either on an experimental or commercial scale, their sovereign currency in digital format in the coming years. Globally, the main challenge is coordination among central banks. Central banks must increase their coordination in the process of defining their CBDC technologies, and the BIS Americas Office can work to achieve this among central banks in the region.

As indicated by international experiments, the use of smart contracts seems to be key to allowing integration between potential CBDC solutions in different countries. Without coordination on cross-border payments, which can be promoted through CBDCs, cryptocurrencies will remain an attractive alternative option. Nevertheless, even if CBDC technologies are not yet ready to solve problems with cross-border payments, other technologies, such as those supporting domestic instant payment systems, can be used to fill in the gaps.

By promoting the use and standardisation of such payment solutions, the BIS Americas Office has the potential to coordinate efforts aimed at the interoperability of countries' payment systems and to make cross-border payment flows cheaper, more agile and more accessible – particularly for retail transactions. Moreover, given the position of the United States as the largest payment counterparty for international payments, a solution for the Americas would need to envision its global reach.

The development of instant payment ecosystems in jurisdictions of the region (CoDi in Mexico, Pix in Brazil and FedNow in the United States) represents a sizeable opportunity for the construction of a multilateral solution. This integration would be capable of addressing, if not all, several of the historical shortcomings of this payment modality in a relatively short time horizon.

Alternatively, a multilateral solution can be achieved through the participation of countries' payment systems in the Nexus project, an initiative led by the Innovation Hub that intends to interconnect fast payment systems in a global network. In this arrangement, smaller payment systems can be interconnected to the network through direct participation in one of the regional systems and indirect participation in the Nexus network.

Both options will require a high degree of coordination among countries and compliance with common regulatory and technological standards. Initially, the BIS Americas Office can work as a hub for discussing these and other viable alternatives, and, later, the Innovation Hub can work as an instigator and coordinator for the integration of payment systems.

The first moves towards greater integration will certainly depend on the jurisdictions that have more developed retail payment systems, such as Brazil, Mexico, the United States and Canada. In the case of Brazil, in addition to a modern exchange rate framework, the country also has an instant payment scheme, Pix, that is an international reference and widely adopted by Brazilian individuals and companies. The engagement of the BCB and the main jurisdictions in the region around an integration project can generate a broader movement in the same direction.

Finally, in addition to promoting coordination in the adoption of new technological standards, the exchange of experiences and knowledge between central banks can significantly increase the likelihood of success for each jurisdiction's projects and thus their positive impact on domestic financial and payment systems. In this sense, we see the BIS Americas Office as a knowledge hub for experiences in the region and for exchanging experiences and impressions regarding ongoing projects in Europe and Asia.

Conclusions

This chapter shows the importance of the BCB's relationship with the BIS, and the learning that this relationship has brought to our institution. Major issues for the BCB have been the subject of fruitful discussions at the BIS, including the role of central banks' coordination in increasing the effectiveness of their measures, and the key elements for price, macro and financial stability, as well as for economic growth.

Looking ahead, the BIS and the BIS Americas Office could fulfil a very important role in helping countries with technology-related issues. The financial system is experiencing a period of unprecedented technological innovation. In the wake of these developments, central banks in the Americas are moving forward with their innovation agendas. The BIS can contribute to their endeavours by promoting the coordination of central banks in the adoption of new technological standards, as well as the related exchange of experiences and knowledge.

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