

Crypto Assets and CBDCs in Latin America and the Caribbean: Opportunities and Risks*

M. Appendino, O. Bernalova, R. Bhattacharya, JF. Cleve, N. Geng, T. Komatsuzaki, J. Lesniak, W. Lian, S. Marcelino, M. Villafuerte and Y. Yakhshlik

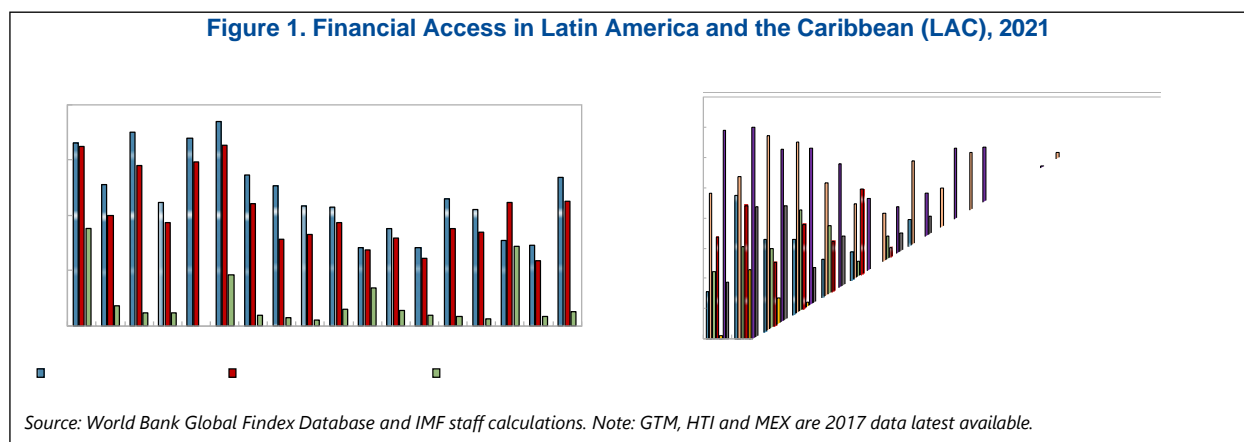
* This paperwork was originally published by the International Monetary Fund and it has been included in the current edition of the Public Budget International Journal upon permission granted by the institution. The views expressed in IMF Working Papers are those of the author(s) and do not necessarily represent the views of the IMF, its Executive Board, IMF management, or DFI

Introduction

The rapid technological innovations the world has seen in recent decades have also been expanded to the realms of money, payments, and financial services, with a promise of making them more accessible, cheaper, and faster, including across borders. The use of cryptography and distributed ledger technology (DLT) such as blockchains for record keeping² has led to the creation of digital assets supported in turn by other infrastructure and associated entities (i.e., exchanges, wallet providers, miners), a departure from the reliance on central bank money and established/regulated financial intermediaries.

The inception of crypto assets, and their associated technologies, provides LAC with opportunities and also challenges. On the opportunities' side, these technologies could help overcome LAC's still relatively low levels of financial inclusion and help reduce the cost of cross-border transactions like remittances (Figure 1).³ On the challenges' side, many LAC countries have macroeconomic vulnerabilities, a history of macroeconomic instability, low institutional credibility, sizable capital flows, corruption, and large informal sectors, and the advent of crypto assets can accelerate currency and asset substitution, facilitate informal and even illicit transactions, and undermine tax collections and the implementation of exchange and capital control restrictions. In response to these opportunities and concerns, central banks are contemplating the issuance of their own central bank digital currencies (CBDCs).

In this context, this paper provides an overview of the nature, pros, and cons of crypto assets and CBDCs, documents their recent experience in LAC, and presents some general lessons and policy recommendations for the region.



Crypto Assets and CBDCs: An Overview

Definitions and Basic Taxonomy

While there are no consistent definitions or taxonomy of crypto assets as they continue to evolve, they can be classified according to their key features as suggested in the recent IMF paper on the elements of effective policies for

² A repeated digital copy of all transactions that is publicly available at multiple locations and

verified/updated by multiple and anonymous validators. That information is tied to specific wallets though the actual identity of the parties involved is not disclosed.

³ According to the 2021 World Bank survey Findex, 72 percent of its adult population had an account in a financial institution (up from 54 percent in 2017), with prevalent difficulties in opening bank accounts, high costs in highly concentrated financial systems, low financial literacy, and poor broadband internet access. While mobile phone penetration is much higher (about 90 percent), only 22 percent of the surveyed population had a mobile money account. In terms of remittances' costs, digital modes offer lower fees for instant money transfers but flows in LAC are among the lowest in the world (17 percent of total remittances in 2021 versus a global average of 24 percent).

crypto assets (IMF, 2022c): unbacked tokens/crypto assets, stablecoins, and other tokens (including utility and security tokens). In this paper, we will focus on the first two of them.

Unbacked crypto assets (or tokens) have no backing assets, are usually issued in a decentralized manner, are transferable, have no redemption pledge, and provide no direct claims on the issuer. With no backing assets, unbacked tokens have volatile prices and are mostly held for speculative purposes. The recent plunge in crypto assets' value raises questions about their usefulness as a store of value or even as a hedge against economic and political instability, while the actual transaction speed and scalability issues question their case as a means of payment. Furthermore, the fragmented proliferation of crypto coins does not allow them to replace money as a “coordination device that serves society through its strong network effects” (BIS, June 2022). According to Chainalysis (2021), many countries from LAC would be included within the group of countries with the highest crypto adoption. In addition, the value of remittances using crypto assets more than doubled between 2019 and 2021 though they remain quite low.

Stablecoins are centrally or de-centrally issued crypto assets which aim to have a stable price through reserve assets and/or through algorithms that respond to demand and supply. They are generally denominated in a monetary unit of account, such as the dollar, and may pledge to redeem into cash at par. The stablecoins that hold very safe and liquid assets as reserves (akin to eMoney) may be in a position to do so. However, others may fall short, for instance if they hold risky or illiquid assets as reserves, or if they do not offer a legal claim on the issuer or on the reserve assets (IMF, 2022c). They are vulnerable to runs as documented by the collapse of the algorithmic stablecoin Terra in May 2022 (see Bains, 2022, Box 4). According to Google search, in LAC the highest interest in stablecoins among internet users is recorded in Brazil, Colombia, Dominican Republic, Ecuador, Mexico, Peru, and El Salvador.

CBDC is a digital form of fiat money issued by a central bank. Depending on the objectives, it can be made accessible for all domestic users (the so called “retail CBDC”) or only to selected financial institutions to help improve financial market efficiency and facilitate cross-border payments in some cases (“wholesale CBDC”). An increased digitalization of money and payments, and their associated impact on domestic and international financial systems, has fostered the interest of central banks worldwide and in LAC in CBDCs. Most central banks are looking at them as part of improvements to payments systems, while the central banks of The Bahamas (since October 2020), the ECCU, and Jamaica are already issuing them. According to Google Trends frequencies, worldwide interest in CBDCs has been on the rise since 2019. As to LAC, it was noticeable among users from Argentina, Brazil, Colombia, Mexico, and Peru.

Potential Implications of Unbacked Crypto Assets

Unbacked crypto assets would offer some potential benefits that have not yet materialized. They claim to lead to cheaper and faster payment and settlement of transactions by reducing the need for intermediaries through the use of DLT (though in practice crypto transactions can be slow and very expensive as for instance validators need to be compensated to ensure the safety of the network and they might be in short supply during peak times). It could be argued that they might enhance the financial inclusion of previously unbanked segments of the population and facilitate the provision of financial products and services to them, but this would require some degree of digital literacy and internet connectivity on top of lower prices and fees (IMF, 2022c). Another benefit of crypto assets and their associated technologies might be the increased competition and ability to design more tailored financial products to different segments of the population, i.e., considering their particular needs and constraints. At a global level, they could help simplify international payments and increase efficiencies in cross-border transactions (e.g., remittance

transfers, which are an important economic lifeline in many LAC countries), which tend to be slow, expensive, and difficult to track in real time given that they must go through multiple currencies and payment systems.⁴

However, these potential benefits come along with many challenges and risks, particularly for vulnerable LAC countries with a history of macroeconomic instability, low institutional credibility, sizable capital flows, corruption, and large informal sectors. From a global financial stability perspective, risks arise from a potential large size of crypto asset markets, an increased transmission of financial shocks and amplification of global financial cycles, and the direct and indirect exposures of financial institutions to crypto assets (and its ecosystem). Those risks are now much more evident following the recent sharp falls in crypto assets' values. Following IMF 2022c, risks can be grouped in the following categories:

- Macroeconomic, including reduced effectiveness of monetary policy, increased currency/asset substitution or “cryptoization,” increased volatility of capital flows and reduced effectiveness of capital flow management measures (CFMs), and fiscal risks from tax avoidance and evasion and a more challenging use of withholding taxes and third-party information;
- Financial stability, including cyber risks;
- Financial integrity, since crypto assets can be misused to commit a range of crimes;
- Legal, given the challenges in applying existing laws to crypto assets;
- Consumer protection, stemming from lack of understanding of crypto assets' risks; and
- Market integrity and contestability, linked to issues like congestion or lack of interoperability.

It is worth stressing that declaring a crypto asset official currency or legal tender has negative economic and legal implications (IMF, 2022c). For instance, if a crypto asset is adopted as an official currency, government revenues would be exposed to exchange rate risk if quoted in advance in a crypto asset. In addition, there would be contingent liabilities if convertibility to fiat currency is guaranteed by the government and the operationalization of the e-wallet is under the responsibility of a state entity as in the case of El Salvador (see below). The adoption of a crypto asset as a legal tender could also negatively impact public financial management by complicating the functioning of the treasury single account, weakening cash management, complicating fiscal reporting, and undermining fiscal reports' reliability.

The empirical evidence on the usage of crypto assets across countries (see section II.A) as well as some regression analysis tend to validate some of the above listed concerns. A couple of empirical studies made at the Fund using various indicators of crypto usage across countries seem to suggest some cross-country association of crypto usage with corruption (the more corruption, the more crypto usage) and capital controls (the more capital controls, the more crypto usage), while macroeconomic conditions (the higher inflation or exchange rate volatility/depreciation, the higher the crypto usage) and population age structure (the older the population structure, the lower the Bitcoin trading) explain the within-country drivers of crypto usage over time.⁵ The size of remittances does not explain cross-country variations, although an increase in remittances would be associated with the increase in the use of crypto assets. Those results, though tentative because of low data quality or limited data availability, would be consistent with crypto usage as a hedging or speculative investment instrument, or as a tool to bypass controls including on corruption.

Given the variety of risks implied by crypto assets, including the ones revealed in the recent collapse of the crypto exchange FTX (Box 1), developing an adequate regulatory framework for the crypto asset ecosystem is necessary and should be accompanied by an enhanced global cooperation to address regulatory gaps and prevent potential regulatory arbitrage.⁶ Except for AML/CFT issues, where the FATF expanded its international standards to cover

⁴ IMF 2022c reports that the median Bitcoin network transaction fee would be high relative to most other forms of domestic digital payments, but lower compared to small value remittances for example.

⁵ Alnasaa et al, 2022; IMF 2022b.

⁶ Cuervo et al., 2019, IMF 2022a, IMF 2022b.

virtual assets and virtual asset providers, financial sector regulators have taken varied and uncoordinated approaches in the absence of international standards.

Box 1. The Collapse of FTX

The Bahamas-based exchange FTX and its sister trading house, Alameda Research, recently collapsed after a run on deposits exposed an initially estimated US\$8 billion hole in the crypto asset exchange's accounts. FTX, the third largest crypto exchange in the world before its downfall, had 1 million users and was valued at US\$ 32 bn in January 2022. It filed for Chapter 11 bankruptcy protection in the United States on November 11, 2022. Contagion to wider financial markets was limited.

The collapse exposed a mix of liquidity mismatches, opaque intragroup funding, and risky investments. The rapid decline of FTX started from a report of *Coindesk* that pointed to liquidity imbalances in Alameda Research with a significant portion of its assets held in artificially inflated FTTs, a token issued by FTX. Such interconnectedness rattled investors, who further acted upon concerns about FTX mishandling customer deposits to backstop Alameda's trading losses, which led to an investigation from U.S. regulators on potential fraud. The hope for a recovery of FTX evaporated after Binance abandoned a proposed rescue deal.

The complicated ownership of FTX and Alameda, combined with its cross-border nature and many creditors, makes the winding down of FTX very difficult. FTX is domiciled in Bahamas but incorporated (not licensed) in Antigua and Barbuda and affiliated with about 130 entities. Alameda is a large crypto-asset hedge fund established in the British Virgin Islands. The decision of the Bahamas to freeze FTX Digital Markets' assets created a tension with the Chapter 11 bankruptcy process, although FTX DM is not part of the Chapter 11 bankruptcy entity list.

Potential Implications of Stablecoins

Stablecoins share most of the same potential (yet unrealized) benefits and challenges described for unbacked crypto assets, with some differences due to the fact that their values would, in principle, be less volatile.

The implied lower volatility would make them in principle more attractive as a replacement for cash and as a medium of exchange than crypto assets. Therefore, stablecoins would be more serious threats in terms of currency substitution and financial disintermediation and reduced effectiveness of monetary policy. However, they might offer a false sense of security as many stablecoins suffer from poor disclosure (more critically on the composition of their reserve assets) and their governance is not well regulated, e.g., in terms of liquidity and auditing requirements (Fall 2021 GFSR, chapter 2). Stablecoins also lack the regulatory framework and protection given to bank deposits and e- money. In that context, and as documented above, concerns about the quality of their reserves and their liquidity could make stablecoins more prone to “runs”, with potential spillovers to the financial system, specifically to more credit-sensitive market segments (like commercial paper).

The regulation of stablecoins is at an early stage despite their recent expansion. The IMF is currently working on that with relevant standards-setting bodies (FSB, CPMI/IOSCO, FATF and BCBS). Regarding the liquidity and run risks mentioned above, the FSB high-level recommendations include strict rules on reserve assets management, adequate capital and liquidity buffers to absorb credit, liquidity and market risks, as well as risks related to legal, operational and cyber risks relevant to the stabilization mechanism, and particular attention to the degree of risk-taking in terms of duration, credit quality and concentration of a GSC's reserve assets.

Potential Implications of CBDCs

A CBDC could help central banks to take advantage of technological innovations underpinning the development of crypto assets while continuing to provide a **safe means of payment** and **secure store of**

value that also serves as a **common (and stable) unit of account**. Importantly, CBDCs should support, or at least not undermine, financial integrity (i.e., anti-money laundering and combating the financing of terrorism (AML/CFT) rules, including customer

due diligence measures and other measures to fight corruption and foster good governance), financial stability, and monetary policy effectiveness. At the same time, CBDCs will not solve underlying problems affecting the credibility of national currencies and could even exacerbate them (e.g., by facilitating the monetary financing of the government and the increase in the supply of base money).

CBDC motivations and benefits

The BIS (October 2020) and Soderberg (2021) list the following as **payment system-related motivations** for the potential introduction of a CBDC:

- ensure continued access to central bank money, particularly where access to cash is in decline;
- ensure resilience of the payment system as an additional payment method, particularly under severe circumstances (e.g., during national disasters, which would require offline capabilities);
- encourage financial inclusion (i.e., access to appropriate and affordable financial services) by facilitating access to a means of payment.;
- support public privacy, a key feature of cash holdings;
- facilitate fiscal transfers, as shown by the need to quickly mobilize resources during the pandemic;
- enhance cross-border payments by making international transfers less costly and by facilitating the access to financial services for households and small firms;
- increase competition in a country's payment system by avoiding concentration and monopolies by large payment service providers (or big tech services) operating in closed platforms;
- reduce the costs associated with the provision of cash.

An additional policy goal would be to protect monetary sovereignty by offering a secure and convenient public digital currency to reduce the risk of currency substitution. Obviously, this requires stability of the local currency and of macroeconomic conditions and policies as starting points since a CBDC by itself would not fundamentally change the demand for local currency. In emerging and developing economies, CBDCs would be mostly motivated by the needs to enhance financial inclusion and improve efficiency of payments. As stated earlier, a large proportion of the LAC population remains unbanked with negative consequences for economic and social development. Among the main impediments for financial access in the region, the World Bank Findex survey stresses the lack of sufficient funds, high interest rates and payment services costs, limited trust in financial institutions, long distances, and lack of proper documentation. In that context, introducing a CBDC may help enhance the population's access to financial services, including as a complement to the introduction of instant retail payment systems that settle transactions between end users through a range of interfaces and/or competing private payment service providers (PSPs) on the central bank's balance sheet in near real time on a 24/7 basis.⁷ Another potential benefit from a CBDC for LAC would be the formalization of some enterprises operating mostly in cash in the informal sector that were to adopt CBDC and benefit from the digital recording of transactions to reduce accounting costs and to gain access to banking credit (Alfonso et. al, 2022).

CBDC-related risks

In terms of **potential risks**, Mancini-Griffoli et al. (2018) focus in particular in the implications of CBDC in terms of financial stability, financial integrity, and monetary policy effectiveness. But there are other risks worth highlighting, including cross-border and cyber risks.

Financial stability risks by disintermediating banks through deposit substitution. This would lead to lower credit and a negative impact on economic growth, but could be partly mitigated by central bank's liquidity injection and the positive impact of a CBDC in terms of an improved payment

infrastructure and enhanced

⁷ This obviously will depend on the specific country's barriers to inclusion. For instance, CBDC cannot resolve barriers to inclusion related to issues like financial literacy, low trust, preference for cash and general poverty, and inadequate telecom infrastructure.

financial inclusion. An additional concern is that a CBDC may facilitate a generalized (i.e., not from one bank to another) run on banks under macroeconomic or financial stress conditions by offering a readily available, safe, and liquid alternative to deposits. It could be argued, however, that such a scenario would be limited given the widespread use of deposit insurance and bank resolution frameworks to protect retail depositors.

Financial integrity could be undermined by a CBDC relative to cash and current noncash fund transfer systems, for instance if it were to offer full anonymity and large-value transactions. By contrast, financial integrity could be strengthened if authorities impose strict limits on the size of transactions and mitigated if the CBDC is designed to facilitate effective customer identity authentication and tracking of payments and transfers, transaction monitoring, and other AML/CFT risk-based measures.

CBDCs issued by advanced countries could negatively affect emerging markets by increasing pressures for currency substitution and reducing the scope for monetary policy, including reducing the ability to enforce exchange restrictions and capital flow management measures.

Risks from cyberattacks. CBDC will have to contend with operational and reputational risks arising from disruptions and cyberattacks.

If a central bank were to decide to introduce a CBDC, which should be based on a comprehensive and balanced policy-oriented assessment, its design will be critical to attain its policy goals and minimize potential risks. In this regard, the BIS (October 2020) has proposed three overall principles for the design of CBDCs: (i) a central bank should not compromise monetary or financial stability by issuing a CBDC; (ii) a CBDC would need to coexist with and complement existing forms of money; and (iii) a CBDC should promote innovation and efficiency.

In addition to being low-cost, secure, interoperable (i.e., in a system with sufficient interaction mechanisms with private sector digital payment systems), supported by a robust legal framework and aligned to the relevant regulatory standards, the following design elements around which there would be a growing convergence (Soderberg 2021) are worth highlighting:

CBDCs have been predominantly focused on their domestic use, but there is growing recognition that cross border coordination should be considered early in the design.

Remuneration is advocated mostly in academic literature but less so by central banks in order to minimize disintermediation risks.

Many countries are considering limits or caps on balances in digital wallets and transactions to minimize disintermediation risks.

Availability of both on-line and off-line functionalities.

Limited anonymity is preferred for CBDCs because of financial integrity considerations.

A focus on cross border solutions for wholesale CBDCs.

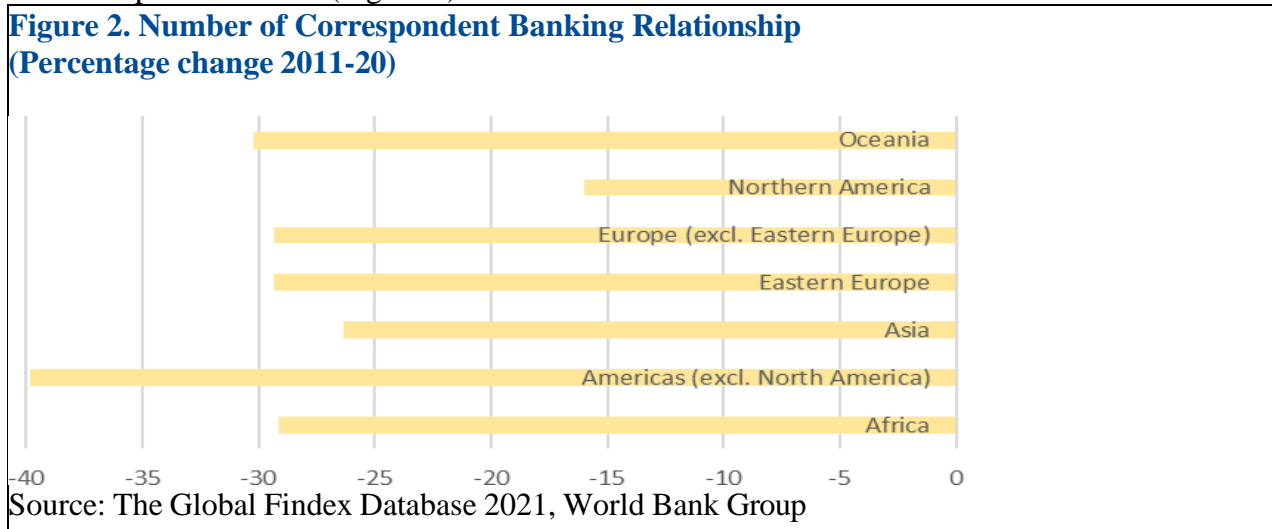
Restrictions aimed at reducing financial stability risks and crowding out banks.

Cross-Border Payment Issues

Cross-border payments tend to be expensive, opaque, and slow as several correspondent banks might need to be involved to settle a transaction. This is particularly important for the economies and social fabric of LAC since remittances represent an important source of foreign exchange and income in many countries. For instance, remittances amounted to 340 percent of receipts from exports of goods and services in Haiti in 2021, while in El Salvador, Guatemala, and Honduras remittances amounted to more than 90 percent of receipts from exports of goods and services. However, remittances are deemed to be costly (e.g., the cost to

send US\$200 to LAC was estimated to be 5.5 percent in 2021 or almost double the Sustainable Development Goal of 3 percent), slow (the standard payment chain process including messaging, settlement, and disbursement could take between 3 to 5 days), cumbersome, and lacking transparency. These problems stem from several frictions including fragmented and truncated data formats,

complex processing of compliance checks, limited operating hours, legacy technological platforms, high funding costs, long transaction chains, and weak competition (Miccoli, 2022). These issues have been exacerbated by the decline in correspondent banking, with the LAC region the more affected by the fall in active correspondent banks (Figure 2).



Digital money has several advantages that would lead to cheaper, faster, more transparent and accessible cross-border payments as they would involve fewer intermediaries but greater competition, greater transparency, common standards designed from the ground up, safety and integrity, and 24/7 availability allowing for instant cross-border settlement. The G20 has made enhancing cross-border payments a priority and endorsed an ambitious roadmap developed by the Financial Stability Board (FSB) and other relevant organizations (FSB, 2020). This is important for LAC, since, as shown in Bersch et al. (2021), despite wide accessibility to mobile internet in the LAC countries and global technological advances in the front-end processes of remittances (e.g., apps of remittances operators), cash remittances continue to be large (80 percent of total remittances) and uptake in digital remittances in the region is limited which would be explained by relatively low financial inclusion and high informality. That paper also found only sparse information on the penetration of digital back-end process providers in LAC countries—including private digital money, distributed ledger technology, and token-based payments’ providers, which are all alternatives to the traditional correspondent-banking back-end process providers of settlement and messaging in remittances. Gaps in the regulatory environment could also be a factor in the low penetration of digital remittances in the LAC region. For example, according to the GSMA Mobile Money Regulatory Index (MMRI) the LAC region scores the lowest in the world, particularly lagging in the Know Your Customer Regulation. Carare et al. (2022) found a clear trend of declining remittance fees across countries at all levels of digitalization, albeit they remain higher for Central America and the Dominican Republic relative to other countries and noted that the authorities were actively exploring the use of digital money to advance domestic payment systems, expedite financial inclusion, and lower remittances fees.

While stablecoins credibly pegged to safe assets would have a better chance to become an important vehicle for cross-border payments than crypto assets beset by high price volatility and scalability challenges, CBDCs might have a more promising future in enhancing cross-border payments since direct liabilities of central banks are the least risky and most liquid settlement assets. This will require a careful focus on their design features in terms of (i) access (i.e., their availability to non-residents for a retail CBDC and to foreign banks and other payment service providers for a wholesale CBDC) and (ii) interoperability between CBDC systems of different countries or even with non-CBDC payment arrangements. It is likely that facilitation of cross-border payments would be focused through wholesale

CBDCs, at least at the beginning. It is also likely that, given governance challenges and relatively high upfront costs, interlinking CBDC systems be implemented mainly at a regional level or between countries with large bilateral or multilateral trade volumes (see BIS, July 2022). Various CBDC experiments have been conducted to test “multiple CBDC” arrangements (mCBDC) allowing transactions among CBDCs of different jurisdictions (see Auer and Holden,

2021) based on the use of a DLT platform and public key cryptography to settle international transactions completely bypassing financial intermediaries such as correspondent banks. In any case, international collaboration will be needed to enhance cross-border payments and at an early stage to ensure interoperability between CBDC systems.

Relevant Experiences in Latin America and The Caribbean

Crypto Assets

Existing Regulations/Restrictions in the Region

Although LAC has been at the forefront of crypto adoption, crypto assets regulation diverges widely across the region in the absence of accepted international standards, ranging from crypto acceptance to crypto prohibition.⁸ El Salvador went beyond those approaches by adopting a crypto asset (bitcoin) as a legal tender, incentivizing its use including by guaranteeing its convertibility with the U.S. dollar. While some countries have not yet specified any laws regarding digital currency trading or exchanges, most economies are contemplating regulation as the adoption of crypto assets rises. Over the last three years, LAC countries have made significant advances towards establishing a regulatory framework, in particular in countries with the highest adoption of crypto assets (Argentina, Brazil, and Colombia). In many countries, legislators have been presenting bills that are in different stages of discussion and approval and have appointed specific supervisory bodies. However, the region (as the rest of the world) still lacks common and comprehensive regulatory standards to effectively address the inherent risks while reaping the benefits of the growing crypto markets. Annex I summarizes the state of regulations in LAC as of mid-2022, keeping in mind that the crypto ecosystem is moving fast, and new regulations are expected to be introduced in the region.

El Salvador's Introduction of Bitcoin As Legal Tender

El Salvador was the first country to adopt Bitcoin as an official currency with legal tender status alongside the U.S. dollar despite concerns about its volatile value and its lack of intrinsic value (i.e., it is not supported by backing assets or the credibility of a central bank). The “Bitcoin law” was adopted on June 8, 2021, establishing the U.S. dollar to be used as a reference currency for accounting purposes and mandating the acceptance of Bitcoin by economic agents in exchange for goods and services and allowing its use for the payment of taxes and outstanding debts. On September 7, 2021, the authorities adopted regulations needed for the Bitcoin ecosystem and introduced the e-wallet, *Chivo*, thereby fully implementing the law. *Chivo* is fully connected with the country's banking system, allowing users to transfer U.S. dollars from and to the platform, including by using Visa/Mastercard payment system. It can be used by registered Salvadorans (individuals, businesses, and government entities), including the ones living abroad as a way to facilitate the sending of remittances.⁹

The government guarantees the automatic conversion from Bitcoin to U.S. dollars in *Chivo*. A trust fund, *FIDEBITCOIN*, endowed with US\$150 million has been established to (i) guarantee the conversion from Bitcoin to

U.S. dollars and (ii) to back *Chivo*, which provides automatic and free convertibility services, financially. When providing exchange services to its users, *Chivo* functions as an intermediary between users and wholesale Bitcoin exchange providers, and all costs and risks of exchanging and settling transactions are taken by *Chivo* at no cost to its users including through a network of more than 200 *Chivo* ATMs throughout the country. *FIDEBITCOIN* covers all the costs related to instantaneous convertibility between Bitcoin and U.S. dollars, transaction fees to Visa/Mastercard

-
-
- ⁸ There is also a lack of recording procedures in most of the region for capturing crypto asset transactions.
- ⁹ As of 2022Q2, the official macroeconomic statistics have not reflected the Bitcoin transactions and positions.

payment system, and supporting operation of Chivo ATMs. This represents a (nontransparent) recurrent subsidy/incentive, estimated to cost as much as 0.1 percent of GDP annually assuming a rate of use by 20 percent of adult population, which need to be added to the upfront fiscal costs to promote the introduction of bitcoin as legal tender.¹⁰

Formally, the launch of e-wallet Chivo—operating on both Bitcoin-supported payment framework and the traditional payment system—was motivated by the relatively slow progress in improving financial inclusion and to promote digital transactions in U.S. dollars and in Bitcoin. By 2021, only 31 percent of El Salvador’s adult population had a bank account, one of the lowest shares in the region due to the inability of the population to meet the requirements to open an account (notably, having a tax identification number and a minimum starting balance of USD 150). Since 2017, the number of initiatives—such as simplified bank accounts and the Financial Inclusion law to allow digital products and mobile money¹¹—had limited impact on improving financial inclusion. The launch by the central bank of the 24/7 payment system (*Transfer365*) in June 2021 allows for instantaneous online banking transactions for the banked population.

Preliminary evidence on the basis of a nationally representative survey (Alvarez et al., 2022) would suggest that “despite the legal tender status of Bitcoin and the large incentives implemented by the government, the crypto asset is largely not an accepted medium of exchange in El Salvador.” The survey found that only 20 percent of firms report accepting Bitcoin as a means of payment and only 5 percent of all sales are paid in Bitcoin. Furthermore, 88 percent of businesses automatically convert money from sales in Bitcoin into U.S. dollars. While a significant fraction of Salvadoran population (85 percent of adult population) downloaded the Chivo e-wallet (just over half of the survey respondents), the use of Bitcoin has been relatively low and has been concentrated among the banked, educated, young, and male population, which is not consistent with the objective of promoting financial inclusion.¹² Operational use of Chivo-wallet is small, processing on average 5 thousand transactions daily, which represents less than 2 percent of daily transactions in debit and credit cards.

Furthermore, Chivo-wallet remittances are low (about 1.6 percent of total remittances), due to cash preference for both recipients and senders of remittances, as cash use is prevalent in Salvadoran economy and there is a limited access to recharge Chivo wallets for Salvadoran migrants in the U.S.. Cash is the dominant form of payments in El Salvador, as 70 percent of population are unbanked, and 49 percent of employment is in the informal sector.

Moreover, two thirds of remittances are received in cash and immediately spent on consumption purposes (see charts and 2021AIV staff report). Similarly, Salvadoran migrants sending remittances from the U.S. choose the cash mode, as most of the migrants in the U.S. are financially excluded and therefore cannot send remittances by other modes (online—from bank account and/or debit/credit card). Salvadoran migrants in the U.S. cannot make electronic deposit to Chivo wallet accounts, which require having bank account and/or debit/credit card. While cash deposits through Chivo wallet ATMs are possible in 57 locations in 7 U.S. states—with most of Salvadoran migrant population—these Chivo wallet remittances are insignificant, averaging 1.6 percent of the monthly volume of received remittances.

Finally, granting legal tender status to bitcoin raises concerns as it is not widely accessible to the population, which can question the enforcement of the legal tender status.

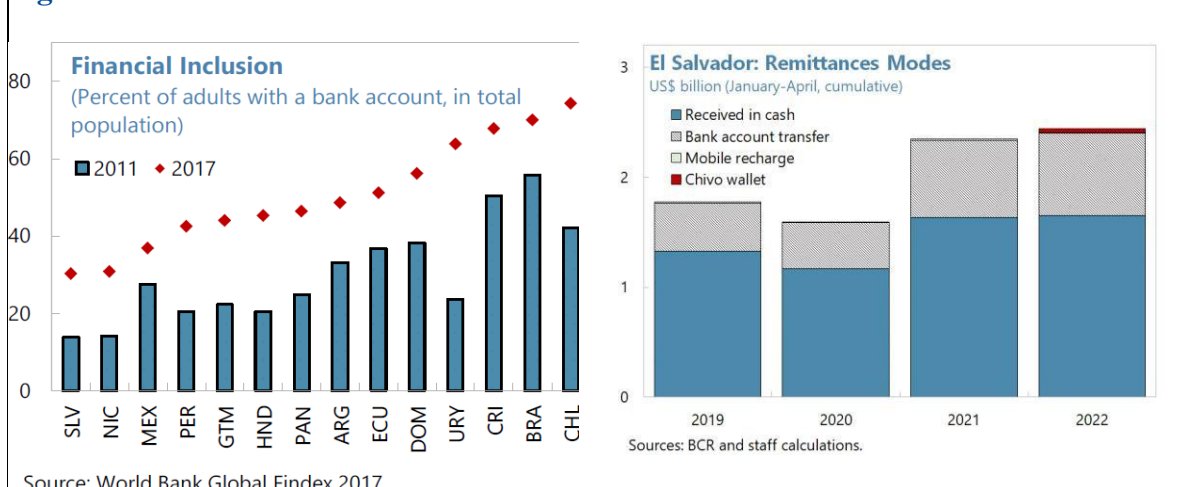
¹⁰ Staff estimates that the short-term budgetary costs are 1 percent of GDP for 2021-2022, including seed

money for trust fund (½ percent of GDP), Bitcoin bonus of US\$30 for each download (0.4 percent of GDP), and promotion campaign (0.1 percent of GDP). See El Salvador 2021 Article IV Staff Report for more details.

¹¹ Mobile money is a form of mobile payment service typically offered by a mobile network operator or another entity in partnership with an MNO using mobile money accounts.

¹² Low use of Bitcoin could be attributed to a continued high use of cash in the economy, operational difficulties, and volatility in the Bitcoin-U.S. dollar value (despite public backstop).

Figure 3. Financial Inclusion and Remittances in Selected LAC Countries



**Stablecoins
Existing Regulations/Restrictions in the Region**

Following the fallout of TerraUSD stablecoin in May 2022, the U.S. Treasury Secretary called for stablecoins regulation to be in place by end-2022. In February 2022, members of the U.S. House committee had already discussed a report on stablecoins by the President’s Working Group on Financial Markets and raised questions on the recommendation to limit stablecoins’ issuance to banks. Congressman Josh Gottheimer also unveiled a draft bill which proposed that stablecoins could also be issued by “a federally insured bank” or “a non-bank issuer that maintains 100 percent of reserve assets in U.S. dollars.” Nellie Liang, the undersecretary for domestic finance at the U.S. Treasury, argued in the Washington Post on March 6 that “stablecoins’ claim to be a safer crypto asset — but they’re far from risk-free”, and urged Congress “to enact legislation to ensure that stablecoins are subject to appropriate and comprehensive regulation.”

Outside the U.S., the debate on regulation, supervision and oversight of stablecoins has also heated up, as the mid- May 2022 events raised concerns about spillover impacts across crypto markets and across borders. The IMF is currently working on the regulation of stablecoins with the relevant standards-setting bodies, such as the FSB, CPMI/IOSCO, FATF and BCBS. The Financial Stability Board (FSB) will facilitate the implementation of its high-level recommendations for regulation, supervision, and oversight of Global Stablecoin Arrangements. The CPMI and IOSCO have issued a consultation paper on how the Principles of Financial Market Infrastructures (PFMI) might be relevant for some types of systemic stablecoins models, particularly those used for cross-border payments and for those considered as securities. IOSCO has set out principles for the regulation of crypto asset exchanges, and FATF has wide-ranging AML-CFT standards applicable to virtual assets and service providers.

Facebook’s Digital Wallet (Novi) and its Pilot in Guatemala Using Stablecoins: A Failed Experience

Guatemala is heavily reliant on remittances, with inflows at 15 percent of GDP in 2020. Remittance flows in the U.S.- Guatemala corridor is the second largest in Latin America after the U.S.-Mexico corridor. Like the rest of Central America, there is room for efficiency gains in transfers of remittances, as they are subject to market concentration and high costs. There has been some diversification in remittance service providers, and digital means have become more prevalent, as new fintech players entered the market and traditional money transfer operators have complemented cash collection at physical locations with online

platforms allowing for credit/debit card and bank account transfers.

However, remittances are still dominated by origination at physical locations and cash pick-up (Bersch and others 2021).

Against this background, Facebook announced the launch of a pilot project for storing and transferring value through its digital wallet, *Novi*, in October 2021. The pilot would be limited to users in the U.S. and Guatemala. It would allow users to make domestic as well as cross-border peer-to-peer payments instantly and without fees but with quantitative limits. While currently only Pax Dollar (USDP) – a USD stablecoin issued by an organization called Paxos – can be held on Novi, more stablecoins could be included in the future. Coinbase will provide custodian services (International Monetary Fund 2021). However, it was announced in July 2022 that the project would be shut down in September 2022, an example of the challenges of introducing and sustaining digital currencies in the region.

Stellar-Based Stablecoins in the Region

The Stellar ecosystem, launched in 2014 and incorporated in Canada, is an open financial infrastructure, supporting several programming languages, applications, games, wallets, service and payment providers, fiat and non-fiat issuers, and fiat on/off ramps. Stellar is secured by a unique blockchain mechanism called the Stellar Consensus Protocol (SCP), instead of the “proof-of-work” mechanism. Stellar users can digitize, issue, and redeem digital money (tokens), creating a token representing any underlying asset (i.e., currency or gold). For example, a user can deposit USD 100 and issue USD-denominated tokens for the same value. These tokens can be traded, change owners, and be redeemed back to a traditional USD at the end, but the actual USD never moves. All money transactions in Stellar network are conducted by entities holding the deposits and issuing credits for those deposits in the network. Thus, they act as a bridge between traditional fiat money and the Stellar network.

Anclap is a Stellar-based digital payment network in Latin America issuing stablecoins. Established in 2017, the Anclap ecosystem was aiming to operate in Argentina, Peru, Colombia, Chile, Mexico, and Brazil. Anclap launched a Digital Peso (ARS) in January 2020 and a Digital Sol (PEN) was issued in September 2021. Anclap planned to launch the stablecoins Digital Colombian (COP) and Digital Chilean (CLP) in October and November 2021 but delayed their introductions. Mexican authorities have put regulation in place to avoid this from happening in Mexico, e.g., by denying e-money licenses to crypto players. In Peru, the central bank warned the public against the digital Sol clarifying that it is not endorsed by it, it is not covered by the current regulatory framework, and mentioning plans to introduce an official CBDC.

Anclap’s digital ecosystem achieves faster transactions (including for cross-border remittances) by relying on some trusted validators within their consensus process (characteristic of a federated consensus algorithm), which would in turn make it more vulnerable to security attacks than other networks which charge higher transaction fees and use more validators. It facilitates daily transactions, even for unbanked individuals, allowing them to buy a prepaid debit card with which they can access tokens anytime and anywhere, and even withdraw cash from any ATM. The system is reportedly available 24/7 and requires a government-issued ID. The network claims to comply with Know-Your- Customer (KYC) and Anti-Money Laundering (AML) regulations through dedicated protocols. Every stablecoin (token) issued in the system is reportedly fully backed by the same-currency deposit in a local financial institution. The users can send stablecoins to others, save or sell them, and transfer the funds to their bank account.

Reserve, Petro, and AirUSD

As citizens have looked for digital solutions to banknotes’ shortages (Venezuela) and to the impact of protracted and elevated inflation (Argentina, Venezuela), stablecoins have become financial lifelines. Stablecoins also provide solutions when capital controls or international sanctions (e.g., Venezuela) disrupt the access to hard currencies (U.S. dollar) Therefore, there is natural demand for assets that can work as a

savings vehicle pegged to foreign currencies and that are accessible.

“Reserve” is a startup established in 2019, launched in Venezuela in 2019 and in Argentina in 2021. Its users are mostly located in Argentina, Venezuela, and Colombia. Reserve Dollar (RSV) is pegged to U.S. dollar one-to-one, and is backed by other stablecoins (1/3 USDC, 1/3 TUSD, and 1/3 USDP). Many users seem to opt to convert local

currencies receipts into Reserve to protect against inflation. In addition, certain businesses in Venezuela accept Reserve as a payment method for goods and services.

For beneficiaries of remittances from the six million Venezuelan migrants and refugees spread across Latin America, Reserve has proved successful in preserving savings and protecting their livelihoods, granting the benefits of crypto assets but without their extreme volatility. Amid the Bolivar's sharp depreciation, users protect the value of their remittances through Reserve's digital dollar and can swiftly convert their funds to local currency when needed or pay directly with the RSV stablecoin if the merchants accept it.

Stablecoins have also proved attractive for governments. In December 2017, attempting to mitigate the impact of the

U.S. financial sanctions and to allow Venezuela to break away from the U.S. dollar dominance, the Maduro administration announced the creation of the Petro, a crypto asset controlled by the state, with an issuance limited to US\$5 billion and backed by oil reserves from the unexploited Ayacucho field in the Orinoco Oil Belt as well as by gold and diamond reserves from the Mining Belt.¹³ Since its launch, the government has been promoting its stablecoin¹⁴ through social transfers denominated in Petro, including to retirees, and even forcing some businesses to receive payments in Petro. The payment of taxes and public services is facilitated in Petro, while some taxes and fees have been referenced to its value. Despite these efforts, the Petro has struggled to gain recognition domestically. This situation has been compounded by financial sanctions, as in 2018 the U.S. issued an executive order barring U.S. citizens from holding or trading any digital currency issued by, or on behalf of, the Venezuelan government. The opacity, sanctions, and operational problems have depressed the demand for Petro, resulting in the coin being traded sometimes at a heavy discount (20-50 percent below its face value).

Similarly, in an intent to bypass the controls imposed by the Maduro administration over the domestic financial system, the U.S. government has been using Circle's stablecoin (USDC) and Latin America-based crypto exchange Airtm to transmit U.S. aid to Venezuelan healthcare workers. Once the USDC is received on Airtm wallets, it is then dispersed to accounts of Venezuelan health care workers as AirUSD (Airtm's stablecoin-backed dollar token).

However, intense pressures from the government to block the registration of beneficiaries and to control Airtm's banking transactions has hindered its development.

Energy Costs and the Potential Taxation of Crypto Assets' Mining: the Case of Paraguay

Some crypto mining companies, associated with crypto assets based on proof-of-work consensus mechanisms, have started to operate in Paraguay taking advantage of its excess supply of clean and renewable energy, low electricity rates and income tax rate, and legal certainty.¹⁵ This is happening in a context where excessive electricity consumption and control difficulties have led several countries to more closely regulate the activity and even prohibit it. This is the case of China, which prohibited crypto mining since September 2021 after being the source of 78 percent of the crypto mining production. Iceland, which produces clean energy (geothermal and hydroelectric) and historically had oversupply of electricity (at least until 2020) started to face excess demand in December 2021, and its government had to suspend the granting of new crypto mining licenses.

As described in Annex I, the Paraguayan congress has been keen in fostering crypto mining in the country including by establishing that electricity tariffs on those activities should not exceed industrial tariffs by more than 15 percent. The government vetoed such legislation noting that crypto mining is characterized by high consumption of electricity,

¹³ The value of one Petro was fixed at 60 US dollars. <https://www.bcv.org.ve/billetes-y-monedas/criptomonedas/actos-administrativos/whitepaper-del-petro>

¹⁴ Theoretically denominated a conditionally-stable crypto asset, as oil and gold also have specific volatilities

¹⁵ See Fintech Note 22/06 for a deeper discussion of the relation between the design of crypto assets and their energy consumption profiles.

intensive capital utilization, and minimal generation of jobs. The fate of such legislation is still uncertain as congress would be keen on restarting its discussion. In any case, associated policy choices in Paraguay involve very complex tradeoffs starting with the fact that the current growing internal demand would exhaust the surplus of electrical energy by 2030-35 and increased crypto assets' mining could exhaust excess capacity even earlier, lead to lower exports, raise the price of electricity for other firms and households, increase the consumption of more polluting sources (biomass or fuel), and make more difficult to achieve the country's emissions reductions' goals.

One policy option that has been considered elsewhere is the introduction of “demand flexibility programs” between miners and the utility providers with the aim of focusing their demand to periods outside of the peak hours of greatest consumption (e.g., applying the model currently in place in Paraguay for electro-intensive activities). However, an efficient implementation of those programs would be very complex as it requires that incentives are aligned for firms to find it profitable to operate during off peak hours and to shut down during peak hours. This depends not only on electricity prices, but also on bitcoin prices, which are highly volatile. Furthermore, the negotiation with the large mining companies would not be simple due to asymmetries in the access to information.

Another policy issue in Paraguay (and other countries in the region) would be whether to charge crypto miners a selective tax or higher electricity rates. This would not make a difference to the miners' incentives but would do so in terms of the allocation of additional revenues within the public sector (if, as in the case of Paraguay, the utility company is a public one). The selective taxes would go the treasury while higher tariffs would imply higher profits for the utility company. This differentiated allocation might in turn affect decisions in terms of compensating households eventually affected by higher tariffs (under scenarios of no excess electricity supply) and/or of introducing tariffs' cross-subsidization. In addition, it is worth taking into account that selective taxes usually require congressional approval while electricity rates are usually set by the companies or the Executive Power.

Regional Dollarization Experiences and Potential “Cryptoization”

“Dollarization” refers to the official or “de facto” adoption of an alternative currency in place of the official domestic one. It is widespread in the region¹⁶ and has become a crucial element in LAC's economic landscape (Savastano 1996), with some countries even going for full dollarization (Ecuador and El Salvador).

Two types of “de facto” dollarization can be highlighted. On the one hand, currency substitution or real dollarization, which implies the use of the foreign currency as a means of payment or unit of account. On the other hand, asset substitution or financial dollarization, which implies the use of the foreign currency as a store of value. Each type of dollarization has been linked in the literature to several determinants (Levy Yeyati, 2021). Currency substitution has been traditionally associated with inflation, including the memory of past inflation or expectations of future inflation. By contrast, financial dollarization has been rationalized in terms of risk differentials either through a portfolio optimization approach or market failures (e.g., institutional failures inducing regulatory arbitrage or facilitating tax evasion). The empirical evidence so far tends to favor the portfolio approach vis a vis the inflation rate explanation, which would be consistent with the fact that dollarization has been quite persistent in the region despite a relatively long history of disinflation successes. However, the empirical work would still support the presence of low institutional credibility as a factor in the form of slow changes in expectations and a role for institutional variables like legal framework, property rights, and governance.

¹⁶ Full or official dollarization occurs when a foreign currency—usually, the U.S. dollar—is adopted by a country as its main or exclusive legal tender. Partial or de facto dollarization occurs when a country keeps its own local currency in circulation, but also allows payments and transactions to be carried out freely in a foreign currency.

Since the 2000s, many countries in the region have undertaken attempts to de-dollarize their economies. Those efforts have focused on the consolidation of macroeconomic stability, microeconomic measures based on market incentives (e.g., differential reserves requirements, the development of competitive savings instruments in local currency) or regulatory limits (e.g., limits on U.S. dollar lending) to deter investors from dollarizing their financial assets and liabilities, and regulations affecting the choice of foreign currency as a means of payment or a unit of account (e.g., legal tender restrictions, mandatory price denomination in the local currency). (Levy Yeyati 2021)

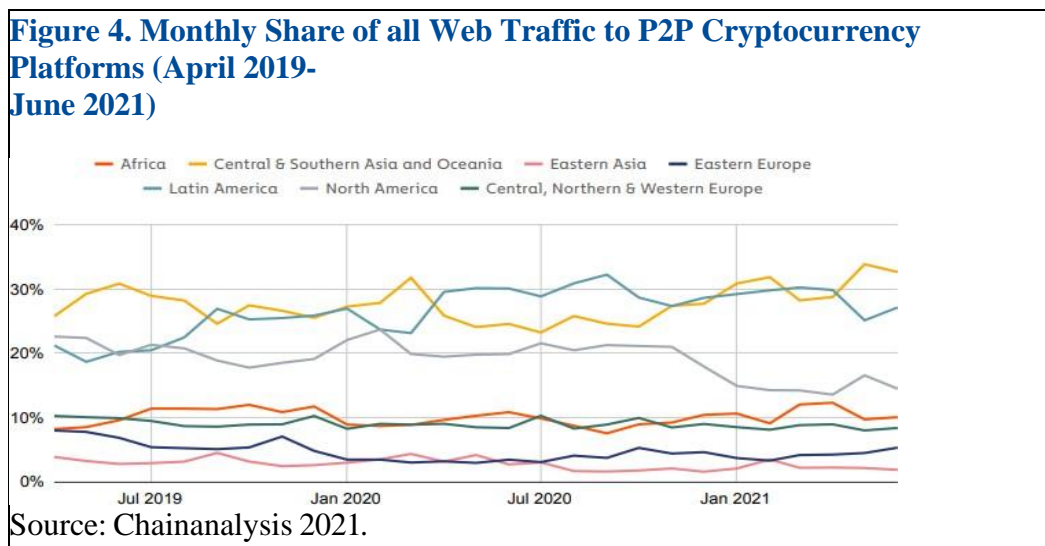
Still, dollarization remains widespread and has even intensified in some countries. Furthermore, the recent surge of crypto assets in the region raises the question whether there is a new form of dollarization that can be termed as “cryptoization.” It is thus important to identify the determinants of dollarization that could drive the emergence of cryptoization, as a form of currency substitution (El Salvador) or an alternative to real and financial dollarization (Argentina and Venezuela).

In the case of cryptoization, on top of inflation or policy credibility concerns, its increase could be also driven by:

Reduced transaction costs: Another clear common incentive is to promote more efficient and low-cost payments within and across countries. In addition, reduced switching costs will facilitate currency substitution (IMF 2020). These are also opportunities for countries heavily dependent on remittances to further expand the use of crypto assets.

Interoperability: The globalization of finance and communication technologies already offer wider accessibility. However, crypto assets’ compatibility with smart contracts and financial applications could significantly impact global trade and financial intermediation, with the potential to increase financial inclusion.

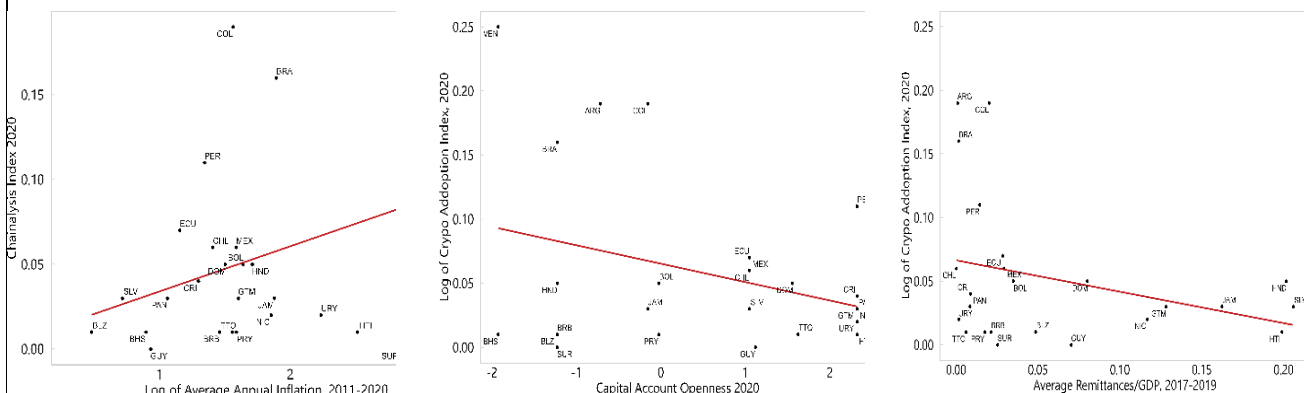
Country case studies in this paper would confirm that these motivations are behind the adoption of crypto assets. For instance, the desire for efficient cross-border transactions would be behind Anclap, a digital payment network that covers several South American countries, while demand for Reserve in Venezuela arises as a means of saving in a country with hyperinflation. Two additional motivations would further underpin the demand for crypto assets. First, some countries in Latin America face stringent capital controls (Argentina, Venezuela). Second, unbacked crypto assets (but not stablecoins) are vehicles of speculative investment. Available data suggest that there has been a strong crypto adoption in some Latin American countries and that demand appears to be particularly strong in P2P usage (Figure 4).



Looking at disaggregated data would suggest that crypto adoption is positively correlated with inflation while negatively correlated with capital account openness and remittances to GDP ratio (Figure 5).¹⁷ These associations are broadly confirmed by cross-sectional regressions, as googletrend search of Bitcoin tends to be higher in countries with more stringent capital account restrictions and higher inflation, though countries with high remittances-to-GDP ratios do not necessarily have higher googletrend search (Table 1). While the results with respect to inflation and capital account openness are consistent with our conjecture on inflation and capital controls being drivers of crypto adoption, the counterintuitive result for the remittances to GDP ratio would corroborates the findings in Bersch and others (2021) that digital remittances in Central America remain nascent. Turning to within-country drivers of crypto adoption over time, currency depreciation, increases in inflation, and the increase in remittances tend to increase interest in Bitcoins, while the impact of changes in capital account openness and IT infrastructure was not detected (Table 2).

Figure 5. Crypto Adoption and its Drivers in Latin America

(a) Inflation and Crypto Adoption (b) Capital Account Openness and Crypto Adoption (c) Remittances and Crypto Adoption



Source: Chainanalysis 2021, ARREAR, Haver and staff calculations

Table 1. Association of Country Characteristics with Interest in Bitcoins

Dependent variable:	(1)	(2)	(3)
ln_googletrend_bt			
Capital account restrictions (Chinn-Ito)	0.141* (1.75)	0.141 (1.02)	0.207 (1.27)
Inflation	0.0787 (0.61)	0.597 (1.48)	0.306 (0.96)
Foreign Exchange Volatility	-0.407 (-1.40)	0.733 (0.99)	0.163 (0.22)
Share of population above 65	0.381 (1.33)	0.153 (0.42)	0.384 (1.16)
Remittances/GDP	-0.201 (0.86)	-0.266 (-1.56)	-0.245 (-1.72)
Constant	-0.143 (-0.82)	1.675*** (11.51)	1.809*** (10.50)
N	147	20	63

Source: Staff estimates

t-statistics in parentheses, *p<0.1, **p<0.05, ***p<0.01

Note: Data covers Latin America and Caribbean countries in 2013-2019 at an annual frequency. All control variables are standardized by demeaning and dividing by standard deviation. (1) is

estimated by pooled OLS with year fixed effect, (2) is estimated by cross-country OLS using 2019 data only, and (3) is estimated by between-effect regressions.

¹⁷ We note that this relationship could be sensitive to the inclusion of more recent data, as there has been an increase in inflation and a decrease in crypto prices, which could reduce crypto adoption in 2022.

Table 2. Drivers of Interest in Bitcoins				
Dependent variable:	(1)	(2)	(3)	(4)
<i>ln_googletrend_bt</i>				
Capital account restrictions (Chinn-Ito)	-0.108 (-0.47)	0.0228 (0.11)	-0.137 (-0.61)	-0.110 (-0.47)
Inflation	0.0165 (1.31)	0.0915 (0.78)	0.0167 (1.31)	0.0162 (1.29)
Exchange rate (LC/USD) (log)	2.074* (1.92)	1.813 (1.23)	2.068* (1.87)	2.090* (1.93)
Share of population above 65	1.609 (1.68)	2.809** (3.15)	1.764 (1.50)	1.657 (1.64)
Remittances/GDP		0.423* (1.94)		
Mobile phone subscription (percent of population)			-0.0702 (-0.49)	
Secure internet servers (per million people)				-0.000007 (-0.32)
Constant term	0.424 (1.25)	0.474 (1.65)	0.411 (1.19)	0.435 (1.27)
<i>N</i>	181	170	176	181
<i>R</i> ²	0.888	0.894	0.883	0.888
Source: Staff estimates t-statistics in parentheses, *p<0.1, **p<0.05, ***p<0.01 Note: Data covers Latin America and the Caribbean countries 2013-19 at an annual frequency. All control variables are standardized by demeaning and dividing by standard deviation and lagged by one period. Country and year fixed effect with cluster-robust standard errors.				

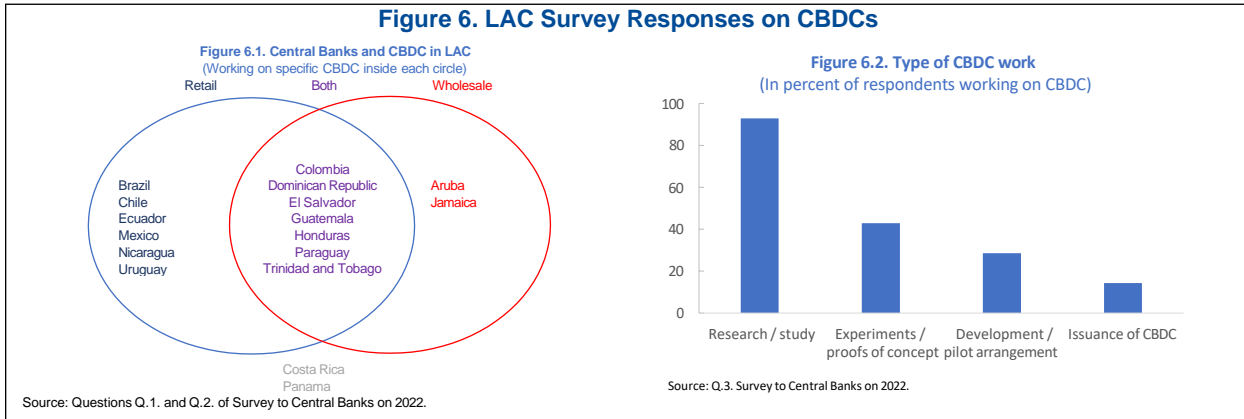
If these crypto assets start to replace domestic currencies as means of payment, store of value and unit of account more broadly, this would constitute a new form of currency substitution. They would affect monetary policy implementation and create financial stability and fiscal risks (by facilitating tax evasion) and can make capital flows more volatile (IMF 2021). While the use of crypto assets appears to remain small relative to the money circulation at the current juncture, more extensive adoption of stablecoins can pose significant challenges.

CBDC

Regional Survey

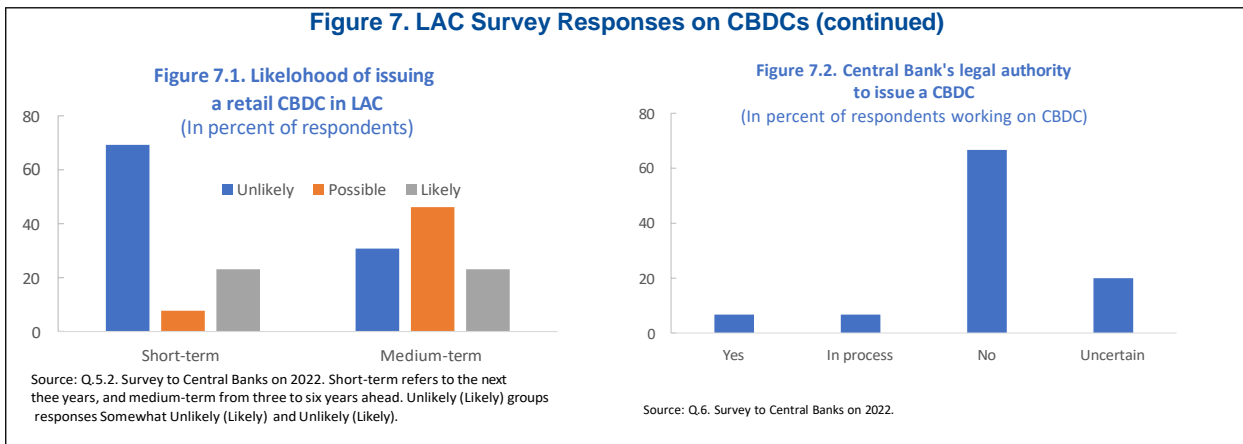
Most central banks in LAC are analyzing CBDC but their work is mostly at early stages. Based on the results of a survey to central banks in the region undertaken by the Fund in the second quarter of 2022, only two (Costa Rica and Panama) out of seventeen respondents claimed not to be working on a CBDC.¹⁸ Half of the respondents was considering both a retail and a wholesale CBDC, forty percent are focusing only on a retail CBDC, while only two were looking only at a wholesale CBDC (see Figure 6.1). Most of the respondents have been researching the topic, about slightly less than half of them are working towards experiments or proofs of concepts for a CBDC, a fifth is working on setting up a CBDC pilot, and two reported to have plans towards issuing it (Jamaica and Mexico) (see Figure 6.2).

¹⁸ The respondents included the central banks from Aruba, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Trinidad and Tobago, and Uruguay. The survey had three parts: Part A on CBDC, Part B on the general use of stablecoins and unbacked crypto-assets, Part C on the use of non-public digital money for remittances and international payments for another Departmental project.



Consequently, most central banks do not have concrete plans to issue a CBDC though the likelihood of issuance

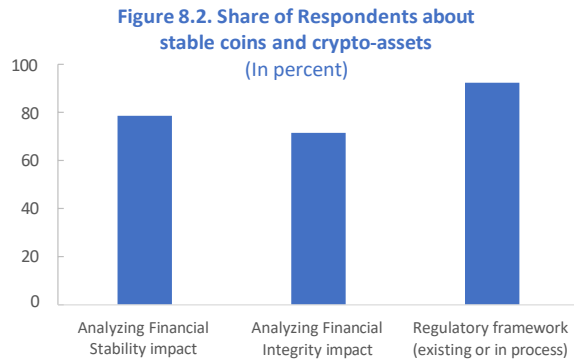
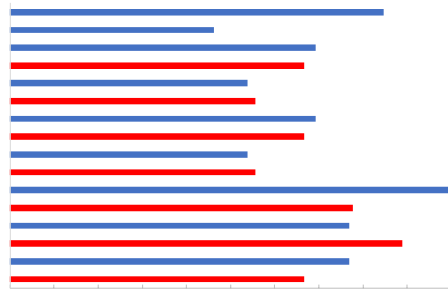
increases over the medium-term (see Figure 7.1). In fact, only Jamaica is reportedly very likely to issue a wholesale CBDC in the next few years, while Brazil and Mexico foresee issuing a CBDC over the medium-term. Furthermore, most of the central banks do not have the legal authority to issue a CBDC or report to be uncertain about the prospect. Within the survey respondents, only Paraguay claimed to have the legal authority to issue a CBDC while Jamaica was reportedly in the process of changing the law as needed (see Figure 7.2).¹⁹



Most respondents to the survey in LAC see CBDC as a tool for improving their payments systems and facilitate access to it. Consistent with the discussion in this paper, at least half of the central banks working on CBDC have considered important each of the motivations that our survey asked about for both wholesale and retail CBDC. The efficiency of the domestic payment system and access to it are the most important motivations for the issuance of both retail and wholesale CBDC. Financial inclusion and monetary sovereignty are additional key factors for the specific case of retail CBDC issuance because the retail CBDC should facilitate the inclusion of unbanked individuals and prevent currency substitution practices with stable coins or crypto assets. The acceleration of digitization during the pandemic and the contribution of CBDC to the resilience of the payment system are the motivations that follow for central banks that plan to issue retail or wholesale CBDC (see Figure 8.1).

¹⁹ In June 2022, shortly after the survey, the Jamaican Parliament passed amendments to the Bank of Jamaica Act and subsequently Bank of Jamaica (Amendment) Act 2022 (Act 5 of 2022) was duly assented by the Governor General to accommodate the Bank of Jamaica as the sole issuer of CBDC and recognize its CDDBC as legal tender (please also see the Jamaica case study in this section).

Figure 8. LAC Survey Responses on CBDCs (concluded)



Source: Q.10.1., Q.10.2. and Q.11. Survey to Central Banks on 2022.

Most LAC countries consider the use of crypto assets as a marginal phenomenon but are concerned with their impact on financial stability and integrity. Most of the respondents see the use of crypto assets as trivial or only used by niche groups (except for El Salvador, Panama and Colombia).²⁰ This pattern holds for both domestic and cross-border payments, although the lack of knowledge about the usage of crypto assets for cross-border payments is much more frequent. Furthermore, most central banks do not have information about the evolution in their usage. The few respondents that answered about this issue claimed that the usage of crypto assets was increasing for both domestic and cross-border payments. In light of these trends, about three quarters of the respondents are analyzing the financial stability and integrity impacts of these digital assets and most of them have (e.g., El Salvador, Nicaragua and Mexico) or are in the process of establishing a regulatory framework for them (Figure 8.2).

Regional Experience with CBDCs

The LAC region has been in the forefront of CBDC adoption, with formal introduction in Bahamas, the ECCU, and Jamaica, in addition to a pilot project in Uruguay. The text below provides a summary of their experiences.

Bahamas

The Bahamas’ Central Bank Digital Currency (CBDC), the “Sand Dollar”, was officially launched on October 20, 2020, and was the first state-backed digital currency in the world. The main objectives were to boost financial inclusion for communities in remote islands and to strengthen the resilience of the payments system to natural disasters and pandemics. An important additional consideration for launching the Sand Dollar has been the high cost for government agencies to make cash-based payments to citizens who lack bank accounts. There are plans to integrate government agencies in the Sand Dollar network to support digital government payments to individuals to lower this cost. Issuance to date of Sand Dollars has been limited and use of the platform by licensed financial institutions appears muted. As of end-January 2022, CBDC in circulation was less than 0.1 percent of currency in circulation and of broad money.

The nationwide rollout that started in 2020 involved two phases. In the first phase, private-sector players such as banks and credit unions will ready their systems with Know-Your-Customer (KYC) and other compliance checks across low-value, personal and enterprise wallets. The Central Bank of Bahamas (CBOB) has an in-house know your customers (KYC) or e-KYC solution, which all the institutions can use and hence do not need to incur extra costs. This is used to establish which of three wallet levels a user can

have. A basic wallet only requires an email address or

²⁰ The three countries perceive the use of unbacked crypto assets to be more widespread than that of stablecoins, and more frequent in the case of cross-border payments. El Salvador made Bitcoin legal tender in 2021, and Colombia based its answer on the proliferation of crypto assets' exchanges and service providers.

phone number but no photo ID. However, it is restricted to a \$500 balance and \$1500 in monthly transactions. The second level requires a government photo ID, and the limits are \$5,000 for balances and \$10,000 transactions. The third level requires businesses to provide their license and tax filings, with a holding limit of \$8,000 to \$1,000,000 with unlimited transactions. The Sand Dollar is linked to the existing financial system through a dynamic link, where excess balances in wallets are deposited in a user's accounts at financial institutions. The Sand Dollar's second phase focuses on preparing essential infrastructure services in the government and private sectors, such as utility companies Phase 2 has been delayed by the new government and it is unclear when this phase will start.

Despite its limited use to date, the Sand Dollar is still assessed to pose risks to financial intermediation, integrity, and cybersecurity. The CBDC could substitute for deposits in commercial banks, with implications for bank funding, profitability, and financial intermediation. Moreover, a digital currency involves costly investments in new technologies, infrastructure, and external expertise. It can also expose a central bank to new risks and introduce new challenges for ensuring financial integrity, while cyberattacks or technological glitches can impact the central bank's reputation. Its architecture has some features to mitigate risks:

Financial stability. To limit disintermediation risks and substitutability with bank deposits, Sand Dollar holdings do not earn interest, and a ceiling is in place limiting the amount users are able to hold in their wallets. Moreover, level 2 and 3 wallets are linked to accounts at financial institutions. To mitigate potential runs in case of stress, a circuit breaker has been embedded in the system to prevent massive flows. However, depending on the deposit structure of banks, some banks could still be vulnerable to financial disintermediation and bank runs, and deposits could quickly move from a financial institution to the CBDC.

Financial integrity. The Central Bank Law and other legislation were amended to reflect the new digital legal tender. The central bank also plans to promote an e-KYC register to maintain identification of individuals who do not maintain such information with banks or other financial intermediaries. Sand Dollar-integrated wallets are enabled with multi-factor authentication features. All mobile devices are required to support a passcode or a biometrics-based sign-in to access the app and complete transactions. The wallets cannot be used outside the country or for FX operations on their own, which reduces their susceptibility to illicit international flows.

Cybersecurity. The central bank has a unit tasked to monitor cyber risk and is upgrading its IT systems and monitoring systems. All Sand Dollar authorized financial institutions (AFIs) are required to complete robust and intensive cybersecurity assessments by an independent international firm before receiving approval to integrate the Sand Dollar platform with their custom applications.

The central bank is working to ensure the offline usability of the Sand Dollar, so that citizens can still transact even when there is no electricity or cell phone network: the authorities consider off-line functionality vitally important.

However, the authorities have encountered unanticipated difficulties in achieving it. During the pilot projects on two key islands in December 2019 and February 2020 it was revealed that the planned solution of local off-line networks – built on introducing local redundancies to the main telecommunication system – did not fully achieve the policy goal. The telecommunication masts required in the solution are vulnerable to the same weather conditions as the main telecommunication system. Also, the geographical reach of the local networks is limited, which makes it difficult to make payments between islands. During the second phase of the Sand Dollar project the CBOB is seeking alternative solutions together with its main contractor.

The Bahamas has stated that the use of the Sand Dollar is exclusively for domestic purposes and that cross-border payments must take place through commercial banks in traditional non-CBDC Bahamian dollars. Foreigners can own and pay with Sand Dollars when visiting The Bahamas by registering for an account with low holding size and monthly transactions' limits but cannot transfer or pay with them abroad. However, Mastercard and Island Pay launched Sand Dollar prepaid cards in February 2021 that allow for instant conversion of digital currency to traditional Bahamian

dollars, and to pay for goods and services Mastercard is accepted on the islands and also around the world. During the second phase of the project, the CBOB is planning to further explore cross-border uses.

ECCU

The Eastern Caribbean Currency Union (ECCU)'s Central Bank Digital Currency (CBDC), DCash (DXCD), is the first digital currency introduced by a currency union. As a digital form of the EC dollar, DCash is a legal tender of the Eastern Caribbean Central Bank (ECCB) and is developed to serve as a key instrument for facilitating the digital transformation of the ECCU.²¹ The idea was initiated by Bitt, a private company, around 2017, which the ECCB incorporated in its 2017-21 transformation agenda. Following the development and testing phase in March 2019- February 2020 and after a delay due to the pandemic, DCash was introduced on a pilot basis in March 2021, initially in four (out of 8) ECCU countries (Antigua and Barbuda, Grenada, St. Kitts and Nevis, and St. Lucia). The DCash pilot project was extended to St. Vincent and the Grenadines in August 2021, to Dominica and Montserrat in December 2021, and to Anguilla in June 2022. The ECCB plans to continue the pilot program until June 2023 to allow all member countries at least one year experience with DCash before drawing lessons from the pilot.

DCash has been launched with a view to improving payment efficiency, financial inclusion, and competitiveness and resilience. The initiative was prompted by the high cost of payments-related banking services and slow adoption of new technologies by the private sector. Cash is expensive to issue and handle in the ECCU, including transportation, storage, and security for both the central bank and the private sector, with many islands that are widely dispersed.

Mobile payment is under-developed in the ECCU, despite a high penetration of smartphones. Credit cards and debit cards charge high transaction fees (currently around 3.5 percent). Small firms in the informal sector bear the cost of inefficient payment disproportionately, and many households in these island economies are still under-banked (as the number of credit and debit cards per person is much lower than in other regions with similar development level).

Financial friction implied by high payment costs hinder economic growth and make the system more vulnerable to shocks. DCash, which charges no fees for transactions in the pilot stage, can lower the cost of payments and decrease the use of paper cash as well as of cheques, which account for around 80 percent of all transactions. The ECCB has a goal of cutting it by half, to reduce the costs of cash usage.

The DCash has several distinct design features. It is based on private blockchain technology, with all system services, except the minting system, stored at Google Cloud. The ECCB has the sole authority to issue and redeem the digital currency and will be able to fully control its supply. It has a "two-tier system" to fully utilize the comparative advantage of (i) the private sector to interact with customers and carry out the relevant AML/CFT requirements, including the necessary customer due diligence measures; and (ii) the central bank to provide trust and manage the DXCD scheme in line with its payment system policies. The ECCB can observe each transaction data (but anonymously) and the outstanding stock of the DXCD in each digital wallet. The ECCB does not see detailed information about the DXCD transactions (e.g., the identity/name of payers and payees and the purpose of transaction). Financial institutions can fully observe the transaction purpose (e.g., the goods or services payers bought from payees), if either payers or payees are their own customers. They are responsible for maintaining their own clients' database.

To minimize financial stability risks, the digital currency is designed as a small value retail instrument, with no interest accrued and no use for foreign exchange transactions. The size of its holding and transaction values per wallet is limited and digital wallets bear no interests, to avoid competition with savings accounts of financial institutions. The transfer between digital wallets is only allowed to take place within the ECCU, with no use for foreign exchange transactions. Financial institutions are allowed to

control the amounts of digital currency depositors can exchange for deposit accounts, which would help their liquidity management.

²¹ Most member countries in the ECCU have already introduced the legal framework to recognize the DCash as a legal tender and the ECCB as its issuer, by passing an amendment to the Eastern Caribbean Central Bank Agreement Act (1983).

To mitigate cybersecurity risks, the pilot is limited in the scope of system integration. Most importantly, the DCash system is not planned to be linked to the ECCB's core payment systems (such as the RTGS), banks' operating systems, and the Automated Clearing House. This is intentional and a prudent approach given (not fully known) risks entailed in the digital currency system. This, however, means that after the pilot, another round of testing will be needed to assess vulnerabilities and risks after connecting the DCash system to other payment and operating systems at the ECCB and financial institutions.

While about three-quarters of financial institutions have participated so far in the pilot, the adoption of DCash so far has been slow, albeit uneven across countries. According to the ECCB, 22 financial institutions, 11 agencies, 292 merchants, and 4,039 end-users in ECCU countries have participated in the pilot program as of end-April 2022.

Meanwhile, despite rolling out the DCash pilot only in August 2021, St. Vincent and the Grenadines has become the front-runner in the uptake of DCash, with the participation of 5 financial institutions, two agencies, and about one thousand customers so far, owing to the on-boarding of the largest bank which has readily available resources for launching DCash in the context of its own digitalization efforts. The overall protracted uptake is largely due to the lack of marketing and public awareness as well as resource constraints faced by financial institutions and merchants in the context of increased burden posed by the pandemic and acquisitions and mergers following the exit of several foreign banks from some ECCU countries. In addition, DCash is still relatively unknown to the public, which underscores the need for public education campaigns to raise awareness and informing the various stakeholders about the potential benefits of a CBDC. However, the ECCB expects DCash diffusion to accelerate as it shifts the focus from onboarding countries to marketing and public education campaigns and more merchants and large banks participate in the pilot. The ECCB plans to draw lessons from the pilot once concluded. Nevertheless, no decision has been taken yet on if to continue with the issuance at the end of the pilot program.

In addition, the uptake was interrupted by a two-month outage in early 2022. This was further exacerbated by a lack of timely communication on the extent and cause of service disruption and timelines for recovery. DCash went offline between mid-January to mid-March 2022 on account of a problem with the system's operational management processes of renewing/rotating digital certificates. This IT operational function falls under the responsibilities of the technology vendor. According to the ECCB, the outage has disrupted only new transactions and on-boarding of new users, leaving the Distributed Ledger Technology (DLT) and existing data/transactions intact. All balances under the pilot program are guaranteed by the ECCB.

The Pilot project provides opportunities to examine risks and assess policy gaps. Ample excess liquidity in the system and the design of DCash as a non-interest retail instrument with holding limits help mitigate possible financial disintermediation risk. However, the effects of the DXCD on the choice of payment instruments and financial institutions' funding are uncertain, especially under stress, and this calls for the ECCB and national supervisors to closely analyze liquidity and funding conditions of financial institutions, including through liquidity stress testing.

Additionally, the ECCB could be exposed to operational and financial risks from malfunctioning of the digital applications, platforms, or infrastructure, due to cyberattacks. The identification of cybersecurity threats and the exploration of risk mitigation measures are important pre-requisites to the DXCD. The data and privacy governance frameworks need to be established to ensure that sensitive financial or personal data is protected.

The DCash experience so far provides some useful lessons for other countries who are considering

CBDCs. CBDCs have the potential to increase economic efficiency and foster financial inclusion, but sufficient efforts and resources are needed to raise public awareness and facilitate communication with end-users to boost confidence and uptake. Implementing safeguard measures will help contain various risks to which CBDCs could expose central banks and the financial system, including those related to financial intermediation, financial integrity, and cybersecurity. The DCash outage experience underscores the need to enhance central banks' operational resilience and business continuity plans, including through incident response planning and ensuring adequacy of skilled resources. It also stresses the

importance of clear division of operational, oversight, and risk management responsibilities between central banks and technology providers/operators, and establishing appropriate project management governance arrangements. This is important as failures in CBDC implementation can undermine the credibility of central banks. Moreover, greater efforts in exploring business cases and incentives for the private sector would help promote adoption.

Jamaica

The Jamaican government announced the introduction of a CBDC in March 2021, appointing a technology provider (eCurrency Mint) immediately thereafter and implementing a limited and successful pilot program throughout 2021 that involved four merchants and the National Commercial Bank as a wallet provider. The Bank of Jamaica (BoJ) announced in December 2021 that it will roll out its CBDC across the country in 2022. Its roll-out will include two extra wallet providers and the testing of transactions between customers of various participating wallet providers to verify interoperability. As an important step towards the formal launch of the currency, the Jamaican Parliament passed in June 2022 amendments to the Bank of Jamaica Act and subsequently BoJ (Amendment) Act 2022 (Act 5 of 2022) was duly assented by the Governor General to accommodate the Bank of Jamaica as the sole issuer of CBDC and recognize its CBDC as legal tender. The CBDC is aimed for domestic use and the BoJ projects to replace some 5 percent of Jamaican dollars' currency in circulation with the new digital currency each year.

The main objective behind the launch of a CBDC has been financial inclusion through a digital currency with no user fees or transaction costs. In addition to financial inclusion, the Bank of Jamaica (BOJ) expects the CBDC to (i) provide additional means of efficient and secure non-cash payment; (ii) increase efficiencies for banks as it relates to the costs for handling and distributing cash; (iii) reduce costs in the currency management process of the BOJ; (iv) provide a socially optimal mix of retail payment instruments; and (v) facilitate interoperability between existing electronic retail payment systems.

In terms of technical design, it is worth noting that the Jamaican CBDC does not use distributed ledger technology but instead an existing centralized payment system (the central bank's Real Time Gross Settlement System (RTGS), JamClear) to avoid having to intervene manually to move from eCurrency's system into the settlement system. CBDC will be issued to banks and to the payment services providers who will distribute it to their customers, clients, merchants and consumers through either an E-money wallet, card networks, or other digital options. To get the CBDC wallet the customers will need to contact a wallet provider of their choice and, if they do not have a bank account use the tax registration number and a government-issued photo ID. The analysis of the customers signing-up for the CBDC will allow the BOJ to assess its contribution to expanding financial inclusion.

The authorities recognize that the CBDC has to provide right balance between the AML/CFT regulations and the privacy considerations. To protect privacy, the CBDC solution support the protection of personal identity through built- in solutions such as encryption techniques, digital signatures, and multi-factor authentication mechanisms. To combat AML/CFT, the CBDC will allow for tracking of all payments by financial institutions and by the relevant authorities under the Proceeds of Crime Act (POCA) when required. Wallet Providers are either regulated or authorized by the BoJ and, therefore, the BoJ is the Competent Authority under POCA for these entities and moreover the authorities believe that the Wallet Providers already have in place effective risk-based AML/CFT frameworks.

To enhance governance, and limit potential reputational risks, an internal BOJ oversight committee was established to provide oversight over the CBDC project's progress and manage any financial, and nonfinancial risks impacting the BOJ. The committee includes the supervisory, audit, IT, and financial

functions of the central bank. In addition, in July 2021 the IMF provided technical assistance to the BoJ on central bank risk management, fintech and security which included risk considerations related to the CBDC and its operation.

Uruguay

Uruguay completed a pilot with e-Peso from November 2017 to April 2018. The Central bank used a simple technology: token-based and relying on a state-owned cellphone company. The e-Peso was linked to a phone number without DLT, the end-users did not require internet connection (just a mobile phone line), and the settlement was instantaneous. There were no costs to either the Central Bank of Uruguay or to the end-users. The e-Peso could be used for payments in registered stores and for peer-to-peer transfers between registered users. Transactions were anonymous but traceable with the users' wallets. The users' wallets were encrypted at the Global E-note Manager (GEM) and the e-Pesos were secured at GEM even if users lost their phones or the password of a digital wallet. The unique and traceable digital bills prevented double-spending and falsification.

The total issuance of e-Pesos was limited to 20 million pesos (about US\$670,000) and the wallet size to 30,000 pesos for individuals (about US\$1,000) and 200,000 pesos for registered businesses. Limits on e-wallets' size made the e-Peso similar to cash and reduced its competition to other means of payments or bank deposits. Transfers between peers with e-Pesos were widespread throughout the pilot period. The number of operations rose with the learning process of users. The pilot was limited to 6 months and the e-Peso bills were subsequently destroyed.

The pilot was followed by an evaluation process and drew some lessons towards a potential future introduction of a CBDC including the importance of the central bank's reputation and security features, the merits and feasibility of simple technological solutions, and the potential complementarity of CBDCs with other means of payment (see Sarmiento, 2022). The new central bank authorities delayed the move to a second stage of a CBDC project to focus on the rollout of the fast payments system.

Several other countries in the region are conducting studies into CBDCs,²² at different stages of development including with technical assistance from the Fund. In what follows, short summaries are presented of the status of that work by October 2022.

Argentina

In February 2021, the Central Bank (Banco Central de la República Argentina, BCRA) formally proposed to President Fernandez to consider the introduction of a digital peso.²³ However, according to Alfonso et al. (2022) the BCRA is not prioritizing the issuance of a CBDC though it would continue researching it. To improve the speed of and access to payments, the BCRA relies on the initiative Transferencias 3.0.

Brazil

The Central Bank of Brazil (BCB) decided to explore the possibility of introducing the Digital Real, a CBDC, by creating an internal working group in August 2020 that included all areas of the BCB. This project is the next step of a comprehensive set of reforms that started more than a decade ago aiming at leveling the field for fostering new business models and other innovations in the financial services industry based on technological advances, enhancing the efficiency of the retail payment system, and eventually increasing the efficiency in cross-border transactions.²⁴

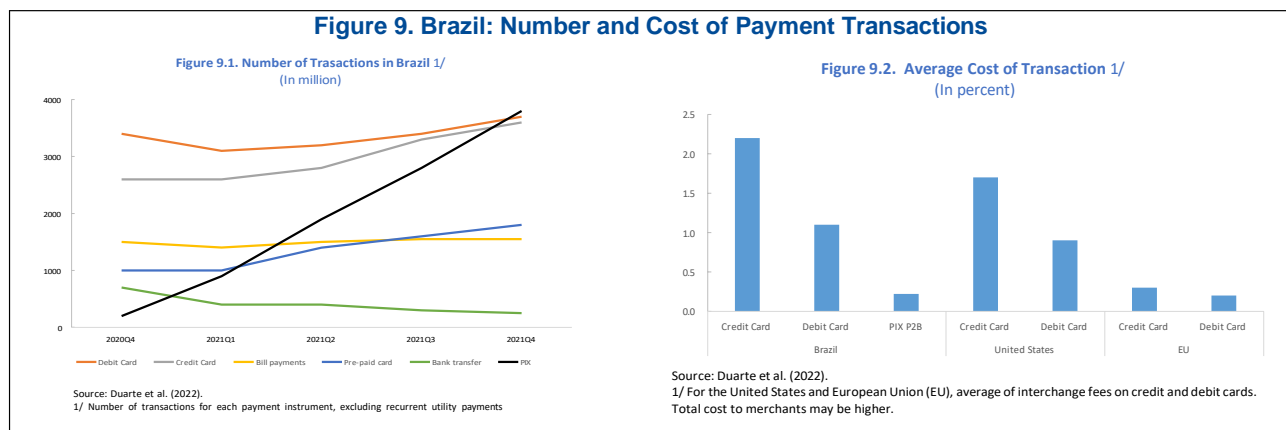
The introduction of Pix, an instant payment platform, in November 2020 was a key milestone in the evolution of Brazil's payments system. This platform enables the instant execution of electronic payments and transfers and is the

²² See also [Central Bank Digital Currency Tracker - Atlantic Council](#)

²³ Argentina Is Starting to Think About a Digital Peso – Decrypt. See <https://decrypt.co/57351/argentina-digital-peso>

²⁴ IMF WP/21/114 discusses the evolution of these policies and their impact on the fintech landscape in a case study about Brazil up to the beginning of the pandemic. It also depicts the substantial developments of fintech in Brazil over the recent decade.

result of extensive consultation between the BCB and participants in the payment system since the creation of the *Working Group on Instant Payments* in 2013. The BCB (i) issues the regulation that governs Pix and supervise its compliance, and (ii) manages the platform’s technological infrastructure. This centralization allowed the BCB to provide a public, safe, and low-cost infrastructure that is highly integrated with market players in the Brazilian payment system that intermediate between final users and the Pix’s instant payment system.²⁵ By the end of 2021, transactions in Pix surpassed both credit and debit card transactions thanks to a network that includes close to 800 private PSPs, including traditional banks and fintech companies (Figure 9.1). The Pix also served almost two thirds of the adult population and close to 60 percent of the firms interacting with the national financial system. Furthermore, the cost to merchants of accepting retail payments is much lower than credit and debit card payments (Figure 9.2). Interestingly, this innovation has been widely accepted by all financial institutions since the total number of transactions has increased for all parties thanks to increased financial inclusion in Brazil.



The Digital Real could aim at creating an additional layer to the digital payment system building on innovative technologies and policies under the BCB’s regulatory umbrella. The BCB is considering features of programmable money for the development of smart contracts using the Digital Real to help expand the range of digital payment services and stimulate the development of digital innovations. Additional policies, like the introduction of the Open Banking initiative since the beginning of 2021, could also contribute to fostering competition in the provision of these innovative financial services. Open Banking allows customers to share their financial data with other institutions under the BCB supervision to allow them to compete and offer alternative financial services.

As part of the proof of concept of its CBDC, the BCB has launched a new edition of the Lift Challenge focused on the Digital Brazilian Real. To identify concrete projects in such a dynamic context, the last edition of the Lab for Financial and Technological Innovations’ (*Lift* as in its Portuguese acronym) Challenge called for projects related to CBDC. The BCB selected 9 projects from different institutions that include traditional banks, credit card, fintech, and technological companies, DeFi lending platforms and crypto assets’ exchanges. The pilot implementation of these projects is expected in 2023 and enlighten further discussion on the future of the Digital Real.

The BCB would eventually decide the characteristics of its CBDC in 2024, after testing its own pilots in 2023. The Digital Real would be issued by the BCB and under the custody and distribution of the Brazilian Payments System. Although it is too early in the process to envisage the characteristics of the Digital Real, the BCB has suggested that it would most likely be online given the technical difficulties of an off-line CBDC, although an offline option has not been discarded. It would not bear interest to limit potential financial disintermediation risks. Its introduction would need a change to the Central Bank Law, but it

would not affect existing data privacy and security provisions that are embedded in Bank Secrecy and Brazilian General Data Protection Act. A CBDC would need to comply with court

²⁵ Initially, the mandatory participation of the key market players created critical mass, and new institutions joined Pix afterwards.

orders to track illicit transactions, a task that a CBDC is likely to facilitate efficiently. The systems already in place, including for Pix, may support domestic interoperability. The BCB is keen on engaging with other jurisdictions to ensure interoperability across borders and to reduce the costs of cross-border payments.

Chile

The Central Bank of Chile (BCCCh) has published a white paper and has called for a public survey to evaluate the risk and benefits from the potential issuance of a retail CBDC. The BCCCh established a working group to assess the existing retail payment system and evaluate the issuance of a CBDC in 2021. It published a first white paper with a preliminary assessment of benefits and risks of issuing of a retail CBDC.²⁶ The paper found that the Chilean retail payment system was adequate for the needs of the Chilean economy and highlighted the principles that a CBDC should follow. It concluded that, although a retail CBDC could address several of the challenges from the rapidly changing payments ecosystem, the decision to issue a CBDC should be based on a thorough cost-benefit analysis. To better inform this analysis, in July 2022 the BCCCh called for a survey to the citizens and corporates about the risks and benefits from the potential issuance of a retail CBDC. The respondents had until October 2022 to answer the survey. The BCCCh is currently working on a second stage of digital currency exploration, holding seminars, talks and roundtables to get feedback from the private sector, especially on financial stability issues. A second report is expected to be published in the first half of 2023.

Colombia

The Banco de la República (BanRep) began research into retail CBDCs in 2017 in the context of the need to further develop its instant payment system. Although the use of e-payments has grown since the pandemic, it is still lagging behind that of peer countries. In its study, BanRep focused on the impact of a CBDC on financial intermediation and credit supply, financial inclusion and stability, monetary policy transmission, as well as on the impact of foreign CBDCs. BanRep will continue further cost-benefit analysis of CBDCs.²⁷

Peru

The Peruvian authorities conducted an initial assessment of the possibility of introducing a CBDC with technical assistance support from the Fund following the principles suggested in section I.B above. [add reference]. This meant probing the underlying assumptions to the problems facing the Peru payment system and identify potential solutions (which may or may not include the introduction of a CBDC).

Despite recent efforts, financial inclusion and the adoption of digital retail payment services in Peru are low. Building on its 2015 financial inclusion strategy, Peru developed a National Financial Inclusion Policy (PNIF) in 2019 to promote financial access to all segments of society. Despite the associated efforts, still 48 percent of the Peruvian population was unbanked as of mid-2021. The lack of financial inclusion is more acute among rural residents due to generally lower incomes and wealth and geographical factors like low population density in rural areas that make banking services less accessible and more expensive. Promotion of an effective digital payment system has not been a solution as major e-wallet providers do not interoperate among themselves or with unaffiliated bank deposit accounts because the largest banks operate in their own closed-loop systems. BIM, a national platform to ensure interoperability of e-money payments, fails to support connectivity with unaffiliated e-money issuers or bank deposit accounts.

²⁶ “Emisión de una Moneda Digital de Banco Central de Chile. Primer Informe: Evaluación Preliminar.”
Banco Central de Chile, May 2022.

²⁷ [Some thoughts about the issuance of a retail CBDC in Colombia \(bis.org\)](https://www.bis.org/cbdc/retail/colombia.htm)

Initial analysis point towards several barriers against financial inclusion and digital payment adoption in Peru. They include (i) limited digital and financial literacy, (ii) insufficient telecommunications infrastructure, (iii) a “culture of cash” and high informal labor participation, (iv) low wages and wealth levels, (v) elevated fees and fragmentation (lack of interoperability of solutions) in the banking sector, (vi) distrust of financial services and preferences for privacy, and (vii) limited access points including digital infrastructure especially in more remote locations. Surveys conducted by the IMF highlighted some motivational, capacity, and behavioral factors that would reinforce the preference for cash, including concerns on high costs, the preference for informality, low ubiquity of current solutions, and related low perceived benefits of digital solutions.

The IMF mission identified as viable solutions to enhance digital payments either to reinforce existing payment instruments and systems or to introduce a CBDC. The first option would entail an intervention by the central bank of Peru to mobilize stakeholders to interoperate existing stores of value (e.g., accounts, digital money, and e-money) and connect and enhance a select set of existing payment systems to be fully interoperable and accessible to all (e.g., faster payments and/or debit cards). The issuance of a CBDC (in tokenized form in Peru) would require a sound legal basis to ensure a high level of legal certainty, legal tender status, regulation, and oversight of relevant actors, and more generally the mandate of the BCRP to carry out necessary functions and pursue interoperability. All this would need to be accompanied by capacity building across the jurisdictions to ensure that regulatory, supervisory, and law enforcement authorities are equipped to adapt to the introduction of a CBDC. In any case, a robust evaluation of technical, operational, regulatory, financial, and economic risks of CBDC or alternative solutions will need to be conducted before making a decision in one way or another.

In that context, three critical enablers and four specific factors were identified as foundational elements for the successful introduction of any solution. The critical enablers include: (i) creating a clear and compelling vision to enhance payment services to the financially excluded; (ii) the inclusion, involvement, and support from stakeholders (both public and private sector); and (iii) a facilitating mechanism to enable cooperation between competitors (such as a payment system management body). The four factors to catalyze the adoption and usage of solutions include (i) efficient “on and off ramps” between cash and the digital payments ecosystem; (ii) provision and promotion of digital payment solutions by government and businesses (including awareness campaigns and appropriate pricing); (iii) the widespread availability of payment acceptance infrastructure; and (iv) solutions that support multiple types of payments.

Finally, it is worth mentioning the introduction of a digital wallet by Ecuador in 2014 as an initiative that could appear as a failed CBDC. It involved the issuance of digital currency by a central bank that was not the issuer/“owner” of the currency in a fully dollarized economy that has the U.S. Dollar as the sole legal tender. The digital currency was offered directly by the Central Bank of Ecuador with the stated objective of promoting financial inclusion and backed in principle by U.S. dollar assets in its balance sheet. The central bank kept all the users’ personal data and transaction records at its platform. This initiative did not attract much demand and it was abandoned in 2018 in the context of distrust about the true reasons for its creation and potential risks of de-dollarization and monetary instability. In fact, a sharp fall in international oil prices during the 2014-2018 period led to large fiscal deficits that were partly financed by the central bank’s international reserves. The lack of credibility would explain why Ecuador’s digital wallet initiative was not successful (including as an engine of financial inclusion) in contrast to the experience of other emerging and developing economies around the world.

Lessons and Policy Recommendations

The onset of crypto assets and CBDCs is transforming money and payments. The description and analysis in this paper of the experiences in LAC stress the opportunities and risks brought about by them and their

underlying technologies for a diverse region facing challenges ranging from relatively low financial inclusion and fragmented

payment systems to volatile macroeconomic conditions and capital flows. As shown by the recent sharp fall in their values, crypto assets imply more risks than benefits (particularly given the lack of intrinsic value of unbacked crypto assets) but should be expected to continue to be part of the payment system's landscape. By contrast, (properly designed) CBDCs could help achieve some public policy objectives, including facilitating remittances. In that context, some policy recommendations are laid out below in terms of enhancing the policy and regulatory frameworks to respond to crypto assets' risks, using digital currencies to enhance cross-border payments, and introducing CBDCs.

Enhancing the Policies and Regulations in Response to Crypto Assets

As stated in IMF, 2022c, policy and regulatory responses to manage the risks associated to crypto assets (and harness their potential benefits) can be framed around three dimensions:

Macro-financial considerations

Domestic regulatory, supervisory, and oversight responsibilities and effective implementation of existing standards (e.g., the FATF standard on AML/CFT)

Global coordination given the extra-territoriality of crypto assets.

Regarding the first dimension, in LAC is particularly critical as a first line of defense to have in place strong monetary and fiscal policies/frameworks and not to declare privately issued crypto assets as legal tender due to potentially negative fiscal and financial implications (IMF, 2022c). To protect against increased volatility of capital flows linked to crypto assets, in addition to greater exchange rate flexibility, the authorities could counter the erosion of CFMs by clarifying the legal status of crypto assets.

The second dimension would involve the establishment of crypto assets' legal certainty through updated classification and treatment of crypto assets in private and financial laws as well as the development and enforcement of prudential requirements to all actors on top of FATF standards on AML/CFT (IMF, 2022c). While regulation should be tailored to jurisdiction-specific features, some key regulatory requirements should be set across the crypto asset ecosystem (IMF 2002a and 2022b), including on crypto assets' issuers (e.g., publication of clear, accurate, and understandable explanations of the crypto asset issued), stablecoins' issuers (e.g., strict rules on reserve assets management as well as capital and liquidity buffers to absorb credit, liquidity, market, and legal risks relevant to the stabilization mechanism), service providers (e.g., licensing process), regulated financial institutions (e.g., clear limits on their exposure to and engagement with the crypto asset ecosystem), wallet providers (e.g., segregation of investors' holdings, robust cybersecurity requirements, timely recordkeeping of holdings), and exchanges (e.g., robust governance and prudential requirements, transparency standards).

Regarding the third proposed dimension, the cross-border nature of crypto assets requires comprehensive, consistent, and coordinated **global** standards to achieve effective crypto assets' regulation. The global regulatory framework should be **comprehensive** and risk-based, providing a level playing field along the activity and risk spectrum while flexible enough to adapt to a changing landscape and risk outlook. It also needs to have a globally **consistent** taxonomy and implementation to facilitate common regulatory standards and approaches. International **coordination** and collaboration will also be key to prevent regulatory arbitrage and palliate to the potentially limited effectiveness of national approaches. Many international organizations are working on this (e.g., the FSB, CPMI/IOSCO, FATF and the IMF).

Still, risks to investors, market integrity, financial integrity, and financial stability emanating from crypto assets could become systemic in some LAC countries, warranting regulatory responses by national authorities even in the absence of robust global regulatory standards. This is challenging given rapid

changes, the multiplicity of entities involved, and limited data. Completely banning crypto assets (e.g., in Bolivia, and Argentina and the Dominican Republic for regulated financial institutions) will not likely be effective in the long-run. If the authorities face severe and immediate risks, temporary measures to slow down the adoption of crypto assets could be considered to protect customers and

financial stability. The focus should rather be in addressing the main drivers of the demand for crypto assets including weak macroeconomic conditions or unmet digital payment needs, plus explicitly promoting the transparent recording of crypto assets transactions in the official national statistics.

Digital Currencies and Cross-Border Payments

Using digital money and associated technologies (i.e., blockchain and DLT) to enhance cross-border payments – that is faster, cheaper, more transparent, and more inclusive cross-border payment services - would deliver widespread benefits for residents and economies in the LAC region and support economic growth, international trade, regional / global development, and financial inclusion. This, however, would require strong collaboration and cooperation among the countries in the region. In this context, it may be useful to establish a Task Force or Committee from a small group of LAC countries heavily reliant on cross-border payments and remittances (e.g., Mexico, Peru, Colombia, Guatemala, Honduras) and the United States (and other advanced countries) to propose, and put in place, measures to address the key challenges faced by cross-border payments relating to cost, speed, access, and transparency. Drawing on the Focus Areas identified by the BIS (BIS, July 2020), the work of the Task Force or Committee could initially focus on three key areas:

- Coordinate regulatory, supervisory, and oversight frameworks. This will involve advancing consistent international rules and standards and supporting their national implementation without compromising individual jurisdictional discretion or lowering standards. This is important in LAC since, as discussed above, the region lags in many areas like mobile money regulation and Know Your Customer provisions.

- Improve existing payment infrastructures and arrangements to support the requirements of the cross-border payments market. Underlying blockchain and distributed ledger technology (DLT) systems would have to be interoperable for efficient cross-payments to take place, and this may not be the case without harmonization in design and implementation. Similarly, the presence of legacy systems and infrastructures in various countries contributes to the technological divergences at play (World Bank Group, 2021). Addressing these challenges would involve promoting technical and operational improvements to existing domestic and international payment infrastructures that cross-border payments depend on. This could include aligning processes and operating hours across systems, introducing reciprocal liquidity arrangements, and interlinking existing payment systems.

- Increase data quality and straight-through processing by enhancing data and market practices. Poor data quality and limited standardization of data exchange make cross-border payments more complex to process, in turn affecting their speed, price, and transparency. Promoting the adoption of common message formats and common protocols for data exchange would directly mitigate the frictions around fragmented and truncated data and could also improve efficiency in the processing of compliance checks.

In this context, CBDCs can play a promising role in enhancing cross-border payments in the region. Therefore, cross-border issues should also be considered in the design of CBDCs at an early stage. As the BIS (BIS, June 2022) argues, if central banks take these issues into account while studying the adoption of domestic CBDCs and commit to interoperability, consistent standards, and coordination of CBDC designs, many problems inherent in today's legacy technologies and processes could be avoided. Conversely, if CBDCs are not designed with the international dimension in mind, fragmentation of CBDC systems similar to the existing fragmentation of payments systems is possible. Hence it is highly recommended that central banks take interoperability issues into account at an early stage when designing their domestic CBDC. The Fund will soon finalize a paper where the economics of a platform for cross border payments

leveraging new technology are delineated.

Introduction of a CBDC

Having central bank money (the economy's unit of account) in a digital form, taking advantage of the central bank critical roles in credibly intermediating resources across financial institutions and providing sufficient liquidity for

settlement, can help unleash further financial inclusion and innovation with active participation of the private sector (BIS, June 2022). Risks from CBDC adoption seem manageable and there is a case for introducing it if properly justified. From the analysis above, the following principles can be highlighted towards a decision regarding the introduction (or not) of a CBDC:

- identify main goals and assess domestic demand taking into account the growing popularity of digital and mobile payments and the potential impact of (i) upgrading the payment infrastructure (e.g., 24/7 near real-time payments with low or no costs) and/or (ii) introducing “open banking” initiatives to make financial institutions’ data on their customers available to other financial services providers;
- determine main stakeholders and evaluate the availability of the necessary market infrastructure and capacity of the central bank and other market participants to support the CBDC;
- review domestic legislation and identify whether legal amendments are required for the adoption of CBDC, in particular to ensure the CBDC is considered currency;
- develop an oversight framework to ensure safety, efficiency, and resilience of the CBDC;
- prepare a detailed implementation plan building on a feasibility study that should be made public and that should describe the domestic payment system and the potential advantages of a CBDC over other options available to the Central Bank and its design options and strategies to manage potential risks.

To leverage resources and countries’ experiences on crypto assets and CBDCs, LAC authorities should consider setting up regional working groups that would help coordinate crypto assets’ regulation, solutions for cross-border payments, and to peer-learn on lessons from their explorations on domestic payments (CBDCs, fast payment systems). The Fund could contribute as a catalyzer for these regional initiatives, in addition to providing support in the implementation of policy recommendations through capacity development activities.

Annex I. Regulation of Crypto Assets in LAC

Crypto Acceptance in LAC Bahamas

The Bahamas' [Digital Asset Registered Exchanges Act](#) (the DARE Act) came into force on December 14, 2020. This legislation establishes a comprehensive regulatory framework for digital asset operations in The Bahamas, regulating and supervising virtual asset service providers. Under the DARE Act, the Securities Commission of The Bahamas is overseeing the regulation, monitoring and supervising of the issuance of digital assets and those persons conducting digital asset businesses, the development of rules, guidance and codes of practice with regard to the conduct of digital asset businesses and ITOs; the approval and regulation of digital asset businesses; the regulation of initial and subsequent token offers; and enforcing the provisions and any violations of DARE.

Brazil

In December 2022, a law (Lei 14.478/21/12/2022), that provides for guidelines to be observed in the provision of virtual asset services and in the regulation of virtual asset service providers in the country, was passed by Congress and signed into law by the President. The law establishes definitions for exchanges and virtual currencies. It also requires a central body to oversee all crypto assets-based operations to be appointed by the government's executive branch. The law clarifies that it does not affect the digital representations of the national fiat currency (the real), other international currencies, or rewards points given by some companies in advertising campaigns.

Chile

The Financial Stability Council (CEF in Spanish) issued in 2018 a warning regarding risks related to the acquisition and trading of crypto assets, which were activities outside of the regulatory and supervisory perimeter. In October 2022, the Chilean Congress approved the Fintech Law, which brings into the regulatory perimeter most Fintech activities, including service providers related to digital assets such as trading exchanges or intermediaries. The Fintech Law considers crypto assets as financial instruments that will be subject to the Financial Market Commission's (the Chilean financial regulatory agency, the CMF) regulations, while stablecoins (defined narrowly in terms similar to electronic money) will be subject to the central bank's regulations. The Fintech Law was the product of three years of work modify several legal bodies to include a complete framework of different Fintech activities (crowdfunding, open banking, roboadvisors, payment initiation services, among others). The law became on effect in February 2023 (<https://www.bcn.cl/leychile/navegar?idNorma=1187323>).

Colombia

In December 2021, the Financial Information and Analysis Unit (UIAF) issued [Resolution 314](#), which requires crypto users to report transactions and a draft law ([proyecto de Ley 632](#)) to define the general aspects of the operation and functioning of crypto assets through the Cryptoactive Exchange Platforms (PIC) was presented to Congress. As of April 1, 2022, Bitcoin transactions greater than US\$150 must be notified to the UIAF, with penalties for non-compliance. Colombia is in the process of introducing stricter crypto regulations with the goal to fight against tax evasion and other legal mechanisms to fight and control against money laundering and financing of terrorism ([As per a statement from DIAN](#) - Dirección de Impuestos y Aduanas Nacionales de Colombia).

El Salvador

On September 7, 2021, El Salvador became the first country in the world to have made Bitcoin, or any other crypto asset, a legal tender. The law was passed by the Legislative Assembly on June 9, 2021, and effected 90 days after the publication of the law in the official gazette ([Ley Bitcoin, English version here](#)). The regulation of the Bitcoin Law was published in the official gazette on August 27, 2021 ([Official Gazette No.163](#)) and entered into force on September 8, one day after the entry into force of the Bitcoin Law. The Regulation is applicable to Bitcoin Service Providers, which are defined as natural or legal person who provides for itself or for third parties, service related to bitcoin, and are used as custodians, crypto exchanges, and payment processors or wallets. A Bitcoin Service Providers register was created, which will be overseen by the Central Reserve Bank. Registration will be mandatory for Bitcoin Service Providers. Under the regulation, Bitcoin Service Providers must comply with the following standards of conduct:

- Have an anti-money laundering program in compliance with local legislation and international practices.
- Procedures to avoid loss, theft, or deterioration of clients' assets.
- Record of assets, liabilities and equity of the Service Provider and records of customer accounts and transactions, as well as the claims or complaints of the latter.
- Publish on its website the terms of the contact of the SSF to address unresolved complaints from the provider.
- Cybersecurity program.
- Physical security program and disaster recovery plan (“BCP”).
- A resolution plan for orderly liquidation in the event of insolvency.
- Limit for transactions according to comprehensive risk management.

The Superintendence of the Financial System oversees the supervision of the regulations applicable to the Bitcoin Service Providers under the Bitcoin Law. Additionally, it establishes that Banks are empowered (but not obliged), to provide financial services to Bitcoin Service Providers or to open accounts to Bitcoin users.

However, Banks must provide services, such as exchange platforms without generating commission, to digital wallets offered by the State to guarantee financial inclusion.

Although the authorities implemented AML/CFT standards on Bitcoin service providers via regulatory technical standards and guidance, they are also engaged in legislative amendments to the Law against Money and Asset Laundering to bring the laws in line with the current FATF Standards and in preparation for the country's upcoming evaluation of its AML/CFT framework by GAFILAT.

On August 31, 2021, a US\$150 million trust fund was created ([Decree 137](#)) by the government to allow local merchants to instantly convert bitcoin to U.S. dollars, offsetting their exposure to bitcoin.

Mexico

On March 9, 2018, Mexico enacted a [Fintech Law](#) to regulate Financial Technology Institutions, which includes a chapter on operations with crypto assets. Under this law, Mexico's Central Bank (Banxico) is granted broad powers to regulate virtual assets, including specifying those virtual assets that financial companies are allowed to operate within the country, defining their characteristics, and establishing the

conditions and restrictions applicable to transactions with such assets; and authorizing financial companies to perform transactions with virtual assets.

On September 10, 2018, secondary regulations issued by the [Mexican Banking and Securities Commission](#), [Banxico](#) and the [Ministry of Finance and Public Credit](#) were published on the Federal Official Gazette to regulate the Law Regulating the Financial Technology Institutions.

In addition, Mexico extended the application of its laws regarding money laundering to virtual assets on September 3, 2018 ([Federal Law for the Prevention and Identification of Transactions with Resources of Illicit Origin](#)), thereby requiring financial institutions that provide services relating to crypto assets to report transactions exceeding certain amounts.

On March 2019, Banxico issued specific regulations on virtual asset trading, through [Circular 4/2019](#), covering financial institutions and financial technology institutions. Regulated institutions, prior authorization from Banxico, are only allowed to carry out virtual asset transactions and services with their clients or on their own account.

Mexico's Bitso crypto exchange bills itself as the first fully regulated exchange in Latin America. It is overseen by the Gibraltar Financial Services Commission.

More info: <https://www.globallegalinsights.com/practice-areas/blockchain-laws-and-regulations/mexico>

Panama

A draft bill entitled "[Crypto Law: Making Panama Compatible with the digital economy, blockchain, crypto assets, and the internet](#)" has been submitted to Parliament on September 6, 2021 and seek to recognize crypto assets as an alternative payment method.

Paraguay

In December 2021, the Senate of Paraguay approved a proposed bill regulating crypto mining and trading as an industrial activity. The legislation defines several key terms including virtual assets, tokens, crypto assets mining, and virtual asset service providers (VASPs). The law also aims to foster the growth of crypto mining activities, through licenses, by using the surplus electricity generated in the country with electricity tariffs on those activities not exceeding industrial tariffs by more than 15 percent. It also grants the Ministry of Industry and Commerce the authority to seek assistance from government bodies outside its boundaries to implement the law. Paraguay is seeking to attract international business and investment by passing legislation that will position it as one of the most crypto-friendly countries in the region. In July 2022, the bill was approved by the Chamber of Deputies, but vetoed by President Abdo Benitez in August noting that crypto mining is characterized by high consumption of electricity, intensive capital utilization, and minimal generation of jobs. In end-September the Paraguayan Senate overruled the presidential veto, and the law was sent back to the Chamber of Deputies. The approval of the Law remains uncertain, including.

Peru

On December 20, 2021, A draft of a new crypto asset law called "[Crypto asset Marketing Framework](#)" was introduced in in the Peruvian Congress under the number [1042/2021-CR](#), seeking to regulate the crypto assets interactions that are already happening in the country. The draft law, besides defining what a crypto asset is and establishing the duties of virtual asset service providers (VASPs), also seeks to legalize the use of assets to incorporate and be held by companies.

The law also proposes the creation of a public registry for VASPs, that users can consult anytime to find out if an exchange or platform is registered to do business on Peruvian soil. In addition, it establishes the conditions that each VASP must follow to operate lawfully in the country.

The draft compels these companies to inform, in their contract of services to the user, that Peru does not consider crypto assets as legal tender, and that the supervision of these assets by the government constitutes no guarantee against the risks that operating with crypto assets can bring to users.

Uruguay

In 2018 the Uruguayan Chamber of FinTech created a Commission for crypto assets, with the objective to develop a specific regulatory framework for the sector. In 2021, the Central Bank of Uruguay through their financial innovation program Nova published [a document](#) that paves the way for possible regulation based on the different services, not the asset.

Venezuela

Venezuela's government officially launched its own centralized digital currency, [the Petro](#), in February 2018. In March 2018, the Nacional Constituent Assembly (the Venezuelan legislature) declared the Petro illegal.

Notwithstanding, President Nicolas Maduro declared that the Petro would be used as legal tender in Venezuela. Despite the government's efforts, the Petro has struggled to gain recognition domestically.

In April 2018, Official Gazette No. [6370](#) and [6371](#) published the following government instruments/initiatives:

(1) Constituent Decree on Crypto assets and the Petro Sovereign Cryptocurrency, issued by the National Constituent Assembly; (2) the creation and regulation of the Office of the Venezuelan Superintendent on Crypto assets of Venezuela and Ancillary Activities (“SUPCACVEN”); and (3) the creation of the Treasury of Crypto assets of Venezuela.

SUPCACVEN was replaced by the National Superintendence of Cryptocurrencies (“[SUNACRIP](#)”) in early 2019. By presidential decree, Venezuela established a new legal framework for crypto assets and related activities. In part, the decree stated that SUNACRIP would exercise the broadest powers within the legal framework to regulate the creation, issuance, organization, operation, and use of crypto assets.

On September 21, 2020, Venezuela legalized bitcoin mining and announced that it would grant mining licenses by utilizing the Integral Miners Registry. In effect, all mining activities must be exercised through the National Mining Pool (“NMP”) whereby the government will oversee and distribute the rewards obtained from mining activities. Those who operate outside the NMP will be penalized. SUNACRIP also issued Administrative Guidelines No. 057-2020 ([Official Gazette No. 41,955 of 1 September 2020](#)), which established the requirements and procedures for delivering and receiving crypto assets remittances to individuals in Venezuela.

While crypto assets have a legal status in Venezuela, the government has imposed intense controls on exchanges, users and miners, with the aim of safeguarding the usage of its local currency. In this vein, a new tax has just been approved on all financial transactions conducted in foreign currencies or in crypto assets other than the Petro.

Crypto Prohibition in LAC

Argentina

The Central Bank of Argentina has recently announced a ban on crypto assets trading in the financial system ([BSRA Statement](#)). This shift away from a crypto-friendly environment, comes after Argentina's biggest private bank decided to add crypto trading, which triggered the regulator's action to protect investors and the financial system. Before this decision, the Financial Information Unit (UIF) had issued regulations related to crypto assets under the anti-money laundering (AML) law and the tax reform law. The [UIF Resolution 300/2014](#) required most obliged subjects under the AML Law to report all the transactions performed with crypto assets, regardless of their amount. In December 2017, the tax reform law introduced several amendments to the income tax law and established several provisions related to digital currencies.

Bolivia

Bolivia is the only country in Latin America that has fully banned Bitcoin and all crypto assets to protect its sovereign currency and dissuade citizens from taking risks in the volatile crypto market. In May 2014, the Central Bank of Bolivia issued a directive to prohibit virtual currencies, but it was not until December 15, 2020 that the ban was formally ratified ([Resolucion de Directorio No. 144/2020](#)).

Ecuador

Although Ecuador does not expressly forbid crypto trading like Bolivia, the Central Bank of Ecuador has repeatedly warned that crypto assets are not an authorized payment method in Ecuador ([BCE Press Releases](#) and [Ley Fintech](#)).

Dominican Republic

The Dominican Central Bank has indicated that financial institutions authorized to operate in the country may not engage in transactions that use virtual currencies ([Law 183-02](#)). In 2017 the Monetary Board and the Central Bank of the Dominican Republic reiterated that local regulated financial institutions are not allowed to invest or perform operations using virtual currency, and individuals who acquire them or accept them as payment do so at their own risk ([Comunicado June 29, 2017](#)).

References

- Adrian, T., T. Mancini-Griffoli, July 2019, The Rise of Digital Money, IMF Fintech Note 19/01
- Agur, I., Ari, A., Dell'Ariccia, G., January 2022, Designing Central Bank Digital Currencies, Journal of Monetary Economics Volume 125
- Alfonso, V., S. Kamin, and F. Zampolli, 2022, Central Bank Digital Currencies (CBDCs) in Latin America and the Caribbean, BIS Working Papers No. 989
- Alnasaa, M., N. Gueorguiev, J. Honda, E. Imamoglu, P. Mauro, K. Primus, and D. Rozkkov, 2022, Crypto Corruption and Capital Controls: Cross-Country Correlations, IMF Working Paper 22/xx
- Alvarez, F, D. Argente, and D. Van Patten, Are Cryptocurrencies Currencies? Bitcoin as Legal Tender in El Salvador, NBER Working Paper 29968, April 2022
- Auer, R., P Haene and H Holden, Multi-CBDC Arrangements and the Future of Cross-Border Payments” BIS Papers No. 115, 2021
- Bains, P., A. Ismail, F. Melo, and N. Sugimoto, 2022, Regulating the Crypto Ecosystem: The Case of Stablecoins and Arrangements, IMF Fintech Notes/2022/008
- Bank of Canada, 2021, “[Revisiting the Monetary Sovereignty Rationale for CBDCs](#)”, Staff Discussion Paper 2021-17
- Bank of International Settlements, July 2022, Interlinking payment systems and the role of application programming interfaces: a framework for cross-border payments, Report to the G20
- Bank of International Settlements, June 2022, Annual Economic Report 2022, The future monetary system (chapter III)
- Bank of International Settlements, October 2020, Central bank digital currencies: foundational principles and core features
- Bank of International Settlements, July 2020, Enhancing cross-border payments: building blocks of a global roadmap. Stage 2 report to the G20
- Bersch, J., JF. Cleve, N. Muhammad, E. Pérez Ruiz, and Y. Yakhshilikov, “Fintech Potential for Remittance Transfers: A Central America Perspective”, IMF Working Paper 21/175
- Biagio, B., Money and customer funds in the world of digital finance: Who really owns what? Journal of Payments Strategy & Systems, Vol. 15, number 1, Spring 2021. pp. 37-53 (17)
<https://www.ingentaconnect.com/content/hsp/jpss/2021/00000015/00000001/art00004>
- Brookings Institution, 2019, “[Has the dollar lost ground as the dominant international currency?](#)”
- Burlon, L., C. Montes-Galdon, M. Munoz, F. Smets, “The optimal quantity of CBDC in a bank-based economy”, CEPR Discussion Paper No. DP16995, February 2022
- Carare, A., L. Franco, M. Hadzi-Vaskov, J. Lesniak, D. Vasilyev, Y. Yakhshilikov, “Digital Money and Remittances Costs in Central America, Panama and the Dominican Republic”, IMF Working Paper, 2022
- CEPR, 2010, “[A Concise History of Exchange Rate Regimes in Latin America](#)”

Chainalysis, 2021, “[2021 Geography of Cryptocurrency Report](#)”

Cuervo, C., A. Morozova, N. Sugimoto, Fintech Note on Regulation of Crypto Assets, December 2019

DailyCoin, Central Bank of Peru Warns of Sol Digital Token as it Plans to Issue a CBDC (Dec 02, 2021). <https://www.investing.com/news/cryptocurrency-news/central-bank-of-peru-warns-of-sol-digital-token-as-it-plans-to-issue-a-cbdc-2697506>

Demirgüç-Kunt, A., L. Klapper, D. Singer, and S. Ansar, 2021, “Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19”, World Bank Group

Duarte, A., J. Frost, L. Gambacorta, P. Koo Wilkens, and H. S. Shin, 2022, “Central banks, the monetary system and public payment infrastructures: lessons from Brazil’s Pix”, BIS Bulletin 51, March 2022

Forbes 2021, “Facebook’s Novi Poses Fresh Challenges for Remittances”

<https://www.forbes.com/sites/danielwebber/2021/10/28/facebooks-novi-poses-fresh-challenges-for-remittances/?sh=313f646778f0>

IADB, 2000, “[Assessing Dollarization: An Application to Central American and Caribbean Countries](#)”

IMF, 2020, “[Digital Money Across Borders: Macro-Financial Implications](#)”, IMF Policy Paper No. 2020/050.

IMF, 2021, “[Global Financial Stability Report](#)” Chapter 2: The Crypto Ecosystem and Financial Stability Challenges.

International Monetary Fund 2021, “Fintech update: September 2021”, Monetary and Capital Markets Department

IMF, 2022a, Capital Flow Management Measures in the Digital Age: Challenges of Crypto Assets. IMF,

2022b, Fintech Note: Regulation of Crypto Assets: A Closer Look at the Crypto Asset Ecosystem. IMF,

2022c, Elements of Effective Policies for Crypto Assets.

Khan, A., M. Malaika, Central Bank Risk Management, Fintech, and Cybersecurity. IMF, 2021

<https://www.imf.org/en/Publications/WP/Issues/2021/04/23/Central-Bank-Risk-Management-Fintech-and-Cybersecurity-50278>

Levy Yeyati, E., 2021, “[Financial Dollarization and De-Dollarization in the New Millennium](#)”

Lolly Crypto. Anclap launches Peru’s stablecoin on Stellar blockchain. <https://coinscreed.com/anclap-launches-perus-stablecoin-on-stellar-blockchain.html>

Lukonga, I., 2021, Oversight of CBDC Financial Market Infrastructures (FMIs), PowerPoint Presentation.

Makiko, M., K. Ito, S. Ohsawa, and H. Tanaka, 2019, “What is Stablecoin? A Survey on Price Stabilization Mechanisms for Decentralized Payment Systems”

https://www.researchgate.net/publication/333815432_What_is_Stablecoin_A_Survey_on_Price_Stabilization_Mechanisms_for_Decentralized_Payment_Systems

Mancini-Griffoli, T., M. S. Martinez Peria, I. Agur, A. Ari, J. Kiff, A. Popescu, C. Rochon, 2018, Casting Light on Central Bank Digital Currencies. IMF Staff Discussion Note

<https://www.imf.org/en/publications/staff-discussion-notes/issues/2018/11/13/casting-light-on-central-bank-digital-currencies-46233>

Miccoli, M., 2022, Cross-Border Aspects of Digital Payments and Digital Money, PowerPoint Presentation Reserve, “About the Reserve Project” <https://reserve.org/project/#main-content>

Sarmiento, A., 2022, “Seven Lessons from the e-Peso Pilot Plan: The Possibility of a Central Bank Digital Currency”, Latin American Journal of Central Banking

Savastano, M., 1996, “[Dollarization in Latin America: Recent Evidence and Some Policy Issues](#)” IMF Working Paper 96/4

Soderberg, G. 2021, CBDC Behind the Scenes: Emerging Trends, Insights, and Policy Lessons, IMF Fintech Note

Sun, Z. 2021 “Stablecoin payment app Reserve helps individuals protect their savings against inflation in Latin America”, <https://cointelegraph.com/news/stablecoin-payment-app-reserve-helps-individuals-protect-their-savings-against-inflation-in-latin-america>

Sveriges Riksbank. E-krona Pilot. Phase 1. <https://www.riksbank.se/globalassets/media/rapporter/e-krona/2021/e-krona-pilot-phase-1.pdf>

The Economist. 2021. “[Will the Dollar Stay Dominant? Digital Money May Pose a New Threat to Dollar Hegemony](#)”

World Bank Group, 2022, “What Does Digital Money Mean for Emerging Market and Developing Economies” World Bank Group, 2021, The Global Findex Database 2021

Wright, C., The Long Awaited Peruvian Stablecoin is all Set to Launch for Colombia and Chile. October 4, 2021. Timestamp Magazine <https://timestampmag.com/2021/10/04/the-long-awaited-peruvian-stablecoin-is-all-set-to-launch-for-colombia-and-chile/>

