Cryptoasset ecosystem
in Latin America and the Caribbean

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Table of contents

Acronyms

ACH – automated clearing house

AML – anti-money laundering

API – application programming interface

ATM – automated teller machine

B2B – business-to-business

BCB – Central Bank of Brazil

BCRA – Argentinian Central Bank

BIS – Bank for International Settlements

BTC – bitcoin (the cryptocurrency)

BTM – bitcoin teller machine

CA – cryptoasset

CBB – Central Bank of The Bahamas

CBDC – central bank digital currency

CBECI – Cambridge Bitcoin Electricity Consumption Index

CCAF – Cambridge Centre for Alternative Finance

CeFi – centralised finance

CFT – combatting the financing of terrorism

CNBV – National Banking and Securities Commission

CVM – Securities and Exchange Commission (of Brazil)

DAO – decentralised autonomous organisation

dApp – decentralised application

DE – dinero electrónico (CBDC in Ecuador)

DeFi – decentralised finance

DLT – distributed ledger technology

e-KYC – electronic know your customer

ETF – exchange-traded fund

ETH – ether (the cryptocurrency)

FCA – Financial Conduct Authority

FINMA – Swiss Financial Market Supervisory Authority

fintech – financial technology

GDP – gross domestic product

GHG – greenhouse gas

GPU – graphics processing unit

HQs – headquarters

ICO – initial coin offering

ID – identity

IDB – Inter-American Development Bank

IMF – International Monetary Fund

KYC – know your customer

LAC – Latin America and the Caribbean

NFT – non-fungible token

OTC – over-the-counter

P2P – peer-to-peer

PPP – purchasing power parity

QR – quick response

RFB – Receita Federal do Brasil (The Federal Revenue of Brazil, part of the Ministry of Finance)

SHCP – Secretaría de Hacienda y Crédito Público (The Secretariat of the Treasury and Public Credit, Mexico)

suptech – supervisory technology

TVL – total value locked

UNICEF – United Nations Children's Fund

USSD – Unstructured Supplementary Service Data

VPN – virtual private network

Glossary

advanced trading service – a service allowing users to buy portfolio bundles and access more sophisticated tools, such as trading on margin.

anti-money laundering and combatting the financing of terrorism – the laws and regulations intended to stop criminals from disguising illegally obtained funds as legitimate income or financing terrorist activities.

bitcoin teller machine – a machine that allows users to buy and sell cryptoassets in exchange for physical cash.

blockchain – a distributed ledger used to make a digital record of the ownership of assets, in particular, cryptocurrencies.

brokerage service – a service that lets users conveniently buy and sell cryptocurrencies at a given price.

business-to-business payment platform – a payment platform that facilitates fund transfers between businesses, often across borders.

central bank digital currency – an electronic form of central bank money in the national unit (for example, USD) representing legal tender that enables households and businesses to store value and make payments. The liability lies with the central bank, similar to the physical currency in circulation.

clearing – transmitting, reconciling and sometimes confirming transfer orders from when a transaction is initiated to when it is settled.

cloud mining service – a service that rents out hash power generated by its own equipment to customers.

cold storage – refers to storing a private key offline in a cold wallet that has never been connected to the internet; hence should not be easily compromised.

consumer payment service – a service enabling consumers to use cryptoassets to make payments, including providing debit cards.

cryptoasset – an umbrella term comprising all types of digital tokens (such as security tokens, cryptocurrencies and stablecoins) issued and transferred via open and permissionless as well as closed enterprise distributed ledger technology systems.

cryptoasset exchange – a platform that provides services to buy and sell cryptoassets, either in exchange for fiat currency ('fiat-supporting' exchange), another cryptoasset ('cryptoasset-only' exchange) or other assets such as gold.

cryptoasset miner – an individual or organisation involved in processing transactions on public blockchains by deciding which transactions will be added, often in a single batch (block), to the global ledger (blockchain).

cryptoasset payment service provider – a platform that acts as a gateway facilitating the use of cryptoassets for all types of payments.

cryptoasset wallet – a program that handles key management and supports various technical and commercial services. Many solutions provide an easy-to-use interface for the end user that abstracts away the complexity of key management.

cryptocurrency – digitally created tokens within a system comprising a peer-to-peer network, consensus mechanism and public key infrastructure. No central authority governs the system. Instead, the rules (for example, defining what constitutes a valid transaction) are enforced by all network participants (nodes).

cryptographic keys – see 'keys'.

custodial exchange/custodian – an exchange that takes custody of users' cryptoassets.

custodial wallet – a wallet provider that takes custody of users' cryptoasset holdings by controlling the private key(s).

decentralised exchange – a peer-to-peer relay exchange built on top of a public blockchain that facilitates cryptoasset trading without a central point of control.

decentralised finance – a financial ecosystem based on blockchain technology that lets users buy and sell assets and access financial services openly and transparently without intermediaries.

distributed database – a data record managed by a combination of machines distributed across different countries and organisations rather than being controlled centrally, such as in a company's server or cloud.

distributed ledger technology – a digital system for recording asset transactions where the transactions and their details are recorded in multiple places at the same time. It allows simultaneous access, validation and record updating across a networked database. Distributed ledgers have no central point of control.

electricity mix – the share of the primary energy sources used to generate all of a country's electricity. These include coal, oil, gas, nuclear, hydro, solar and wind power.

fiat gateway – a solution that connects the cryptoasset ecosystem with traditional financial markets.

general-purpose cryptoasset platform – a platform offering a range of money transfer and payment services. Generally, payments are in cryptoassets but can be exchanged for national currencies.

graphics processing unit – an electronic circuit that increases a computer's calculation capacity.

hardware cryptoasset wallet – a small device that securely stores private keys without exposing them to connected machines.

hashing – applying an algorithmic function (a hash) to data to convert it into a random string of numbers and letters. This acts as a digital fingerprint of that data so it can be locked in the blockchain.

hashrate – a measure of the speed at which a machine (or machines) can process a proof-of-work algorithm. Total hashrate generally refers to the aggregate computing power of all mining hardware attempting to solve the puzzle at a given time.

high-frequency trading services – a provider enabling automated market-making and arbitrage strategies.

hosted wallet – see 'custodial wallet'.

hot storage – refers to keeping private keys on an online device connected to a network (in hot wallets).

incorporation jurisdiction – the jurisdiction where the parent organisation is incorporated.

keys – refers to a pair of public and private keys that are used together to protect data. For example, if a message is encrypted using a person's public key (for example, an email address), they can only decrypt ('unlock') it using their matching private key (for example, a password to a bank account).

know your customer – a regulated process to verify a customer's identity, including collecting customers' proof of identity and proof of address to prevent illegal or fraudulent activities.

merchant service – a service that processes payments for cryptocurrency-accepting merchants and provides additional merchant services, such as shopping cart integrations and point-of-sale terminals.

mining – a process where miners earn cryptocurrencies by using computers to solve cryptographic equations. The term also refers to the process of securing the blockchain.

mining pool – a structure combining multiple miners' computational resources to increase the frequency and likelihood of finding a valid block; rewards are shared among participants.

mining pool operator – a service combining computational resources from multiple hashers and distributing rewards.

mining value chain – comprises agents performing specific operations to process public blockchain transactions, including mining hardware manufacturers, individual miners, mining pools, pool operators, cloud mining services and remote hosting services.

money transfer service – a service that enables users to access, use and transfer funds, such as for remittances and bill payments.

multi-signature scheme – enables multiple keys to be combined so that a specific number of keys is required to sign a transaction and move funds.

non-fungible token – a unique digital asset that cannot be copied, substituted or subdivided. It is recorded on a blockchain and used to certify ownership and authenticity. It can create a tokenised proof of title to a unique digital version of an underlying digital or physical asset.

off-chain – a process or transaction that occurs outside a distributed ledger network.

off-ramp – a fiat gateway that lets users convert a cryptoasset into fiat currency.

on-chain – a process or transaction that takes place directly on a distributed ledger network.

on-ramp – a fiat gateway that lets users convert fiat currency into a cryptoasset.

operational headquarters – the country where an organisation predominantly operates.

order-book exchange – a platform that uses a trading engine to match buy and sell orders from users.

over-the-counter desk – enables users to engage in bilateral trades outside formal trading venues.

payments processor – a third-party service provider that handles the details of processing card transactions between merchants, issuing banks and acquiring banks.

peer-to-peer lending – enables individuals to lend money to other individuals or businesses. Peer-to-peer websites act as marketplaces, uniting individuals or businesses needing loans with lenders.

point of access – provides the hardware or software to capture payment transactions and transmit them to a network, such as an online or a mobile point of sale.

proof-of-work – a consensus mechanism blockchain networks use to achieve distributed consensus, confirm transactions and add new blocks to the chain. Users must solve complex computational puzzles to add a new block to the chain, deterring malicious actors from attempting to take control of the network.

proprietary mining – miners operating mining equipment on their own behalf.

regulatory sandbox – a formal regulatory programme that allows market participants to test new financial services or models with live customers, subject to certain safeguards and oversight.

remittances – money sent by migrants back to their home country.

remote hosting service – a service that hosts and maintains customer-owned mining equipment.

self-hosted wallet – a non-custodial application that stores cryptoassets on a device, for example, a mobile phone, desktop computer or tablet.

smart contract – a self-executing software program that automatically performs some function (for example, making a payment when an event triggers the smart contract).

stablecoins/tokens – a category of cryptoassets that aims to maintain a stable value with reference to a specified asset or basket of assets and provide stability compared to the high volatility of unbacked cryptoassets. They are often pegged to a specific fiat currency.

suptech – an acronym for 'supervisory technology'. It refers to using innovative technology and data analysis solutions to enhance financial authorities' market oversight capabilities. It helps supervisory agencies digitise regulatory and reporting processes to more efficiently and proactively monitor the risk and compliance of financial institutions.

tokenisation – the process of digitally representing an existing, off-chain asset on a distributed ledger.

top-ups and refills – a provider enabling consumers to top up or refill various products and services, such as mobile contracts and prepaid cards.

trading bot – a platform using an algorithm to optimise trading strategies.

trading platform – a platform that provides a single interface for connecting to several other exchanges and offers leveraged trading and cryptoasset derivatives.

vault services – sophisticated key management services and custody solutions combining multiple layers of security.

Forewords

Cambridge Centre for Alternative Finance

UNIVERSITY OF CAMBRIDGE Judge Business School

The rapid pace of change in the cryptoasset ecosystem has increased the urgency for greater understanding and cooperation among public and private stakeholders to ensure that the industry's development is sustainable, consumer protection is robust and policymaking is evidence-based. Collaborating with the Inter-American Development Bank (IDB), the Cambridge Centre for Alternative Finance (CCAF) conducted surveys to better understand cryptoasset ecosystem developments relating to both the public and private sectors in Latin America and the Caribbean (LAC).

The private sector survey aimed to gather empirical data from respondents involved in cryptoasset exchange, storage, payment, mining or educational activities. For the public sector, the survey primarily targeted respondents at central banks and supervisory and regulatory institutions. The resulting Report is based on data from over 80 public and private institutions across LAC. Survey findings were supplemented with data from a suite of CCAF digital tools, qualitative interviews with leading cryptoasset companies, and desktop research on regulation and policy.

The survey findings provide a snapshot of the ecosystem at a moment in time (the surveys were conducted in mid-2022). They suggest that cryptoasset firms operating in LAC had substantially increased their operations and product and service offerings, and seen rapid user growth in the years before the survey was conducted. On the other hand, it seems that regulators had developed a more positive attitude toward cryptoassets in the same period, partly due to their perception that cryptoassets may contribute to a more inclusive, diverse and innovative financial sector. It appears that regulators and policymakers also lack sufficient technical understanding and capabilities when it comes to regulating and supervising cryptoassets, hence their need for technical assistance and capacity building. Both private and public sector institutions stated that increased cooperation is essential and that there is a need for regulatory clarity and certainty. Furthermore, private sector respondents identified working with corporate clients and expanding decentralised finance services as some of the most promising future growth opportunities.

We hope this study's findings will provide insights into the development of LAC's cryptoasset ecosystem and inform evidence-based decision-making and regulation. We would like to thank IDB for being a long-standing supporter of the CCAF's research. In particular, we express our gratitude to Daniel Fonseca, Diego Herrera, Jaime Sarmiento and Sahara De La Torre, without whom this study would not have been possible.

Bryan Zhang
Executive Director and Co-Founder
Cambridge Centre for Alternative Finance

The Cryptoasset Ecosystem in Latin America and the Caribbean report is a relevant milestone in our successful partnership with the Cambridge Centre for Alternative Finance (CCAF). So far, we have cooperated on eight publications related to financial technology (fintech) over the past eight years. In 2022, our previous report, *The SME Access to Digital Finance Study: A Deep Dive into the Latin American Fintech Ecosystem*, allowed us to identify stylised facts on micro, small and medium-sized enterprise (MSME) financing in Latin America and the Caribbean (LAC) through fintech platforms.

In this new Report, we decided to use a broad definition for what constitutes cryptoassets, expanding it beyond the idea of payments, storing value, speculating and investing to exchanges (trading cryptocurrencies), infrastructure providers, decentralised finance and many more segments. The document shows how cryptoasset platforms in LAC have more than doubled since 2016, reaching over 170 active firms serving the region in 2022, of which approximately 100 firms have their operational headquarters or parent organisation incorporated in LAC. For the firms with operational headquarters in LAC, the largest segment is exchanges (49 firms, 74% of the total), followed by digital payments (27, 41%) and digital custody (18, 27%).

Together with the CCAF, we collected 52 survey responses from private organisations to identify their activities. The most common services these firms offer are exchange services, receiving, sending and storing cryptoassets, cryptoasset-related education and consulting. Furthermore, we found that cryptoasset firms are evolving into alternative full-service fintech providers, providing four services on average. Almost half the surveyed platforms deliver their services in more than two countries concurrently. Brazil and Argentina are the most common countries they serve, as every third surveyed company provides services in both countries.

As the cryptoasset ecosystem moves forward, so do regional regulators and supervisors. We surveyed 31 public institutions to understand their stance toward the cryptoasset ecosystem. It is worth highlighting that six regional jurisdictions have issued laws, regulations or rules on cryptoassets in LAC. FintechRegMap, an Inter-American Development Bank (IDB) interactive map, displays the status of relevant regulations in the region. The map is available at www.iadb.org/FintechRegMap or the Power BI mobile application.

Furthermore, the public sector believes cryptoassets can create a more inclusive financial services landscape in LAC: 77% of regulators and supervisors underlined that cryptoassets offer new functions that complement traditional financial solutions. In addition, private and public sectors agree that cooperation is critical to shaping a safe and innovative ecosystem. Half of the surveyed public institutions believe in the importance of constant dialogue with companies in the ecosystem.

The cryptoasset ecosystem has institutional capacity implications for financial regulators and supervisors. As IDB has recommended from an empirical standpoint in other scenarios, strengthening institutional capacity to respond proactively to the opportunities and risks posed by cryptoassets requires (i) developing the legal and institutional framework, (ii) developing human talent and (iii) creating technological capability. Supervision, but primarily understanding such a complex ecosystem, will also require international cooperation and dialogue.

It is also fair to say that cryptoasset-related business models might require specific regulatory actions if they (i) create systemic or idiosyncratic risks that affect financial sector stability, (ii) reduce the market's competition or transparency, or (iii) deteriorate financial consumer protection. On the other hand, as highlighted by this study, the first step in moving toward cryptoasset regulation is clearly defining what cryptoassets are from a legal standpoint.

This study intends to deliver a tool for understanding the cryptoasset ecosystem in LAC and will be helpful to its actors, our regional policymakers and the public. We believe that beyond cryptoassets, fintech is an effective sector to improve lives in LAC through financial inclusion.

Anderson Caputo Silva
Connectivity, Markets and Finance Division Chief
Inter-American Development Bank

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ASAFINTECH
ASOCIACIÓN SALVADOREÑA DE FINTECH

ONG BITCOIN CHILE
ASOCIACIÓN CHILENA DE CRIPTOTECNOLOGÍAS

Fintech
GUATEMALA

FinteChile

FINTECH
MÉXICO

CÁMARA ARGENTINA FINTECH

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Finally, we would like to express our utmost gratitude to all survey respondents from across LAC who participated in the surveys. Their contribution is core to the realisation of this study.

Note: Some survey respondents preferred not to publicly disclose their participation.

Executive summary

The cryptoasset sector has grown substantially across Latin America and the Caribbean (LAC) in recent years. Throughout 2022, the Cambridge Centre for Alternative Finance (CCAF) at Cambridge Judge Business School, in collaboration with the Inter-American Development Bank (IDB), surveyed, researched and interviewed key stakeholders of LAC's cryptoasset ecosystem. The aim was to gain insights into its development, market trends, challenges and opportunities, as well as regulatory and policy issues.

For this study, the CCAF gathered **52 responses from private sector stakeholders and 31 from public institutions in LAC**. The private sector survey focused on identifying cryptoasset use cases, opportunities and risks and determining the level of cooperation between various stakeholders. The public sector survey aimed to understand the attitudes, perceptions, organisational roles, current activities and plans of LAC regulators and supervisors. Survey data was supplemented with data from the Cambridge Fintech Ecosystem Atlas (Atlas) and the Cambridge Bitcoin Electricity Consumption Index (CBECI) and qualitative interviews with some of LAC's largest private cryptoasset companies. Empirical data was collected between June and August 2022.

Below, we describe the key findings of this study. It is important to note that they provide a snapshot in time of the ecosystem and stakeholder perceptions and should be considered with caution, given important developments in the global cryptoasset industry in the second half of 2022 and in 2023.

Development in industry structure

Cryptoasset companies are gradually **evolving into full-service financial technology (fintech) providers** serving as **one-stop shops** for investors, consumers and businesses. All surveyed entities **offer more than one service and, on average, offer four services**. The services most often provided are services for buying and selling cryptoassets, followed by those related to payments and custody of cryptoassets, as well as cryptoasset-related education and consulting services.

Cryptoasset industry players **seek to abstract away the complexity of blockchain technology** to attract users with little or no previous knowledge of cryptoassets. To achieve this goal, companies implement blockchain-related processes in the back end and aspire to have the front end of their applications look and work similarly to non-cryptoasset financial services providers.

Market growth

Cryptoasset companies are expanding from their headquartered countries to others in the region. Almost half of those surveyed already **serve three or more countries** in LAC. The most commonly served countries are Brazil, Argentina and Colombia. The importance of overseas markets is high as these companies' share of international users is above 40%.

The cryptoasset industry grew quickly between 2020 and the first half of 2022. **A median cryptoasset company doubled its users in 2020**, with a **median growth rate close to 50% in both 2021 and the first half of 2022**. Users' engagement with company services also grew as the **share of active and identity-verified users increased**. User growth contributed to the increase in hiring by **LAC cryptoasset companies** as new employment opportunities in the industry emerged.

Regulators' attitude toward cryptoassets

Regulators' survey responses suggest they had begun to view cryptoassets more positively in the years preceding the study. **Thirty-six percent of public sector survey respondents stated they have a more positive attitude** toward cryptoassets than five years ago.

Cryptoasset companies believe regulators understand cryptoassets better than before 2020 and have seen rising interaction with regulators through **innovation hubs and regulatory sandboxes**. Only 37% of private sector survey respondents believe that LAC regulators do not understand cryptoassets (more than a 50% decrease compared to the period between 2017 and 2019).

Perceived and actual use cases of cryptoassets

Most **regulators believe cryptoassets are useful, especially in creating a more inclusive financial services landscape**. Only 7% of public sector survey respondents regard cryptoassets as not useful, and almost **80% stated that cryptoassets can offer new functions and services that are complementary to traditional financial solutions**.

According to the private sector survey respondents, **cross-border remittances and payments are among the most important use cases** for cryptoassets in LAC. The prominence of these use cases is a recent occurrence. Before 2020, the most important driver of cryptoasset use in LAC was profiting from changes in cryptoasset prices, according to the private sector survey results.

Cooperation between industry and regulators

Both cryptoasset companies and regulators believe **cooperation between industry and the public sector is necessary** to help create a safe and innovative cryptoasset ecosystem in LAC. Over half of the surveyed public sector institutions believe they should be in **constant dialogue** with companies and other stakeholders.

Despite growing interaction with fintech and blockchain associations, most public sector survey respondents stated that their **level of cooperation with local and especially international private companies remains low or non-existent**.

Regulatory challenges for the industry

Public and private sector respondents agree that **regulatory unclarity and the lack of a regulatory framework are among the most significant industry challenges**. Notably, private sector survey respondents highlighted that regulatory unclarity is a more significant challenge to industry growth than any business-related challenge.

Respondents in both surveys underline the challenge arising from a lack of regulatory staff with in-depth knowledge of cryptoassets, with regulators stating their **need for further cryptoasset training and research**.

Based on the recommendations of IDB, a first step for regulators would be to develop a comprehensive **understanding of cryptoasset technologies and business models**. Establishing **clear roles and responsibilities** for all financial bodies that oversee the cryptoassets industry would follow. Lastly, **leveraging data and digital tools** could help regulators keep up with the industry's rapid pace of change.

Future of LAC's cryptoasset ecosystem

Working with corporate clients and expanding decentralised finance (DeFi) services are among the main growth opportunities highlighted by private sector survey respondents. Other notable opportunities reported include having **clear and comprehensive regulations and transforming cryptoasset companies into full-service fintech firms**.

Although expanding DeFi services is a priority for the private sector, regulators are not likely to implement DeFi regulations soon. Almost half the **regulators did not plan to implement DeFi-related regulation in the next five years following the survey or were unclear about their plans**.

1 Methodology

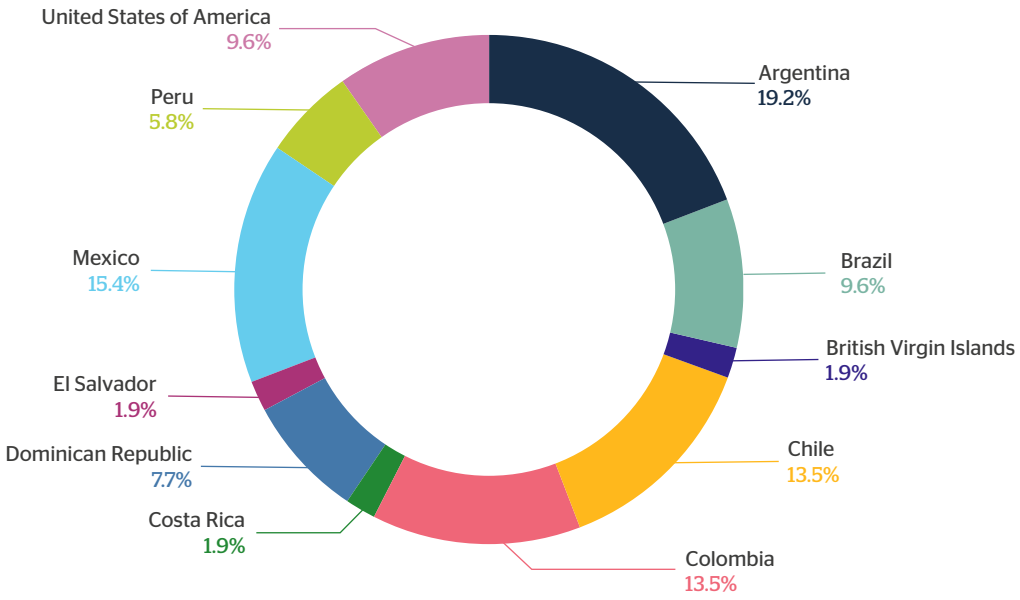
1 Methodology

The Cambridge Centre for Alternative Finance (CCAF), in collaboration with the Inter-American Development Bank (IDB), conducted two online surveys (one for the private sector and one for the public sector) between June and August 2022 via a secure web-based questionnaire. The private sector survey was sent to private companies in Latin America and the Caribbean (LAC) involved in cryptoasset-related[1] activities, and the public sector survey targeted public sector institutions tasked with supervising and regulating the LAC cryptoasset ecosystem. Several of the largest cryptoasset companies in LAC were also interviewed to gather more qualitative and quantitative data.

The findings from the interviews and surveys are the primary sources of this Report. They were supplemented with data from the Cambridge Fintech Ecosystem Atlas (Atlas) and the Cambridge Bitcoin Electricity Consumption Index (CBECI). Secondary sources were also used, including legal and regulatory documents, central bank press releases and industry reports to enhance the findings and contextualise the presented information.

Data was collected from over 80 public and private institutions throughout LAC.

The private sector survey was sent to active private sector entities in LAC involved in cryptoasset exchange, storage, payment, mining or education. In total, 52 responses were received from representatives of the cryptoasset industry. Figure 1.1 shows a breakdown of the countries where the survey respondents' operational headquarters are located.

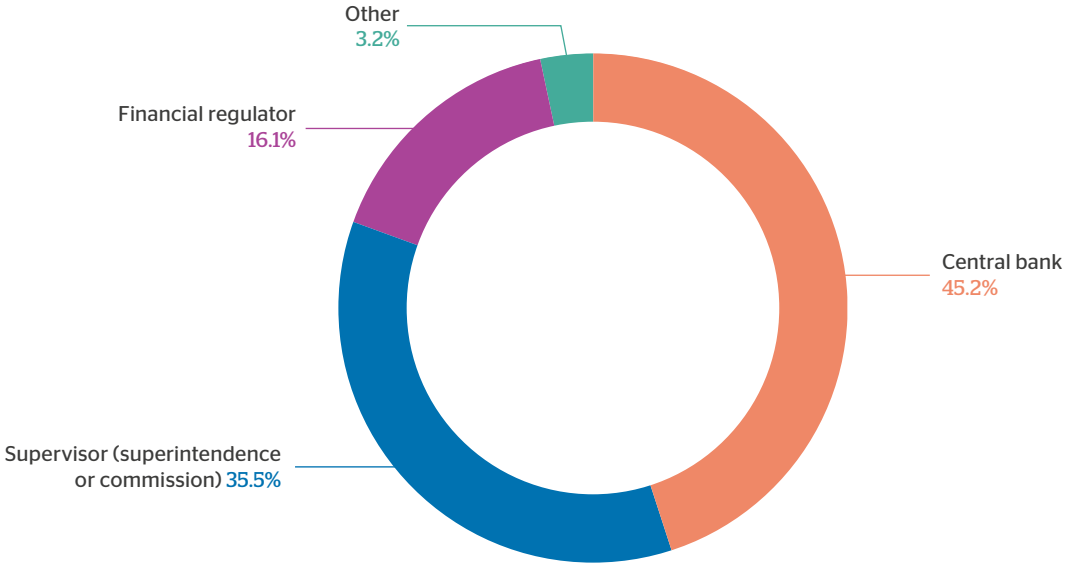


Source: CCAF (LAC private sector survey)

Figure 1.1: Breakdown of surveyed private sector entity locations

1 Survey participants were informed that for the purpose of the survey, the term 'cryptoasset' comprises all types of digital tokens issued and transferred via both open and permissionless as well as closed enterprise distributed ledger technology systems. Hence, cryptoassets include multiple types of tokens such as utility tokens, security tokens, crypto-commodities, stablecoins, cryptocurrencies, payment tokens and hybrid tokens. The survey introduction explicitly stated that cryptoassets are not the same as cryptocurrencies; cryptocurrencies are only one type of cryptoasset.

The public sector survey was sent to key public sector entities involved in regulating or supervising cryptoasset-related activities in LAC. Figure 1.2 shows a breakdown of the types of public sector institutions that were surveyed. Most of the 31 surveyed institutions are central banks, followed by supervisors and financial regulators.



Source: CCAF (LAC public sector survey)

Figure 1.2: Breakdown of surveyed public sector institutions

Various channels were used to disseminate the surveys throughout LAC to gather a representative sample of the regional cryptoasset ecosystem. Both surveys were available in English and Spanish and were initially distributed via personalised email invitations to known private and public sector contacts. The surveys were also indirectly shared via public links on social networks (for example, Twitter and LinkedIn). The IDB network and Atlas were leveraged to identify key cryptoasset entities in LAC. The collected survey data was safely stored and was only accessible to the research team. All individual data points are presented in aggregate form to ensure the privacy of all individuals and institutional respondents.

2 Cryptoasset industry overview

2 Cryptoasset industry overview

The cryptoasset ecosystem in LAC is a complex system comprising multiple actors of different sizes from numerous and often overlapping market segments. These actors often have differing visions for the future and varying levels of cooperation with each other. To overview such a system, we used a specialised ecosystem analysis tool developed by the CCAF, the findings from semi-structured interviews and a survey conducted with cryptoasset firms across the region.

2.1 LAC cryptoasset industry sample findings

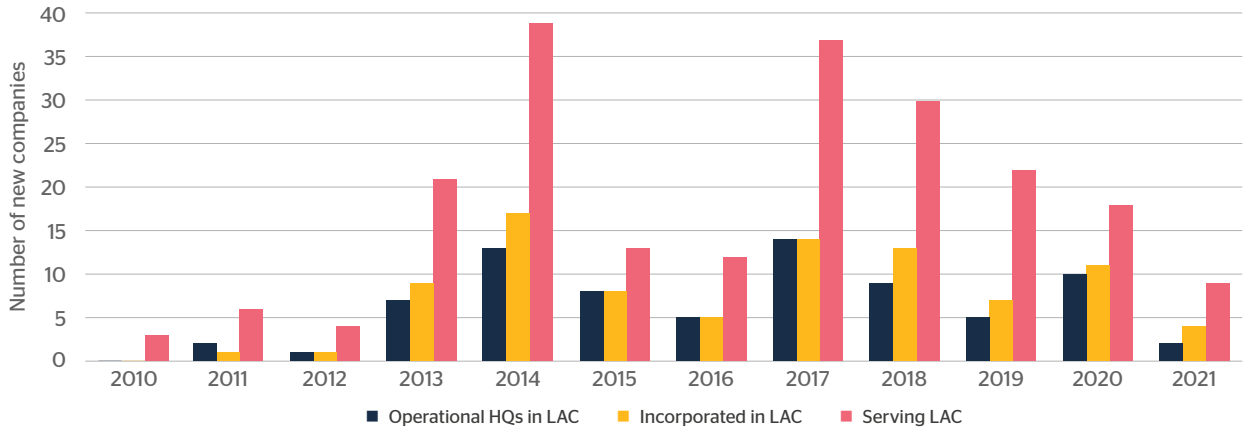
This section reviews the state of the cryptoasset fintech industry in LAC in 2022 and offers insights into its structure and development since 2010.

The analysis presented here is informed by data from the Cambridge Fintech Ecosystem Atlas (Atlas), an online resource allowing users to interact with a visual representation of the fintech industry and its evolution. Today, the Atlas collects and analyses information on fintech companies worldwide but focused initially on cryptoasset companies in LAC. The data presented in the Atlas is publicly available and gathered by researching corporate websites, official documents and company statements. This data is complemented by information from other sources, such as news articles, blog posts and podcasts. The Atlas is a collaborative platform where users can contribute, update and find data about organisations in the alternative finance industry. The CCAF research team regularly validates and updates the data.

Sample description

From the Atlas, we identified 175 cryptoasset fintech firms serving the region in 2022, of which almost 100 had operational headquarters (HQs) or their parent organisation incorporated in LAC. Other firms serving the region are mainly global companies incorporated outside LAC. Based on our sample, the LAC cryptoasset fintech industry has more than doubled since 2016. However, the total number of cryptoasset firms working in the region is likely higher.[2]

Figure 2.1 outlines the number of new cryptoasset fintech firms launched in the region annually from 2010 to 2021. Based on the sample, there was significant growth in 2014 and 2017, with many more new firms being established compared to year-on-year growth between 2018 and 2020.



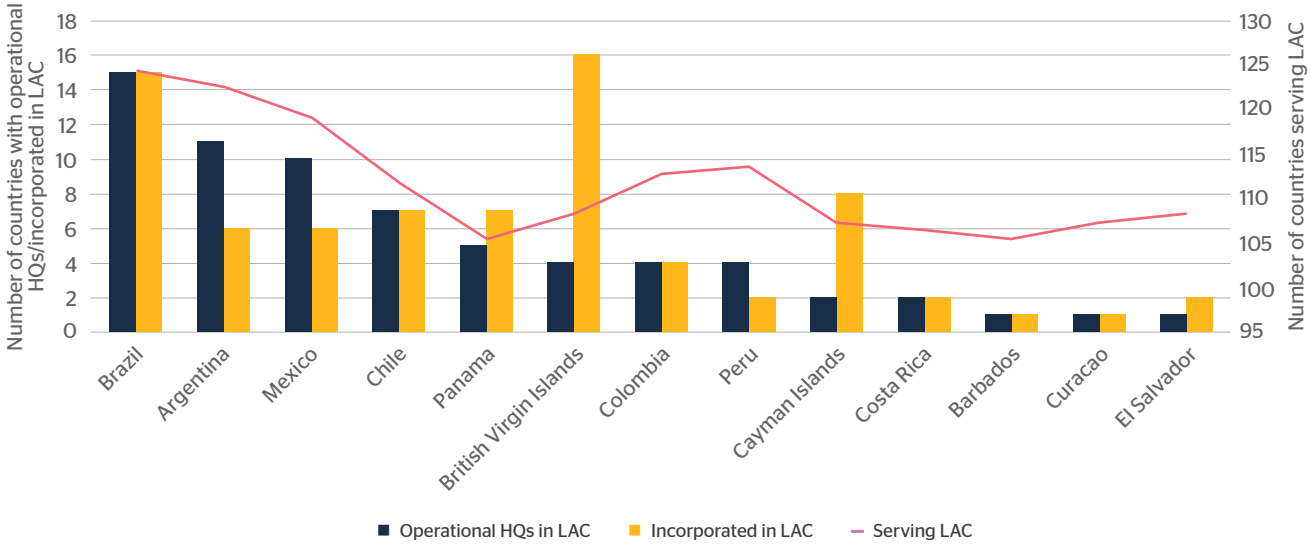
Source: CCAF (Cambridge Fintech Ecosystem Atlas)

Figure 2.1: Number of new cryptoasset fintech firms launched in LAC per year between 2010 and 2021

2 The analysis excludes spin-offs from incumbent firms, bigtechs, and blockchain and cryptoasset firms that do not meet the operational definition of fintech in providing or enabling financial services, such as data and analytics cryptoasset firms; media, events and entertainment firms; infrastructure providers; and cryptoasset firms offering other uncategorised activities such as notarisation and time stamping. Furthermore, firms must have been active for at least one year and have a traceable digital footprint to be included in the sample. Please refer to the Atlas methodology for more details.

Geographical distribution and regional hubs

Figure 2.2 shows that the distribution of cryptoasset fintech firms with operational HQs in LAC is geographically uneven, with a high concentration of firms in the economic centres of Brazil (15), Argentina (11) and Mexico (10). The British Virgin Islands and the Cayman Islands stand out in the list of countries where cryptoasset companies are incorporated.[3] It is important to note that, in general, many companies serve the region and do not have their operational HQs or parent organisation incorporated there. According to the Atlas sample, most countries in the region are served by over 100 companies.

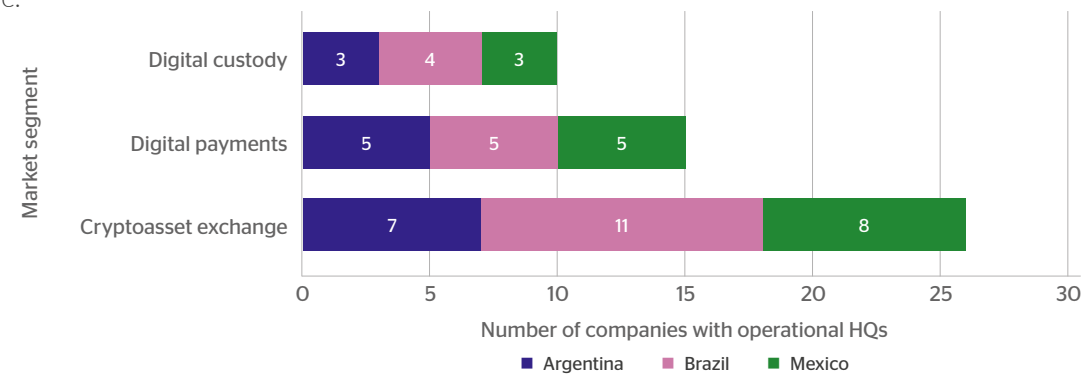


Source: CCAF (Cambridge Fintech Ecosystem Atlas)

Figure 2.2: Number of cryptoasset companies per country

This geographical distribution of companies with operational HQs in LAC is closely linked to the size of the economies and is similar to the distribution trends in the overall fintech ecosystem. For instance, Brazil, arguably the epicentre of LAC cryptoasset fintech firms, leads the regional ranking based on annual gross domestic product, followed by Mexico, Argentina and Chile.[4] Cryptoasset firms with operational HQs in Brazil are clustered in São Paulo, the largest financial centre in LAC.

Comparing the distribution of cryptoasset fintech firms across the three major regional hubs (Brazil, Argentina and Mexico) reveals how these countries share the three main market segments – cryptoasset exchange, digital payments and digital custody[5] – and Figure 2.3 shows that Brazil is the market leader in all three.



Source: CCAF (Cambridge Fintech Ecosystem Atlas)

Figure 2.3: Main cryptoasset verticals in Brazil, Argentina and Mexico

3 In this context, incorporation jurisdiction means the jurisdiction where the parent organisation is incorporated. The operational headquarters is the country where the organisation predominantly operates.

4 https://www.statista.com/statistics/913999/south-america-income-per-capita/

5 The analysis considers native cryptoasset firms that provide payment and custody services. Spin-offs from incumbent firms, bigtechs and other companies that provide cryptoasset services as a secondary activity are not part of the sample.

Since cryptoasset markets are inherently global, cryptoasset entities are often headquartered in one country while also conducting business in others.[6] Most of the companies incorporated in LAC have operational HQs in the region, but around 32% operate outside the region, mainly in the United States, the United Kingdom and Singapore. Of those 32%, most are incorporated in the British Virgin Islands, followed by the Cayman Islands.

The number of employees of firms active in the region can be used to evaluate the industry's overall maturity. Based on the data presented in Table 2.1, of the total sampled firms that have operational HQs in the region, about 50% are 'micro' (1–10 employees) or 'small' (11–50 employees) businesses, 21% are 'medium-sized' businesses (51–200 employees), and only 3% of firms can be classified as 'large' businesses (more than 200 employees). There is a significantly higher number of large enterprises if we consider all companies serving the region, not just those incorporated or with operational HQs there. Multinational cryptoasset fintech companies constitute a substantial share of these enterprises and are primarily headquartered in the United States, followed by Hong Kong SAR, China and Singapore.

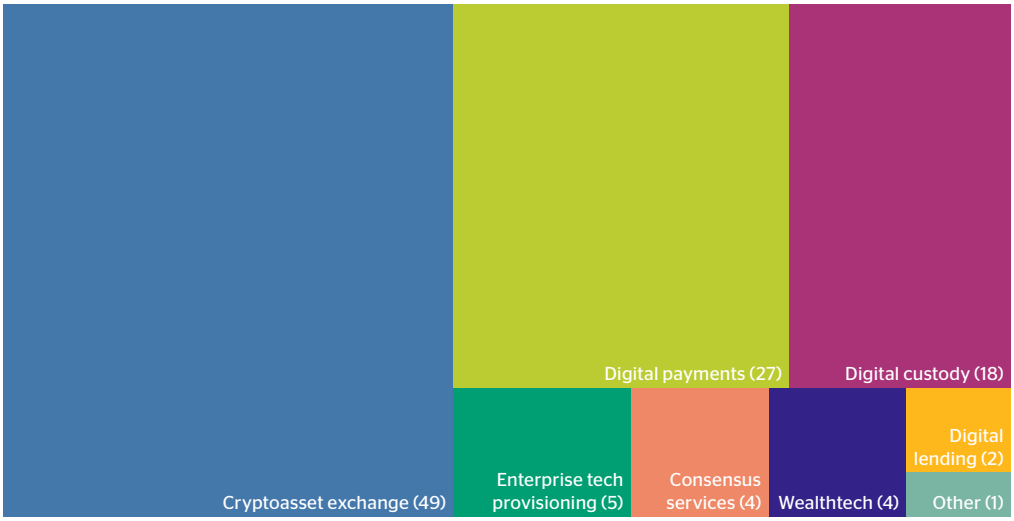
Table 2.1: Number of employees of cryptoasset fintech firms with operational HQs in LAC

Number of employees	Distribution of employee numbers (%)
1–10 (micro business)	22.7
11–50 (small business)	27.3
51–200 (medium-sized business)	21.2
201 or more (large business)	3.0
Unidentified	25.8

Source: CCAF (Cambridge Fintech Ecosystem Atlas)

Market segmentation

Cryptoasset firms' activities are categorised into segments and subsegments based on their business model and value chain positioning. The CCAF classification in Figure 2.4 illustrates a non-exhaustive list of fintech cryptoasset segments within the broader cryptoasset industry. The Atlas sample contains 66 cryptoasset companies with operational HQs in the region, of which 74% (represented by 49 companies) work in the cryptoasset exchanges segment, 41% provide digital payment services and 27% offer users digital custody. Other relevant segments are enterprise tech provisioning (including services related to enterprise blockchain solutions and application programming interface (API) management), consensus services (including mining pool operations), wealthtech (including personal financial management and planning) and digital lending.



Note: The figure in brackets next to each segment indicates the number of companies with operational HQs in LAC for that segment. Segments are not mutually exclusive; in most instances, firms offer services in multiple segments in parallel.

Source: CCAF (Cambridge Fintech Ecosystem Atlas)

Figure 2.4: Cryptoasset industry segmentation

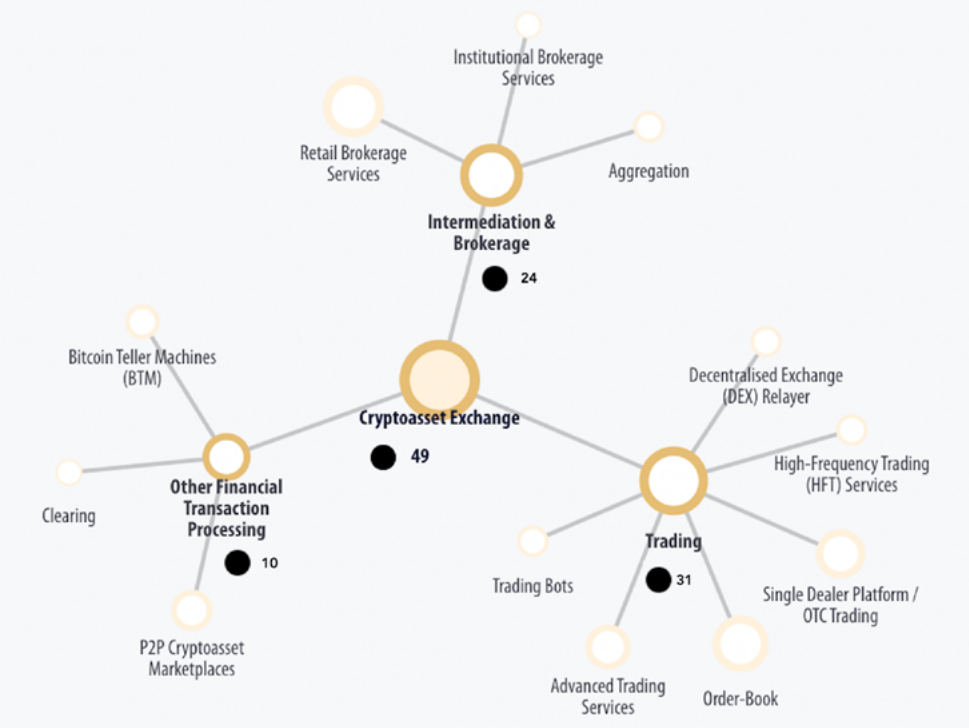
6 https://www.jbs.cam.ac.uk/wp-content/uploads/2020/08/2019-09-ccaf-2nd-global-cryptoasset-benchmarking.pdf

Subsegment breakdown

The following text provides a subsegment breakdown for the three key segments: cryptoasset exchanges, payments and custody.

Cryptoasset exchanges

Cryptoasset exchanges facilitate buying and selling cryptoassets. They usually focus on one or more of the following subsegments (Figure 2.5): (i) trading: providing an online marketplace where buyers and sellers can trade cryptocurrencies for other digital currencies or fiat currencies based on current market prices; (ii) intermediation and brokerage: platforms that offer online financial services to users seeking to buy or sell cryptocurrencies at a premium; and (iii) other financial transaction processing, including bitcoin teller machines (BTM), clearing and peer-to-peer (P2P) cryptoasset marketplaces. Table 2.2 provides more details on these subsegments, including the most popular activities (categories) and their definitions.



Note: The quantities indicate the number of companies with operational HQs in LAC per (sub)segment.
Source: CCAF (Cambridge Fintech Ecosystem Atlas)

Figure 2.5: Cryptoasset exchange subsegments

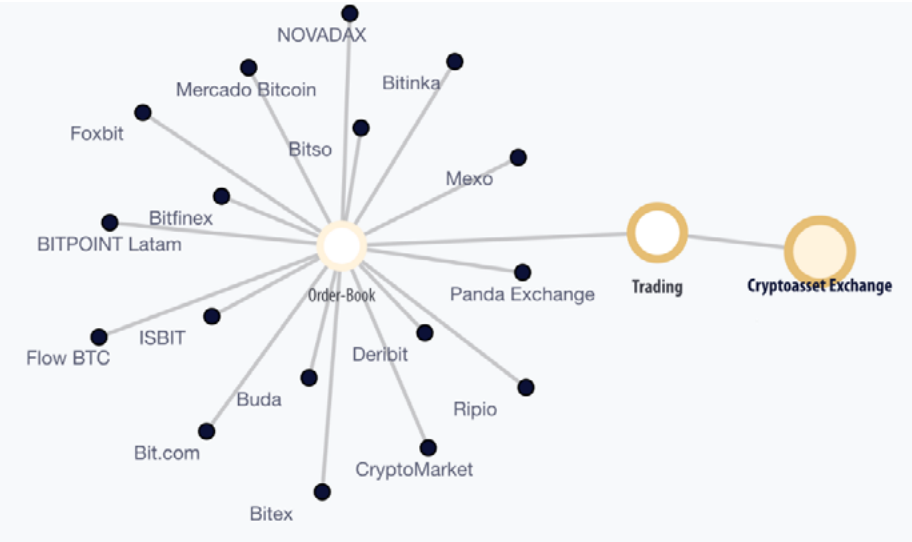
Table 2.2: Number of companies per subsegment and category of the cryptoasset exchange segment

Subsegment	Category	Category definition	Number of companies with operational HQs in LAC	Number of companies serving the region
Trading	Order book	Central limit order book using a trading engine to match buy and sell spot orders from users	17 (35%)	47 (39%)
	Decentralised exchange relayer	P2P relay exchange built on top of a public blockchain	2 (4%)	8 (7%)
	Single dealer platform/over-the-counter trading	Provider enabling clients to engage in bilateral trades outside formal trading venues	11 (22%)	32 (26%)
	Trading bot	Platform using an algorithm to optimise trading strategies	2 (4%)	3 (2%)
	High-frequency trading services	Provider enabling automated market-making and arbitrage strategies	2 (4%)	4 (3%)
	Advanced trading services	Services allowing users to buy portfolio bundles and access more sophisticated trading tools (for example, margin and derivatives)	8 (16%)	27 (22%)
Overall number of companies in the trading subsegment			*31 (63%)*	*75 (62%)*
Intermediation and brokerage	Retail brokerage services	Platform allowing users to buy and sell cryptoassets at fixed prices and submit orders	22 (45%)	49 (40%)
	Institutional brokerage services	Provider executing trade orders on behalf of its institutional clients	1 (2%)	10 (8%)
	Aggregation	Platform aggregating prices to facilitate trade selection for consumers	2 (4%)	9 (7%)
Overall number of companies in the intermediation and brokerage subsegment			*24 (49%)*	*62 (51%)*
Other financial transaction processing	BTM	Machine allowing users to buy and sell cryptoassets in exchange for physical cash	3 (6%)	4 (3%)
	P2P cryptoasset marketplaces	Buyer and seller matching platforms, often coupled with cryptocurrency escrow services	6 (12%)	14 (12%)
	Clearing	Transmitting, reconciling and, in some cases, confirming transfer orders from the time a commitment for a transaction is made until it is settled	1 (2%)	2 (2%)
Overall number of companies in the other financial transaction processing subsegment			*10 (20%)*	*19 (16%)*
Overall number of companies in the cryptoasset exchange segment			***49 (100%)***	***121 (100%)***

Note: Categories and subsegments are not mutually exclusive; in many instances, firms offer services in multiple subsegments and their categories in parallel. The percentages indicate the proportion of companies in the cyptoasset exchange segment.

Source: CCAF (Cambridge Fintech Ecosystem Atlas)

Table 2.2 also compares the number of service providers for different cryptoasset exchange activities in LAC. The three largest exchange activities are order-book trading (offered by 35% of companies headquartered in LAC and working in the cryptoasset exchange segment), retail brokerage services (45%) and single dealer platform/OTC trading (22%). Figure 2.6 provides examples of companies offering order-book trading.

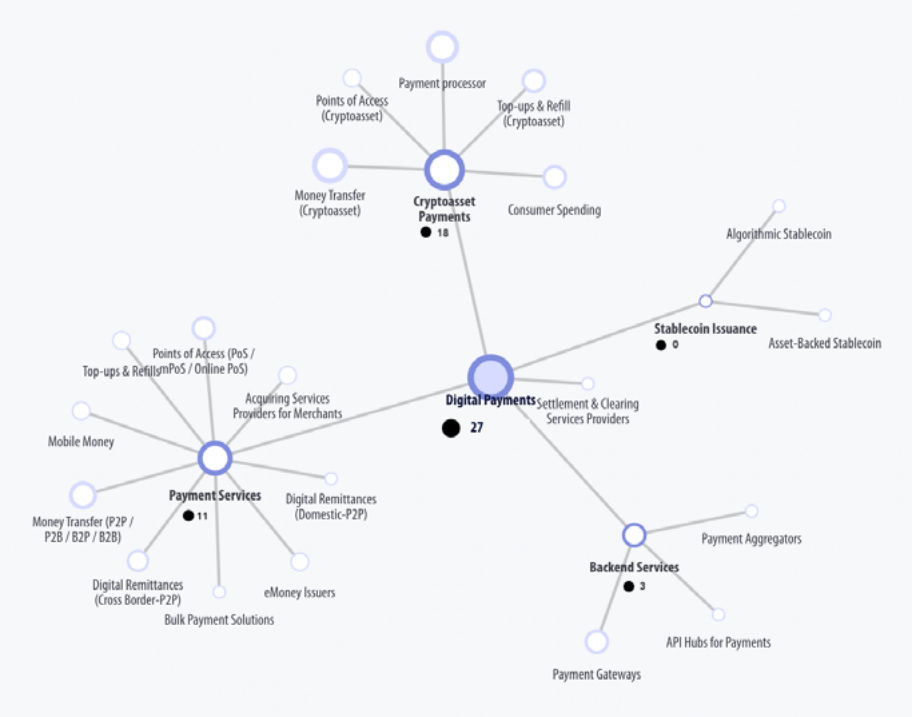


Source: CCAF (Cambridge Fintech Ecosystem Atlas)

Figure 2.6: Examples of headquartered companies offering order-book trading services

Digital payments segment

Cryptoasset payment service providers play a crucial role in fostering the use of cryptoassets as a means of exchange. Payment firms focus on one or more of the following digital payments market activities using cryptoassets as a vehicle: money transfers, points of access, payment processors, consumer spending, and top-ups and refills (Figure 2.7).



Note: The quantities indicate the number of companies with operational HQs in LAC per (sub)segment.
Source: CCAF (Cambridge Fintech Ecosystem Atlas)

Figure 2.7: Digital payments subsegments

Table 2.3 focuses on the number of LAC companies across different categories of the cryptoasset payments subsegment and provides their definitions.

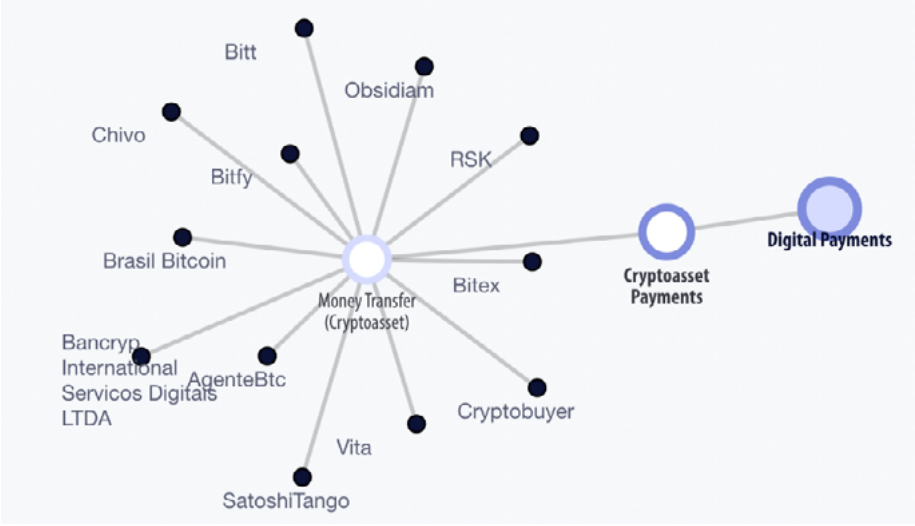
Table 2.3: Number of companies per category of the cryptoasset payments subsegment

Subsegment	Category	Category definition	Number of companies with operational HQs in LAC	Number of companies serving the region
Cryptoasset payments	Money transfers (cryptoasset)	Provide means of payment to access, use and transfer funds for various use cases, for example, remittances and bill payments	12 (44%)	27 (41%)
	Consumer spending	Provides debit cards or other ways for consumers to spend their cryptoassets	3 (11%)	10 (15%)
	Top-ups and refills (cryptoasset)	Provider facilitating top-ups or refills of various products and services, for example, mobile contracts and prepaid cards	3 (11%)	5 (8%)
	Payment processor	Provides services for processing electronic transactions	9 (33%)	19 (29%)
	Points of access (cryptoasset)	Provide hardware or software to capture payment transactions and transmit them to a network, such as a point of sale (PoS), mobile PoS or online PoS	1 (4%)	4 (6%)
Overall number of companies in the cryptoasset payments subsegment			*18 (67%)*	*41 (62%)*
Overall number of companies in the digital payments segment			***27 (100%)***	***66 (100%)***

Note: Categories and subsegments are not mutually exclusive; in many instances, firms offer services in multiple subsegments and their categories in parallel. The percentages indicate the proportion of companies in the digital payments segment.

Source: CCAF (Cambridge Fintech Ecosystem Atlas)

Money transfers and payment processor services are the most popular activities in the cryptoasset payments subsegment. These services are provided by 44% and 33%, respectively, of the 27 cryptoasset companies offering digital payments and headquartered in LAC. The dominance of cryptoasset companies offering money transfers (see Figure 2.8 for examples) confirms the idea that cryptocurrencies can be used as an alternative means of receiving foreign remittances in LAC.

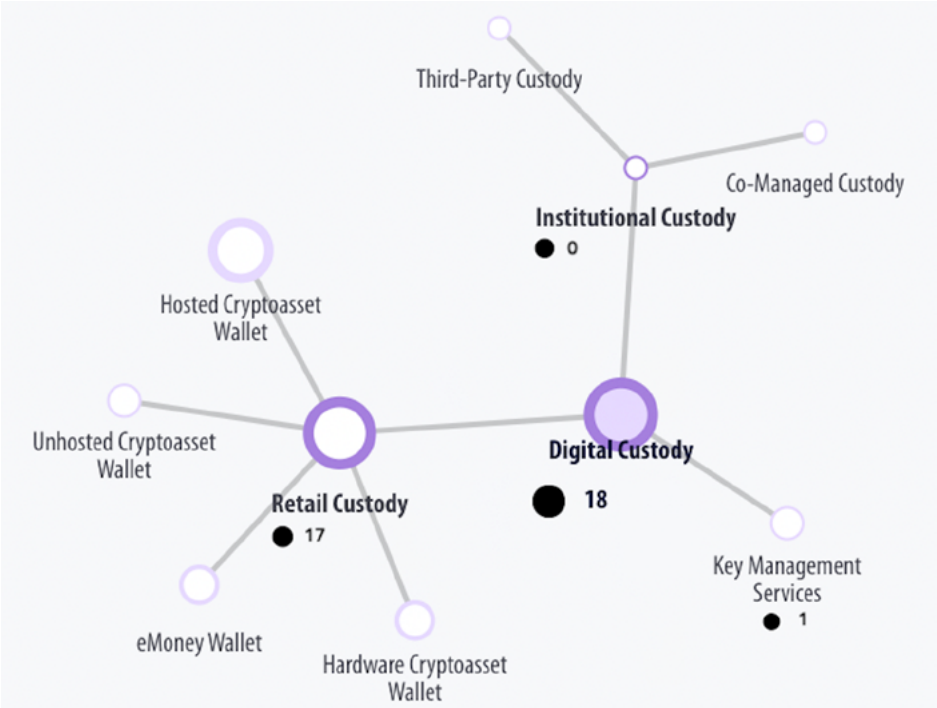


Source: CCAF (Cambridge Fintech Ecosystem Atlas)

Figure 2.8: Examples of headquartered companies offering cryptoasset money transfer services

Digital custody segment

Digital custody providers in the cryptoasset ecosystem are responsible for securing their clients' cryptoassets. They do this by cryptographically protecting the assets using secure key management. According to the Atlas sample, the most important subsegment is retail custody: 94% of the LAC-headquartered cryptoasset companies in the digital custody segment offer their services to retail clients (see Figure 2.9 for an overview of the subsegments).



Note: The quantities indicate the number of companies with operational HQs in LAC per (sub)segment.
Source: CCAF (Cambridge Fintech Ecosystem Atlas)

Figure 2.9: Digital custody subsegments

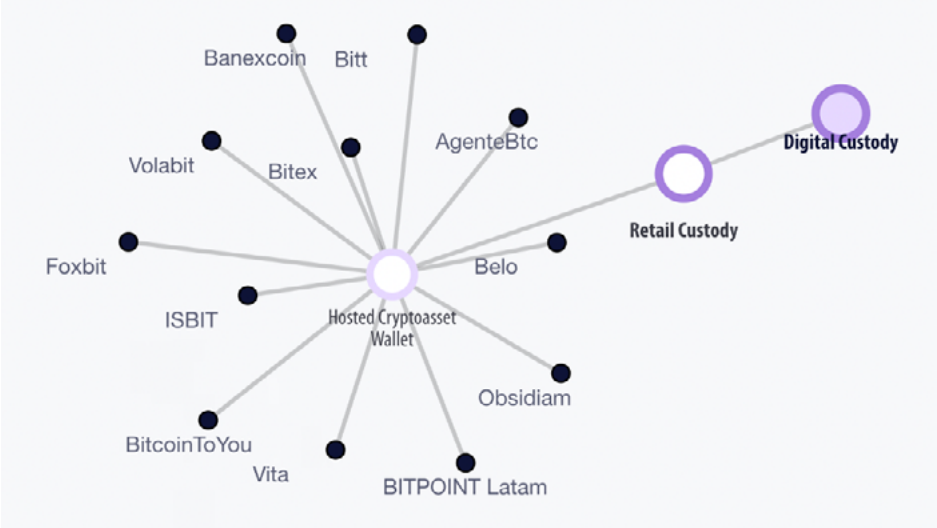
Table 2.4 focuses on the retail custody activities, provides their definitions and compares the number of cryptoasset companies in LAC. The most popular activity is a hosted cryptoasset wallet service. It is part of the product portfolio for 67% of the headquartered companies in the digital custody segment.

Table 2.4: Number of companies per category of the retail custody subsegment

Subsegment	Category	Category definition	Number of companies with operational HQs in LAC	Number of companies serving the region
Retail custody	Hardware cryptoasset wallets	Small devices that securely store private keys without exposing them to connected machines	2 (11%)	4 (8%)
	Unhosted cryptoasset wallets	Non-custodial applications that store cryptoassets on a device, for example, a mobile phone, desktop computer or tablet	1 (6%)	8 (15%)
	Hosted cryptoasset wallets	Custodial applications that store cryptoassets on a device (for example, a mobile phone, desktop computer or tablet) or that can be accessed from any connected device via a browser	12 (67%)	32 (60%)
Overall number of companies in the retail custody subsegment			*17 (94%)*	*47 (89%)*
Overall number of companies in the digital custody segment			***18 (100%)***	***53 (100%)***

Note: Categories and subsegments are not mutually exclusive; in many instances, firms offer services in multiple subsegments and their categories in parallel. The percentages indicate the proportion of companies in the digital custody segment.
Source: CCAF (Cambridge Fintech Ecosystem Atlas)

Many exchanges and payment service providers include wallets in their offerings, meaning they also act as custodial service providers. Figure 2.10 provides examples of companies offering hosted cryptoasset wallets, most of which also offer exchange and payment services.



Source: CCAF (Cambridge Fintech Ecosystem Atlas)

Figure 2.10: Examples of headquartered companies offering hosted cryptoasset wallets

The cryptoasset ecosystem relies heavily on custody services, which are becoming even more important as traditional financial institutions enter the cryptoasset space and seek reliable and secure solutions.

Cryptoasset owners can choose between self-custody, where they manage and protect the assets themselves, and third-party custody (hosted wallets), where they entrust an external entity to handle their private keys on their behalf. This choice may have significant implications for the security and ownership of cryptoassets, as the popular saying 'Not your keys, not your coins' suggests. This phrase reflects the risk of owners losing access to their cryptoassets if the third-party custodian is hacked, compromised or corrupt.

In the early days of Bitcoin in 2009, self-custody was the default option for cryptoasset owners. However, as the market evolved, centralised platforms such as the Mt Gox exchange emerged and offered to custody their users' assets in exchange for convenience and liquidity. Mt Gox dominated the Bitcoin market in 2014, handling over 70% of Bitcoin transactions. However, when Mt Gox was hacked and lost about USD450 million worth of bitcoin (based on the BTC market cap at that time), it exposed the vulnerability of third-party custody and highlighted the need for proper security standards and practices to protect consumers' private keys.

2.2 LAC private sector survey findings

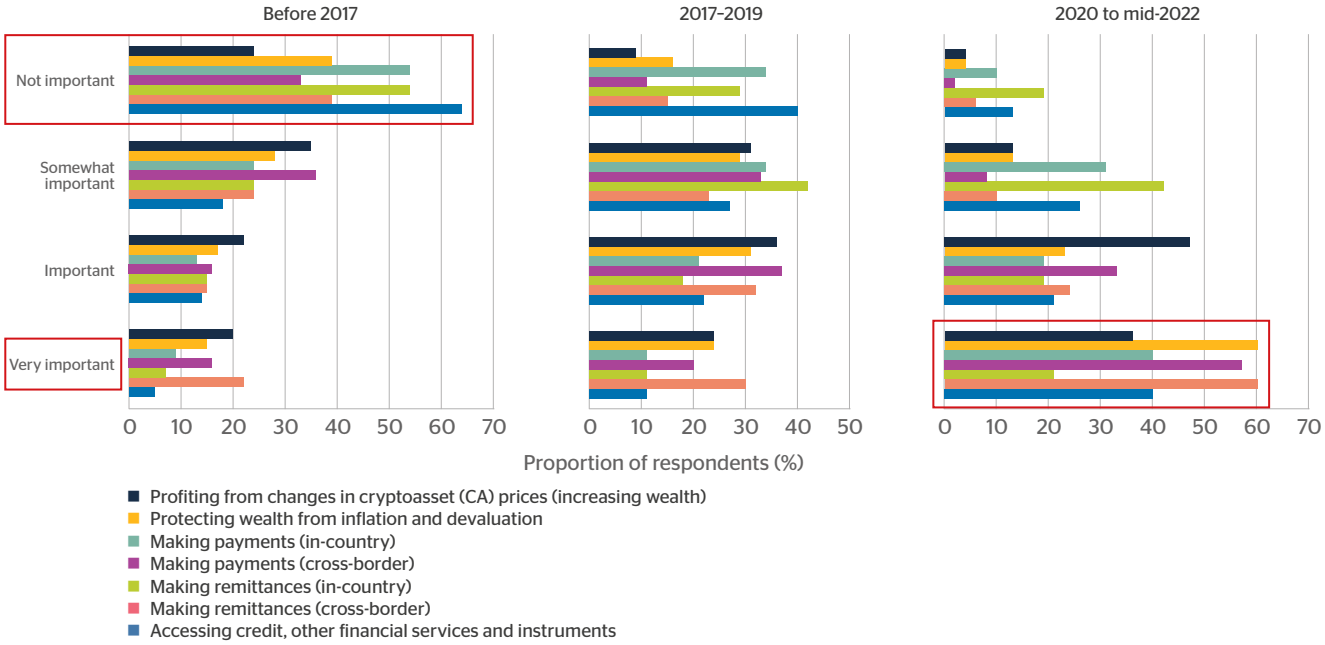
This section aims to shed light on the driving forces behind cryptoasset use cases, track changes in cooperation between various stakeholders and define the key challenges and opportunities for the growth of the cryptoasset ecosystem in LAC. It provides a snapshot of the ecosystem and stakeholder opinions in mid-2022 and is based on 52 survey responses from companies providing cryptoasset-related services in the region. Survey participants have operational HQs in 11 countries, including Argentina, Brazil, Chile, Colombia, the Dominican Republic, Mexico, Peru and the USA.

Importance of cryptoasset use cases

One of the distinguishing features of LAC is the range of motivations to use cryptoassets. Interviews with cryptoasset-related companies and findings from previous research revealed that users perceived cryptoassets as an important tool for remittances and as a hedge against inflation in LAC. Survey responses confirm these perceptions but also indicate a significant shift in the attitude toward cryptoassets' value and the critical drivers behind cryptoasset use over time.

As Figure 2.11 shows, between 2020 and mid-2022, the perception of the most important driving forces behind using cryptoassets in LAC changed. The most important drivers, according to respondents, became protecting wealth from inflation and devaluation (60% of respondents consider this use case very important), making cross-border remittances (60%) and making cross-border payments (57%). Before 2020, the most critical driver reported by survey respondents was profiting from cryptoasset price changes. Also noteworthy is that in contrast to the period before 2017, between 2020 and mid-2022, most use cases were stated as being very important.

How important are the different **driving forces behind the use of cryptoassets**?



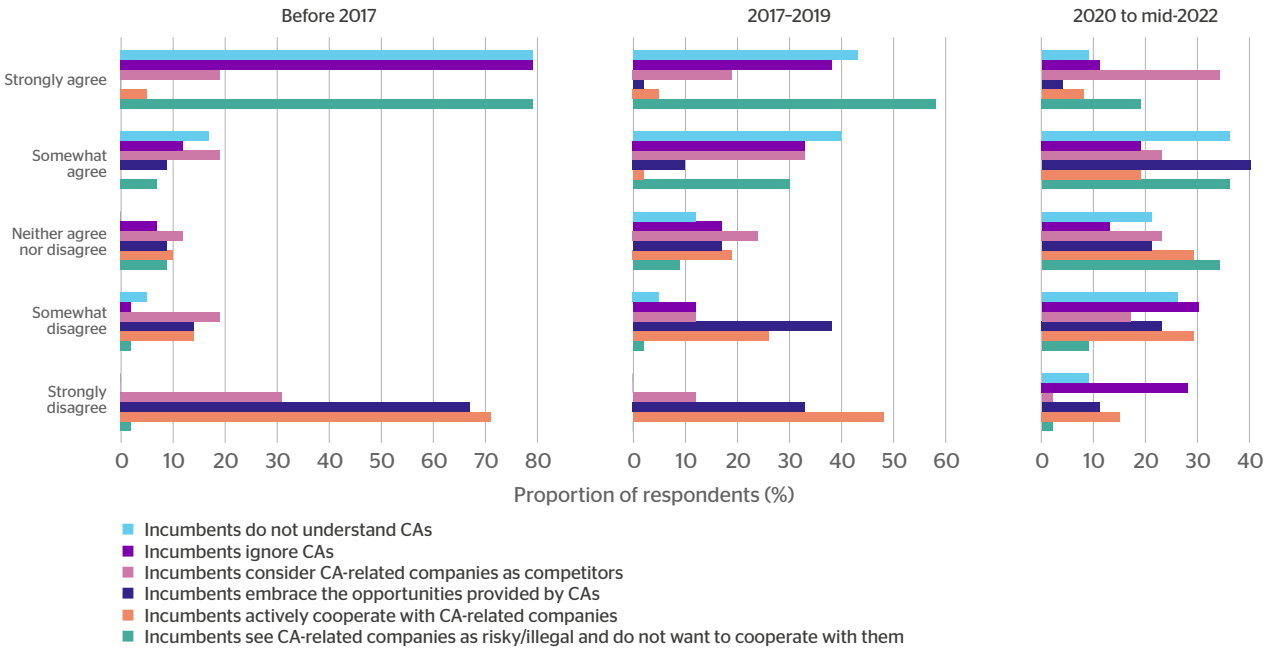
Source: CCAF (LAC private sector survey)

Figure 2.11: There are significant changes in the drivers behind cryptoasset use.

Relationship with regulators and traditional finance

The competition between start-ups and incumbents is often essential to driving innovation and shaping the future of a sector. Approximately 83% of organisations in the cryptoasset ecosystem believe that up until 2020, incumbents did not understand cryptoassets (see Figure 2.12). For the period after 2020 (until mid-2022), one of the most common responses is that incumbents consider cryptoasset-related companies as competitors (57% of respondents agree or strongly agree). The most supported statement for both periods – that incumbents see cryptoasset-related companies as risky/illegal and do not want to cooperate with them – has partially lost its significance in the latest period, falling from 88% before 2020 to 55% after 2020.

How much cryptoasset companies agree or disagree with the following statements that describe **relationships with traditional financial** services providers in LAC?

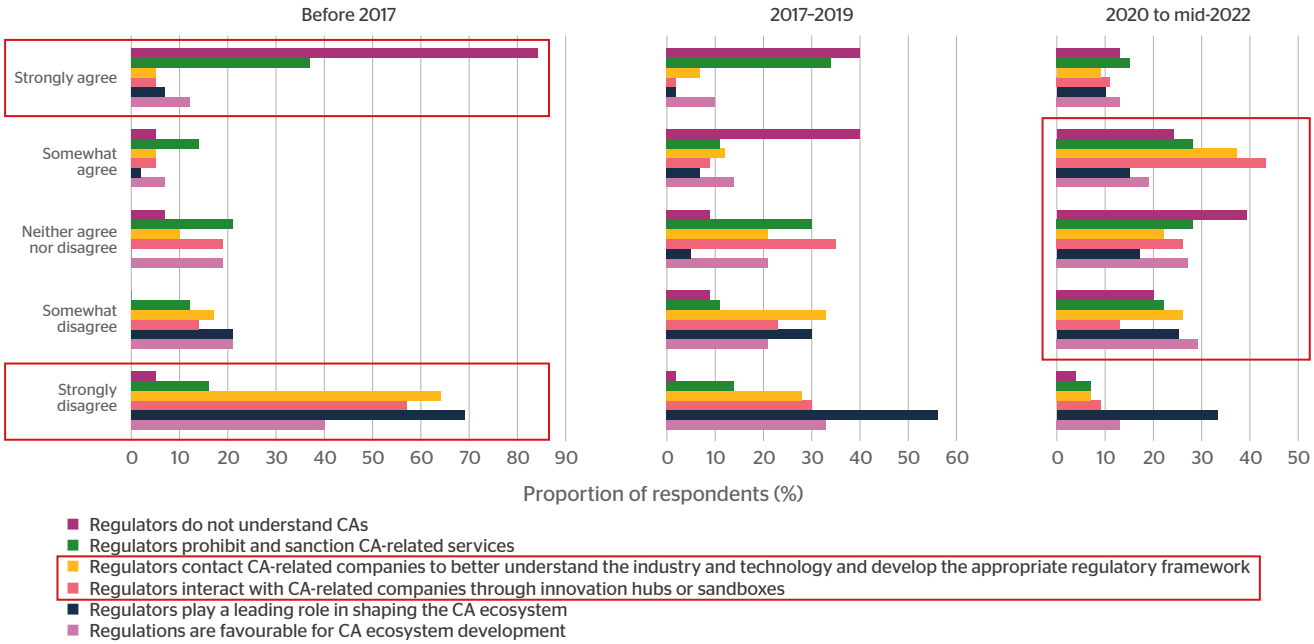


Source: CCAF (LAC private sector survey)

Figure 2.12: Views on cooperation with traditional finance are mixed.

Regarding their relationships with regulators, cryptoasset companies feel there have been some improvements (Figure 2.13) and that regulators understand cryptoassets better. Thirty-seven percent of respondents support the statement that regulators do not understand cryptoassets – a more than 50% decrease compared to the period between 2017 and 2019. The responses indicate a growing interaction with regulators through innovation hubs and sandboxes (from 11% between 2017 and 2019 to 53% after 2020). Despite this increase, there are mixed (and rather negative) views on whether the regulatory environment is favourable and whether there is enough contact between cryptoasset-related companies and regulators.

How much cryptoasset companies agree or disagree with the following statements that describe **relationships with regulators** in LAC?



Source: CCAF (LAC private sector survey)

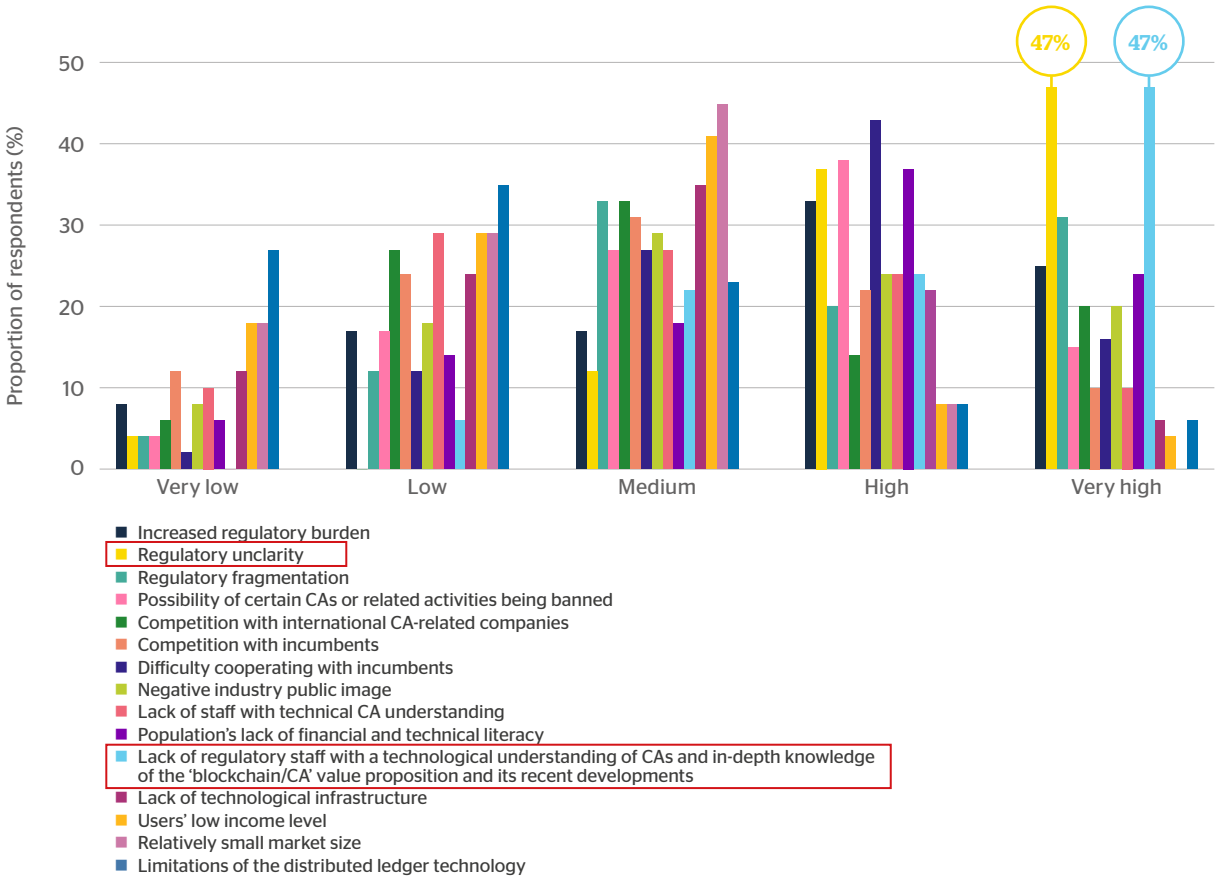
Figure 2.13: Cooperation with regulators via sandboxes and innovation hubs is growing.

Development challenges

Based on the interviews with companies that provide cryptoasset-related services in LAC, a list of 15 challenges that prevent the growth and development of the cryptoasset ecosystem in the region was compiled. According to the respondents who were asked to rate these challenges, the most important are regulatory unclarity (84% of respondents rate their importance as 'high' or 'very high') and lack of regulatory staff with a technological understanding of cryptoassets and in-depth knowledge of the 'blockchain/cryptoassets' value proposition and its recent developments (71%).

Survey respondents believe these challenges are considerably more significant than business-related challenges, such as the difficulty of starting to cooperate with incumbents, competition with other companies, lack of technological infrastructure, lack of talent and the population's poor financial and technical literacy (Figure 2.14).

What are the **main challenges** that prevent further growth and development of the cryptoasset ecosystem in LAC? Rated in terms of importance?

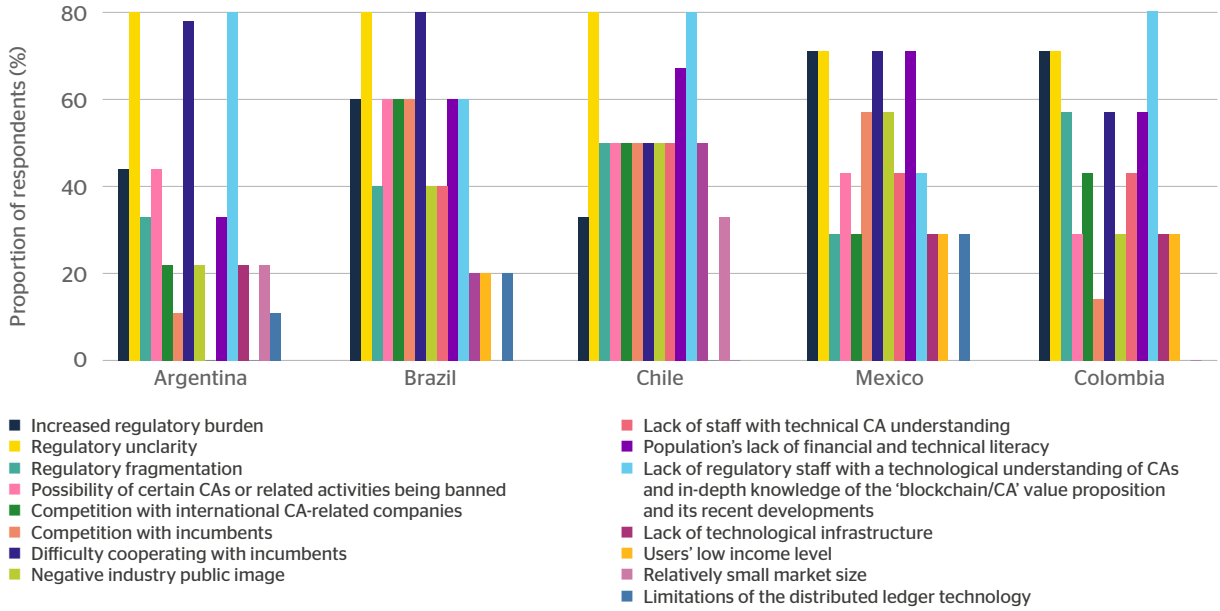


Source: CCAF (LAC private sector survey)

Figure 2.14: The main challenges preventing the growth and development of the cryptoasset ecosystem are related to regulation.

Figure 2.15 provides insight into the peculiarities of certain LAC countries and shows the proportion of respondents that rated the challenges as 'high' or 'very high' in importance. For instance, it suggests that starting to cooperate with incumbents is a relatively more significant challenge in Argentina, Brazil and Mexico than in the LAC region overall. Mexican cryptoasset companies consider the increase in the regulatory burden as a primary challenge, while in Argentina, the challenge of competition with incumbents appears to be the smallest.

What are the **main challenges** that prevent further growth and development of the cryptoasset ecosystem in LAC?



Note: The vertical axis is cut at 80% to prevent attributing answers to companies.

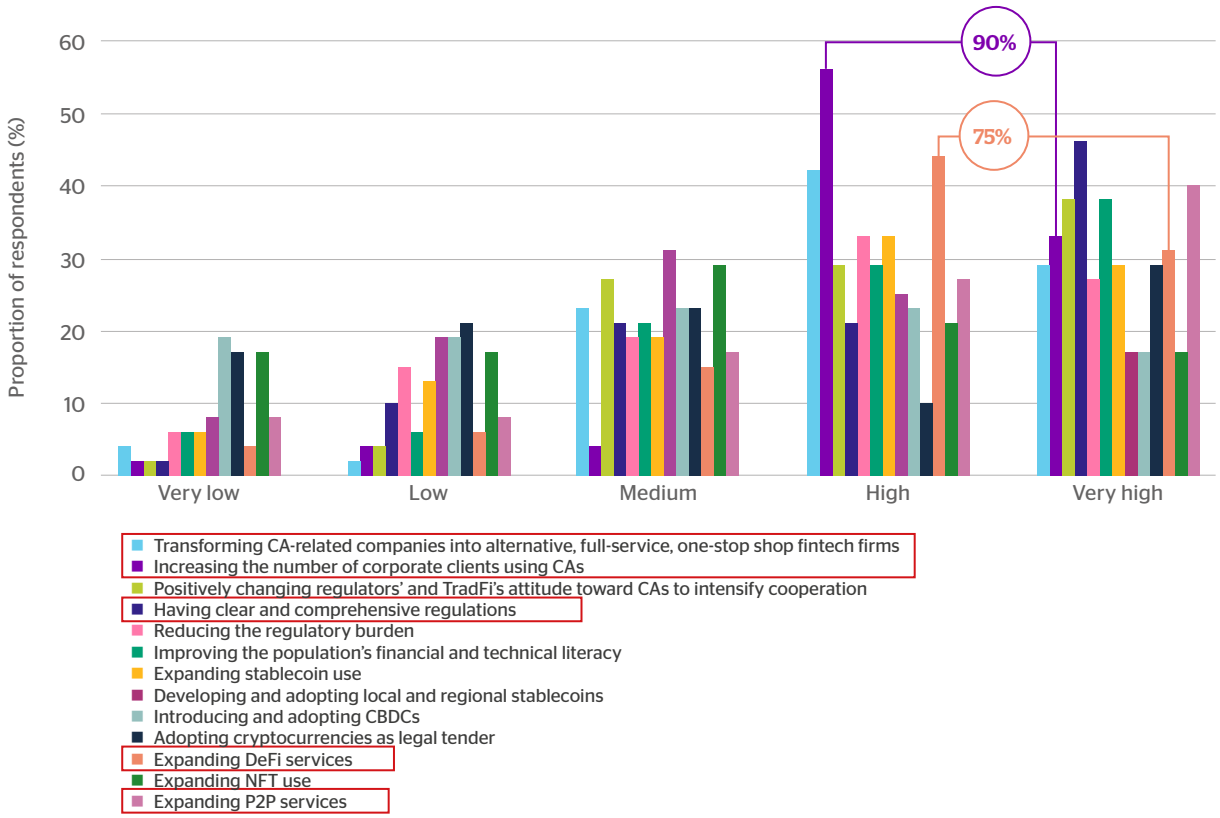
Source: CCAF (LAC private sector survey)

Figure 2.15: Challenges to developing the cryptoasset ecosystem with 'high' or 'very high' importance vary across LAC.

Growth and development opportunities

As Figure 2.16 illustrates, the main opportunities for further growth and development of the LAC cryptoasset ecosystem are increasing the number of corporate clients using cryptoassets (90% of respondents rate the importance as 'high' or 'very high') and expanding decentralised finance (DeFi) services (75%).

What are the **main opportunities** for further growth and development of the cryptoasset ecosystem in LAC? Rated in terms of importance.



Source: CCAF (LAC private sector survey)

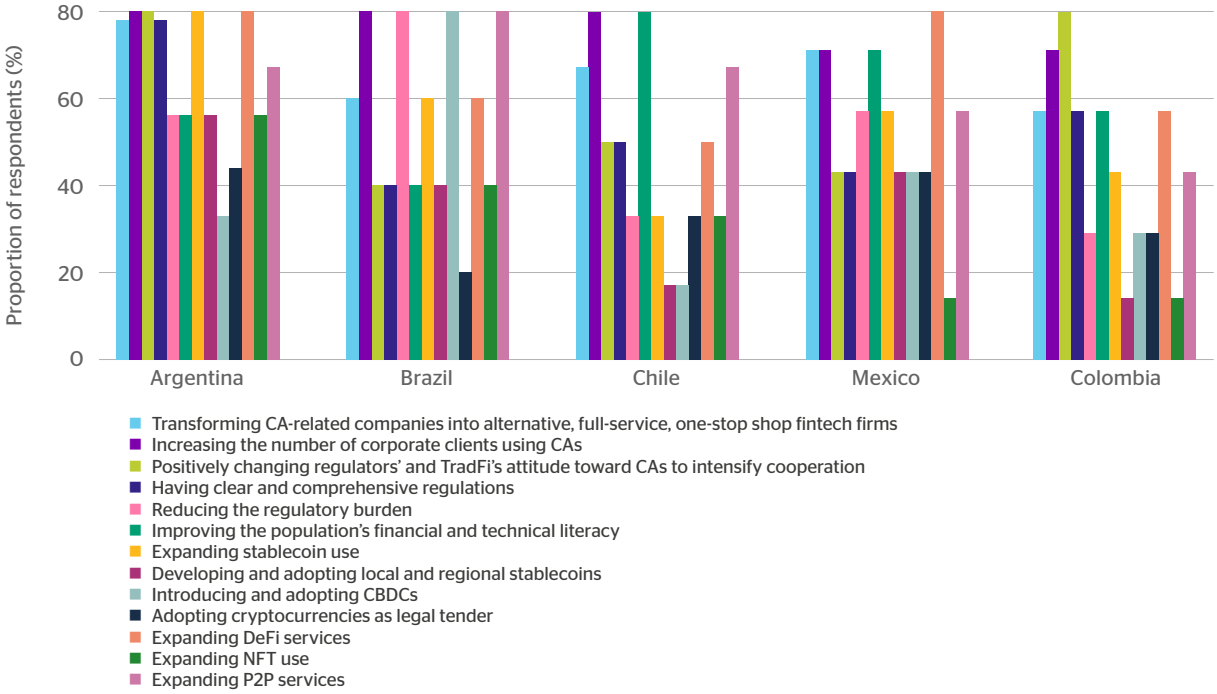
Figure 2.16: Growth of the business-to-business (B2B) segment, clear regulation and DeFi services expansion have 'high' or 'very high' importance as opportunities for development.

Other key opportunities for growth include having clear and comprehensive regulations (reported by 67% of respondents), transforming cryptoasset-related companies into alternative, full-service, one-stop shop fintech firms (71%) and expanding P2P services (67%).

The opportunities considered least important for growth by private sector respondents are expanding non-fungible token (NFT) use (38%), adopting cryptoassets as legal tender (40%) and introducing central bank digital currencies (CBDCs) (40%).

Figure 2.17 shows that key opportunities vary across the region for private sector respondents. Transforming into full-service fintech firms is fundamental in Argentina and Brazil. One of the major opportunities for Chile is improving financial literacy. In Mexico, it is expanding DeFi, and cryptoasset companies in Colombia hope for a positive change in regulators' and traditional finance's perception of cryptoassets. Stablecoins play a much more important role in Argentina, while CBDCs are a key factor in Brazil.

What are the **main opportunities** for further growth and development of the cryptoasset ecosystem in LAC?



Note: The vertical axis is cut at 80% to prevent attributing answers to companies.
Source: CCAF (LAC private sector survey)

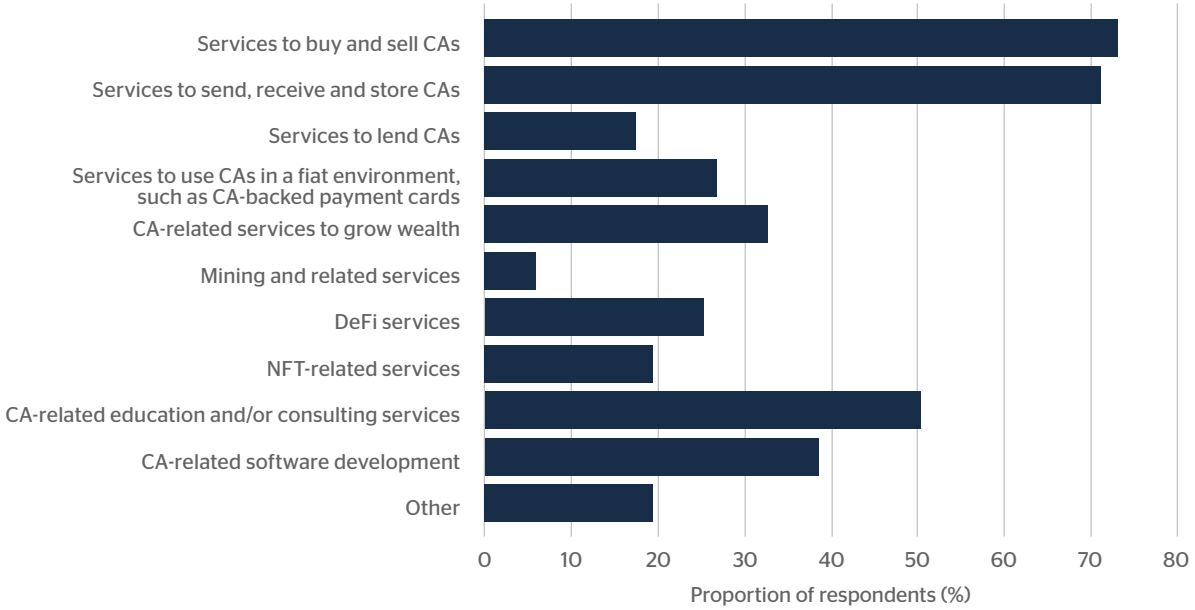
Figure 2.17: Opportunities for growth with 'high' or 'very high' importance vary across LAC.

Transformation into full-service fintech companies

It is essential to highlight that cryptoasset companies are already becoming one-stop shop fintech companies. All surveyed companies provide more than one service and, on average, offer four services.

Figure 2.18 shows that the most commonly offered services are those related to buying and selling cryptoassets (38 companies or 73% of respondents), sending, receiving and storing cryptoassets (37 companies) and cryptoasset-related education and consulting (26 companies). Almost 65% of respondents offer the first two services, and over one-third have a portfolio that includes all three. A common alternative extension to this service package is cryptoasset-related services to grow wealth, for example, portfolio management and interest-earning accounts for cryptoassets. Interestingly, DeFi-related services are often offered with NFT-related services.

Please indicate the **type(s) of cryptoasset-related services** your company provides to customers in LAC.



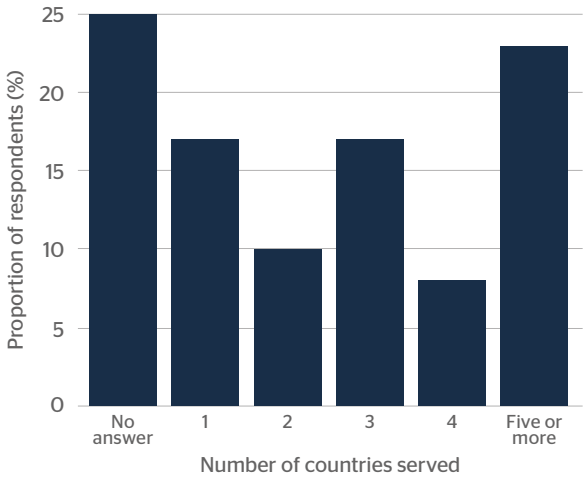
Source: CCAF (LAC private sector survey)

Figure 2.18: Exchange and payment services are the most popular service offerings.

International service offering

A further developmental step for many cryptoasset companies is offering their services internationally. As Figure 2.19 shows, almost half of the cryptoasset companies from LAC already serve three or more countries in the region.

From **how many countries** do most users of your services in the LAC region come?

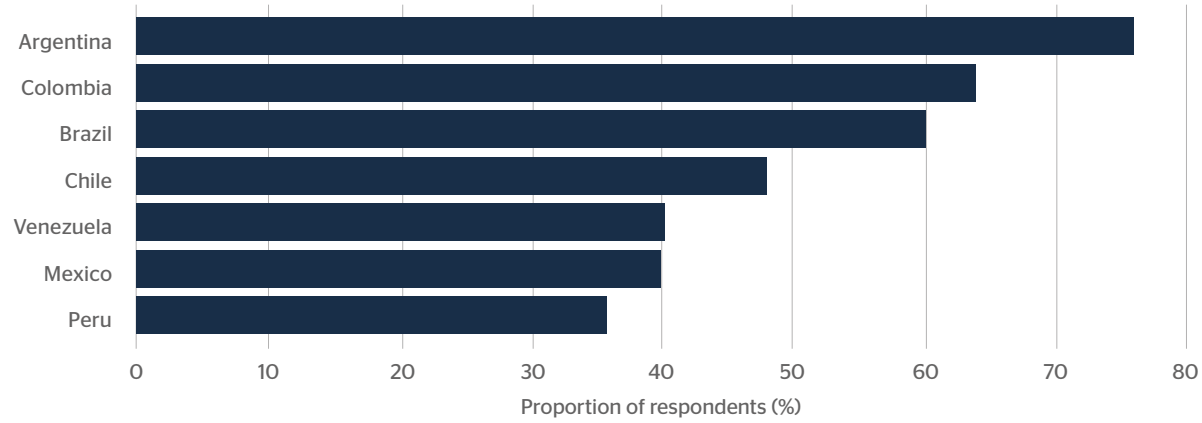


Source: CCAF (LAC private sector survey)

Figure 2.19: Many cryptoasset companies have begun expanding internationally.

The most common combination of countries that cryptoasset companies serve is Brazil and Argentina (one-third of the 52 surveyed firms). This combination often extends to Colombia, Mexico or Chile. Mexico is mainly combined with Argentina, while Venezuela is combined with Colombia. Figure 2.20 shows the main countries from which users of the 25 companies serving three or more markets come.

Which are the top five countries from which most users of your services in the LAC region come?



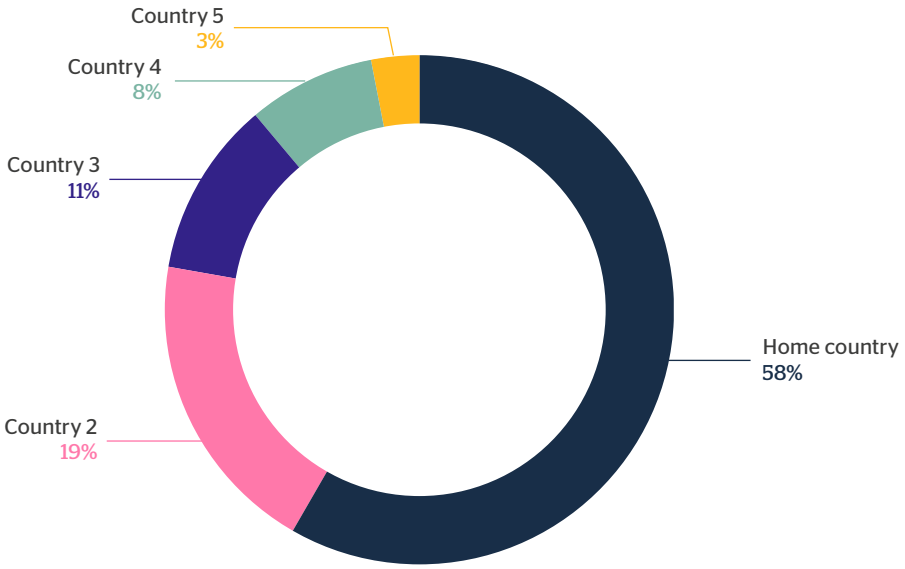
Note: Data is shown for the 25 surveyed companies that serve three or more countries.

Source: CCAF (LAC private sector survey)

Figure 2.20: Argentina, Brazil and Colombia are the top three countries from where users of the surveyed companies come.

Notably, the importance of international markets is relatively high. Figure 2.21 shows the average share of national and international users for companies that serve three or more countries.

What is the **share of the top five countries** from where most users of your services in the LAC region come?



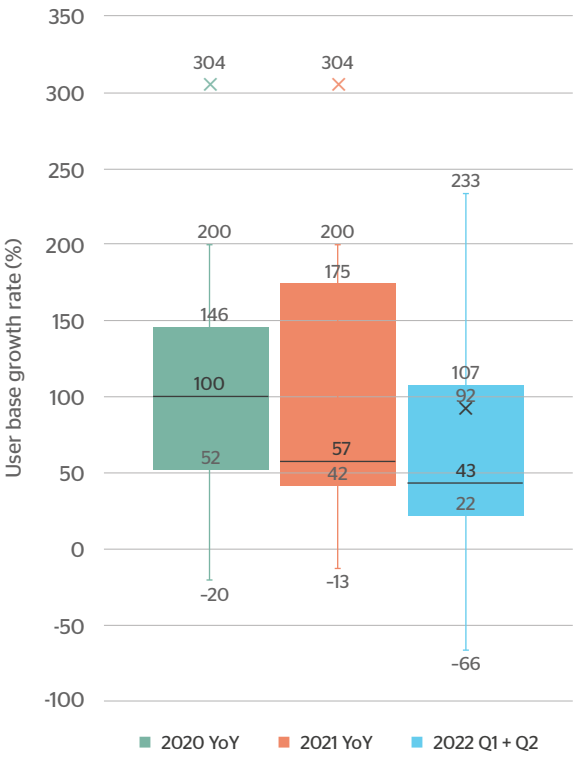
Source: CCAF (LAC private sector survey)

Figure 2.21: International users play an important role in LAC cryptoasset firms.

User growth rate

Offering a more comprehensive service package in multiple countries is closely associated with increasing the number of users. The survey reveals that a median cryptoasset company grew its user base by 100% in 2020 and 57% in 2021. Notably, the median growth rate in the first half of 2022 was almost equal to the annual growth rate for the whole of 2021 (see Figure 2.22). In general, growth rates vary significantly. For example, cryptoasset companies in the second and third quartiles of the sample grew between 44% and 150% in 2021, and due to several outliers, the average growth rate was as high as 305%.

What is your user base growth rate?



Note: Outliers are not shown on the chart.
Source: CCAF (LAC private sector survey)

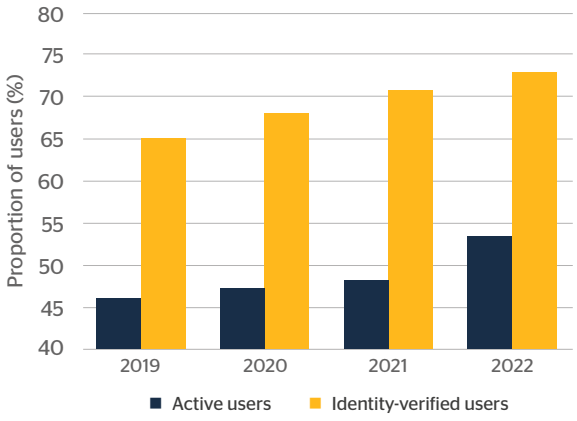
Figure 2.22: Cryptoasset companies doubled their number of users every one to two years.

Publicly available information on cryptoasset companies supports our findings of high growth rates. For instance, the Brazilian cryptoasset exchange Mercado Bitcoin grew from 1 million users to more than 3 million users between 2019 and the first half of 2022.[7] Argentinian cryptoasset platform Ripio, which serves five countries in LAC, reached its milestone of 3 million users at an even more impressive rate (from approximately 350,000 users at the end of 2019).[8]

Relationship with users

Focusing only on the number of users to represent a company's growth can be misleading, as it does not reflect users' engagement with the company's services. The survey data shows an increase in the proportion of active and identity-verified users (see Figure 2.23), indicating that the connection between cryptoasset companies and their users has grown closer.

What are the proportions of active and identity-verified users?



Source: CCAF (LAC private sector survey)

Figure 2.23: The share of active and identity-verified users has increased.

7 https://www.mercadobitcoin.com.br/

8 https://www.ripio.com/ar/institucional/

3 Cryptoasset mining

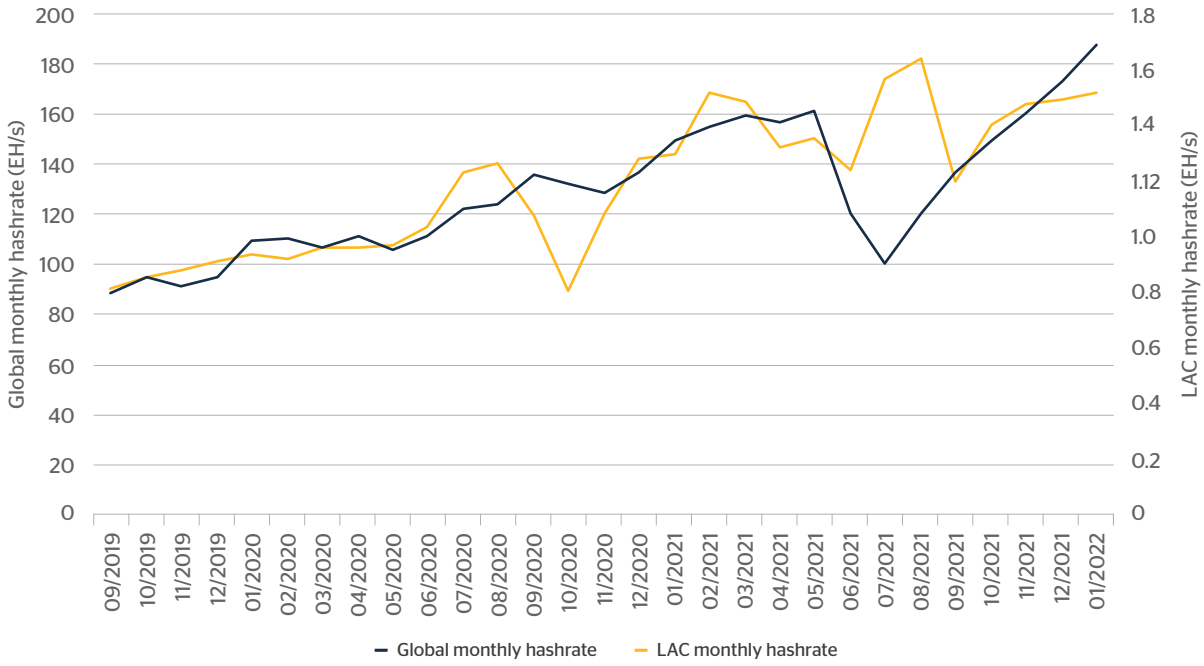
3 Cryptoasset mining

Cryptoasset mining, cryptomining or simply mining is a crucial process behind the proof-of-work (PoW) blockchain consensus mechanism used in Bitcoin and numerous altcoins. Mining, which helps verify transactions and create new cryptoasset tokens, can positively impact the cryptoasset ecosystem by encouraging cryptoasset adoption and providing an income stream for miners. However, cryptomining has raised environmental concerns due to its electricity consumption. This chapter draws on interviews with LAC cryptomining companies, Cambridge Bitcoin Electricity Consumption Index (CBECI) data and secondary data sources. These sources were used to identify the size, trends and geography of cryptomining in LAC while considering multiple stakeholder implications.

3.1 Size and trends of mining activity

LAC has several features that support cryptomining and allow miners to be internationally competitive. These features include abundant power resources, especially from renewable solar and hydro sources, and relatively cheap electricity. Nevertheless, according to the CBECI, mining in LAC represents only 1% of the global Bitcoin mining volume. In July 2021, LAC's maximum global mining share was 1.56% (equivalent to 1.56 EH/s in absolute monthly rate). In October 2020, its minimum global mining share was 0.61% (0.8 EH/s in absolute monthly rate).[9]

Figure 3.1 shows how the global mining hashrate fluctuated between September 2019 and January 2022. Global Bitcoin mining steadily increased during this period, except between June and July 2021, when the mining ban in China significantly decreased the worldwide mining volume. This event allowed other regions to increase their shares and involvement, resulting in the LAC hashrate steadily growing during July and August of 2021. One reason is that LAC became one of the target destinations for migrating Chinese cryptomining companies. According to the *Financial Times*, more than 430,000 mining machines were moved out of China, of which 15,500 ended up in Paraguay and 7,000 in Venezuela.[10]



Source: CCAF (Cambridge Bitcoin Electricity Consumption Index)

Figure 3.1: LAC and global mining hashrate fluctuations

9 The analysed data covers hashrate estimates from September 2019 to January 2022; the minimum and maximum estimates may differ depending on the chosen time span.

10 https://enterprise.ft.com/ft-education-resources/licence-finder/?segmentId=6d5cdd02-8d05-0a6b-b96d-c00c3597de46

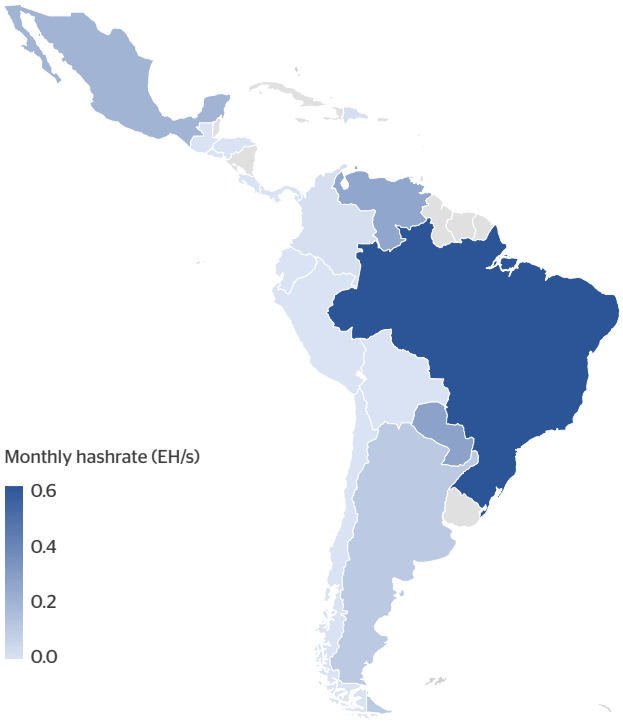
There is some anecdotal evidence that Chinese mining companies sent older equipment to LAC since the region has relatively few cryptoasset regulations and relatively cheap electricity, making mining profitable even with less energy-efficient equipment.[11] In addition to the Chinese miner migration, mining equipment prices decreased during the same period, which LAC miners may have taken advantage of to expand their capacities.[12]

The most recent data from the CBECI is for January 2022 and indicates that Brazil was the Bitcoin mining leader in LAC. Brazil's monthly hashrate of 0.62 EH/s accounted for 0.33% of the global mining activity in January 2022 (see Table 3.1). Other countries that played a significant role in Bitcoin mining at that time were Paraguay (0.15% of global mining), Venezuela (0.14%), Mexico (0.11%) and Argentina (0.06%). The rest of the countries in the region have mining shares equal to or below 0.01% (see Figure 3.2).

Table 3.1: Hashrate in select LAC countries

Country	Average monthly hashrate (2019–2022) (EH/s)	Average share of global mining (2019–2022) (%)	Monthly hashrate (January 2022) (EH/s)	Share of global mining (January 2022) (%)
Venezuela	0.50	0.41	0.26	0.14
Brazil	0.30	0.21	0.62	0.33
Paraguay	0.22	0.18	0.28	0.15
Mexico	0.08	0.06	0.21	0.11
Argentina	0.03	0.03	0.11	0.06
Colombia	0.02	0.02	0.02	0.01
Dominican Republic	0.01	0.01	0.02	0.01

Source: CCAF (Cambridge Bitcoin Electricity Consumption Index)



Source: CCAF (Cambridge Bitcoin Electricity Consumption Index)

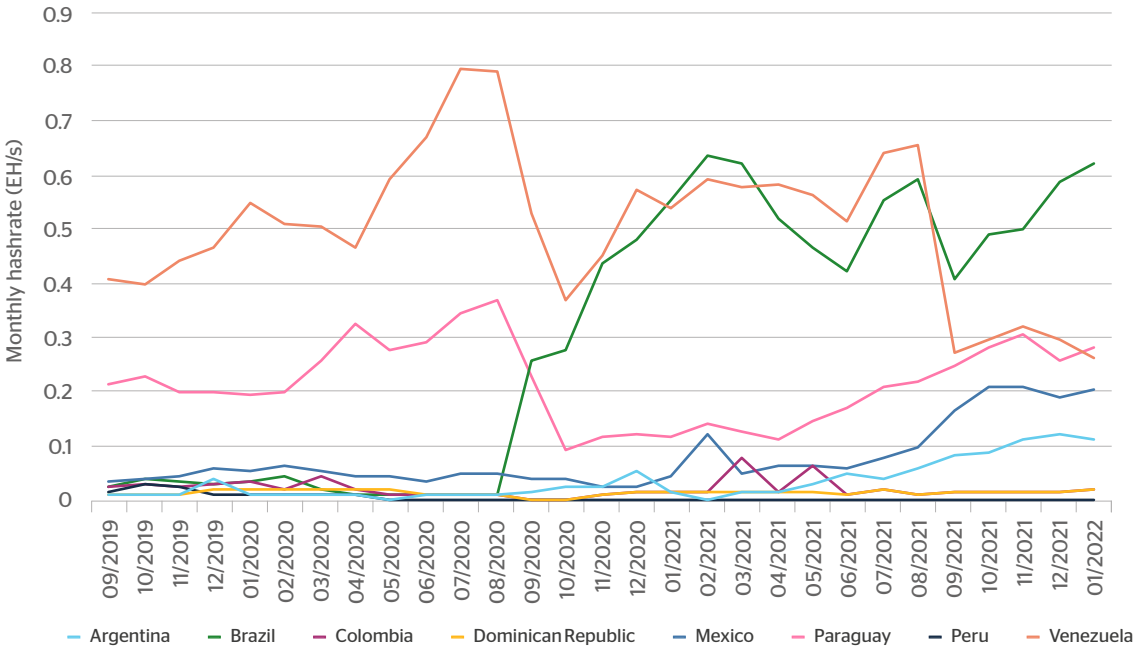
Figure 3.2: Map of regional differences in cryptomining intensity as of January 2022

11 https://www.xataka.com.mx/criptomonedas/millones-maquinas-para-minar-criptomonedas-han-abandonado-china-ultimos-meses-rusia-eua-estan-sus-nuevos-destinos

12 https://www.criptonoticias.com/comunidad/precios-asic-minar-bitcoin-estan-minimos-julio-2021/

Brazil only recently became the leading Bitcoin mining country in LAC. Historical data shows that between 2019 and 2021, Venezuela was at the top of the list. However, from September 2020, the mining volume in Venezuela decreased, falling from 0.79 EH/s in August 2020 to 0.37 EH/s in October 2020.

This sudden decrease could be due to the mining regulations introduced in Venezuela that made it mandatory for miners to obtain a government licence to continue their mining operations.[13] Figure 3.3 suggests that this regulation may have discouraged some miners, as Venezuela did not reach the same cryptomining volume again.



Source: CCAF (Cambridge Bitcoin Electricity Consumption Index)

Figure 3.3: Bitcoin mining hashrate fluctuations in LAC

In contrast, there was little mining activity in Brazil until August 2020, after which there was a sharp and continuous increase until February 2021, when it reached its all-time peak of 0.64 EH/s. Notably, the mining activity growth in Brazil coincides with the sharp decrease in Venezuelan mining activity and the new regulations Venezuela introduced. It is possible that Brazil's share could have been inflated due to redirected IP addresses via the use of virtual private networks (VPNs) or proxy services from Venezuela or other countries.

3.2 Environmental footprint of Bitcoin mining

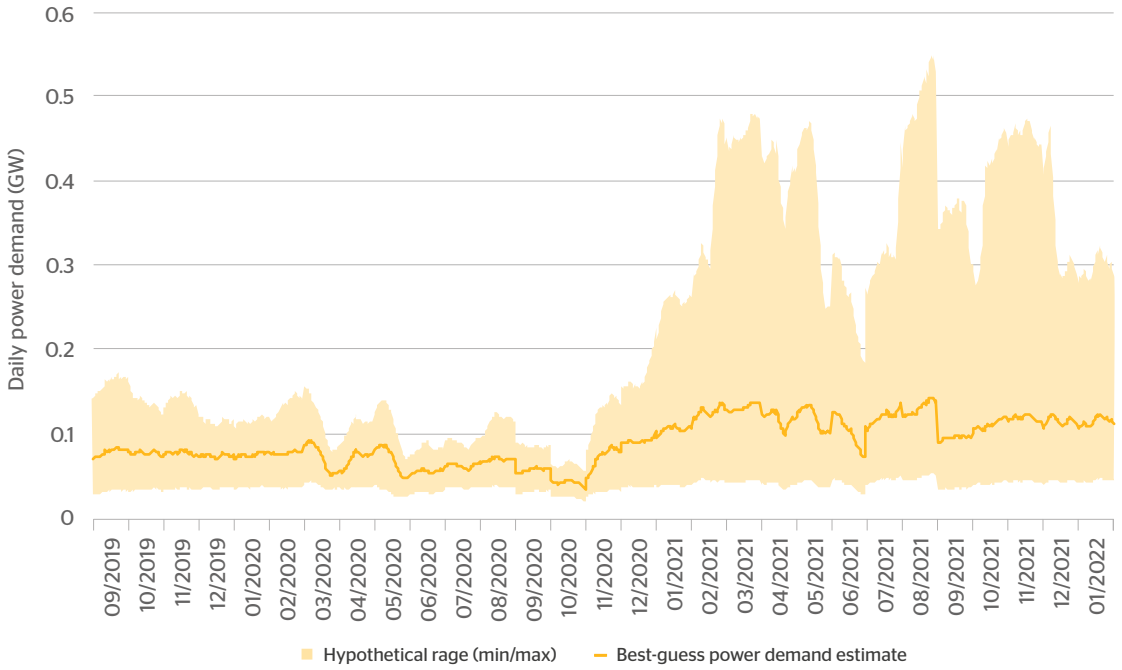
The environmental footprint of Bitcoin mining is an ongoing debate among regulators. The CBECI data allows us to estimate the environmental impact of mining in LAC. It provides daily estimates of the annualised and total greenhouse gas (GHG) emissions and electricity consumption related to Bitcoin mining.

The Bitcoin mining electricity consumption and power demand estimates are based on a model that generates hypothetical minimum (lower bound) and maximum (upper bound) estimates and a best-guess estimate. Detailed information on the methodology and assumptions are on the CBECI website.[14]

According to the most recent data (31 January 2022), the Bitcoin network power demand in LAC was between 0.05 GW (lower bound) and 0.29 GW (upper bound), with a best-guess estimate of 0.11 GW. Figure 3.4 shows the historical fluctuations.

13 https://es.beincrypto.com/venezuela-publica-nueva-regulacion-mineria-criptomonedas/

14 https://ccaf.io/cbeci/ghg/methodology

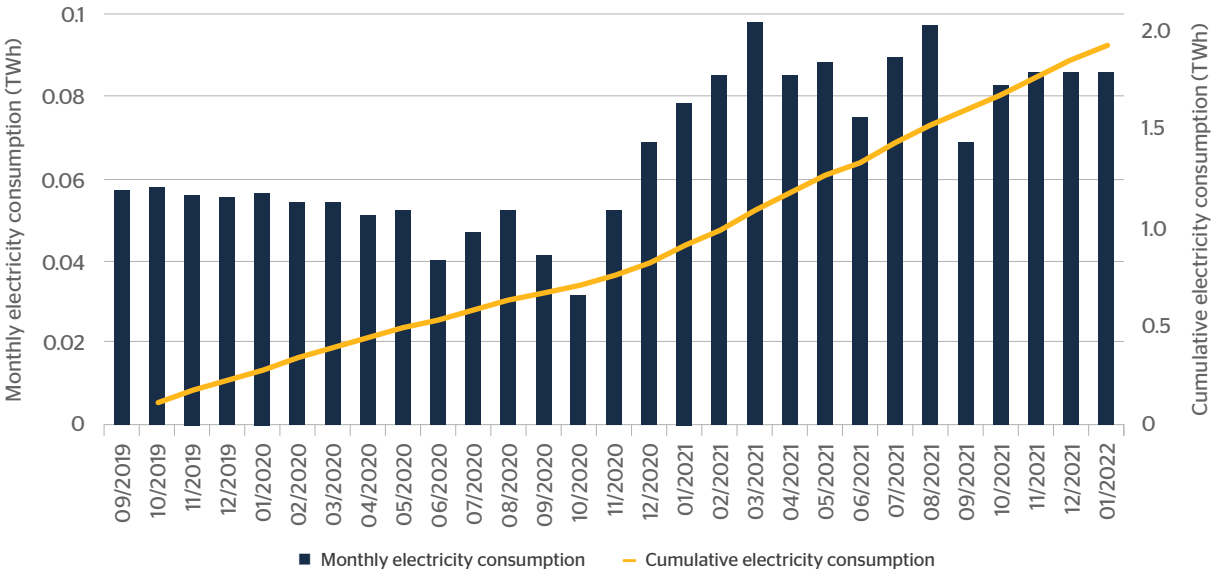


Source: CCAF (Cambridge Bitcoin Electricity Consumption Index)

Figure 3.4: Historical Bitcoin network power demand in LAC: comparison of the hypothetical range (minimum/maximum) and the best-guess estimate

The annualised electricity consumption corresponding to the power demand described above was between 2.51 TWh and 0.40 TWh, with a best-guess estimate of 0.99 TWh. Generally, this estimate rarely exceeds the benchmark of 1 TWh for the entire LAC region. Compared to other types of industries in LAC, the electricity consumption of Bitcoin mining is relatively low.[15] To contextualise this, the total amount of electricity consumed in LAC in 2013 was 1,553 TWh, and it has been increasing ever since.[16]

Figure 3.5 illustrates that after reaching its lowest point in October 2020, the Bitcoin network's electricity consumption in LAC gradually increased until March 2021 and then fluctuated below that level. This is similar to the overall global trend.[17]



Source: CCAF (Cambridge Bitcoin Electricity Consumption Index)

Figure 3.5: Bitcoin mining electricity consumption in LAC

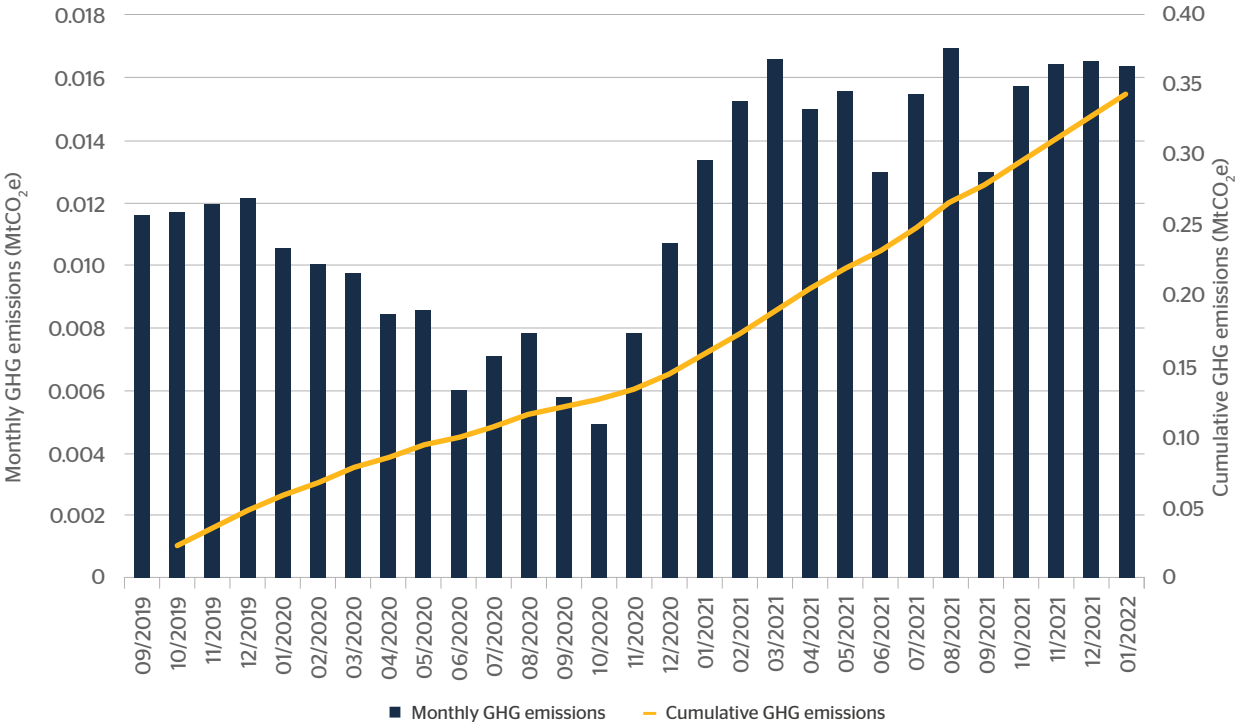
15 See, for instance, https://www.researchgate.net/figure/Electricity-demand-per-sector-TWh_fig4_348424313

16 https://www.researchgate.net/figure/Electricity-needs-through-2040-TWh_tbl1_289768117

17 https://ccaf.io/cbnsi/cbeci

Besides power demand and electricity consumption estimates, GHG emissions are another critical environmental footprint indicator. Hence, the CBECI was extended to include a model that estimates the GHG emissions from Bitcoin mining by analysing the electricity production sources and their associated emissions.

LAC's share in global mining activity was 0.97% in 2021 (the most recent complete annual data available). From this, we could assign approximately 0.55 $MtCO_2e$ (million tonnes of carbon dioxide equivalent) to Bitcoin mining in LAC in 2021. However, after accounting for the LAC countries' electricity mix, the estimate decreases to 0.18 $MtCO_2e$ due to the region's prevalence of wind and solar energy. The estimate for 2021 is 1.88 times higher than for 2020 (0.1 $MtCO_2e$). Figure 3.6 shows the monthly fluctuations of Bitcoin mining GHG emissions.



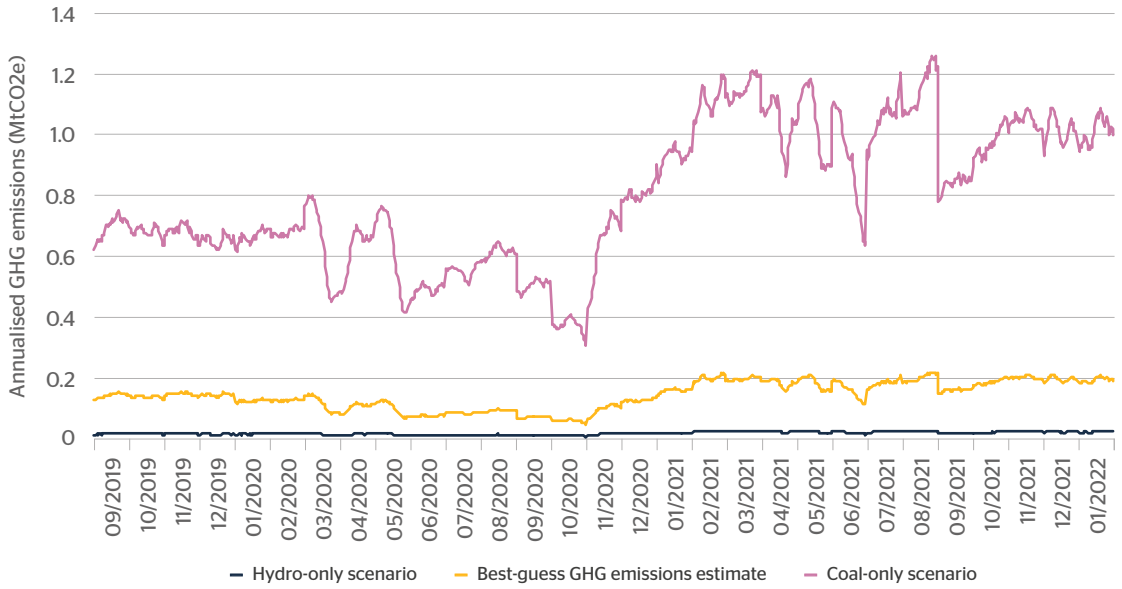
Source: CCAF (Cambridge Bitcoin Electricity Consumption Index)

Figure 3.6: Monthly Bitcoin mining GHG emissions in LAC

In comparison, global Bitcoin mining GHG emissions in 2021 were 56.29 $MtCO_2e$. This estimate is similar to the GHG emissions of countries such as Nepal (48.37 $MtCO_2e$) and the Central African Republic (46.58 $MtCO_2e$) and is equivalent to around half the GHG emissions of gold mining (100.4 $MtCO_2e$).[18]

18 https://www.jbs.cam.ac.uk/insight/2022/a-deep-dive-into-bitcoin's-environmental-impact/

In addition to the previous analysis, three scenarios were compared (see Figure 3.7). The first is an extreme scenario that assumes the entire Bitcoin network is only powered by hydropower. The second extreme scenario assumes the whole Bitcoin network is only powered by coal. The CBECI best-guess estimate lies between these two extreme scenarios and accounts for the region's electricity mix. The energy sources coal and hydropower were selected to highlight the vast difference in GHG emissions at any given level of electricity consumption depending on the energy source powering the network. Hydropower represents the best-case scenario, and coal power is the worst-case.



Source: CCAF (Cambridge Bitcoin Electricity Consumption Index)

Figure 3.7: Annualised Bitcoin mining GHG emissions in LAC

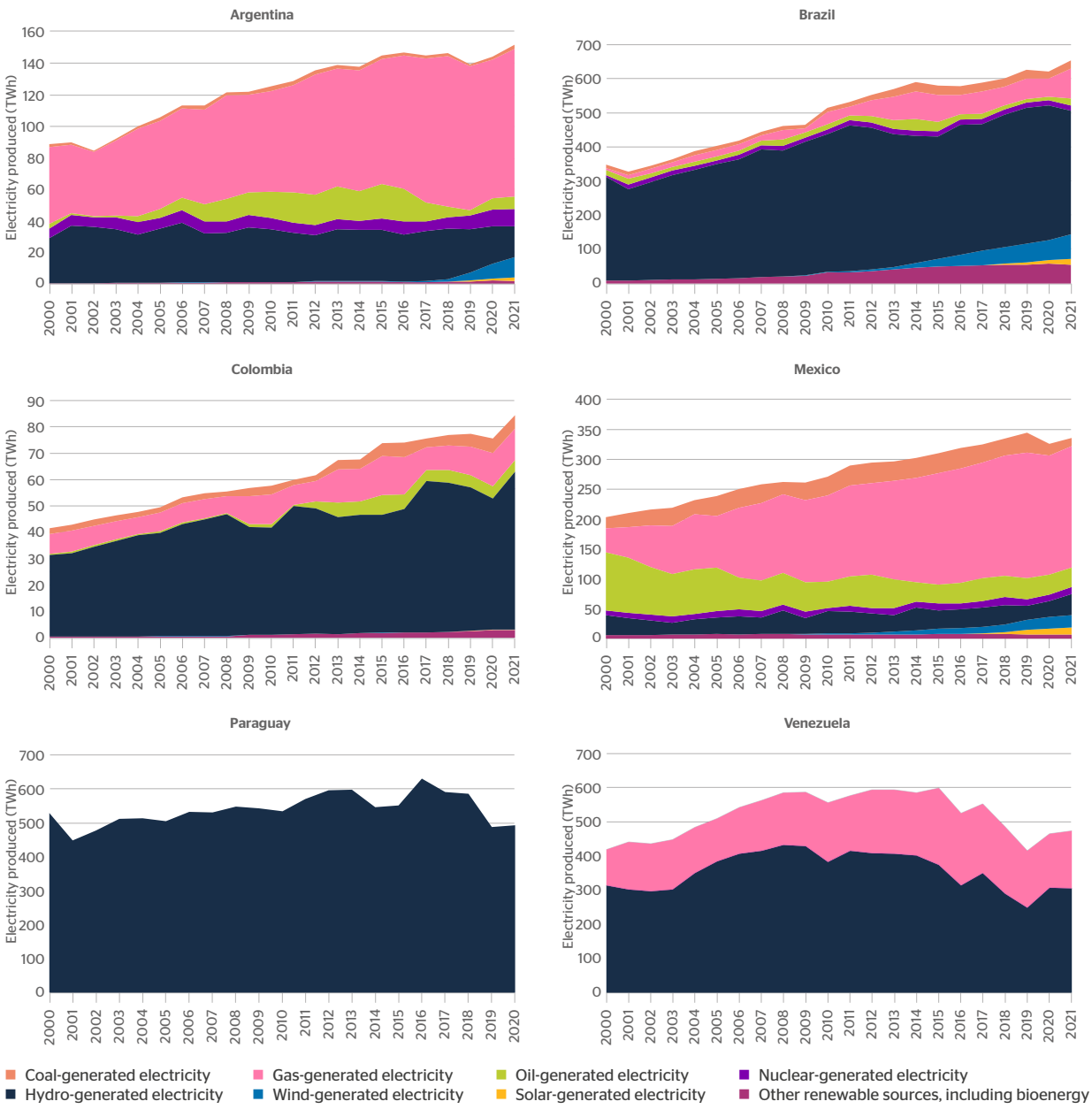
In the hydro-only scenario, Bitcoin mining in LAC would be responsible for about 0.02 $MtCO_2e$, according to the annualised data from 31 January 2022. This number increases to 1 $MtCO_2e$ in the coal-only scenario.

This striking difference highlights the importance of studying Bitcoin's electricity mix in greater detail and the need to distinguish between electricity consumption and climate impact. Although the two are inextricably linked, they are not the same.

According to Our World in Data, based on BP's *Statistical Review of World Energy* (2022), *Ember's Global Electricity Review* (2022) and *Ember's European Electricity Review* (2022),[19] hydropower is the most prevalent energy source in many LAC countries, including Paraguay, Venezuela, Peru, Panama, El Salvador, Costa Rica, Colombia and Brazil. The countries that mainly use gas are Argentina, Bolivia, Mexico, and Trinidad and Tobago. Those that rely on fossil fuels, namely oil, are Jamaica, Honduras, the Dominican Republic, Cuba and the Bahamas. Using coal as an energy source is less widespread in LAC.

Figure 3.8 illustrates the electricity mix in LAC countries with the most mining activity. The graphs show that hydropower is these countries' most common energy source. The relatively low mining activity and the predominant use of renewable energy sources make Bitcoin mining in LAC relatively environmentally sustainable.

19 https://ourworldindata.org/grapher/electricity-prod-source-stacked



Source: Our World in Data

Figure 3.8: Electricity source mix in the six LAC countries with the most mining activity

On top of the relatively low carbon footprint of existing mining activities, several cryptoasset companies in the region are implementing initiatives to capture and offset atmospheric carbon dioxide. For example, Moss Earth specialises in offsetting organisations' footprints through Moss Carbon Credit tokens,[20] and Tropykus offsets its carbon footprint by participating in regenerative finance.[21] These projects illustrate how solutions to the cryptomining industry's problems can originate from both inside and outside the industry.

In conclusion, the Bitcoin mining industry is constantly changing, and this evolution needs to be captured and reflected in future assessments. To meet this challenge, we are continually adjusting and refining the CBECI's methodology as more data becomes available, allowing more granular analysis. Nevertheless, the current methodology has enabled us to show that Bitcoin mining has had a relatively low impact on LAC's environment. Considering the dominance of renewable energy sources used to produce electricity, Bitcoin mining should remain sustainable in most LAC countries, even with the rapid increase in activity.

20 https://moss.earth/

21 https://tropykus.com/

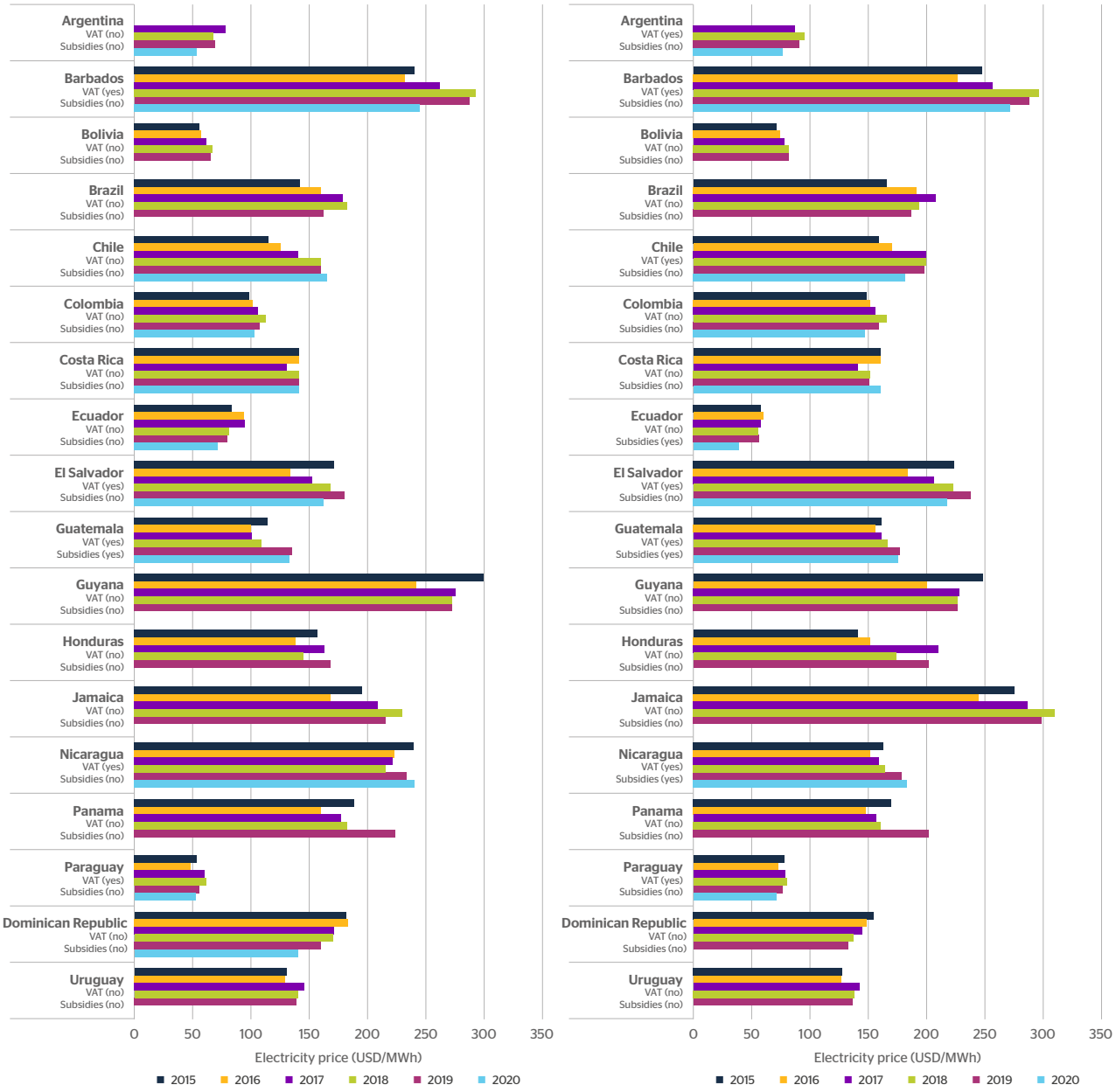
3.3 Country overviews

The popularity of cryptomining varies across LAC countries. Among the determining factors are electricity prices, regulations, subsidies, climate, national electricity mix, cryptoasset adoption and the general state of the economy.

The electricity price is one of the most significant factors determining the profitability of cryptomining farms and whether a country will become a cryptomining hub. The lowest electricity prices in LAC are in Ecuador, Paraguay, Bolivia and Argentina (see Figure 3.9). Mining is not widespread in Ecuador and Bolivia as cryptocurrencies are partially or entirely banned in these countries. In contrast, Paraguay and Argentina are among the leaders in cryptomining. Among the countries with the highest electricity prices in LAC are Barbados and Jamaica, which import their energy.

a) Industrial sector average electricity prices (2014–2020)

b) Residential sector average electricity prices (2014–2020)



Source: Energy Prices in Latin America and the Caribbean 2021. OLADE, Latin American Energy Organization

Figure 3.9: Comparison of electricity prices in the residential and industrial sectors

47

Cryptomining in LAC is organised in pools, registered mining companies, blue farms and ant farms. Mining pools are a form of cooperation in which people share the risks and returns from mining. Usually, miners tend to choose several pools to diversify risks. According to anecdotal evidence, most cryptominers in LAC rely on mining pools with servers on the east coast of the US, including BTC.com, F2Pool, Poolin,[22] Flexpool and Ethermine[23] (for Ethereum). There are few local mining pools in LAC. Examples include Flexpool, which has its servers in Brazil (Sao Paulo),[24] an attempt in Venezuela to create a government-led 'Pool de Minería Digital Nacional', and another mining pool (Tribu) from Venezuela.[25] There is some anecdotal evidence that Binance Pool has servers in Brazil.[26] Other local pools might also exist; however, they are hard to identify due to the lack of transparency in the industry.

Some examples of cryptomining companies include DoctorMiner in Venezuela,[27] BitPatagonia[28] and CriptoLab[29] in Argentina, and BitFarms in Argentina and Paraguay.[30] At least several mining companies from North America plan to expand to LAC soon; for example, Arthur Mining is planning operations in Brazil.[31]

Ant farms are a hobbyist activity where an individual installs mining equipment in a residential area and, therefore, benefits from reduced tariffs compared to industrial operations. Blue farms are a phenomenon that arose in LAC during Covid-19 when industrial manufacturers experienced a decrease in production and installed mining equipment to alleviate their losses. Some of these manufacturers did not declare their mining equipment, attributing the mining electricity consumption to their manufacturing processes.[32] Both ant and blue farms are often seen as illegal or semi-legal grey zone activities.

Brazil

Brazil is LAC's largest economy and one of the leaders in cryptomining, according to the CBECI data sample. As previously mentioned, the country's share of global mining activity may be inflated due to miners using VPNs from Venezuela or other countries. We could not identify any large cryptomining companies in Brazil. However, as LAC's share of global mining is relatively small, several medium-sized mining companies could account for Brazil's hashrate.

Some signs suggest a growing interest in mining, especially Ethereum. One was the noticeable increase in imports of graphics processing units (GPUs) used in mining. For example, in the first quarter of 2021, GPU purchases grew fourfold compared to the same period in 2020.[33] Another was the noticeable rise in online cryptomining-related communities in 2021.[34] Brazil is the only LAC country we identified with local servers of global mining pools, which can attract miners from the whole continent due to latency issues.

22 https://chainbulletin.com/your-friendly-neighborhood-bitcoin-mining-pool

23 https://ethermine.org/start

24 https://www.reddit.com/r/EtherMining/comments/lch9vg/south_america_flexpool_server/ and https://www.reddit.com/r/EtherMining/comments/lql8w3/are_there_any_mining_pools_on_south_america/

25 https://www.doctorminer.com/mina/servicios/tribu

26 https://bitcointalk.org/index.php?topic=5323058.0

27 https://www.doctorminer.com/

28 https://bitpatagonia.com/

29 https://www.criptolab.org/

30 https://bitfarms.com/farms

31 https://arthurmining.com/ and https://youtu.be/1WNe1xDghFY

32 https://www.iproup.com/finanzas/25773-bitcoin-mineria-el-otro-lado-del-negocio-en-argentina

33 https://portaldobitcoin.uol.com.br/empresas-brasileiras-importaram-r-106-milhoes-em-gpus-usadas-em-mineracao-de-criptomoedas/

34 For example, according to Google Trends, searches for phrases like 'cryptocurrency miner' and 'Bitcoin miner' on Google reached their highest number in 2021. For more details see https://portaldobitcoin.uol.com.br/brasil-vive-boom-de-mineracao-caseira-de-criptomoedas/

Brazil does not have the advantage of lower electricity prices. At USD161.5 per MWh,[35] it is higher than the region's average. However, interview responses revealed that some miners establish direct contracts with energy producers that have an electricity surplus.

Until recently, there were high tariffs for importing electronic equipment.[36] To improve this situation, Bill No. 4,401/22 proposed a tax exemption for the import, industrialisation or sale of machines (hardware) and computer tools (software) used in processing, mining and preserving virtual assets until 31 December 2029. However, the Bill did not include regulations regarding the mining operation itself. Currently, profits from token sales are taxed as capital gains, and token owners must report how much cryptocurrency they hold.[37]

Venezuela

Venezuela is another country in the region with relatively high levels of cryptomining. Numerous sources of anecdotal evidence give varying reasons for its popularity. On the one hand, this popularity is linked to high cryptoasset adoption caused by hyperinflation and restricted access to capital. On the other hand, it is due to low electricity prices. Notably, there are significant inconsistencies regarding electricity prices, as many sources estimate tariffs as relatively high and fluctuating between USD0.17[38] and USD0.32[39] per kilowatt-hour. This inconsistency is most likely caused by differences in the exchange rates applied to convert prices from bolívar into US dollars.

From a regulatory standpoint, several legislative initiatives have impacted mining in Venezuela. According to one of them, issued in September 2020, miners had to register and obtain a licence to continue mining cryptoassets.[40]

In March 2023, the national energy supplier CORPOELEC ordered a halt of mining operations, affecting mining facilities in several states amid a corruption investigation involving officials from the country's crypto superintendence SUNACRIP.[41]

Paraguay

For a while, the media portrayed Paraguay as a new mecca for cryptomining.[42] The main reason given was access to the surplus of renewable green energy. Electricity is generated almost entirely (99.7%) by hydropower in Paraguay,[43] most of which comes from the Itaipu Dam, the second biggest hydropower plant in the world, on the border with Brazil. It has an installed generation capacity of 14 GW.[44] Cryptomining was initially seen as a solution to use electricity surpluses and increase the country's income. Since 2021, lawmakers have been discussing a Bill to regulate cryptomining and offer subsidies – exemption from paying VAT[45] – to attract miners to the country.

35 https://biblioteca.olade.org/opac-tmpl/Documentos/old0463.pdf

36 For instance, Bernardo Schucman, Senior VP of the digital currency division at the US miner CleanSpark, in an interview with Cointelegraph in July 2022, mentioned that 'another major trade barrier to encourage the movement of miners to Brazil are the tariffs for importing electronic equipment, which for the most part are the highest rates in the world and cause a direct impediment to the growth of this industrial activity in Brazil.' https://cointelegraph.com.br/news/mining-bitcoin-in-brazil-country-has-the-2nd-most-expensive-electricity-bill-in-the-world

37 https://www.globallegalinsights.com/practice-areas/blockchain-laws-and-regulations/brazil#chaptercontent8

38 https://www.globalpetrolprices.com/electricity_prices/

39 https://www.statista.com/statistics/1173397/commercial-electricity-price-latin-america-country/

40 https://es.beincrypto.com/venezuela-publica-nueva-regulacion-mineria-criptomonedas/

41 See, for instance, https://cointelegraph.com/news/venezuela-shuts-down-crypto-mining-facilities-exchanges-amid-corruption-probe and https://www.bloomberg.com/news/articles/2023-06-21/venezuela-once-embraced-crypto-now-it-s-banned-crypto-mining-trading-petro

42 See, for instance, https://decrypt.co/105409/paraguay-one-step-closer-to-being-a-bitcoin-mining-paradise or https://english.elpais.com/international/2022-08-28/is-paraguay-the-next-cryptocurrency-mecca.html

43 Electricity production by source, World (ourworldindata.org)

44 https://www.power-technology.com/projects/itaipu-hydroelectric/

45 https://finance.yahoo.com/news/paraguayan-senate-passes-bill-regulating-092641719.html?guccounter=1

The Bill faced several obstacles, including a veto from President Mario Abdo on 2 September 2022.[46] The Senate then rejected the President's ban and passed the Bill to the Chamber of Deputies, where it remained until December. If the Chamber also rejected the President's veto, the Bill would be sanctioned without presidential support. However, in the end, it could not collect enough votes.

In general, although Paraguay is perceived as an attractive destination for cryptominers due to the relatively cheaper electricity and lower environmental footprint, the country still needs to establish a legal framework for mining, according to several interviewed companies.

Argentina

Argentina is the fifth largest country in LAC in terms of mining volume. It attracts mining activities because its electricity costs are among the lowest in the region (USD0.03[47]–USD0.04[48] per kilowatt-hour) and were subsidised for a while. The climate is another attractive factor, supported by secondary sources and our interviews. The cold and windy weather in some areas like Patagonia means less energy is required to cool servers. Interviewees also mentioned that the infrastructure and transport system quality make logistics relatively easy compared to other LAC countries.

However, some relatively recent regulation changes partially countered these advantages. The 40/2022 resolution, published and made official on 1 February 2022,[49] eliminated subsidies for power providers, and Cammesa, the country's wholesale electricity market management company, increased electricity fees for cryptominers.[50] This negatively affected mining companies, with some reporting a fourfold increase in electricity costs.[51]

Legislation changes were followed by several incidences suggesting that the goal of increasing industry control was proving successful. For example, Argentina's tax collection agency uncovered illegal crypto farms,[52] and the Customs Office seized more than 2,000 units of mining equipment from a farm accused of manipulating import duties.[53]

Mexico

Cryptoasset adoption is relatively high in Mexico, especially for remittances, which increased the popularity of mining, placing Mexico in the top four cryptomining countries in LAC. There is no specific regulation that applies to cryptomining. Currently, the local regulation covers only general power consumption and, in some instances, users must comply with the electricity consumption levels determined under the Electricity Industry Law.[54]

There have been some discussions about using geothermal power to mine cryptoassets. For example, billionaire Ricardo Salinas plans to install mining equipment near the Domo San Pedro geothermal power plant (with an installed power generation capacity of 25 MW).[55] However, the project is still in the early stages of development, and it has not yet been decided if the project will be implemented.

46 https://news.bitcoin.com/president-of-paraguay-mario-abdo-vetoes-cryptocurrency-bill/

47 https://www.globalpetrolprices.com/electricity_prices/

48 https://www.statista.com/statistics/1173397/commercial-electricity-price-latin-america-country/

49 https://news.bitcoin.com/argentinian-government-raises-energy-costs-almost-4x-for-cryptocurrency-miners/

50 https://forkast.news/headlines/argentinian-tax-agency-first-ever-raids-illegal-crypto-mining-farms/

51 https://www.coindesk.com/business/2022/05/10/argentina-bears-down-on-crypto-miners-amid-power-shortage/

52 See, for instance, https://www.coindesk.com/policy/2022/09/12/argentinas-tax-authority-conducts-first-ever-raids-on-secret-crypto-miners/ and https://servicioscf.afip.gob.ar/publico/sitio/contenido/novedad/ver.aspx?id=1582

53 https://www.coindesk.com/policy/2022/06/28/argentinas-customs-office-seizes-21m-in-crypto-mining-equipment

54 https://www.globallegalinsights.com/practice-areas/blockchain-laws-and-regulations/mexico

55 https://www.thinkgeoenergy.com/mexican-billionaire-eyes-bitcoin-mining-with-geothermal-energy/

El Salvador

El Salvador, the first country in LAC to adopt bitcoin as legal tender (on 7 September 2021), has made some attempts to support the cryptomining industry. In June 2022, the country's President, Nayib Bukele, said it would mine Bitcoin using renewable energy from its volcanoes.[56] Despite being a small country, El Salvador has approximately 20 volcanoes.[57] Three months after the first announcement, it was reported that the state had used geothermal energy to issue new coins.[58]

'The city of Berlin, 112 km south of the capital city of San Salvador, has a geothermal plant built in 1999. The plant comprises 16 2,000–3,000-deep shafts from which steam circulates and makes three turbines function. The energy generated by those turbines can reach up to 107 megawatts, but only five megawatts are used for the operation and mining of Bitcoin. The rest of the energy is used for the country's grid.'

This announcement made El Salvador the first state to use volcanic activity for digital mining.[59] Apart from these developments, El Salvador's involvement in mining is still minimal.

56 https://www.criptonoticias.com/comunidad/adopcion/el-salvador-usara-energia-renovable-volcanes-mineria-bitcoin/

57 https://volcano.si.edu/volcanolist_countries.cfm?country=El%20Salvador

58 https://www.euronews.com/next/2021/10/29/volcanic-energy-is-creating-bitcoin-in-el-salvador

59 https://www.criptonoticias.com/mineria/6-eventos-2021-marcan-fortalezas-mineria-bitcoin/

Mining case study: Bitfarms

Snapshot of the company's history

Bitfarms is a global, publicly traded (NASDAQ/TSX: BITF) Bitcoin self-mining company. It was founded in 2017 by Argentinian entrepreneurs Nicolas Bonta and Emiliano Grodzki. The first farms were opened in Canada and later expanded to the US, Argentina and Paraguay.

Operations

The Argentinian farm is a large-scale infrastructure project in Rio Quatro that began operating in September 2022 and can host 50 MW. As of December 2022, it contained 1,670 miners with an efficiency of 35 W/TH. It runs on electricity produced from a private natural gas source and, at the time of the interview, had a total power demand of approximately 10 MW and a hashrate of 155 PH/s (see Figure 3.10). [60]

	Power demand (MW)	Number of miners	Hashrate (PH/s)	Efficiency (W/TH)	Electricity price (US cents/kW)
Argentina	**10**	**1,670**	**155**	**35**	**~3***
Paraguay	**10**	**2,768**	**130**	**71**	**3.6**

** Subject to FX changes and gas prices.*
Source: Based on the Bitfarms interview and data provided by the company.

Figure 3.10: Bitfarms' operations in LAC as of December 2022

The farm in Paraguay originally contained 2,768 Innosilicon T3 miners, which can be characterised as 'reliable and long-lasting, ... [their] active lifespan has been extended by redeploying them in Paraguay.' With an efficiency of 71 W/TH, the farm runs on hydropower with a total power demand of 10 MW. As of December 2022, the reached hashrate was 130 PH/s. In January 2023, Bitfarms replaced T3 miners with 2,888 M30S miners, bringing the farm's hashrate to 288 PH/s.

Opportunities

In an interview, Bitfarms pointed out that Argentina has a significant surplus of gas and is likely to increase its extraction and exports in the coming years. Opening the Argentinian farm enabled the company to establish a presence before other mining companies were attracted to the country by the available power and strategically oversee forthcoming movements.

Paraguay has a unique electricity mix dominated by clean hydro energy and a surplus that can be domestically monetised.

Challenges

In Argentina, import restrictions create critical challenges as mining farms need to import mining equipment and other resources to grow. At the time of the interview, Bitfarms expected that legislation would change to allow companies to use their funds outside the country for imports, thus partially solving the issue.

In Paraguay, the main challenge is the lack of a regulatory framework, which exposes the company to operational risks and related difficulties, for example, those associated with opening a local bank account. The current legislative initiative is still in progress.

In general, the company can solve these challenges by diversifying its farm locations. Since national regulations can affect cryptomining, having diverse locations allows the company to quickly adapt and relocate facilities if one of the countries it operates in changes its approach.

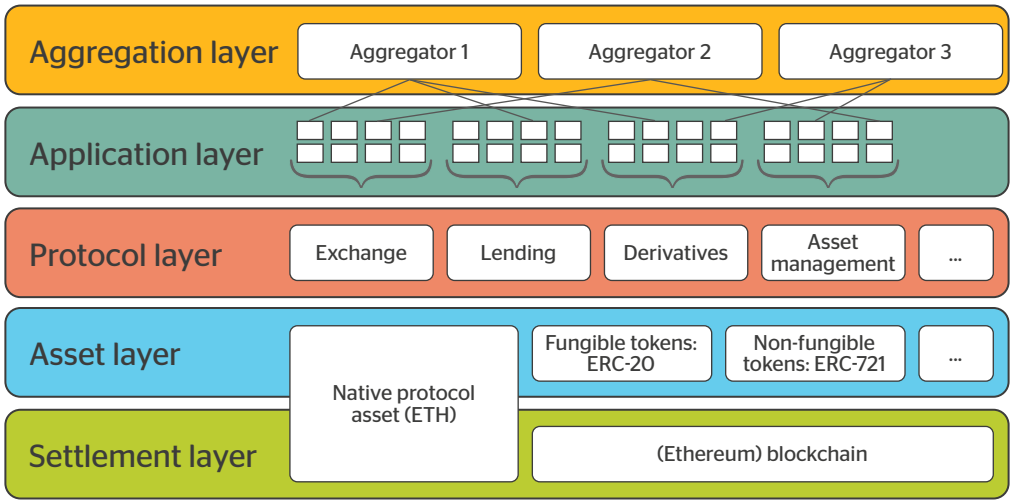
60 The total power demand was limited to 10 MW until March 2023, mainly due to import restrictions and permits. In April 2023, Bitfarms increased its production capacity to 18 MW and expects to reach full capacity during the third quarter of 2023.

4 DeFi and payments

4 DeFi and payments

4.1 Introduction

Blockchain technologies offer many functionalities beyond cryptocurrencies. Their ability to support decentralised systems enables various forms of DeFi. DeFi is an umbrella term that refers to an emerging financial software stack comprising several protocols, platforms and applications built on top of public blockchains.[61] In contrast to established centralised finance (CeFi), projects and protocols under the DeFi umbrella aim to enable disintermediated financial activity. DeFi protocols are often controlled by decentralised autonomous organisations (DAOs) to achieve the decentralisation goal. DAOs are a collection of transparent smart contracts executing the preferred actions of actors who have gained influence over the protocol, which can be achieved through various governance models. DeFi protocols are typically built in multiple 'layers' with applications built on top of protocol and base layers or settlement layers. Figure 4.1 provides an overview of DeFi infrastructure.



Source: OECD

Figure 4.1: Simplified DeFi infrastructure

DeFi currently operates alongside the traditional financial system, thriving where the traditional system displays weaknesses. It is unclear whether these two alternative finance visions will continue in parallel or merge.

DeFi is a relatively new development, and new use cases will potentially emerge in the coming years. However, some key use cases of DeFi have already been identified, such as decentralised stablecoins, exchanges, lending, derivatives and asset management.[62]

One approach to assessing the DeFi ecosystem's development is to track the total value locked (TVL), an aggregate value of cryptoassets locked in DeFi protocols. As of August 2022, there was USD57.1 billion[63] in TVL in DeFi protocols globally, an eight-fold increase from USD6.9 billion in August 2020. Despite this growth,[64] DeFi activity remains insignificant relative to global banking deposits (USD73.4 trillion).[65]

61 https://www.jbs.cam.ac.uk/wp-content/uploads/2021/01/2021-ccaf-3rd-global-cryptoasset-benchmarking-study.pdf

62 https://wifpr.wharton.upenn.edu/wp-content/uploads/2021/05/DeFi-Beyond-the-Hype.pdf

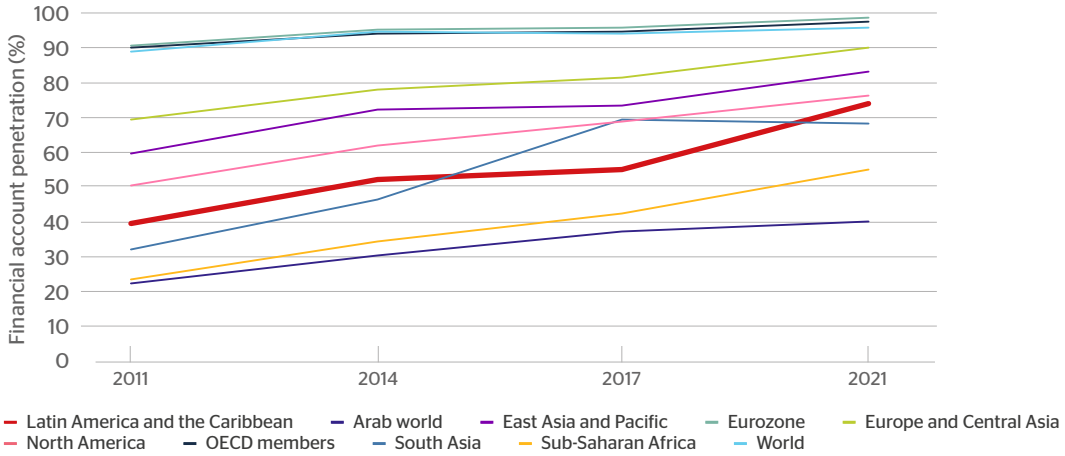
63 https://defillama.com/

64 The text provides numbers for August 2022, when the data for the DeFi ecosystem analysis was collected. As of the end of the year (31 December 2022), there was USD38.7 billion in TVL in DeFi protocols, a six-fold increase from August 2020.

65 https://stats.bis.org/statx/srs/table/b1?m=S

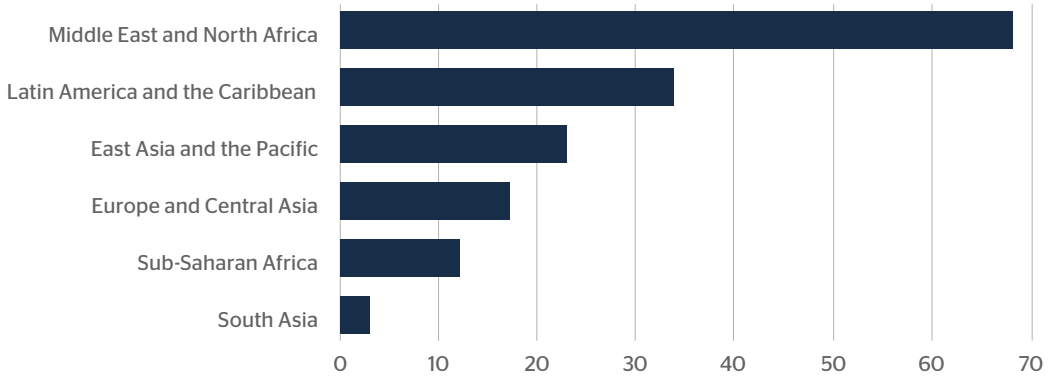
Background for DeFi adoption in LAC

Although the financial services industry has a long history in the region, LAC is characterised by lower basic financial services penetration than more developed regions (Figure 4.2). However, there is evidence that digital solutions are vital to overcoming the challenges associated with financial inclusion in LAC. For example, mobile money use has grown significantly, and the region is now the third largest globally, based on active accounts. Despite already having a relatively sizeable mobile money footprint, in 2021, LAC saw a 34% increase in mobile money accounts (see Figure 4.3).[66]



Source: World Bank

Figure 4.2: Financial account penetration of citizens aged 15 and over



Source: Groupe Speciale Mobile Association

Figure 4.3: Growth rates of mobile money active accounts

Country examples help further illustrate the importance and progress of financial digitisation in LAC. For instance, in Colombia, more than 60% of banking transactions are carried out through digital channels, such as mobile phones or the internet,[67] and 48% of companies surveyed by the country's central bank adopted electronic payment channels.[68] In Brazil, as of December 2022, more than 130 million individuals and about 11 million companies were registered in the central bank's payment system, PIX, making over 2.9 billion transactions monthly, 66% of which were P2P payments.[69]

66 https://www.gsma.com/sotir/wp-content/uploads/2022/03/GSMA_State_of_the_Industry_2022_English.pdf

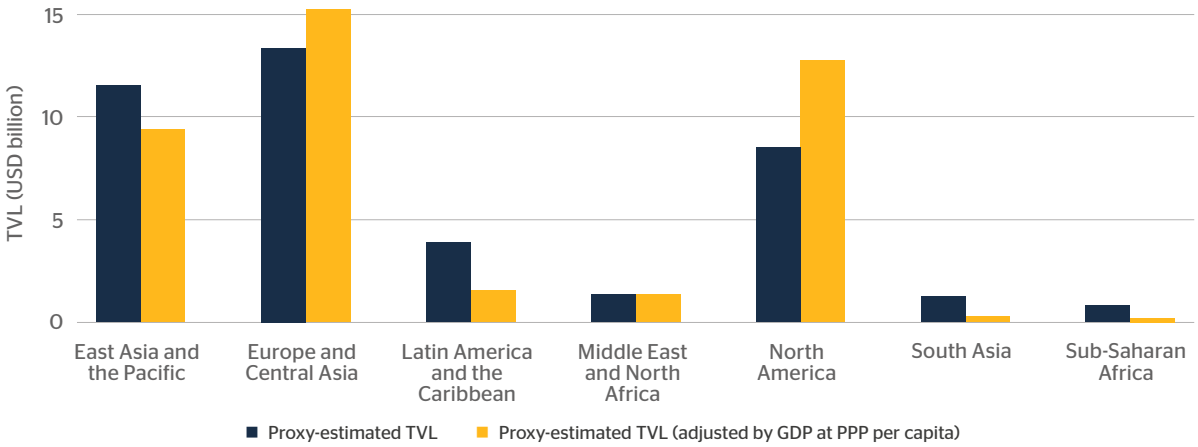
67 https://www.superfinanciera.gov.co/inicio/sala-de-prensa/publicaciones-/medidas-de-la-superfinanciera-ante-coyuntura-por-covid-/cifras-de-seguimiento-a-las-medidas-10103899

68 https://repositorio.banrep.gov.co/bitstream/handle/20.500.12134/10486/encuesta_percepcion_de_usos_de_instrumentos_2022.pdf

69 https://www.bcb.gov.br/en/financialstability/pixstatistics

4.2 LAC's share of global DeFi activity

It is difficult to estimate the geographical distribution of DeFi activity accurately due to its decentralised nature. Based on the web traffic analysis, Figure 4.4 shows proxy estimates of DeFi adoption and use in LAC relative to other regions.[70]



Sources: Similarweb, DeFi Pulse, World Bank and CCAF calculations

Figure 4.4: Proxy-estimated TVL by region

As cryptoasset adoption in LAC increases and users become more familiar with the ecosystem, DeFi activity will likely increase. *The Mastercard New Payments Index 2022*[71] reports much financial innovation in the region, such as cryptocurrencies, DeFi solutions, blockchain and NFTs, with consumers eager to learn more about this ecosystem.

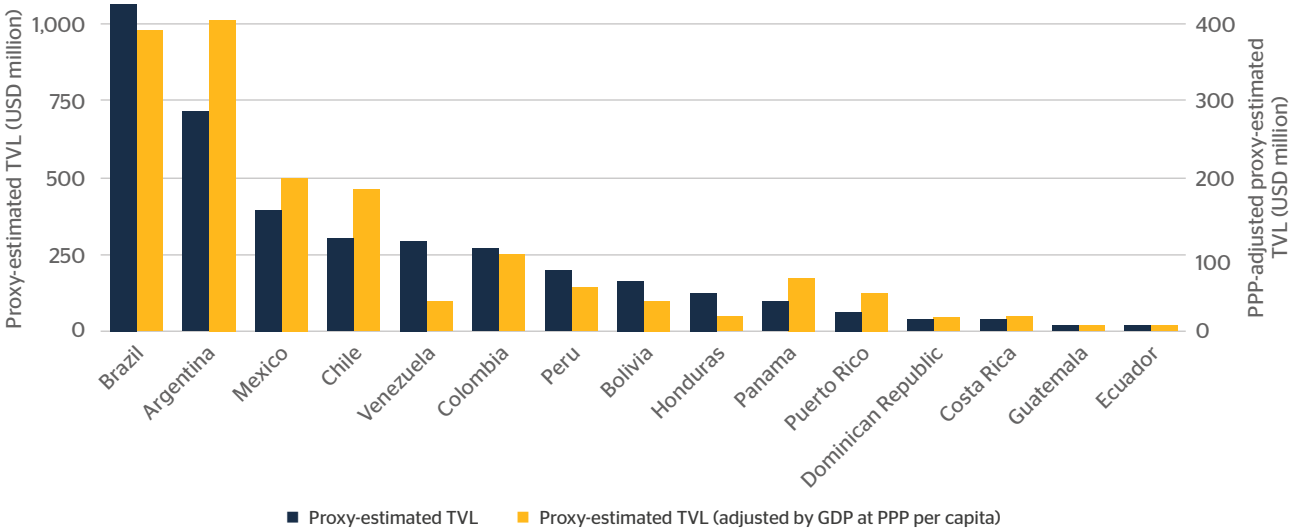
70 We used web traffic data from Similarweb and DeFi data from DeFi Pulse for our TVL proxy-based estimates. The key metric used in the analysis was the number of recorded website visits to the selected DeFi projects/protocols from each source country. This approach assumes that the conversion rate from web activity to TVL is similar across countries. A clear limitation is that any wealth effects are not considered. To address this, we additionally made proxy estimates adjusted by the countries' GDP at purchasing power parity (PPP) per capita (based on the World Bank data). Another important limitation of both estimates is that any activities using VPNs might distort the TVL share attributed to a particular country.

71 https://www.prnewswire.com/news-releases/latin-america-s-crypto-conquest-is-driven-by-consumers-needs-819718066.html

4.3 DeFi in LAC (country level)

DeFi use

Figure 4.5 highlights that Brazil, Argentina and Mexico likely have the highest TVL in DeFi among LAC countries.



Sources: Similarweb, DeFi Pulse, World Bank and CCAF calculations

Figure 4.5: Proxy-estimated TVL by country

The Chainalysis 2022 Geography of Cryptocurrencies Report corroborates these findings.[72] According to the Report, three LAC countries are among the top 25 countries worldwide for DeFi value received: Brazil (8th), Argentina (21st) and Mexico (23rd).

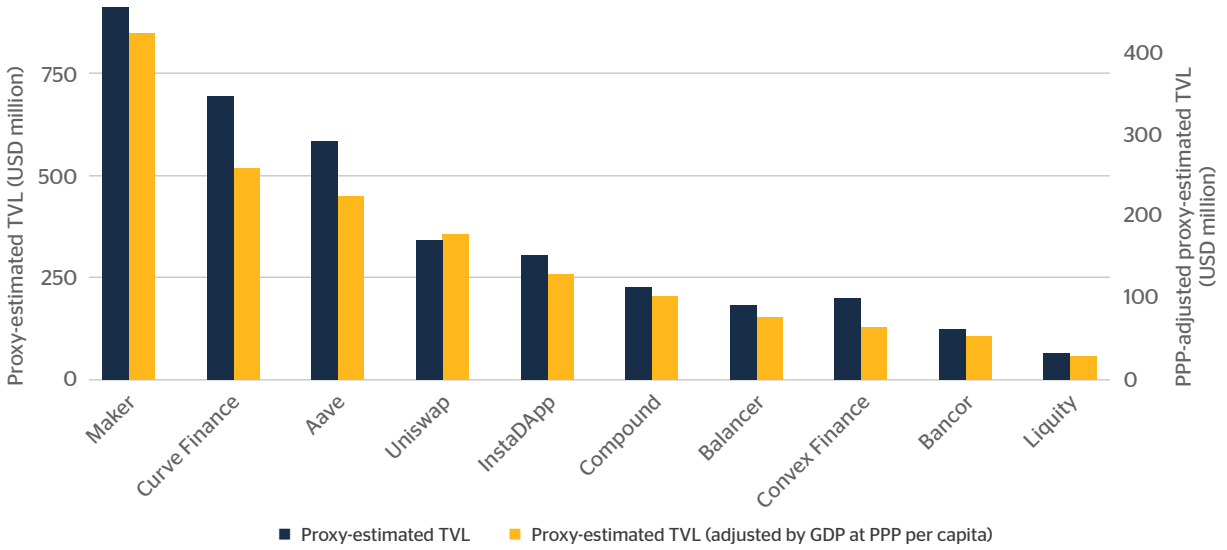
Chainalysis also reports that LAC only accounted for 9% of global value received between July 2020 and June 2021. In their 2021 report,[73] Chainalysis found that the proportion of this value received from people outside the region (89%) was higher than the global average of 78%, likely due to remittance activity. One area where low-income countries outperform high-income countries is P2P activities. Chainalysis also highlighted the differences between Brazil, a relatively high-income country, and Venezuela, a relatively low-income country; Brazil has significantly more DeFi activity, while P2P activity is more significant in Venezuela.

Projects

Based on the analysis of global TVL across DeFi projects and web traffic patterns within the LAC ecosystem, the top three DeFi projects in the region regarding web traffic are Uniswap, Aave and Suchi Swap. The top three projects in terms of TVL are Maker, Curve Finance and Aave. Figure 4.6 shows LAC's proxy-estimated TVL associated with these major DeFi projects. Table 4.1 provides an overview of web traffic ranking, proxy-estimated TVL and prominent use cases of the top ten DeFi projects and their associated infrastructure. Most of the web traffic in LAC flows toward decentralised exchanges. However, in terms of the proxy-estimated TVL from the region, stablecoins (Maker and Curve Finance) attract a relatively higher value share from LAC.

72 https://go.chainalysis.com/geography-of-crypto-2022-report.html

73 https://go.chainalysis.com/2021-geography-of-crypto.html



Sources: Similarweb, DeFi Pulse, World Bank and CCAF calculations

Figure 4.6: DeFi projects with the highest proxy-estimated TVL from LAC

Table 4.1: DeFi projects with the highest proxy-estimated TVL from LAC

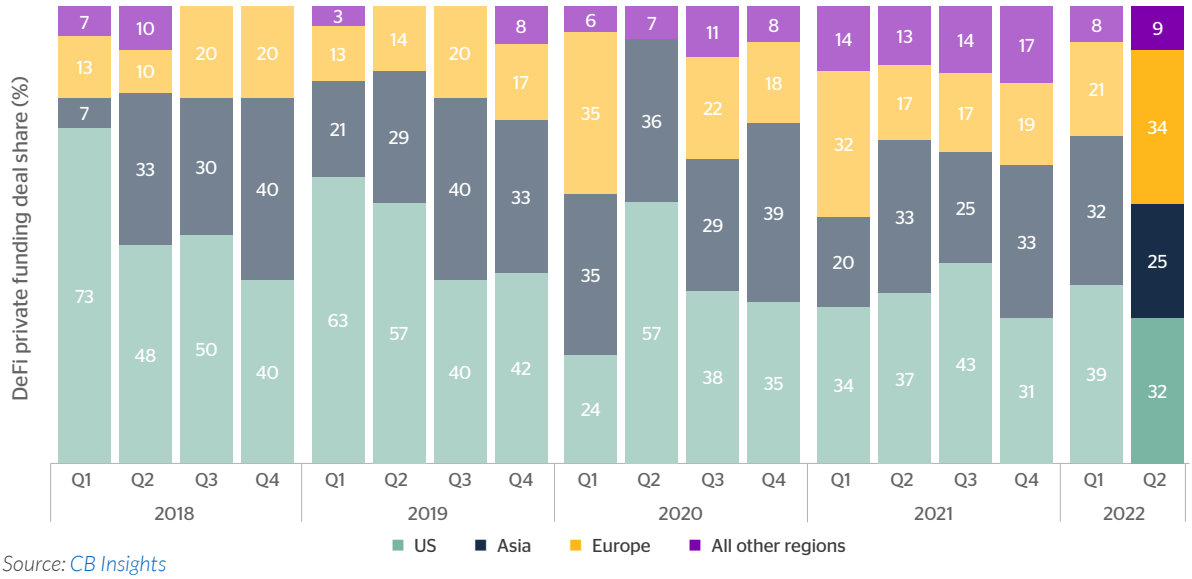
LAC TVL rank	Web traffic rank	Project	Main base layer(s)	Use cases/applications	Global TVL (USD billion)	Proxy-estimated TVL from LAC (%)*
1	9	Maker	Ethereum	Stablecoin	7.85	5.4; 11.6
2	4	Curve Finance	Ethereum	Decentralised exchange (stablecoins)	6.24	5.29; 14.2
3	2	Aave	Ethereum, Avalanche, Optimism, Polygon	Borrowing and lending	7.43	4.56; 11.9
4	1	Uniswap	Ethereum	Decentralised exchange	6.69	2.5; 4.9
5	10	InstaDApp	Ethereum, Polygon, Arbitrum, Avalanche, Optimism, Fantom	DeFi aggregator	2.07	6.2; 14.7
6	5	Compound	Ethereum, Polygon	Borrowing and lending	2.9	3.6; 8
7	7	Balancer	Ethereum	Automated market maker, asset management	1.58	3.5; 8.3
8	13	Convex Finance	Ethereum	Decentralised exchange, automated market maker	4.15	2; 6.2
9	11	Bancor	Ethereum	Decentralised exchange, automated market maker	0.13	2.8; 6.9
10	17	Liquity	Ethereum	Decentralised borrowing	0.88	3.7; 8.5
14	3	SushiSwap	Ethereum, Arbitrum, Polygon, Gnosis, Avalanche	Decentralised exchange, automated market maker	0.93	3.5; 8.2

** The first value represents LAC's share in a DeFi protocol global TVL based on the proxy adjusted by GDP at PPP per capita. The second value is the non-adjusted proxy.*

Sources: Websites of the DeFi projects for information on main layers and applications; Similarweb, DeFi Pulse, World Bank and CCAF calculations for web traffic and TVL rankings and estimates

4.4 Investment in DeFi

Private funding activity is a crucial feature of DeFi ecosystem development, and there were several significant investments in the region in 2021 and the first half of 2022. However, Figure 4.7 highlights the comparatively lower levels of DeFi investment in LAC, captured in the 'All other regions' category. In addition, the average deal size in this category is also significantly smaller. For example, in Q2 2022, the average deal size was USD5 million compared to the global average of USD20 million, with the US having the highest average deal size at USD39 million.



Source: CB Insights

Figure 4.7: DeFi private funding regional deal share comparison by number of deals concluded

Table 4.2 lists some key investment deals in LAC that may have affected DeFi.[74] The largest capital raises were in 2021, with exchanges supporting DeFi tokens (Mercado Bitcoin, Bitso and Ripio) receiving the most funding.

Table 4.2: Investments in LAC projects with DeFi activities

Company	DeFi activity	Headquarters	Capital raised (USD million)*	Series stage	Last fundraising
Mercado Bitcoin	Exchange supporting DeFi tokens	Brazil	200	C	December 2021
Bitso	Exchange supporting DeFi tokens	Mexico	250	C	May 2021
Ripio	Exchange supporting DeFi tokens	Argentina	50	B	September 2021
Hashdex	Asset management	Brazil	26	A	May 2021
RSK Labs	Decentralised exchange, credit, insurance, asset tokenisation	Argentina	7.3	Seed	May 2018
Xcapit	Exchange supporting DeFi tokens	Argentina	1.1	Seed	August 2021
Lemon	Exchange supporting DeFi tokens	Argentina	17.4	A	July 2021
Buenbit	Exchange supporting DeFi tokens	Argentina	11	A	July 2021
Exactly	Credit	Argentina	3	Seed	August 2021
Belo	Wallet	Argentina	3	Seed	May 2022

** The information in this column only shows the amount of capital raised by a company. It does not necessarily imply that this amount was directed toward DeFi activities partially or at all.*

Sources: Coindesk (1, 2), Crunchbase (1, 2, 3, 4, 5), Wilson Sonsini, LatamList and LAVCA

74 Capital raised does not necessarily imply that the funding is directed toward DeFi activities. The companies listed in Table 4.2 engage in various activities, many of which would not be considered DeFi activities. Disentangling the capital allocation decisions of these companies is beyond the scope of this Report.

4.5 Payments and infrastructure

Payments are an essential function of cryptoasset and DeFi protocols. Although some activity takes place in a direct, P2P manner, much activity in the region aims to create linkages between the existing financial infrastructure and emerging cryptoasset infrastructure. The ongoing creation of the on- and off-ramps from emerging cryptoassets in LAC needs to reflect the payment preferences of users in the region. Across LAC, various alternative payment solutions have developed. Below, we explore some key areas of the payments ecosystem and developments paving the way for cryptoassets to become an emerging payment mechanism.

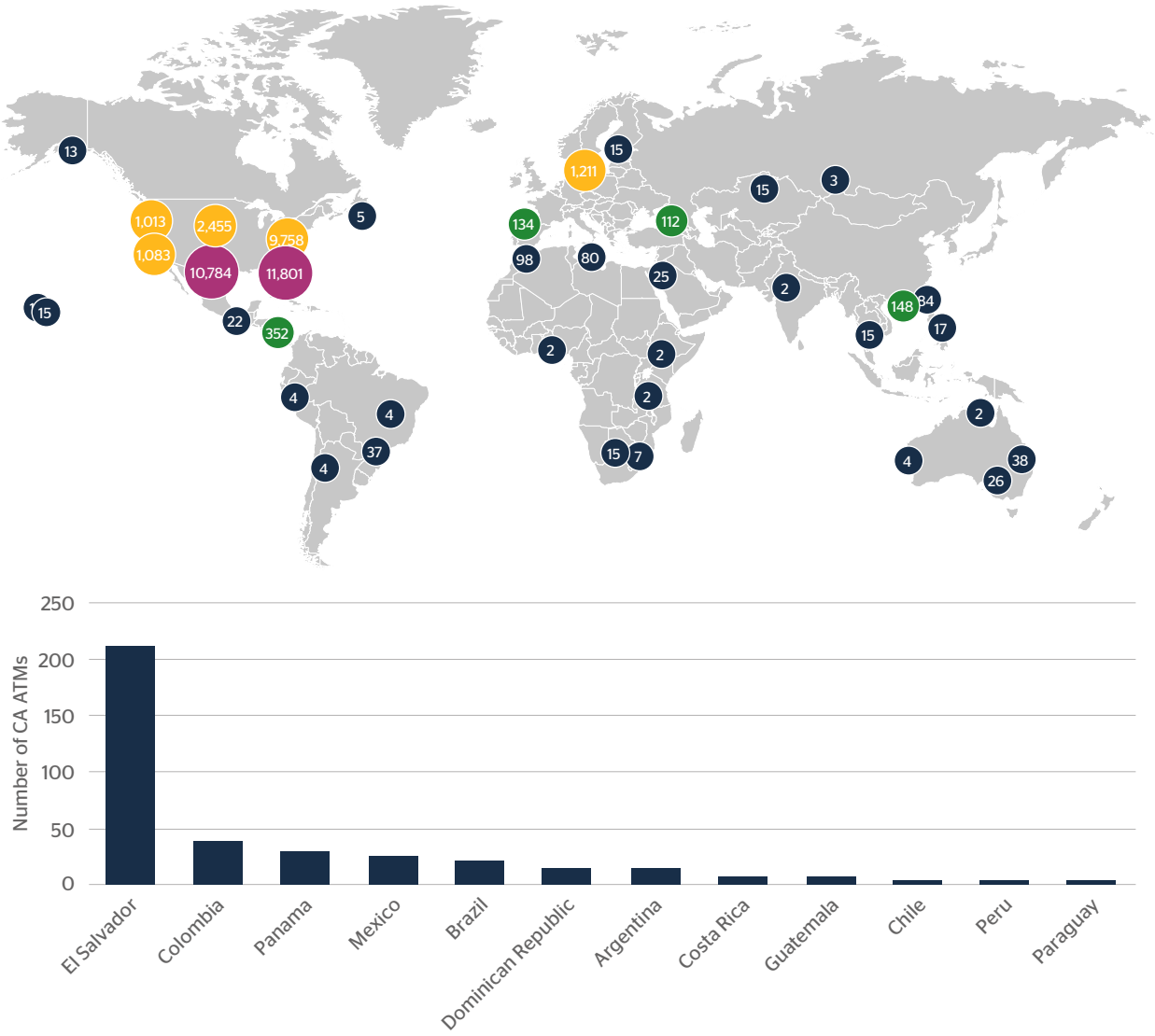
Fiat-to-crypto gateways on exchanges

Many users need to be able to convert their fiat currencies into cryptoassets to engage in various cryptoasset activities. Globally, the fiat currency to cryptoasset gateways have primarily resided on exchanges. These gateways are intertwined with exchanges' trading services and often require users to undergo know-your-customer/anti-money laundering (KYC/AML) verification. While some exchanges attempt to establish their own backend linkages to traditional financial infrastructure, some use third-party settlement networks to speed up their roll-out in new jurisdictions.

Under its Latamex brand, Settle Network is one of LAC's main fiat-to-crypto gateway partners. It offers its established gateways for the major LAC currencies, including the Brazilian real and Argentine peso. Binance, OKEx, Huobi and Bithumb are some of the international exchanges that have partnered with Settle Network in LAC. Other payment gateway service providers operating in the region include CoinsPaid, Coinbase Commerce, Coingate and BitPay.

Cryptoasset automated teller machines

Another way users can interact with cryptoassets is through an ever-increasing network of physical cryptoasset automated teller machines (ATMs). Similar to exchanges, these ATMs allow users to exchange fiat currency for cryptoassets and vice versa. However, there are fewer cryptoasset ATMs in LAC compared to the US, Canada and Europe. Based on the sample of more than 30,000 cryptoasset ATMs across 70 countries collected by Coin ATM radar, El Salvador has the largest cryptoasset ATM network (212 machines) within LAC (see Figure 4.8), followed by Colombia, Panama, Mexico, Brazil, the Dominican Republic and Argentina (all with more than 10 and fewer than 40 machines).



Source: Coin ATM Radar

Figure 4.8: World vs LAC cryptoasset ATMs: ATMs in LAC are underrepresented.

Card services

Card services is one more intersection between cryptoassets and the existing financial system. Leveraging the card infrastructure is one of the ways to make cryptoassets more attractive to users, linking them with payments in fiat currencies. Card services allow users to buy and spend cryptoassets and receive them as rewards in loyalty schemes. They provide users with a familiar interaction when navigating between traditional financial infrastructure and the cryptoasset environment.

The first card linked to cryptoassets in LAC was launched in 2020 when the Mexican exchange Tauros launched a Visa debit card in partnership with Dash.[75] Since then, many new card services (mostly debit cards) have been launched together with traditional payment providers. For example, Visa has announced partnerships in Brazil, Argentina, Mexico, Colombia and Peru, and more in-country partnerships are expected to follow.[76] Similarly, Mastercard is now active in the region and, through its Start Path Crypto programme, has partnered with LAC exchanges and wallet providers, including Belo and Bitfy.[77]

75 https://cointelegraph.com/news/dash-launches-latin-americas-first-ever-crypto-debit-card

76 https://www.visa.co.ve/acerca-de-visa/sala-de-noticias/notas-de-prensa/visa-intensifica-esfuerzo-cripto.html

77 https://www.mastercard.com/news/press/2021/july/mastercard-launches-new-start-path-cryptocurrency-and-blockchain-program-for-startups/

Notable card launches in LAC during the past few years have come from Binance (Mastercard), Ripio (Visa) and Lemon Cash (Visa), some of the larger operators in the region.

Remittances and wallets

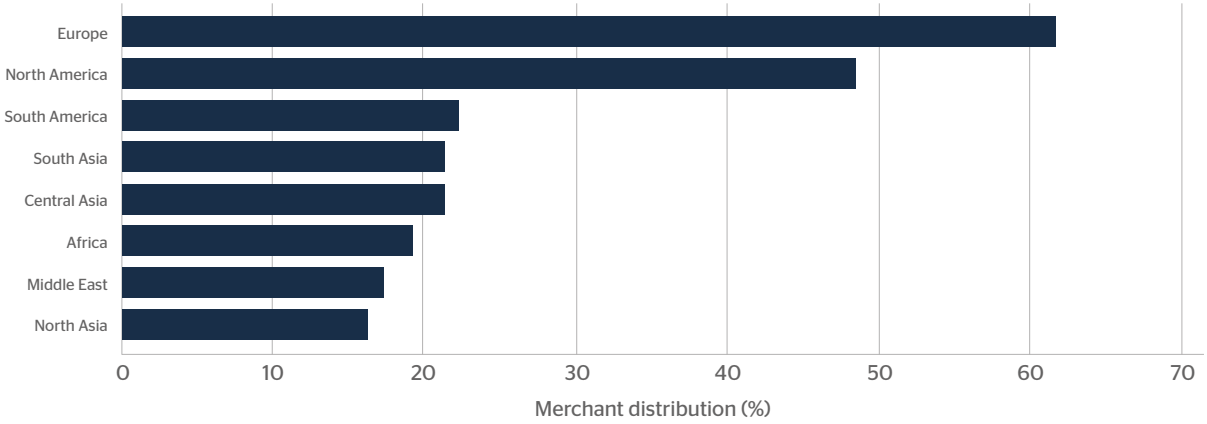
Remittances are a significant part of payment activity in the region. Overall, in 2020, the value of remittances received by LAC represented 2.4% of the GDP, three times the global average of 0.8%.[78] The private sector survey (see Chapter 2) highlights that using cryptoassets to conduct cross-border payments and remittances is becoming more important. These results are also reflected in data from Bitso, a leading cryptoasset company in the region. Bitso reported processing around 4% of inward Mexican remittances in the first quarter of 2022; the country is the second-largest market for inward remittances globally (USD51 billion in 2021).[79] We explore the Bitso case in more detail at the end of this chapter.

Digital wallets allow users to send, receive and store cryptoassets, enabling efficient remittance/cross-border payments without physical infrastructure across multiple jurisdictions. Given that cryptoasset-related activity is centred on exchanges, many of them offer wallet solutions. Responses from the LAC private sector survey highlighted that the second most popular activity is services enabling users to send, receive and store cryptoassets. The first is services related to buying and selling cryptoassets.

Merchant acquiring

Another important area of the payments infrastructure is related to how merchants receive payments. Both e-commerce and physical brick-and-mortar merchants are increasingly adopting technology to accept cryptoassets. The reasons for this are twofold. First, merchants are responding to consumers' emerging demand to transact with cryptoassets. Second is the opportunity to increase profits, as receiving payments in cryptoassets is often cheaper than existing forms.

El Salvador has mandated that merchants must be able to transact in Bitcoin. Across other parts of LAC, where such regulation does not exist, companies such as Strike, OSMO and Blockonomics are integrating payment acquisition services so merchants can leverage cryptoasset networks and accept cryptoasset payments. While admittedly an isolated data point, Blockonomics reported in January 2022 that South America was its third-largest region in merchant distribution (Figure 4.9).



Note: Many Blockonomics merchants operate in multiple regions simultaneously.
Source: Blockonomics

Figure 4.9 Blockonomics merchant distribution

78 https://data.worldbank.org/indicator/BX.TRF.PWKR.DT.GD.ZS

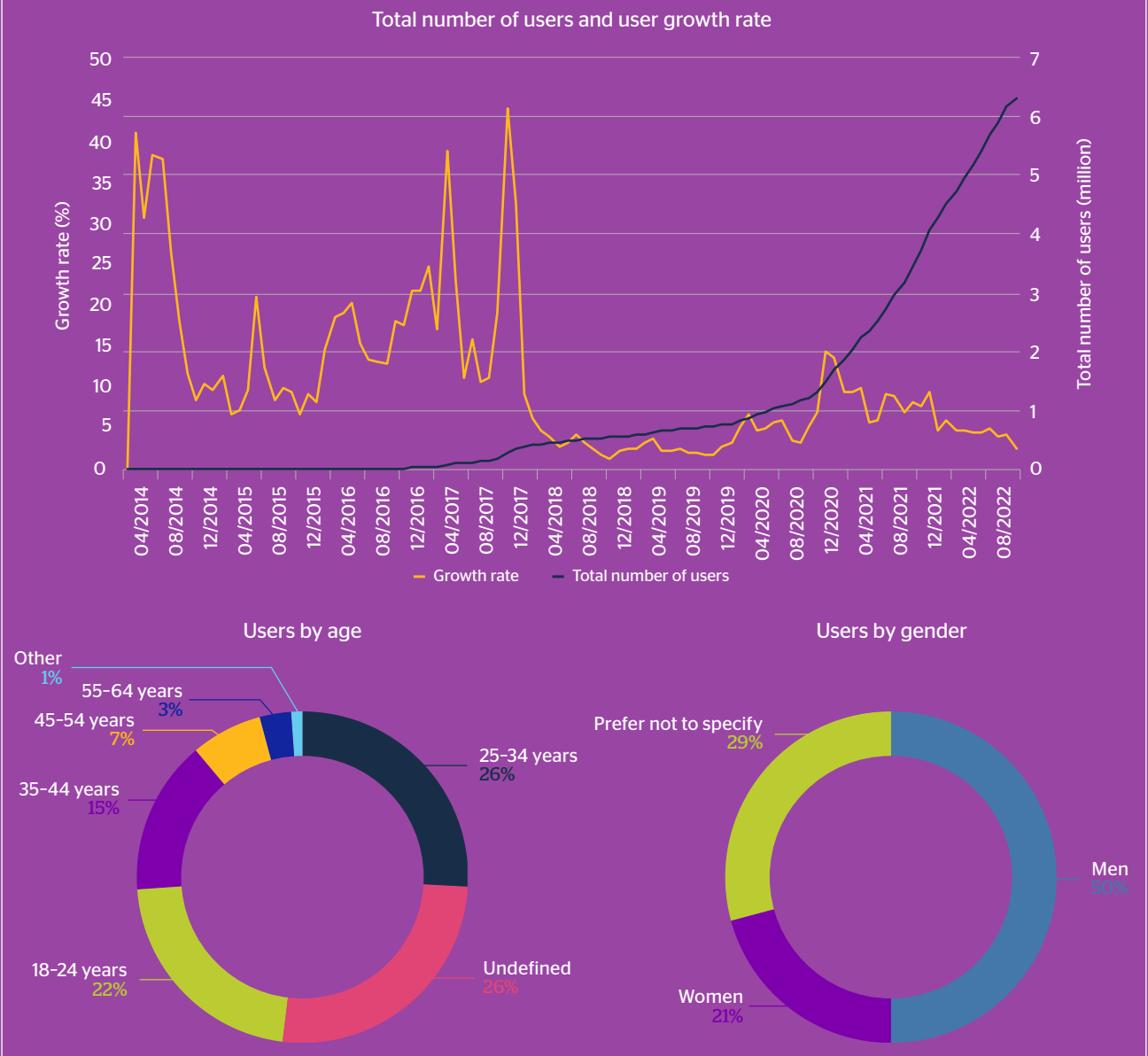
79 https://www.coindesk.com/business/2022/06/16/bitso-processed-1b-in-crypto-remittances-between-mexico-and-the-us-in-first-half-of-2022/

Payments case study: Bitso

Bitso is one of the leading financial services companies powered by crypto in Latin America, with over 7 million users and more than 500 employees in 35 countries. The company was launched in 2014 as a cryptoasset exchange in Mexico. In line with the trends described in Chapter 2, it has transformed into a one-stop shop cryptoasset-focused financial service provider and expanded its operations to Brazil, Argentina and Colombia. Payments and cross-border transfers are essential to the company's current product portfolio. In addition, the company actively cooperates with the B2B segment to promote cross-border cryptoasset payment services. Below, we describe some data that Bitso has shared that provides insight into important developments in the cryptoasset industry, particularly cryptoasset payments.

Aggregate user statistics

The charts in Figure 4.10 provide an overview of aggregate Bitso user data. Since 2014, the number of users has been growing at an average rate of 11% per month and almost doubled in 2022. Approximately half the users are between 18 and 34 years old, and at least 21% identify as female.

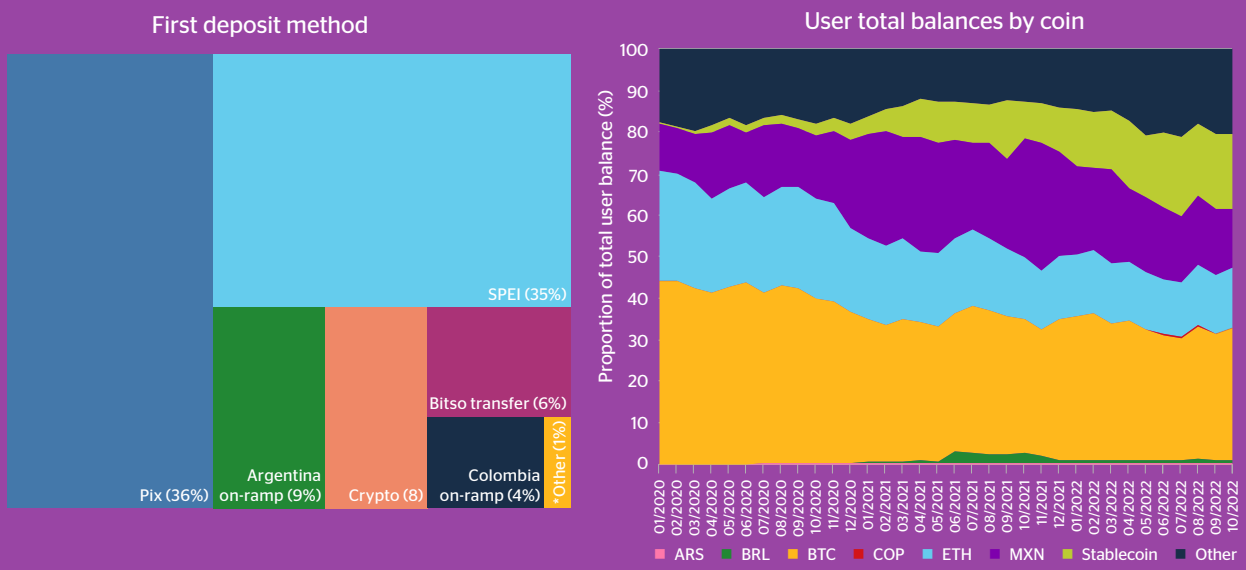


Source: Based on the Bitso interview and data provided by the company.

Figure 4.10: Bitso user growth and demographics breakdown

Structure of assets and the link to the fiat environment

To engage users, Bitso actively uses cryptoasset and fiat bridges. Figure 4.11 shows the first deposit method and the most popular coins users of Bitso exchange and payment services hold. National payment systems, such as SPEI in Mexico and Pix in Brazil, are the main on- and off-ramps that connect new users and Bitso. Other important fiat bridges include ACH/PSE in Colombia and Coelsa in Argentina. Only 13.3% of users made their first deposit via cryptoasset-related bridges.



Note: 'Other' refers to USD on-ramp, Ripple, referral programmes and Bitso+ rewards.

Source: Based on the Bitso interview and data provided by the company.

Figure 4.11: Popular bridges and coins used by Bitso users

While Bitso lists more than 50 cryptoassets, most of the value held by the app's users is in BTC (31.8%) and ETH (14.6%). Other popular cryptoassets include Mana, Litecoin and XRP. Combined, fiat currencies account for about 15% of user holdings. Notably, the role of stablecoins has significantly increased; their share was 0.45% at the beginning of 2020, and by mid-2022, it had grown to almost 20%. Stablecoins are especially popular in Argentina.

Main payment products

Bitso has several services that facilitate cryptoasset payments. The most important is Bitso Transfer. It allows users to send and receive cryptoassets that are credited instantly and free of charge, even if users are located in different countries. The only required information is the user's email address, phone number or referral code. A recipient without a Bitso account has 72 hours to create and verify one to receive the funds.

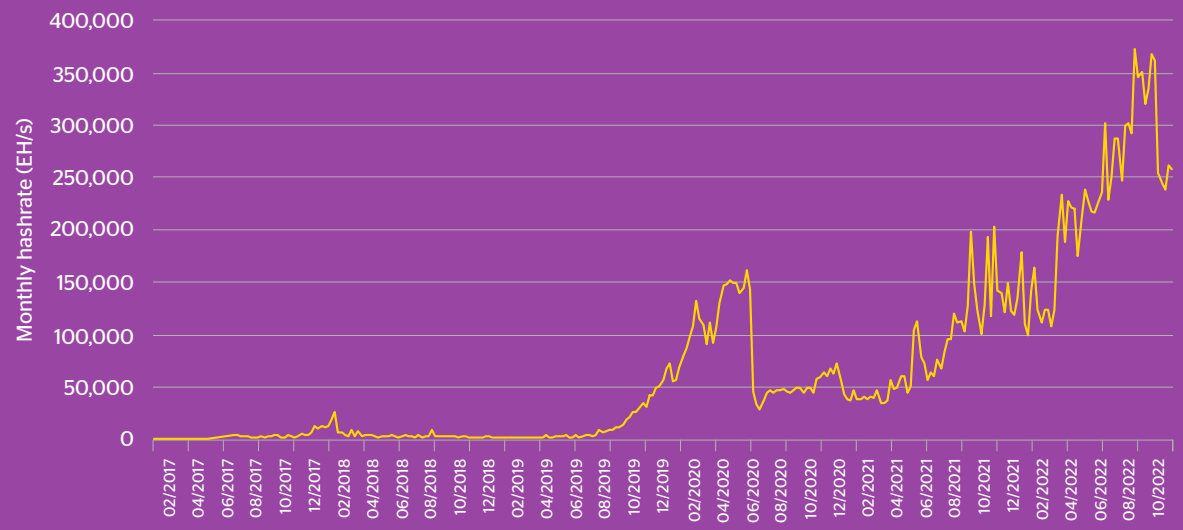
In September 2022, Bitso launched QR payments, allowing users to conveniently pay with BTC, ETH, DAI and USD stablecoins. These are automatically converted to fiat currencies based on the market exchange rate at the moment of transaction. Currently, the service is only available in Argentina, where it is more popular than in other LAC countries. The average transaction size for the first three months of operation was USD6.70, suggesting that cryptoassets are used for small, daily payments.

At the beginning of 2023, the Bitso Card was launched in Mexico; Bitso clients can now use Mexican pesos in their Bitso wallet to pay for products and services with a digital and physical card.

Expansion to the B2B segment

Currently, Bitso is expanding its operations to the B2B segment and, in November 2022, reached the milestone of more than 1,500 active business and institutional clients. Bitso provides them with four financial and technological service categories: cash management, API pay-outs, custodial services and crypto-as-a-service.

One of the main B2B client groups is international payment service providers who leverage Bitso's cryptoasset cross-border payments offering. In 2022, Bitso processed USD3.3 billion in cross-border payments. Most of the volume came from the US–Mexico corridor. Figure 4.12 shows the index of weekly business product volumes, of which cross-border payments have one of the most significant shares.



Source: Based on the Bitso interview and data provided by the company.

Figure 4.12: Sum of weekly business product volumes, indexed to January 2017

Another important Bitso business product allows companies and institutions to accept payments in cryptoassets but receive the amount in local fiat currencies into their bank account. Examples of such companies are the ticket-selling platform Boletomovil in Mexico and the football club São Paulo FC in Brazil.

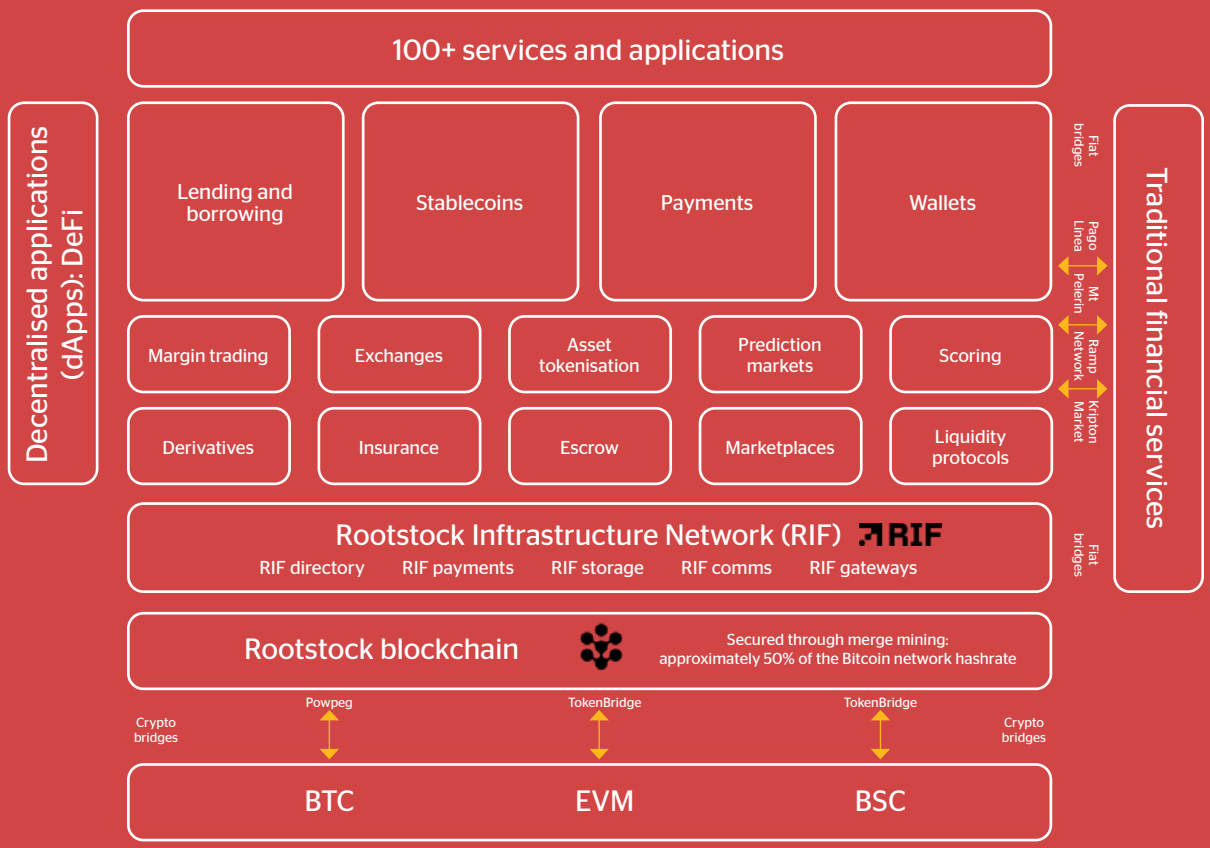
DeFi case study: Rootstock

Rootstock, formerly RSK, is a decentralised smart contract network originally developed by IOV Labs. It enables building decentralised applications (dApps) on top of Bitcoin and other blockchain protocols and facilitates interoperability between chains.

Although the company operates globally, it has strong ties to LAC as IOV Labs' co-founders Diego Gutierrez, Sergio Demian Lerner, Adrian Eidelman and Gabriel Kurman come from Argentina and have long been involved in developing and adopting Bitcoin in the region. The founders created the network as they interacted with the LAC cryptoasset community. They provided the platform so IOV Labs could bring together several technologies (Bitcoin, smart contracts and merged mining) as the foundation of the Rootstock network.

In January 2018, IOV Labs launched the mainnet version of the Rootstock blockchain, considered a Bitcoin 'sidechain'. Its primary goal is to deliver 'everyday DeFi' to users by providing a more secure and scalable platform for running smart contracts.

Over time, the Rootstock network has evolved, and developers have built the Rootstock Infrastructure Framework (RIF), a suite of open and decentralised protocols that facilitate the creation of dApps, many of which are DeFi-focused. The Rootstock network has over 70,000 active users, making over 10 million transactions over the last five years. As of December 2022, 102 services and dApps were on the Rootstock network (up from 45 in December 2020), most of which enable DeFi functions, as Figure 4.13 shows. Many dApps on Rootstock have strong links to LAC, as the projects' founders hail from the region. Each project has a unique perspective on the area's financial inclusion and financial stability challenges.



Source: Based on the Rootstock interview and data provided by the company.

Figure 4.13: Rootstock network

Figure 4.13 also highlights DeFi use cases. Notable dApps on Rootstock include, among others, Sovryn, a P2P lending and borrowing project, which has the largest value locked on the Rootstock network, and Money on Chain, which has facilitated the issuance of stablecoins backed by Bitcoin. Other important examples are multi-blockchain wallets, such as Defiant and Liquality.

The Rootstock network is secured through merged mining, which leverages Bitcoin's PoW algorithm and allows miners to mine multiple cryptocurrencies simultaneously. Key Bitcoin mining pools, such as Antpool, Luxor, F2Pool, Binance Pool and ViaBTC, participate in merged mining; the hashrate on the Rootstock network is about half of the Bitcoin mining network. Additionally, the RIF was constructed to allow interoperability between Bitcoin, Ethereum Virtual Machine (EVM) and Binance Smart Chain (BSC). Rootstock has created several 'bridges' to facilitate this interoperability and connect Rootstock to LAC's wider cryptoasset, payments and DeFi ecosystem. Powpeg is the native bridge of the network and holds the most value, with 3,445 bitcoin 'locked' in the two-way peg as of December 2022.[80] The number of locked bitcoin has grown from 570 in January 2021, indicating a six-fold increase in the Rootstock network.

DeFi dApps on Rootstock: Tropykus

What is Tropykus?

Tropykus is a dApp built on top of the Rootstock network infrastructure. The project was developed in LAC and aimed to fulfil one key DeFi use case for LAC users: savings and borrowing.

How does Tropykus work?

Tropykus uses Rootstock smart contracts and the RIF to allow users to conduct savings and borrowing transactions. Users can deposit cryptoassets, earn a yield and borrow against collateral they have posted. The interest rates associated with each use case are determined dynamically based on the available liquidity and fluctuate in real time depending on supply and demand. The Tropykus protocol adjusts accordingly to provide low interest rates when liquidity is abundant and higher interest rates to incentivise new deposits and loan repayments when liquidity is tight.

Why was Tropykus created?

The founders, Mauricio Tovar, Diego Mazo and David Carvajal from Colombia, sought to address critical challenges in the country and the region more broadly. In an interview, Tropykus indicated that these challenges included currency devaluations and a lack of financial inclusion and financial solutions available to individuals who get their earnings from the emerging cryptoasset economy. In addition, Tropykus noted that, more recently, higher inflation rates across the region have driven adoption as users are increasingly looking for hard currency savings solutions to protect their purchasing power.

The interview also highlighted that while fulfilling these user needs is an excellent growth and development opportunity for Tropykus, there have been some key challenges around the company's evolution, including technical development challenges, such as protocol design, governance mechanisms and overcoming users' attraction to unsustainably high-yielding protocols.

Project statistics

As of December 2022, Tropykus remained a niche and evolving project. The total value of deposits was USD0.7 million, while loans amounted to USD0.4 million. Tropykus' savings and borrowings activity was concentrated in Dollar on Chain, a Bitcoin-collateralised USD stablecoin. Of the value locked in smart contracts on Tropykus, 85% of savings and 98% of borrowings used Dollar on Chain.[81]

81 As of May 2023, the total value of deposits grew to USD2 million, while loans amounted to USD0.58 million. At the same time, 62% of deposits were made using Rootstock native coin (RBTC), while the share of Dollar on Chain fell to 35%.

5 Regulatory framework

5 Regulatory framework

This chapter aims to shed light on regulators' and supervisors' attitudes and plans toward cryptoassets in LAC. The presented findings provide a snapshot of the public sector's opinion in mid-2022. They are based on a survey completed by 31 public sector institutions from 22 countries across the region, including central banks (45% of respondents), supervisors (superintendencies or commissions) (35%) and financial regulators (16%). An overview of the relevant legislation is included to supplement the survey's findings.

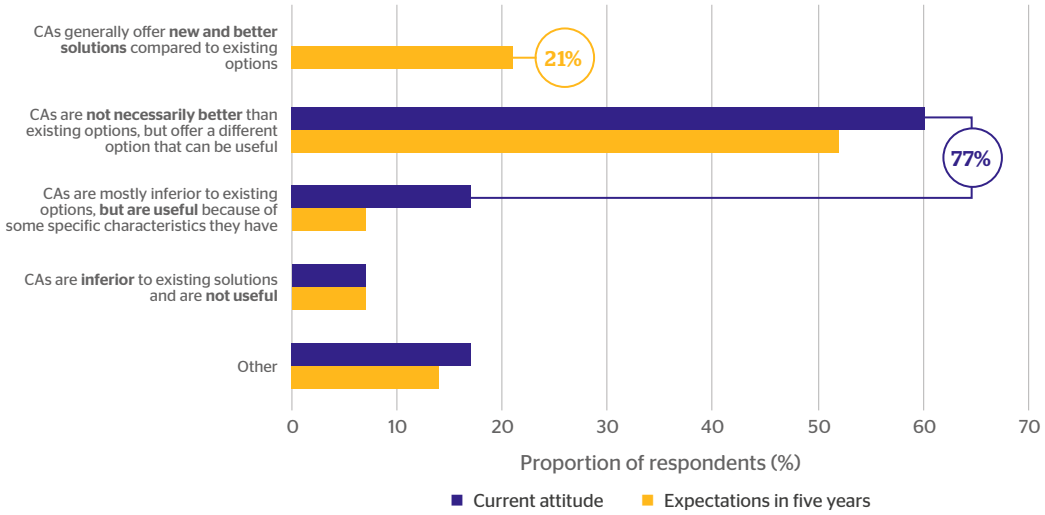
5.1 Attitudes toward cryptoassets

To better understand the regulatory framework for cryptoassets in the region and its future development, it is important to understand public sector representatives' perceptions of this type of asset.

Positive attitude and cautious optimism

Our survey reveals (see Figure 5.1) that 77% of regulators and supervisors believe cryptoassets are valuable as an alternative to existing options or can be useful due to specific characteristics (for example, decentralisation). While most regulators think cryptoassets are not necessarily better or even inferior to other solutions, 21% expect this to change in favour of cryptoassets in five years.

Which statement best describes your **institutional attitude** toward cryptoassets and your expectations for them in five years?

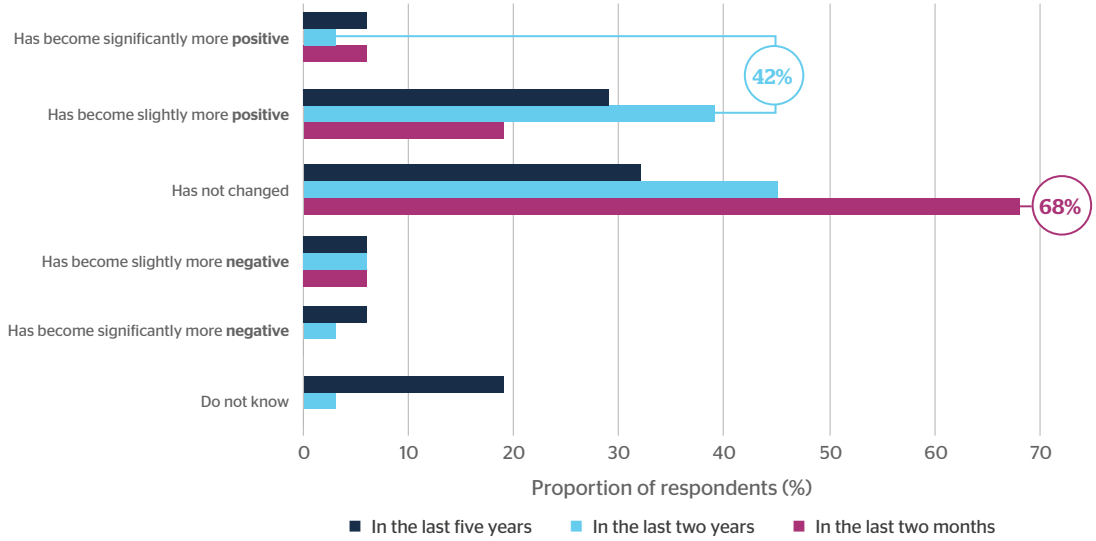


Source: CCAF (LAC public sector survey)

Figure 5.1: Cryptoassets are not necessarily better than other options but are already useful.

A generally positive perception of cryptoassets has not been the consensus in the past. However, in the two years before the survey was conducted, more than 40% of regulators and supervisors had changed their attitude (see Figure 5.2), viewing them more favourably.

How has your institution's attitude toward cryptoassets **changed over time**?



Source: CCAF (LAC public sector survey)

Figure 5.2: The attitude toward cryptoassets has become more positive.

Surprisingly, the so-called 'crypto winter' only had a minor impact on respondents' perception: 68% have not changed their attitude due to the recent price drops of cryptoassets, and 25% view them more favourably.[82] Regulators and supervisors seem to have made up their minds about cryptoassets, as attacks on individual cryptoasset-related projects and market fluctuations do not significantly change their views.

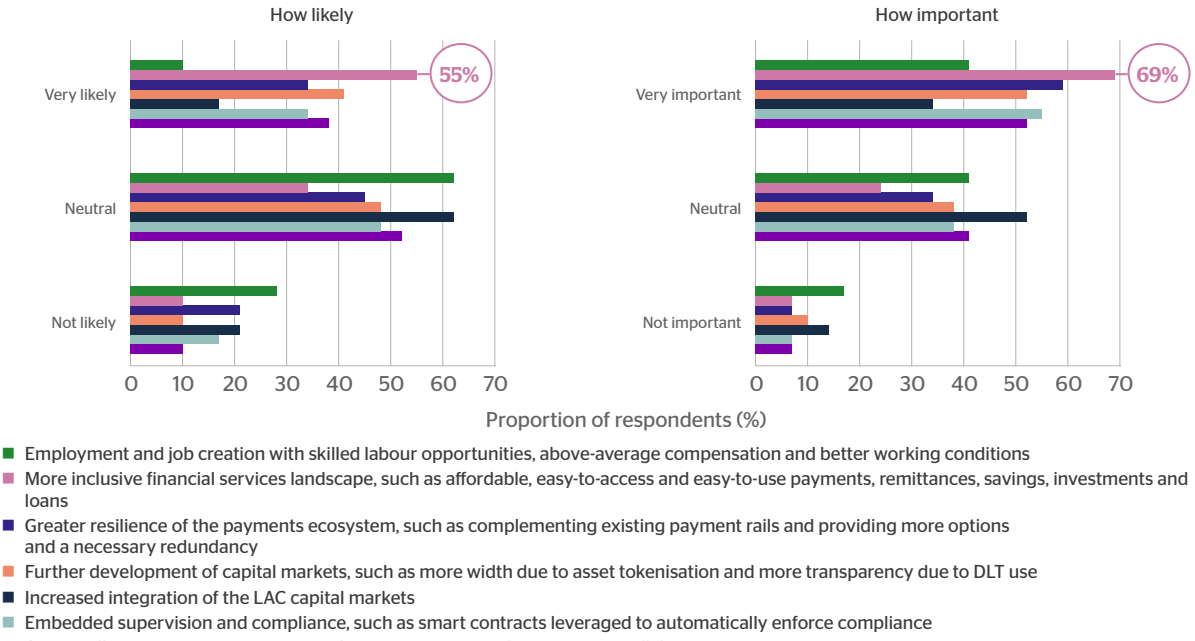
Expectations of a more inclusive financial landscape

A generally positive attitude toward cryptoassets can be attributed to how likely and important regulators and supervisors perceive the promises commonly made by the cryptoasset industry to be.

82 Answers to the public sector survey were collected from mid-June to the end of July 2022. In this context, we use the term 'crypto winter' to refer to the series of price drops in the cryptoasset market between April and mid-June 2022. It included the collapse of several cryptoasset projects, for example, UST (TerraUSD), one of the largest stablecoins.

Over 50% of survey respondents believe that a more inclusive financial services landscape is a very likely and very important promise of cryptoassets (see Figure 5.3). They expect cryptoassets may help provide more affordable, easy-to-access and easy-to-use payments, remittances, savings, investments and loans.

How **likely** and **important** are the **promises of the cryptoasset industry**?



Source: CCAF (LAC public sector survey)

Figure 5.3: Key promises of the cryptoasset industry are more inclusion, positive economic impact and market development.

Two other key promises that respondents believe are likely and important are a generally positive economic impact due to innovation and open-source collaboration and capital markets development, which implies broader asset coverage due to asset tokenisation and greater transparency due to DLT use.

5.2 The current state of regulation

Increased regulatory attention

A more positive attitude toward cryptoassets by LAC regulators will likely influence future regulatory frameworks and could have already played a role in recently introduced legislation. So far, there is one clear sign: an increase in regulators' attention in the last few years. Analysis of publicly available information shows that at least 15 jurisdictions have already addressed cryptoassets.[83]

These jurisdictions can be divided into three groups based on their regulatory stance: (i) those with cryptoasset-specific regulations,[84] (ii) those without specific regulations but with ongoing cryptoasset-focused legislative activities[85] and (iii) those without cryptoasset regulations. Figure 5.4 shows that 87% of jurisdictions have specific regulations or are actively taking legislative steps to address cryptoassets.[86]

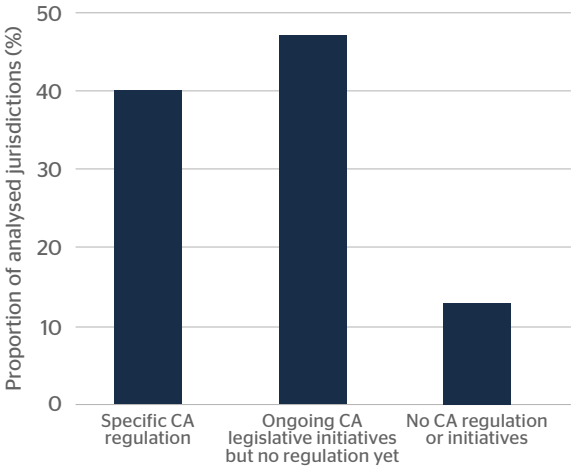
83 The list includes jurisdictions with cryptoasset-specific regulations, initiatives to address crypto-related services, and a decree or an official stance to prohibit or permit cryptoassets in their country. See Appendix 1 for more details.

84 Specific regulation in this context implies that a jurisdiction has a holistic (going beyond anti-money laundering and tax-specific provisions) regulatory framework for cryptoassets, or cryptoasset regulation is shared between different existing laws and policies.

85 Ongoing legislative activities in this context imply that a jurisdiction does not yet have a cryptoasset-specific regulatory framework but is launching one or more initiatives to regulate cryptoassets.

86 See Appendix 1 for details of the grouping and select jurisdictions.

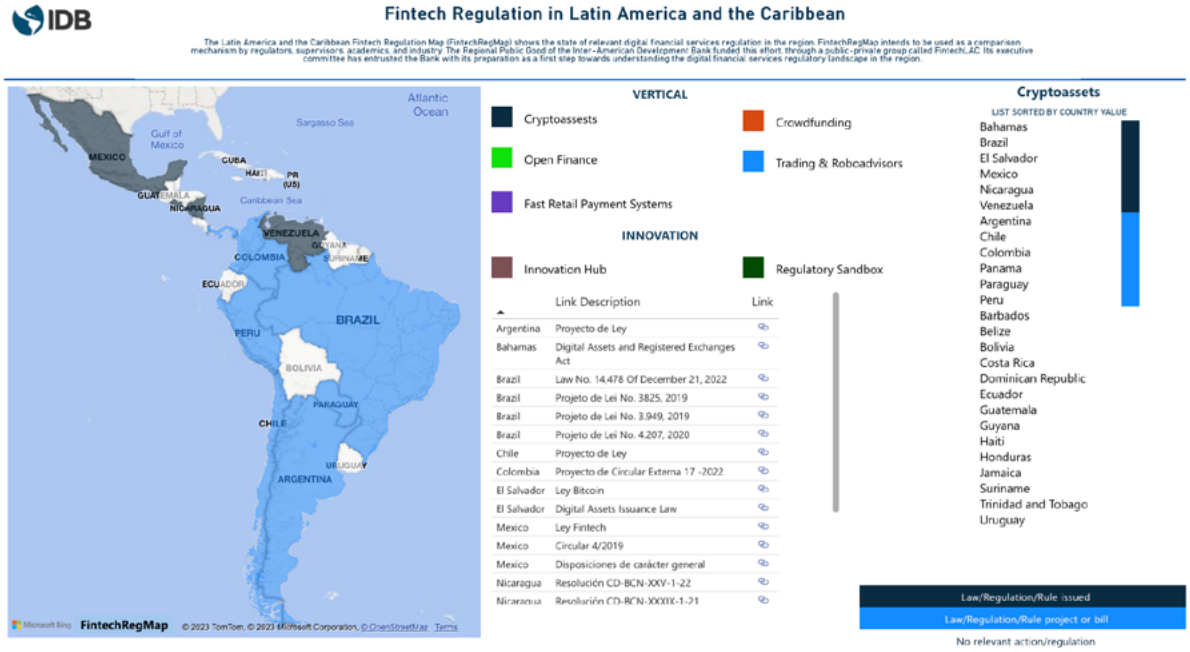
What is the regulatory stance of LAC countries regarding cryptoassets?



Source: Analysis of publically available sources (see Appendix 1 for details)

Figure 5.4: More than 10 out of 15 countries already have or are preparing specific regulations

The FintechRegMap, developed by IDB, can be used to visualise the regional cryptoasset legislative activities, including existing and drafted legislation (see Figure 5.5). It shows that six jurisdictions across LAC had issued and implemented, or are on the path of implementing, cryptocurrency regulations as of December 2022.



Source: IDB, FintechLAC: FintechRegMap, 2022.

Figure 5.5: Overview of LAC's fintech regulation from IDB

For example, in 2021, El Salvador became the first country in the world to establish bitcoin as legal tender. The issuance of Decree-Law 057[87] establishes that any economic agent must accept bitcoin as a means of payment when offered by the person who buys a good or service, any price may be expressed in bitcoin, and tax contributions may be paid in bitcoin. Venezuela issued Constituent Decree No. 41.575[88] to define the regulatory framework applicable to the integral system of cryptoassets. Mexico was the first jurisdiction in LAC to regulate cryptoasset trading platforms, determine their licensing and operation requirements and the powers attributed to the central bank and financial supervisor.[89]

87 https://www.asamblea.gob.sv/sites/default/files/documents/decretos/8EE85A5B-A420-4826-ABD0-463380E2603B.pdf

88 http://www.minci.gob.ve/wp-content/uploads/2019/01/Gaceta-Oficial-Decreto-Constituyente-sobre-el-Sistema-Integral-de-Criptoactivos.pdf

89 http://www.diputados.gob.mx/LeyesBiblio/pdf/LRITF_200521.pdf

LAC is geographically diverse, and the region's demographic challenges and income levels vary. As a result, there is a wide range of regulatory approaches regarding cryptoassets. Further details can be found in the Mexico, Argentina and Brazil case studies at the end of this chapter.

Regulatory focus on cryptocurrencies

Definition lies at the core of cryptoasset legislation. While the definitions of cryptoassets differ across LAC jurisdictions, they do have some similarities and often include features such as (i) a digital representation or store of value, (ii) the use of distributed record-keeping technologies, (iii) electronically traded, registered or transferred, (iv) a means of payment or investment and (v) not recognised as legal tender or guaranteed by the government. See Appendix 2 for a list of definitions across LAC.

An overview of jurisdictions' definitions reveals that when addressing the concept of cryptoassets, LAC legislators primarily consider cryptocurrencies and may not give enough attention to other types of cryptoassets, such as security tokens, governance tokens, utility tokens, algorithmic stablecoins, NFTs and crypto commodities.

There are also potential issues if cryptoassets are defined merely as a representation of value transferred electronically. Such a broad definition may conflict with the securities regulation, as commercialising an asset with underlying value or contractual rights could be classified as an activity reserved for financial institutions.

Some jurisdictions, however, take a more holistic approach to defining cryptoassets. For example, El Salvador published in January 2023 the Digital Assets Issuance Law that includes a definition of digital assets that goes beyond cryptocurrencies. For instance, it defines stablecoins, and derivative, reference and underlying digital assets.[90] The Law also defines an ecosystem framework that includes a National Commission for Digital Assets, a Bitcoin Funds Management Agency, Digital Asset Service Providers and Public Offerings Certifiers, among others.

Another example is the Bahamas, which identifies several types of tokens in their Digital Assets and Registered Exchanges Act, 2020,[91] including the following:

- **Asset token:** 'a digital asset that represents a claim against the issuer that (i) is intended to represent an asset and is embedded with underlying assets, or (ii) derives its value by reference to an underlying asset, or (iii) is secured by an underlying asset, or (iv) is backed by assets held as collateral for the primary purpose of encouraging price stability.'
- **Digital token:** 'a virtual currency token, asset token, utility token, NFT and any other digital representation of value designated by the Securities Commission of the Bahamas as a digital token for the purposes of the Act.'

The Bahamas' approach is consistent with other countries' regulations with a comprehensive asset classification. For example, regulation in Switzerland identifies payment, utility and asset tokens. The United Kingdom distinguishes between exchange, utility and security tokens. Singapore takes a different approach by differentiating between digital payment tokens and excluding digital representations of value.[92]

90 https://sequentia.io/wp-content/uploads/2023/01/Digital_Assets_Issuance_Law_El_Salvador_English.pdf

91 https://www.scb.gov.bs/wp-content/uploads/2020/12/Digital-Assets-and-Registered-Exchanges-Act-2020.pdf

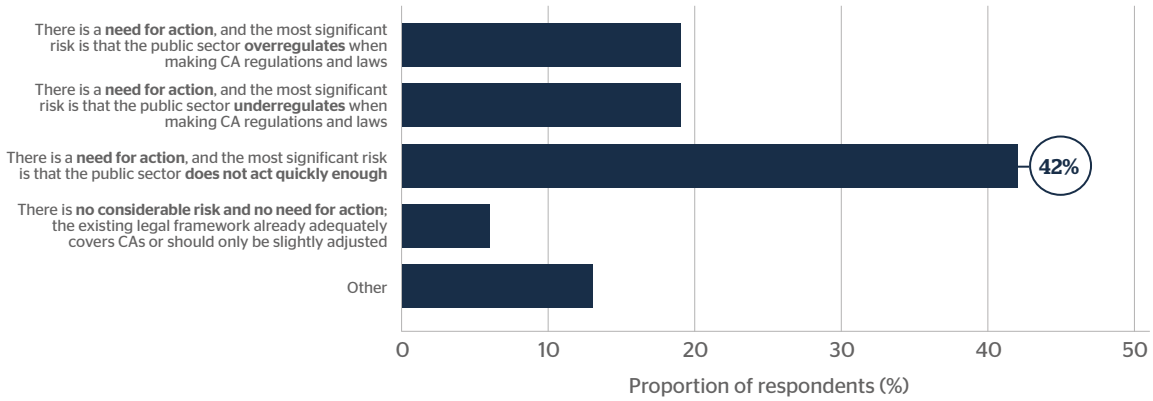
92 Please refer to Appendix 2 for further information on the cryptoasset definitions used by LAC countries and suggested by the UK, Singapore and Switzerland.

5.3 Regulatory plans

Need for action

Although some LAC jurisdictions already have cryptoasset-specific regulations, 81% of the regional public sector representatives acknowledge the need for further action (see Figure 5.6). Notably, the biggest concern for 42% of the regulators and supervisors is that the public sector does not act quickly enough. This response was twice as common as concerns of underregulating or overregulating cryptoassets.

Which statement best describes your beliefs regarding the **risk** and the **need for action** on cryptoasset regulation?



Source: CCAF (LAC public sector survey)

Figure 5.6: There is a need to act and act quickly.

Companies that provide cryptoasset-related services in the region also highlight the need for regulatory action. They believe regulatory uncertainty is the most critical challenge[93] preventing further growth and development of LAC's cryptoasset ecosystem.

Unclear plans for specific cryptoasset types

Despite acknowledging the need for action, the regulatory road maps for most cryptoasset types remain uncertain. For instance, over half of the regulators do not have clear plans for the next five years or do not intend to introduce a regulatory framework for DeFi and related areas such as DAOs, governance tokens and smart contracts. In contrast, cryptoasset-related companies consider DeFi one of the region's top five most promising opportunities for the ecosystem (see Chapter 2).

Regulators are focusing on cryptoasset infrastructure. As Figure 5.7 shows, for the period of one to two years following the survey, their priority is introducing a regulatory framework for cryptoasset exchanges and related financial services (27%). One of the critical goals for the period of three to five years is introducing a regulatory framework for a self-sovereign identity for e-KYC (32%).

93 From a list of 15 challenges collected during the interviews with cryptoasset-related companies and rated by the participants of the private sector survey. See Chapter 2 for more details.

Source: CCAF (LAC public sector survey)

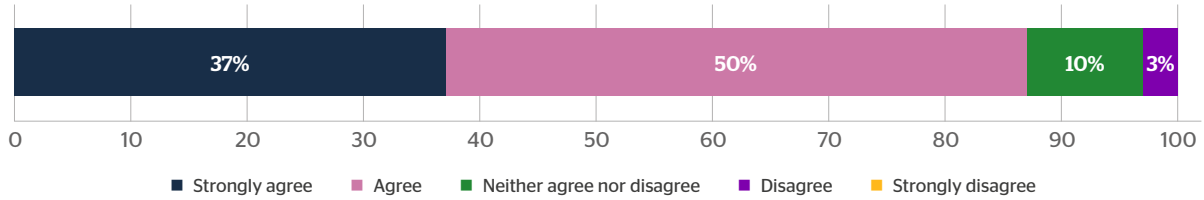
Figure 5.7: 'Not planned for the next five years or unclear' is the most popular answer to the question regarding regulatory plans for most cryptoasset types.

Need for training and research

One possible reason for the lack of regulatory plans targeting more sophisticated cryptoassets is that regulators and supervisors are still familiarising themselves with different types of cryptoassets.

About 87% of the public sector participants believe there is a need to create specialised infrastructure like innovation hubs and regulatory sandboxes to better understand and test the innovation resulting from cryptoassets before regulating it (see Figure 5.8). These results align with the findings from the IDB survey on innovative regulatory tools implemented worldwide.[94]

The public sector should create specialised infrastructure to better understand and test cryptoasset innovation before regulating.



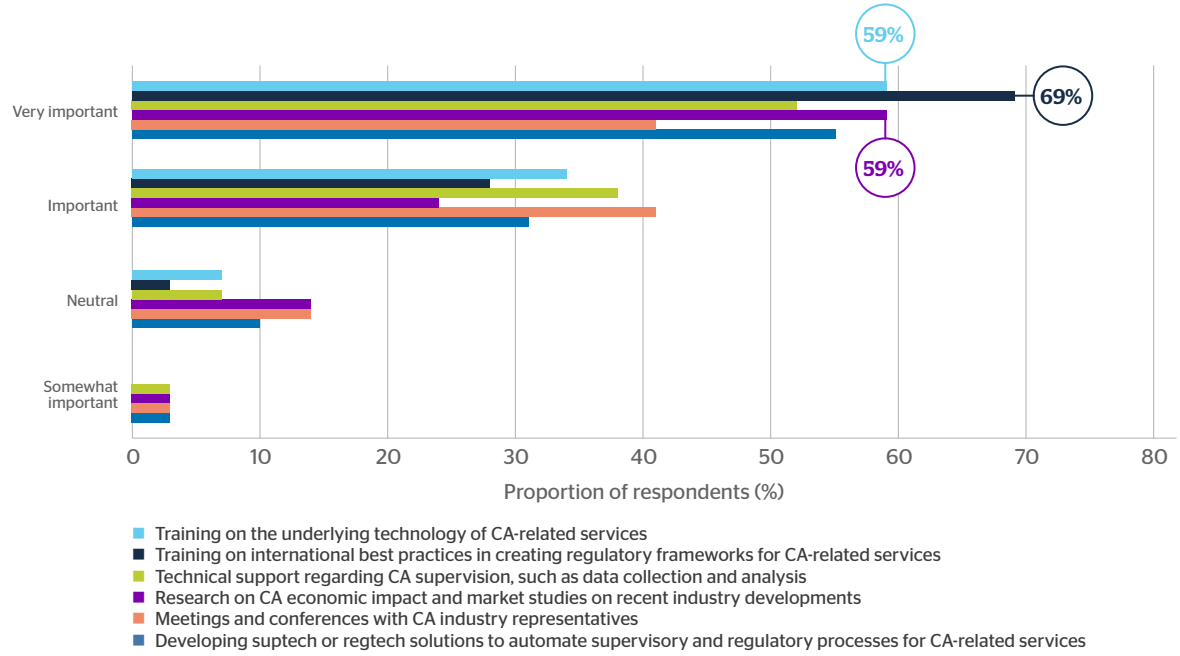
Source: CCAF (LAC public sector survey)

Figure 5.8: There is a need to better understand and test cryptoasset innovation.

94 https://publications.iadb.org/publications/english/viewer/Regulatory-Sandboxes-Innovation-Hubs-and-Other-Regulatory-Innovation-Tools-in-Latin-America-and-the-Caribbean.pdf

As Figure 5.9 shows, most participating institutions reported a great need for training on international best practices when creating regulatory frameworks for cryptoasset-related services (97% consider it important or very important) and the technology underlying cryptoassets (93%).

What is **needed**? How important for your regulatory activities could the following be?



Source: CCAF (LAC public sector survey)

Figure 5.9: Further training is very important.

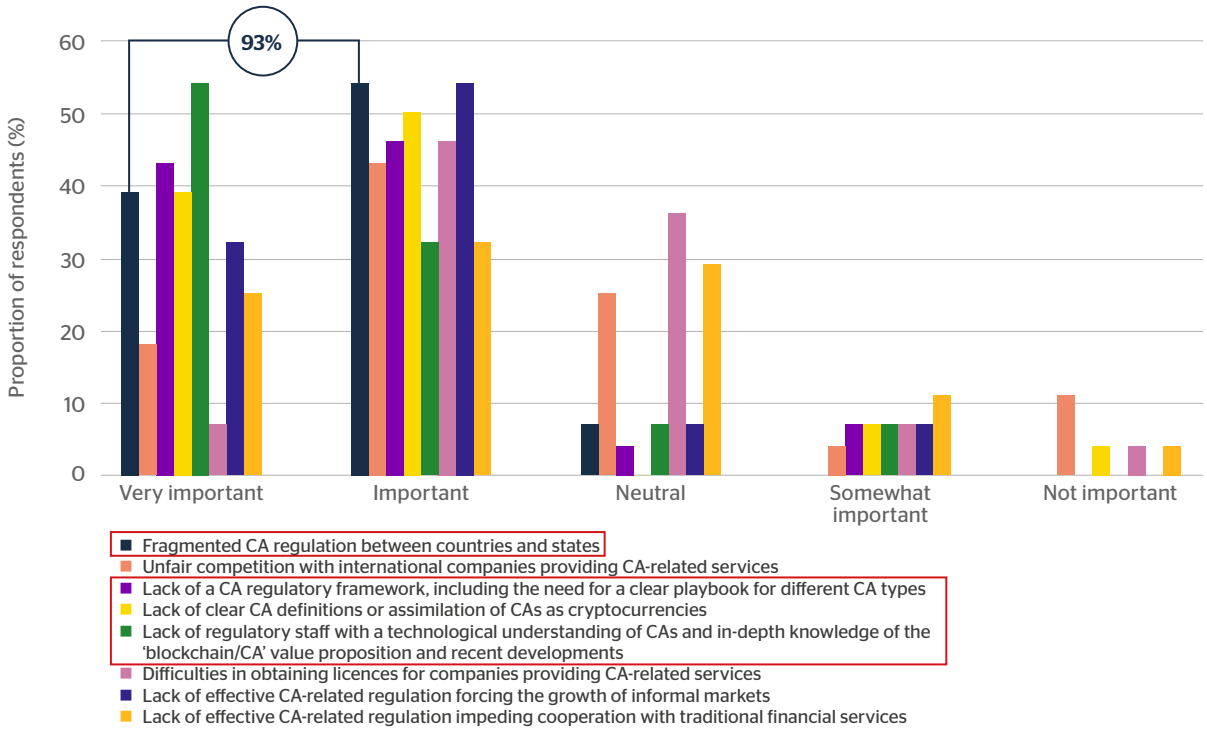
5.4 Key challenges for the ecosystem

Lack of regulatory staff with expertise in cryptoassets

The decision to approach cryptoasset regulation by studying and testing the innovation is closely linked to the challenges for the ecosystem that regulators consider important.

More than 90% of participants acknowledge that one of the key challenges to developing LAC's cryptoasset industry is the lack of regulatory staff with a technological understanding of cryptoassets and in-depth knowledge of the 'blockchain/cryptoasset' value proposition and its recent developments (see Figure 5.10).

How **critical** are the following **challenges** to developing the cryptoasset industry in LAC?



Source: CCAF (LAC public sector survey)

Figure 5.10: Critical challenges include a lack of staff with relevant expertise, regulatory fragmentation and uncertainty.

Lack of clear rules, definitions and regulatory fragmentation

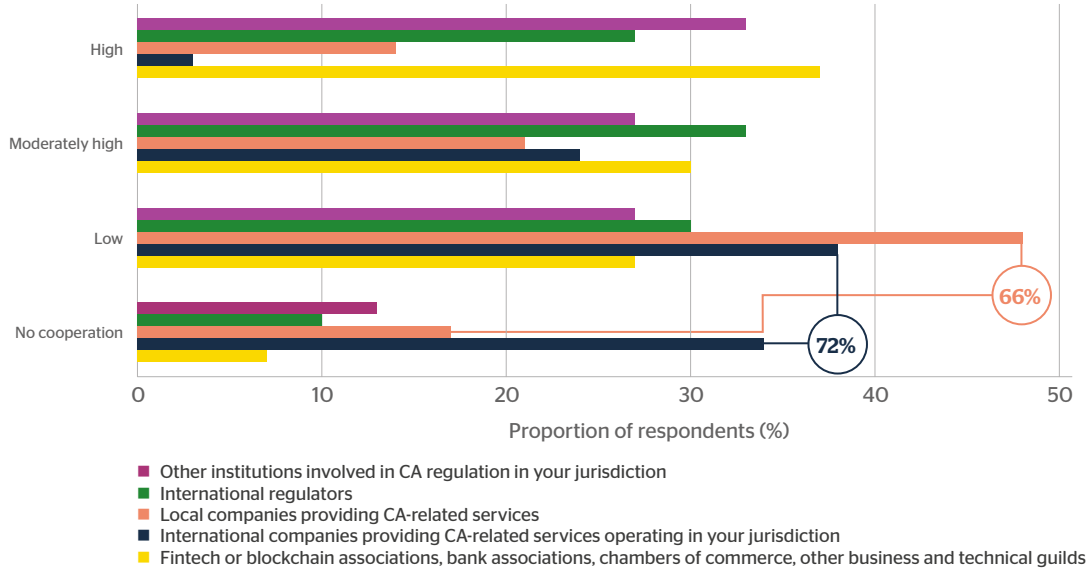
Other fundamental challenges regulators reported are (i) fragmented regulation between countries and states, (ii) a lack of a regulatory framework for cryptoassets, including the need for a clear playbook for different cryptoasset types, and (iii) a lack of a clear definition of cryptoassets or assimilation of cryptoassets as cryptocurrencies.

It is essential to highlight the discrepancy between acknowledging the importance of challenges and the lack of clear plans to address some of them (as described in Section 5.3). At the same time, a challenge can also be an opportunity – private sector representatives believe that providing clear and coherent regulation is the most significant opportunity for the further growth and development of LAC's cryptoasset ecosystem (see Chapter 2 for more details). In this regard, better training for regulators is vital to solving these challenges.

Lack of cooperation

Figure 5.11 highlights another challenge LAC's cryptoasset ecosystem faces. More than 65% of the public sector respondents estimate that cooperation with local companies providing cryptoasset-related services is low or non-existent. More than 70% have the same opinion regarding collaborating with international companies. The problem is partially mitigated by cooperating with associations; however, the level of cooperation varies by jurisdiction.

How would you estimate the **level of cooperation** regarding cryptoassets with the following stakeholders?



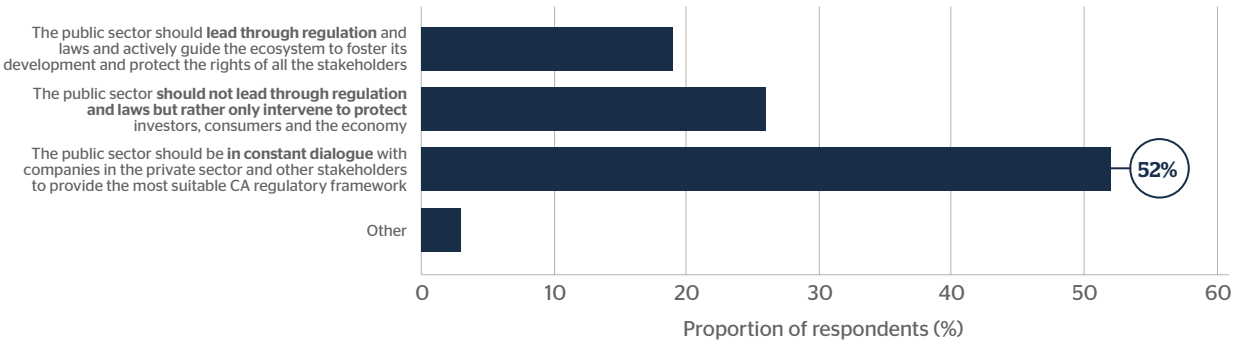
Source: CCAF (LAC public sector survey)

Figure 5.11: Cooperation with private companies is low.

The private sector survey confirms the cooperation challenge. While cryptoasset-related companies appreciate increasing interaction with regulators through innovation hubs and regulatory sandboxes, views on whether it is enough are mixed. At the same time, 67% of companies state that intensifying cooperation with regulators and traditional finance represents a significant opportunity for developing LAC's cryptoasset ecosystem (see Chapter 2 for more details).

The challenge of insufficient cooperation becomes more evident given that over half of the regulators and supervisors believe regulation should be developed in dialogue with the private sector and other stakeholders (see Figure 5.12).

Which statement best describes your beliefs on the public sector's role in the cryptoasset ecosystem?



Source: CCAF (LAC public sector survey)

Figure 5.12: The public sector believes in the co-development of regulation via dialogue.

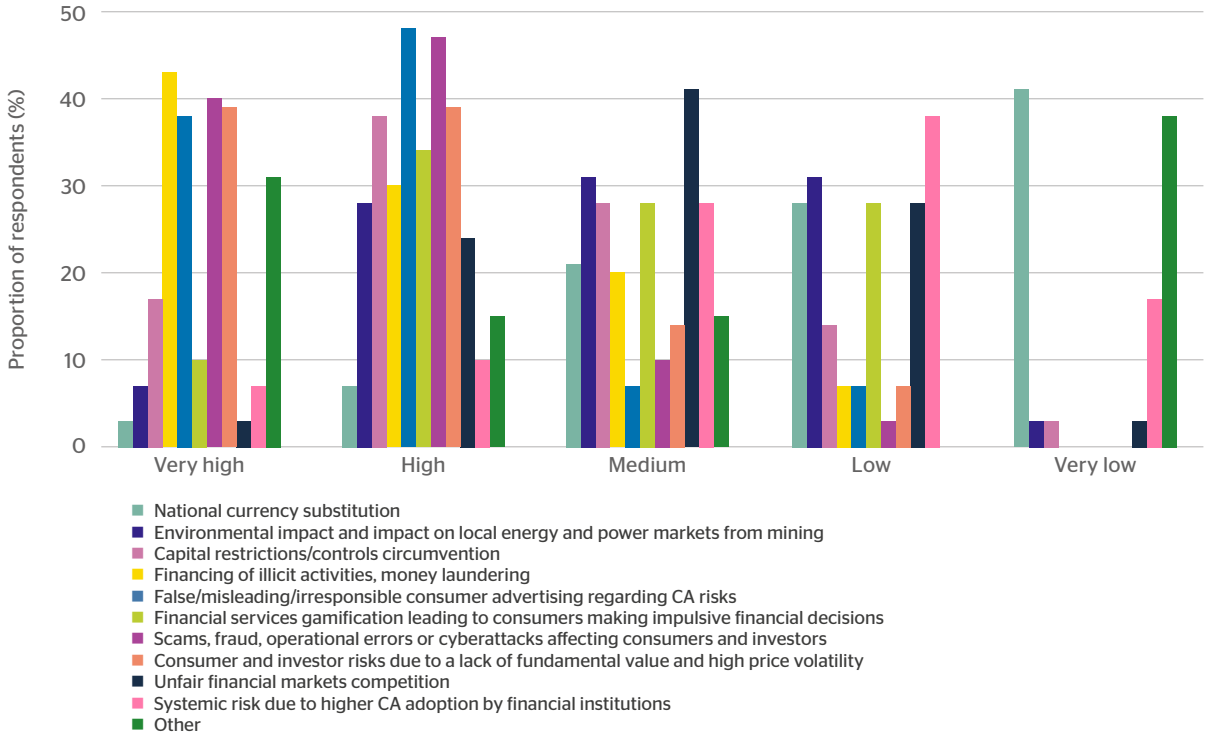
5.5 Key risks and their mitigation

We can guess and anticipate potential future regulatory developments by analysing regulators' and supervisors' current attitudes toward cryptoasset industry risks.

Scams, misleading advertisements and money laundering

As Figure 5.13 shows, the public sector considers the main risks to be (i) scams, fraud, operational errors or cyberattacks affecting consumers and investors (87% of respondents rated this risk as high or very high), (ii) false or misleading consumer advertising that neglects to mention the risks of cryptoassets (86%) and (iii) financing of illicit activities and money laundering (73%).

What are the **main risks** related to the use of cryptoassets? Please rate the following risks in terms of their significance.



Source: CCAF (LAC public sector survey)

Figure 5.13: Risks palette: from financing of illicit activities and money laundering (most important) to currency substitution (least important)

Potential mitigators

Some of these risks might be addressed within legislation planned by regulators, for example, laws for exchange services and e-KYC (see Section 5.3).

Table 5.1 summarises some key risks and possible mitigation measures based on our analysis and suggestions from international organisations like the Bank for International Settlements (BIS), International Monetary Fund (IMF), World Bank, and G7. The suggested mitigators can be implemented as a regulatory recommendation, guideline, policy or part of a comprehensive cryptoassets law. It is important to mention that not all mitigators are feasible or apply to every jurisdiction or use case. The table is simply a toolkit; any potential application should be thoroughly considered and customised accordingly.

Table 5.1: Risks and possible mitigators

Identified risks	Possible mitigators
Cyber risks: • Credential theft and loss • Breach of system integrity and 'double spending' • Network congestion • 'Sybil' attacks • Quantum computing overcoming the encryption of a DLT ledger	• Two-factor authentication • Compliance software for syncing online wallets • Certification for post-quantum design • Incident management procedures, including major operational and security incident detection and classification
Criminal activity: • Fraud • Scams • Personal data leaks • Money laundering	• User data storage and privacy policies that clearly articulate the rules for data management, access, privacy and custody • Privacy-by-design implementations • AML/CFT regulation • KYC requirements • Following international best practices and cybersecurity strategies and regulations, including Financial Action Task Force and Financial Stability Board recommendations on virtual assets
False/misleading/irresponsible advertising	• Consumer protection regulatory guidelines and procedures • A prior authorisation process from the consumer protection regulatory authority for transparent advertising campaigns • Procedures to report misleading promotions
High volatility and lack of fundamental value	• Clear guidelines to promote financial education and enable users and investors to select the most mature, secure, stable and advanced cryptoasset projects to prevent financial loss due to high volatility or lack of fundamental value • 'Seal of approval' from certification companies
Environmental risks	• Justification for ledger infrastructure • Environmental objectives and green finance policies
Unfair competition or lack of cooperation	• Clear registration, licensing or authorisation processes for financial and non-financial entities providing cryptoasset services in the country • Anti-trust regulation to prevent monopoly activities
Gamification of financial services leading to impulsive financial decisions	• Financial education campaigns, free courses, webinars and lectures for the public to generate awareness • Regulatory obligation to clearly state cryptoasset product risks to customers • Security controls for significant sum transactions to prevent accidental or impulsive financial decisions
Financial stability issues	• Exposure limits on cryptoasset holdings • Deposit insurance schemes • Prudential regulation

Sources: World Economic Forum, Federal Reserve, IMF (1, 2, 3), European Union Agency for Cybersecurity, IDB, BIS (1, 2), Financial Stability Board (1, 2), World Bank, G7, Asian Development Bank, European Parliament, Financial Conduct Authority (1, 2), Organisation for Economic Co-operation and Development, European Securities and Market Authority (1, 2)

5.6 Recommendations for cryptoasset regulators and supervisors

With the increasing adoption of cryptoassets and their implications for financial systems in LAC, there is a pressing need to address the industry's regulation and supervision. This section outlines some suggestions and recommendations for financial authorities in LAC to consider when formulating cryptoasset policies and regulations in responding to the opportunities and risks arising from the cryptoasset industry.

It is essential to balance fostering innovation, safeguarding investor and consumer interests, protecting markets and maintaining financial system stability. To achieve this, IDB recommends primarily understanding the complex cryptoasset ecosystem and establishing well-defined guidelines and a clear regulatory and supervisory framework for financial authorities and market players to abide by. From an empirical standpoint, IDB also highlights the importance of institutional capacity building: establishing a clear legal and institutional framework for regulation and supervision and strengthening the financial authorities' human talent and technological capability. Regulation and supervision also require dialogue, cooperation, continuous training and industry research.

Table 5.2 IDB recommendations for financial authorities regulating and supervising the cryptoasset industry

Recommendation	Key considerations
Educate and train	The first step for regulators and supervisors toward regulating cryptoassets is to train and educate themselves on the technologies and business models in the ecosystem. A robust educational foundation, tailored explicitly for regulators, is essential in producing a comprehensive regulatory framework, especially in emerging technology such as cryptoassets. Regulators equipped with the necessary knowledge and understanding of the cryptoasset ecosystem can develop informed and responsive policies and implement appropriate regulations protecting the market's and its participants' integrity. An all-encompassing educational approach to cryptoasset regulation yields long-term benefits by enabling expertise and experiences from various jurisdictions to be incorporated into the international regulatory dialogue. The CCAF, in cooperation with IDB and FintechLAC, has already provided training for over 130 policymakers and regulators in LAC, educating participants on the importance of creating regulations concerning technologies and business models transforming the financial industry.
Map the ecosystem	Ecosystem classification or mapping is essential when approaching cryptoasset industry regulation and supervision. Such classification can be based on different criteria, including the type of assets, activities, underlying technology, functionality, market structure and inherent risks. Irrespective of establishing the bespoke legal framework for cryptoassets, relevant financial authorities may benefit from identifying market participants, understanding associated risks and analysing how cryptoasset activities fit into existing rules and regulations. IDB suggests regularly mapping the ecosystem to better understand current industry trends and participants' interactions and tailor regulatory responses. As part of these efforts, IDB has made FintechRegMap a public good for identifying fintech regulations in LAC, including cryptoassets.
Develop taxonomies	Ecosystem mapping can serve as a basis for developing taxonomies and formulating targeted policies and regulatory measures. Asset- and activity-based taxonomies may help establish a clear regulatory perimeter and determine which assets and activities fall within the regulatory scope. 1 Examples of **asset-based classification** include the following use cases: • Security tokens • Exchange tokens • Payment tokens • Utility tokens Asset classification may also consider the centralised/decentralised nature of the tokens and the collateral mechanisms backing the tokens. 2 Examples of segments for an **activity-based regulatory perimeter** include the following: • **Exchange services:** may involve offering cryptoasset trading, P2P cryptoasset marketplaces, and institutional and retail brokerage services. • **Payment services:** may encompass P2P transfers, merchant payments, remittances and micropayments – services that enable users to transact using cryptoassets. • **Custody services:** may involve managing and safekeeping clients' cryptoassets, focusing on safely storing the assets, for example, through securely managing clients' private keys. • **Wealthtech services:** may encompass managing and investing cryptoassets on clients' behalf to maximise returns and achieve their investment goals. • **Token issuance and ICO:** the regulatory perimeter may be based on rules regarding creating and distributing new tokens on blockchains and fundraising events involving selling new tokens to investors. Regulators may also address DeFi activities, including decentralised lending, borrowing, yield farming and trading. Establishing regulatory perimeters for the DeFi ecosystem is especially difficult, as its decentralised nature makes it challenging to identify and enforce regulations on specific entities or individuals.
Engage stakeholders	Establishing guidelines for stakeholder engagement is necessary to ensure effective regulation, a clear roadmap of future regulation and transparency in the cryptoasset sector. Accommodating market participants may encourage the responsible participation of market players. For entrepreneurship, dialogue and consultations with the financial authorities enable a better understanding and interpretation of existing rules and a clearer roadmap of future regulation to allow better planning. For financial authorities, it provides them with a better understanding of the complexities of the cryptoasset markets and feedback from market participants and enables informed decision-making. There are several considerations for cooperation between regulators and stakeholders: • **Private-public engagement:** ensures a clear channel for dialogue, consultations and feedback, such as industry roundtables, bilateral sessions and calls for evidence. Regulatory drafts may be shared with stakeholders requesting comments and feedback. The responses may then be carefully considered and, where appropriate, the regulatory framework updated. • **Inclusive representation:** ensures a diverse range of stakeholders are included, for example, investors, technology experts, consumers, cryptoasset industry representatives and legal professionals. • **Education and mainstream awareness:** financial authorities' awareness campaigns and educational initiatives empower the public with knowledge about cryptoassets, their risks and the importance of regulatory oversight. Educated stakeholders are more likely to make informed and responsible contributions to the ecosystem. • **Sandboxes and innovation hubs:** establishing policy tools helps improve regulators' technical understanding and expertise in developing cryptoasset policies. At the same time, it allows participants to test products, technologies and business models while receiving guidance from regulators. This may foster dialogue between regulators and market players by creating a secure, collaborative environment for: ° regulators to observe how new technologies and innovations behave in the market, what consumers respond to and what risks may arise from emerging technologies ° entities to enter the market and learn about possible business models.

Recommendation	Key considerations
Establish requirements	Clear and specific registration, operational and licensing requirements may be established under the financial authorities' jurisdictional scope. Examples of what these requirements may refer to include the following:[95] • **Minimum capital:** established at a level that ensures the ability to meet ongoing operational expenses and financial obligations, considering the business size, number of customers and inherent risks. • **KYC/AML compliance:** including robust customer due diligence processes, identity verification and transaction monitoring. • **Risk disclosure policies:** to investors and consumers. • **Whitepaper provision:** including details of the assets' characteristics, functions and risks. • **Governance and management structure:** including requirements to ensure the soundness and qualifications of management, directors and executive personnel. • **Cybersecurity infrastructure:** including policies and infrastructure requirements to protect customers' assets and data. • **Regulatory compliance policies and procedures:** obliging regulated entities to establish sound policies for adhering to regulatory requirements. • **Record keeping and transaction recording:** requiring regulated entities to maintain record-keeping systems for transactions, customer interactions and regulatory reporting, for example, obliging regulated entities to establish policies for regular audits and ongoing transaction monitoring and reporting. • **Business recovery plan:** requiring regulated entities to provide a detailed winding-up business plan. • **Fees and financial charges:** requiring regulated entities to disclose fees, commissions or other financial charges applicable to investors and consumers, such as redemption and remittance fees. • **Deposit guarantee scheme:** requiring regulated entities to disclose whether assets are subject to deposit insurance. • **Segregation of assets:** requiring regulated entities to demonstrate that each customer's assets are held in separate accounts and are segregated from the entity's assets.
Strengthen institutional capacity	Financial authorities' capacity to effectively regulate and supervise the cryptoasset industry's growth depends on a clearly defined mandate, their technological capacity and ongoing training. Empowering financial authorities can be achieved through training, resources, collaboration and digitalisation of the regulatory and supervisory processes. This enhances their understanding of cryptoassets, ensuring effective supervision, regulatory compliance, risk management and consumer protection, ultimately enabling authorities to respond to the evolving regulatory needs of the cryptoasset market. • **Institutional structure:** clearly defining the authority and control remit of various regulatory and supervisory bodies and their departments may help to regulate and supervise cryptoassets effectively. Distinct accountability and law implementation scope may translate into consistent enforcement and supervision, effective risk mitigation and, in effect, enhanced investor protection. • **Technological capacity:** implementing digital solutions may provide prudential data collection, management and analytics, supervisory capabilities, and regulatory and financial reporting. Digital tools such as on-chain analysis tools may enable financial authorities to, for example, access data on transaction volume on chain, number of participants and token distribution. Additional tools, such as market-monitoring, screening and intelligence tools, may be implemented in monitoring regulated entities. Several jurisdictions in LAC have been exploring suptech applications to improve their supervisory technological capacity. As demonstrated by Project Colombia,[96] implementing blockchain-based supervisory solutions may enable real-time market monitoring and regulatory compliance. • **Ongoing training and budgetary accommodations:** continuous training and sufficient budgets can enhance financial authorities' capacity to regulate and supervise the industry. It ensures their employees have up-to-date skills and knowledge and provides the necessary resources to support financial authorities' organisational growth and efficiency.

An appropriate regulatory and supervisory framework for cryptoassets fosters a safe, innovative and sustainable ecosystem. Financial authorities in LAC and beyond are invited to consider the recommendations presented in this section, highlighting the importance of setting transparent guidelines, adopting a risk-based approach, promoting collaboration and encouraging stakeholder participation.

Emphasising educational initiatives may be a sound preliminary step to establishing a regulatory and supervisory framework, as it equips investors, consumers and industry participants with the knowledge needed to navigate the complexities of the cryptoasset landscape. Education is pivotal in mitigating risks, fostering responsible practices and facilitating informed decision-making by market participants. It also contributes to establishing a safe ecosystem for the market to develop.

95 IDB recognises the difficulties in regulating activities with no central entity performing them and the need for adapting regulation to those particular cases. Also, it is relevant to recommend technology-neutral regulations.

96 https://lab.ccaf.io/project-colombia/

5.7 Country overviews: evolution of the regulatory approaches toward cryptoassets in LAC

Mexico

Table 5.2 provides an overview of demographics, technology and cryptoasset adoption statistics, and cryptoasset-related laws and regulatory bodies in Mexico.

Table 5.2: Relevant facts regarding Mexico

Demographics and adoption	Relevant laws	Regulatory authorities
• Population: 126 million (ranked two regionally) • Internet penetration: 72% of the total population (ranked four regionally) • Smartphone penetration: 67% (ranked four regionally) • Global Crypto Adoption Index position: 28 out of 146 (ranked five regionally) • Triple A Crypto ownership: 4.4 million people, 3.4% of Mexico's total population, currently own cryptocurrency (ranked five regionally) • Statista Crypto use: 10% of respondents indicated they either own or use crypto in Mexico (ranked five regionally)	• Law to Regulate Financial Technology Institutions (LRITF) • Circular 4/2019 • Federal Law for the Prevention and Identification of Transactions with Resources of Illegal Proceeds	• National Banking and Securities Commission (CNBV) • Mexican Central Bank (Banxico) • Ministry of Finance and Public Credit (SHCP)

Regulatory path

In Mexico, cryptoasset regulation started with a press release on 10 March 2014[97] issued by the Mexican Central Bank, stating that:

'Cryptoassets are electronic information storage and exchange mechanisms that are not backed by any institution, and therefore are not legal tender. The current legal framework does not recognize them as an official means of exchange, a store of value, or another form of investment. So far, virtual assets have not had a relevant penetration in Mexico. However, Banco de México wishes to warn the public about the risks inherent to the acquisition of these assets and their use as substitutes for conventional means of payment.'

After that, in 2017, there was a press release from the three financial regulators (CNBV, SHCP and Banxico) regarding the risks of using virtual assets and investment schemes associated with initial coin offerings (ICOs).[98]

The following year, Mexico took the initiative by enacting the Law to Regulate Financial Technology Institutions,[99] which introduced innovative concepts in the Mexican financial sector, such as crowdfunding institutions, e-money institutions, a regulatory sandbox, open finance and virtual assets.

In what has become known in Mexico as the 'FinTech Law', Mexico defined for the first time what constitutes a virtual asset:

'A virtual asset is the representation of value registered electronically and used by the public as a means of payment for all types of legal acts and whose transfer can only be carried out through electronic means. In no case shall virtual assets be understood as legal tender in the national territory, foreign currency or any other asset denominated in legal tender or foreign currency.'[100]

In the FinTech Law, there is regulation for banks and fintech institutions offering virtual assets in their portfolio of services. This regulation states that financial entities can only provide these services with written authorisation by Banxico and can only offer virtual assets permitted by Banxico.

97 https://www.banxico.org.mx/publicaciones-y-prensa/miscelaneos/%7B881612EF-DEC3-E03E-8C5A-C795CA66ACEA%7D.pdf

98 https://www.banxico.org.mx/publicaciones-y-prensa/miscelaneos/%7B6D5AAB8C-3BFA-0A8B-5EDD-7EDC04E1931C%7D.pdf

99 https://www.diputados.gob.mx/LeyesBiblio/pdf/LRITF_200521.pdf

100 Article 30 of the Law to Regulate Financial Technology Institutions

In March 2019, Circular 4/2019[101] was enacted. This Circular was the central regulation in terms of the characteristics of operations with virtual assets and the only circular that regulated the abovementioned authorisation from Banxico to operate with such assets. This Circular only permitted back-office operations with virtual assets, closing the door for financial entities to work with virtual assets directly with clients on services such as exchanges, custody, transfers, and buying and selling cryptoassets.

This posture from Banxico was also supported by the Financial System Stability Council, a leading institution in Mexico integrated by all the financial regulators in the country, in June 2019, stating that the financial system in Mexico must keep a 'healthy distance' from virtual assets such as Bitcoin.[102]

Notwithstanding the above posture, regulators did not close the door for virtual assets in the non-financial sector. All activities with virtual assets were permitted in Mexico for non-financial entities and individuals. The only regulation for these services came with the Federal Law for the Prevention and Identification of Transactions with Resources of Illegal Proceeds. This AML regulation introduced three obligations:

1. Cryptocurrency exchanges must be registered before the tax authority to get a username and a password on the AML system called SITI/PLD.
2. Cryptocurrency exchanges, crypto-brokers and wallet providers must present reports for users surpassing a threshold (approximately USD3,100).
3. Cryptocurrency exchanges, crypto-brokers and wallet providers must comply with the AML regulation regarding KYC, due diligence, conservation of data, compliance manual and automated systems, and to have and present terms and conditions and data protection policies for their platforms.

In summary, Mexico initially had a conservative stance, issuing warnings about the technology. It then began regulating and dividing cryptoassets between financial and non-financial sectors. Regulators maintained a distance between the Mexican financial sector and virtual assets. Still, they permitted a wide adoption for non-financial entities and individuals with AML controls. Finally, Mexico continues to evolve while more innovative crypto-based business models are created there.

Argentina

Table 5.3 provides an overview of demographics, technology and cryptoasset adoption statistics, cryptoasset-related laws and regulatory bodies in Argentina.

Table 5.3: Relevant facts regarding Argentina

Demographics and adoption	Relevant laws	Regulatory authorities
• Population: 47 million (ranked four regionally) • Internet penetration: 87.2% (ranked two regionally) • Smartphone penetration: 70% (ranked three regionally) • Global Crypto Adoption Index position: 13 out of 146 (ranked two regionally) • Triple A Crypto ownership: 2.5 million people, 5.6% of Argentina's total population (ranked three regionally) • Statista Crypto use: 21% of respondents indicated they either own or use crypto in Argentina (ranked one regionally)	• UIF Resolution 300/201432 (AML) • Law 27430, Modifications to Tax Law	• Argentinian Central Bank (BCRA) • Argentinian National Securities Commission (CNV) • Financial Information Unit (UIF)

Regulatory path

Argentina's approach to regulating cryptocurrencies began with AML and tax regulations in 2014. Argentinian regulators took the initiative in the context of the worldwide adoption of Bitcoin and altcoins, as it is mentioned in the UIF Resolution 300/2014:[103]

101 https://www.banxico.org.mx/marco-normativo/normativa-emitida-por-el-banco-de-mexico/circular-4-2019/%7BACDFD34F-1226-1893-52EE-D87A28645384%7D.pdf

102 https://www.gob.mx/cms/uploads/attachment/file/470439/Comunicado_de_prensa_CESF_junio_19_Final.pdf

103 http://servicios.infoleg.gob.ar/infolegInternet/anexos/230000-234999/231930/norma.htm

'Virtual currencies represent an expanding business worldwide, which has recently gained economic relevance. Notwithstanding the foregoing, virtual currencies involve a series of risks for the system of prevention of Money Laundering and Terrorist Financing crimes.'

It is important to mention that Resolution 300/2014 was the first official document to introduce a definition for cryptocurrencies in Argentina:

'Digital representation of value that can be digitally traded and whose functions are to constitute a medium of exchange, and/or a unit of account, and/or a store of value, but which are not legal tender, issued or guaranteed by any country or jurisdiction.'

Regarding the evolution of the regulatory ecosystem, Argentina has been actively experimenting with initiatives to regulate crypto-related services and products. Between 2020 and 2021, there were more than six different initiatives to regulate cryptoassets, mining activities, taxation, CBDCs and the use of crypto in civil and commercial activities.

Even with the above, the government is still fully aware of cryptoassets' risks to the financial sector. It is evidenced by the press release from CNV and BCRA in May 2021[104] stating that:

'Cryptoassets present risks and challenges for their users, investors, and the financial system as a whole. In recent years, the proliferation of cryptoassets, the dynamics exhibited by their prices, their underlying technology and global reach, as well as the activities associated with their operation, have led different national and international organisations to issue recommendations in this regard.'

In summary, Argentina initially took a proactive approach toward cryptoasset regulation. After widespread adoption in 2017 (and again in 2021), regulators' strategy has been to generate an active environment of regulatory initiatives to address all aspects of the cryptoasset industry with specialised laws. However, so far, the implemented regulatory framework has focused on AML and tax aspects.

Brazil

Table 5.4 provides an overview of demographics, technology and cryptoasset adoption statistics, cryptoasset-related laws and regulatory bodies in Brazil.

Table 5.4: Relevant facts regarding Brazil

Demographics and adoption	Relevant laws	Regulatory authorities
• Population: 212 million (ranked one regionally) • Internet penetration: 81% (ranked three regionally) • Smartphone penetration: 84% (ranked one regionally) • Global Crypto Adoption Index position: 7 out of 146 (ranked one regionally) • Triple A Crypto ownership: 17 million people, 8.3% of Brazil's total population, currently own cryptocurrency (ranked one regionally) • Statista Crypto use: 16% of respondents indicated they either own or use crypto in Brazil (ranked two regionally)	• BCB RESOLUTION No. 50 (sandbox) • RFB Normative Ruling No. 1,888/19 (tax regulation) • Circular Letter CVM/SIN No. 11/18 (indirect investment in crypto investment funds) • Law No. 14.478 (regulation for virtual asset services and virtual asset service providers)	• Special Secretary of the Federal Revenue of Brazil • Securities and Exchange Commission (CVM) • Central Bank of Brazil (BCB) • National Monetary Council

104 https://www.argentina.gob.ar/noticias/alerta-del-bcra-y-la-cnv-sobre-los-riesgos-e-implicancias-de-los-criptoactivos

Regulatory path

Brazil's regulation started with a stance from BCB[105] and CVM[106] in 2017, the year of the ICO boom and the year that Brazilians started adopting cryptocurrencies widely. In particular, the BCB press release stated:

'Central Bank of Brazil warns that they [cryptoassets] are neither issued nor guaranteed by any monetary authority. Therefore, there is no guarantee that they can be converted to a sovereign currency, and they are not backed by any real asset. As a result, their holders run all the ensuing risks. Their value derives exclusively from the public's confidence in their issuers.'

'Firms that negotiate or store the so-called virtual currencies on behalf of their owners, be they natural or legal persons, are neither regulated, licensed to operate, nor supervised by the Central Bank of Brazil. There is no specific provision disciplining virtual currencies in the legal and regulatory frameworks associated with the National Financial System. The Central Bank of Brazil, in particular, neither regulates nor supervises transactions involving virtual currencies.'

'The Central Bank of Brazil is committed to support financial innovations, including the technology-based ones that make the financial system safer and more efficient.'

Following the above statements, Brazil took a conservative stance toward cryptoassets and ICOs. Still, the government did not prohibit or limit the growth and evolution of crypto services in the country.

The first regulation that introduced a definition of cryptoassets and a crypto exchange was the RFB Normative Ruling No. 1,888/19,[107] which defined a cryptoasset as:

'a digital representation of value denominated in its own unit of account, the price of which can be expressed in local or foreign sovereign currency, transacted electronically with the use of cryptography and distributed ledger technologies, which can be used as a form of investment, an instrument for the transfer of value or access to services, and which does not constitute legal tender.'

Legislators in Brazil also created a regulatory sandbox to have a safe place to test innovative financial models such as cryptoasset-related services.

In December 2022, the Brazilian President signed Law No. 14.478, which regulates the provision of virtual asset services and virtual asset service providers. This Law came into effect 180 days after the signature.

In summary, Brazilian regulators started by warning citizens about the risks of crypto-related services but showed confidence in their financial regulation to cover necessary aspects of the ICOs. In 2019, the tax regulation and client identification regimes with the RFB Normative Ruling No. 1,888/19 were introduced. After this, cryptoasset regulation evolved rapidly due to emerging cryptoasset-related activities within the country. In that sense, the government took a testing approach by introducing a regulatory sandbox to explore innovative models. The regulators introduced legislation for the capital markets with indirect investment in cryptoassets and cryptoasset-ETFs. They also differentiated cryptoasset activities from their fintech sector regarding e-money. They started legislative actions by presenting important initiatives for regulating the cryptoasset space in a specialised way.

105 https://www.bcb.gov.br/ingles/norms/Virtual-currencies-Communique-31379-English.pdf

106 https://www.gov.br/cvm/pt-br/assuntos/noticias/initial-coin-offering--ico--a0e4b1d10e5a47aa907191d5b6ce5714

107 http://normas.receita.fazenda.gov.br/sijut2consulta/link.action?naoPublicado=&idAto=100592&visao=compilado

6 Central bank digital currencies

6 Central bank digital currencies

This chapter provides an overview of the state and evolution of the central bank digital currency (CBDC) landscape across LAC. It also gives an insight into the plans the 14 surveyed central banks representing the region have for CBDCs.

6.1 Overview of the current state

Definition and taxonomy

A CBDC is a 'digital form of central bank-issued money distinct from balances in traditional reserve or settlement accounts.'[108] As it is issued and controlled by a central bank, a CBDC does not fall under the definition of a cryptocurrency typically born to be decentralised and untied to any government or institution.

As a general classification, CBDCs can be divided into two types: wholesale and retail. The general public primarily uses retail CBDCs, while wholesale CBDCs are mainly for interbank transactions. Our public survey findings suggest that LAC central banks mainly focus on retail CBDCs, consistent with previous research on the region.[109]

Retail CBDCs can be divided into one- and two-tier forms. A central bank issues a one-tier retail CBDC directly to individuals. For the two-tier form, it issues the CBDC to intermediaries such as commercial banks or other authorised financial entities. Those intermediaries then distribute the CBDC to consumers.

Most existing CBDC implementations in LAC (for example, the Bahamian Sand Dollar and the Eastern Caribbean Central Bank DCash) offer the one- and two-tier forms in parallel; the consumer has an electronic wallet from the central bank but can also use private bank interfaces and payment systems. This constitutes a hybrid form.

A CBDC hotspot worldwide

CBDC initiatives in LAC started in Ecuador when it launched the Dinero electrónico (DE) in 2014, and since then, they have been spreading across the region. LAC is considered one of the CBDC hotspots worldwide, with most launched projects originating from the region.[110]

Most countries in LAC have expressed interest in CBDCs. However, the depth of engagement varies from exploring the opportunity to having concluded a pilot project or launched a CBDC. Table 6.1 summarises the stages of CBDC projects in the 15 LAC countries analysed based on available public sources.

Table 6.1: Engagement in CBDC projects varies.

Launched a CBDC • The Eastern Caribbean • Jamaica • The Bahamas	**Pilot** • Uruguay (concluded) • Ecuador (concluded)
Planned • Mexico • Brazil	**Exploring** • Argentina • Peru • Colombia • Chile • Honduras • Haiti • Paraguay • Trinidad and Tobago

Sources: Please refer to Appendix 3 for the information sources and details on the analysed countries.

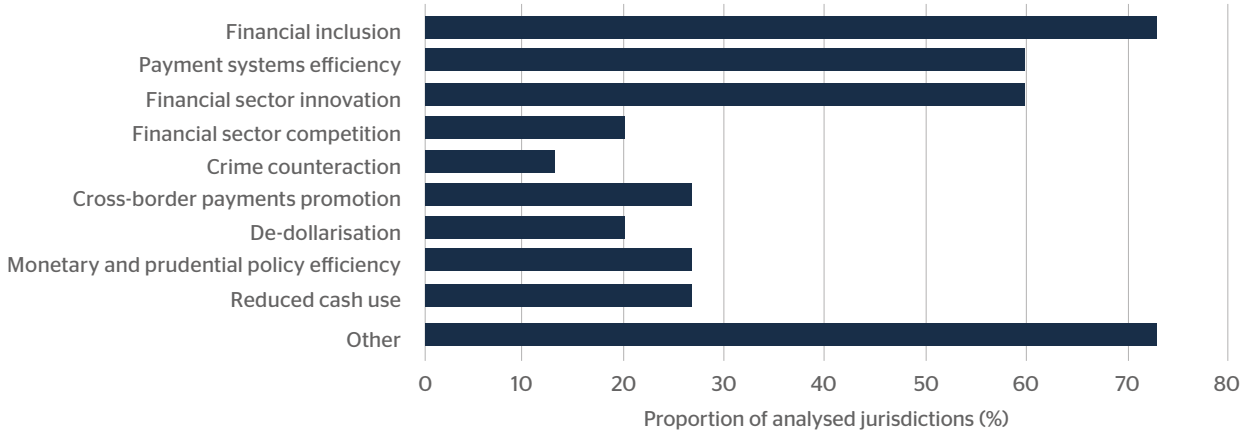
108 https://www.bis.org/publ/othp33.pdf

109 See, for instance, https://www.bis.org/publ/work989.pdf

110 See, for instance, https://cbdctracker.org/ and https://www.atlanticcouncil.org/cbdctracker/

Key drivers of CBDC development

The engagement stage in a CBDC project depends on the central bank's motivation for creating the CBDC. Our analysis of the press releases and research papers of LAC jurisdictions suggests that one of the key motivators for introducing a CBDC is financial inclusion (mentioned by 73% of the regulators), followed by financial sector innovation (60%) and payment systems efficiency (60%) (see Figure 6.1). Other primary drivers are promoting cross-border payments, monetary and prudential policy efficiency and reducing cash use, followed by financial sector competition, de-dollarisation and crime counteraction. Seventy-three percent of central banks also mention other motivations in their CBDC-related communications (see Appendix 3 for details).



Sources: Please refer to Appendix 3 for the information sources and details on the analysis.

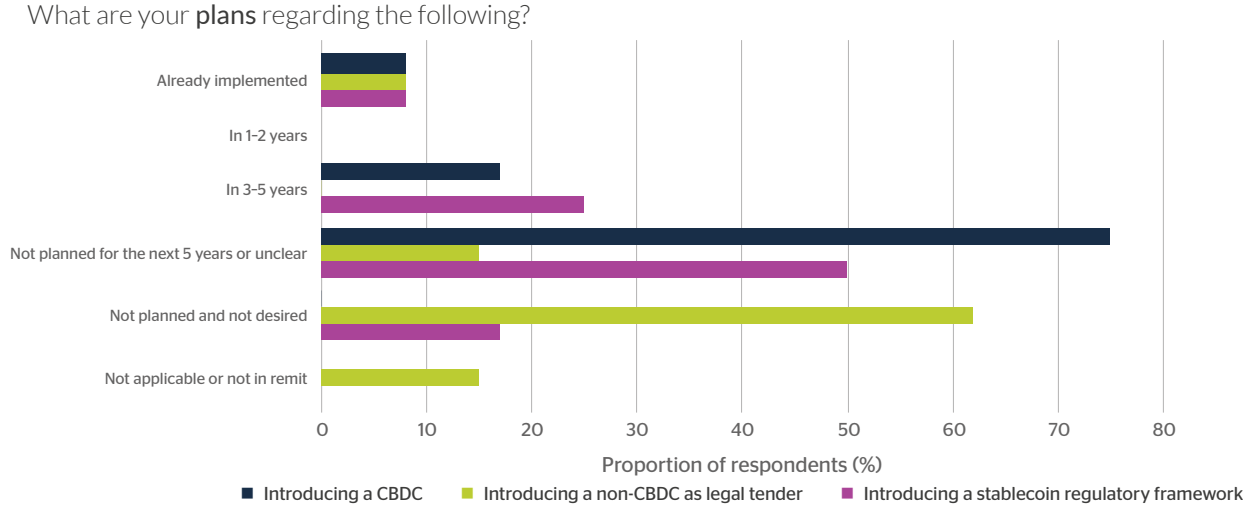
Figure 6.1: Financial inclusion is the primary motivator for issuing a CBDC.

6.2 CBDC plans and design choices

Upcoming CBDC launches

Although central banks across LAC are considering implementing CBDCs and appreciate their potential benefits, our public sector survey suggests that none of the jurisdictions will launch a new CBDC until mid-2024,[111] and only about 17% of central banks planned to introduce one in the three to five years following the survey. Even though all central banks express interest in CBDCs, 75% do not have a clear plan for them.

As Figure 6.2 suggests, plans to introduce a CBDC and a regulatory framework for stablecoins appear to occur in tandem. Additionally, releasing a stablecoin regulation or implementing a CBDC will likely happen sooner than making a non-central-bank currency legal tender.



Source: CCAF (LAC public sector survey)

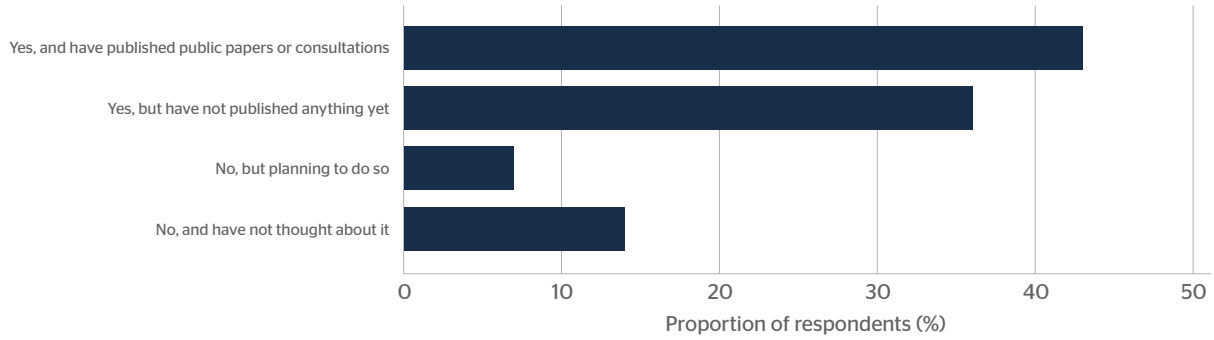
Figure 6.2: Several potential new CBDCs are being planned, but plans are mostly unclear.

111 Answers to the public sector survey were collected between mid-June and the end of July 2022.

Research and pilot projects

Most LAC countries appear to be at the preliminary stage, where central banks are researching CBDCs (see Figure 6.3) and considering starting a pilot project (Figure 6.4). According to the survey, almost **80% have already carried out some CBDC-related research,** and more than 40% have published papers or consultations. Additionally, 7% are planning to research CBDCs in the future. More importantly, 24% of central banks planned to launch a CBDC-related pilot project in the two years following the survey; another 31% plan to do so in the longer term.

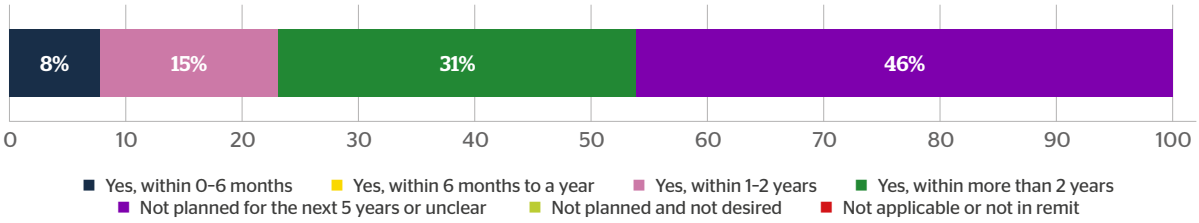
Have you implemented any **research** related to CBDCs?



Source: CCAF (LAC public sector survey)

Figure 6.3: Most central banks research CBDCs.

Do you plan to implement any **pilot projects** related to CDBCs?



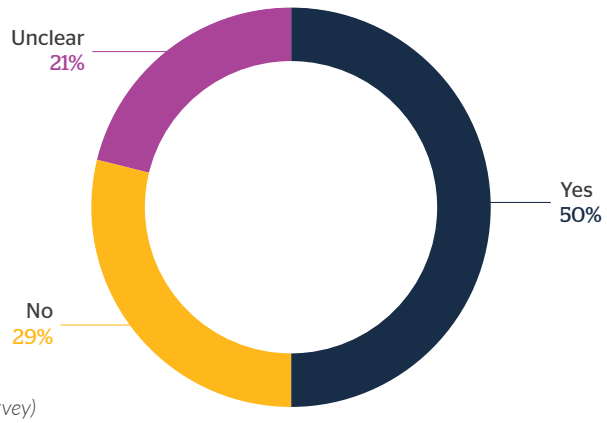
Source: CCAF (LAC public sector survey)

Figure 6.4: Over half of the central banks are planning a pilot CBDC project.

Authority to issue CBDCs

Several other signs indicate that LAC regulators are not yet ready to implement a full-scale CBDC. For example, unclarity surrounding legal authority or regulatory mandate may hinder innovation. Figure 6.5 indicates that almost 30% of central banks do not have a regulatory mandate to issue a CBDC, and approximately 20% are uncertain about their legal authority to do so.

Does your institution have the legal **authority** to issue a CBDC?



Source: CCAF (LAC public sector survey)

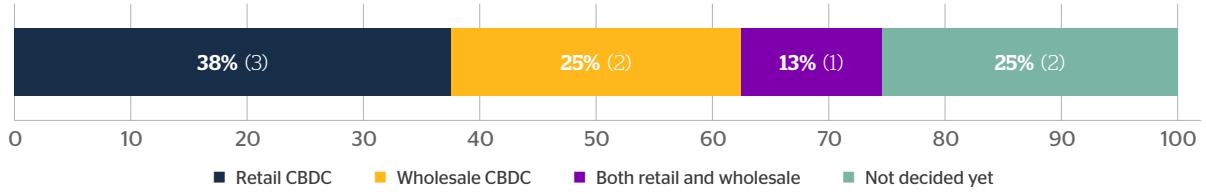
Figure 6.5: Half of the central banks do not have or are unsure about their authority to issue a CBDC.

CBDC design choices

Only a fraction of respondents answered the survey questions regarding potentially implementing a CBDC. This limited data suggests that:

- three out of eight central banks are considering a retail CBDC and two a wholesale one
- six out of nine central banks are contemplating cross-border payments (see Figures 6.6 and 6.7).

What **type** of CBDC do you consider implementing?



Source: CCAF (LAC public sector survey)

Figure 6.6: Half of the central banks are considering implementing a retail CBDC.

Are **cross-border payments** a consideration for the CBDC implementation in your jurisdiction?

Source: CCAF (LAC public sector survey)

Figure 6.7: Two-thirds of central banks are considering implementing a CBDC with cross-border functionality.

6.3 Implementation-related aspects

Following the leaders

Although many countries in LAC are still exploring introducing CBDCs, the region currently hosts most of the world's active CBDCs. Additionally, the largest economies, Brazil and Mexico, have formal plans to implement CBDCs in 2024. A statement from the President of the Peruvian central bank captured what some other central banks in the region may also believe: they do not have the necessary resources or risk appetite to lead a CBDC implementation but, at the same time, they do not want to lag behind those that do.[112] Therefore, it is likely that other countries will follow once Brazil and Mexico implement their CBDCs.

Collaboration for CBDC development

The cost of implementing a CBDC is an important factor, and it is higher for those who want to lead the way. The cost comprises the financial burden and the disruption the implementation causes. Smoothing the process could help reduce these costs. This would include gaining support from the many stakeholders involved and putting the required legal, regulatory and technological frameworks in place. The stakeholders whose support is needed include the government, private banks, credit unions, payment service providers, merchants, system providers and consumers. The process Brazil used to implement its PIX instant payment system may serve as a guide.[113]

112 https://www.reuters.com/world/americas/perus-central-bank-joins-global-push-develop-digital-currency-2021-11-16/

113 https://www.bcb.gov.br/content/publications/Annual_Report_docs/Annual_Report_2020.pdf

Collaboration is a critical element in implementing a CBDC; it makes it easier for authorities to determine the roadmap and the CBDC's form. For example, Peru collaborates with central banks in India, Singapore and Hong Kong.[114] The conceptual, technical and legal analyses required to understand CBDCs better can be done collaboratively. Another important consideration is whether developing the entire system in-house or using a vendor's technology solutions is more cost-effective. Examples of cooperation with private companies include the CBDC in the Eastern Caribbean, supported by Bitt's Digital Currency Management System.[115]

Addressing regional specifics

There are many reasons why most central banks in LAC are not planning to implement a full-scale CBDC soon and are only exploring this opportunity. Developing a CBDC is a complex process that requires rigorous research and consideration of a region's specific challenges. This subsection gives a high-level overview of some of these challenges and potential mitigation solutions.

Preference for cash and a large informal economy

One overarching obstacle to circulating a CBDC in many LAC countries is that the public prefers to deal in cash. For example, in Mexico, 90% of financial transactions below MXN500[116] and 78% of transactions above MXN501 in 2021 were made using cash.[117] It is the main means of payment at points of service in LAC, accounting for almost USD600 billion or 35.6% of the transaction value in 2021.[118]

This preference for cash is intricately linked to the prevalence of an informal economy. Cash serves as the medium of exchange for undeclared transactions, as it is difficult for public authorities to trace its movement. Developing countries with a large informal economy, which is true for most countries in LAC (for example, 55% in Mexico, 47% in Brazil and 46% in Argentina),[119] may face difficulties when attempting to circulate a CBDC and consequently will have less flexibility to advance monetary policy.

Tax reductions can change the risk/benefit perception of undeclared business activities by companies and individuals. When taxes are lower, the risk of undeclared activity remains the same, but the benefits of not paying taxes decrease, potentially decreasing the size of a country's informal economy. The appeal of cash may decrease if government organisations are obliged and private companies are incentivised to pay employees through bank accounts or, in this context, CBDC accounts instead of cash.[120]

A central bank could consider implementing cash-like characteristics when designing a CBDC. For instance, cash is preferred because of its anonymity when transacting; therefore, a CBDC may be more readily accepted if anonymity, for example, for lower-value transactions,[121] is assured. Another way to encourage wider adoption is through other incentive mechanisms, such as higher savings interest rates for a CBDC.

Poor financial and digital literacy

The lack of financial literacy is prevalent across LAC, which is a significant obstacle to developing innovative public-sector projects such as a CBDC. According to a Latin America Development Bank survey,[122] only one in two Colombians and Peruvians know that money loses value with inflation. In Ecuador and Brazil, the proportion of people aware of inflationary effects drops to one in three.

Poor digital literacy is another significant challenge. According to UNICEF, 3.7 billion people globally do

114 https://www.reuters.com/world/americas/perus-central-bank-joins-global-push-develop-digital-currency-2021-11-16/

115 https://www.bitt.com/success-stories

116 Approximately USD25 as of 31 December 2022

117 https://www.inegi.org.mx/programas/enif/2021/

118 https://offers.worldpayglobal.com/rs/850-JOA-856/images/SPGPR2022.pdf

119 https://www.statista.com/statistics/1037255/informal-employment-share-argentina/#:~:text=In%202020%2C%20the%20percentage%20of,the%20beginning%20of%20the%20decade

120 https://www.worldbank.org/en/publication/globalfindex/Report

121 See, for instance, https://www.ecb.europa.eu/paym/intro/publications/pdf/ecb.mipinfocus191217.en.pdf

122 https://www.caf.com/es/conocimiento/visiones/2021/05/como-estan-la-inclusion-y-educacion-financiera-en-america-latina/

not have internet access. In LAC, this figure is 130 million. Education and training are the primary ways to improve the population's digital skills and knowledge. For instance, Costa Rica has a national programme called Intelligent Community Centers to ensure universal access to the internet, bridge the digital divide and improve the population's digital literacy.

Lack of identity documents

Identity document requirements prevent a significant proportion of LAC's population from accessing banking and mobile services. For example, more than 5 million people fled Venezuela, many of whom remain undocumented,[123] and around 3 million Brazilians have no identity documents.[124] In Mexico, a considerable challenge is identifying northbound migrants from across LAC.[125]

IDB has suggested that 'flexible account requirements for low-value and low-risk accounts can facilitate access to financial services.'[126] Implemented examples include Colombia's principle-based AML system (SARLAFT 4.0) and tiered KYC legislation in Mexico.

The interoperability of a CBDC with government-issued digital identitifications (digital IDs) could boost CBDC adoption by people without conventional identity documents.

Furthermore, if a CBDC is implemented in a two-tier form, collaborative solutions with the financial sector can be employed. For example, the Mexican government enables banks to authenticate individuals biometrically, paving the way for broader adoption of digital IDs.[127] A similar approach can be considered when adopting a CBDC.

Limited accessibility, power outages and natural disasters

Another challenge of issuing a CBDC in LAC is that it must function continuously and be available to the entire population without exception. This requirement presents some difficulties regarding technical specifications related to connectivity, continuity plans and interoperability.

Some design considerations the BIS[128] and IMF[129] have identified to help mitigate these challenges include the following:

- Safeguards or contingency plans that reduce risks of system interruption
- Offline capabilities in case of natural disasters or power failures
- CBDC interoperability with existing payment systems
- No or minimal user costs
- Extending CBDC custody beyond mobile phones

A CBDC, especially one designed with offline capabilities, would allow people to still transfer funds or cash when traditional financial services are interrupted due to natural disasters or power outages. Considering that in some LAC countries, mobile networks serve a far greater proportion of the population than ATMs (for instance, in Mexico, ATMs cover only 12% of the people in rural municipalities,[130] while internet penetration is 50.4%),[131] a CBDC could promote funds transfer after a natural disaster or even encourage fiscal policies for SMEs and hard-to-reach individuals, as identified by the BIS.[132]

123 https://www.unhcr.org/innovation/wp-content/uploads/2020/06/Displaced-Disconnected-South-America-WEB062020.pdf

124 https://agenciabrasil.ebc.com.br/justica/noticia/2023-05/cnj-contabiliza-100-mil-atendimentos-na-semana-de-registro-civil

125 https://www.itu.int/hub/2021/06/digital-id-improving-financial-access-across-latin-america/

126 https://www3.weforum.org/docs/WEF_Accelerating_Digital_Payments_in_Latin_America_and_the_Caribbean_2022.pdf

127 https://www.itu.int/hub/2021/06/digital-id-improving-financial-access-across-latin-america/

128 https://www.bis.org/publ/work989.pdf and https://www.bis.org/publ/work948.pdf

129 https://www.imf.org/-/media/Files/Publications/FTN063/2022/English/FTNEA2022004.ashx

130 https://www.cnbv.gob.mx/Inclusi%C3%B3n/Anexos%20Inclusin%20Financiera/Panorama_IF_2021.pdf

131 https://www.inegi.org.mx/contenidos/saladeprensa/boletines/2021/OtrTemEcon/ENDUTIH_2020.pdf

132 https://www.bis.org/publ/work989.pdf

Currency substitution and capital flight

For some economies in LAC, currency substitution and capital flight are significant challenges. In this context, the factors to consider are high inflation, unfavourable macroeconomic conditions, exchange rate volatility, low central bank credibility, insecure financial systems and uncertain or undesirable monetary policies.

The BIS[133] and IMF[134] have also identified specific measures, such as international cooperation, to preserve the global monetary system's stability, increase the range of financial assets (including cross-border), introduce flexible exchange rates and strengthen regulatory policies.

As the IMF has identified,[135] some CBDC projects, such as the Bahamian Sand Dollar, have built preventive measures into their CBDC design against sudden outflows of bank deposits. These measures include holding limits on CBDCs and prudently planning the CBDC development process.

6.4 Country overviews

Concluded project: Ecuador

The first CBDC in LAC was the DE from the Central Bank of Ecuador. The DE was in circulation between 2014 and 2018 and was an early indicator of the region's interest in CBDCs. It was based on free messaging via the Unstructured Supplementary Service Data (USSD) protocol to increase adoption and promote financial inclusion. Opening and maintaining accounts and most transactions, including payments, were free of charge.[136] Users only needed a mobile phone connected to any national telecom provider and a national identity card to participate.

The number of DE accounts grew to almost half a million. However, over 70% were never used after opening, and the total volume of DE transactions was only about USD65 million.[137]

The project encountered the typical concerns a CBDC faces, such as the potential loss of privacy, the uncertainty of whether it was fully backed and the inability to make international payments. The factors contributing to the project's conclusion included the lack of cooperation with the private banking sector, insufficient DE use in public institutions' expenditures, inadequate infrastructure, such as cash-in/loading points, and lack of incentives for DE adoption.[138]

Launched CBDC: The Bahamas

The Sand Dollar is a CBDC from the Central Bank of Bahamas (CBB). It started as a pilot project in the district of Exuma at the end of 2019 and was expanded to the Abaco Islands two months later. By the end of 2020, it was launched nationwide.[139] This CBDC is widely regarded. For example, the Project Management Institute considers it the fifth most influential project in 2021, even more so than the Winter Olympics.[140] In 2022, the IMF recognised the Sand Dollar's potential to foster financial inclusion.[141]

The Sand Dollar is a combination of the one-tier and two-tier models. Users with a wallet can make payments directly (one-tier). However, they can also use authorised financial institutions, such as the local company Island Pay or international companies like MasterCard (two-tier).

133 https://www.bis.org/publ/work989.pdf

134 https://www.elibrary.imf.org/downloadpdf/journals/001/2022/083/001.2022.issue-083-en.xml

135 https://www.imf.org/en/News/Articles/2022/02/09/sp020922-the-future-of-money-gearing-up-for-central-bank-digital-currency

136 https://www.elcomercio.com/actualidad/negocios/dinero-electronico-transacciones-tips-banco.html

137 https://www.cato.org/blog/worlds-first-central-bank-electronic-money-has-come-gone-ecuador-2014-2018

138 https://www.sciencedirect.com/science/article/pii/S2666143821000107

139 https://www.sanddollar.bs/history

140 https://www.pmi.org/most-influential-projects-2021/50-most-influential-projects-2021/sand-dollar

141 https://www.imf.org/en/News/Articles/2022/05/09/pr22141-the-bahamas-imf-executive-board-concludes-2022-article-iv-consultation-with-the-bahamas

Certain technical specifications of this CBDC were crucial to its success. For example, the Sand Dollar's offline functionality was essential in restoring Abaco's financial system after the damage Hurricane Dorian caused. To promote financial inclusion, the CBDC includes digital ID solutions; multi-factor authentication and fraud-detection monitoring help protect customers against illicit activities.

The CBB is focused on increasing the Sand Dollar's availability and encouraging businesses and individuals to adopt it. One of the lessons learnt is the need to ensure financial institutions' participation in growing the CBDC network. To that end, the Bahamian CBDC has an API library that helps create digital solutions on top of the CBDC layer. Another vital component of the Sand Dollar's success is its physical infrastructure development, which includes low-cost redundant networks, termed 'CBDC Wi-Fi', that support the existing network connections.[142]

Design stage: Brazil and Mexico

The planned CBDCs of Brazil and Mexico stand out from other CBDC explorations in the region as they have been formally agreed upon and have a launch date. These initiatives lead the way and provide clarity for other regional implementations, which will gain traction once Brazil's and Mexico's CBDCs are fully active. Brazil successfully implemented the instant payment system PIX, and Mexico its Interbank Electronic Payment System (SPEI) and later an electronic payment platform CoDi.[143] These give a technological foundation for CBDC offerings and provide a possible approach to bringing various stakeholders together.

The Bank of Mexico sees CBDCs as one of four pillars of a broader strategy that includes payment system SPEI, authentication system SAVI and API interoperability. Regarding implementation, the Bank of Mexico has also identified four essential roles: regulator, supervisor, developer and operator.[144] These four critical strategy pillars and roles illustrate how CBDCs can function alongside current processes. Identifying 'developer' as one of the roles demonstrates that the technology is expected to play a central role even after the initial implementation.

The Central Bank of Brazil (BCB) created a special working group to design its CBDC. It also launched a government programme called the 'Lift Challenge Real Digital', which gathered different stakeholders and aimed to collect technical specifications and develop use cases. Based on the Lift Challenge and a sequence of webinars, the BCB identified several guidelines that, among other things, underline the importance of:[145]

- cross-border arrangements to integrate with other digital currencies for more flexible international transfers
- promoting innovative models, such as smart contracts, the internet of things and programmable money, to foster new relationships in the financial market and more dynamic provision of digital services
- the role of financial institutions as custodians of the Digital Brazilian Real to allow private agents to build innovative solutions on top of the CBDC layer.

142 https://www.omfif.org/2020/09/three-lessons-from-project-sand-dollar/

143 https://www.bcb.gov.br/content/publications/Annual_Report_docs/Annual_Report_2020.pdf and https://www.banxico.org.mx/sistemas-de-pago/d/%7BA9287AEE-664E-324B-9599-4FF89B6D7791%7D.pdf

144 https://www.banxico.org.mx/sistemas-de-pago/d/%7BA9287AEE-664E-324B-9599-4FF89B6D7791%7D.pdf

145 https://institutopropague.org/en/crypto/digital-real-understand-the-guidelines-for-the-brazilian-cbdc/

Appendices

Appendices

Appendix 1 Jurisdictions addressing cryptoassets

Country	Relevant regulators	Regulatory stance*	Laws/official stance	Initiatives
Argentina	• Argentinian Central Bank • Argentinian National Securities Commission • Financial Information Unit	2	AML and tax regulations: • UIF Resolution 300/2014 • Law 27430, Modifications to Tax Law	• Bill 6055-D-2020 • Bill 1362-D-2022 • Bill 4610-D-2021 • Bill 3262-D-2021 • Bill 2933-D-2021 • Bill 0261-S-2022 • Bill 6055-D-2020
Brazil	• Special Secretary of the Federal Revenue of Brazil • Securities and Exchange Commission • Central Bank of Brazil and the National Monetary Council	1	• BCB RESOLUTION No. 50 • RFB Normative Ruling No.1,888/19 • Circular Letter CVM/SIN No.11/18 • Law No. 14.478	• Bill of Law No. 2,060/19 • Bill of Law No 3,825/19 • Bill of Law No. 3,949/19 • Bill of Law No. 4,207/20
Mexico	• National Banking and Securities Commission • Mexican Central Bank • Ministry of Finance and Public Credit	1	Cryptoasset framework: • FinTech Law • Circular 4/2019 AML regulation: • AML Law	• Initiative for CBDCs
Colombia	• Central Bank of Colombia • Financial Superintendency of Colombia • Directorate of National Taxes and Customs	2	AML and tax regulations: • Resolution 314 • Concept 20436	• Draft law 268 of 2019 • Draft Circular 17/2022 • Draft Law 139/2021C
Chile	• Central Bank of Chile • Chilean Internal Revenue Service • Financial Market Commission	2	Tax regulation: • Pronouncement of the National Directorate on taxation	• Draft Law 14708-03 • Draft Law on Fintech in Securities Market Areas
El Salvador	• Ministry of Finance • Superintendency of the Financial System • Central Reserve Bank of El Salvador	1	Cryptoasset framework: • Bitcoin Law • Technical Standards to Facilitate the Participation of Financial Institutions in the Bitcoin Ecosystem • The Bitcoin Trust Act	
Venezuela	• The National Superintendency of Crypto-assets and Related Activities • The Cryptoassets Treasury	1	Cryptoasset frameworks: • Special Official Gazette No. 6.370 • Decree No. 41.575 • Special Official Gazette No. 41.969 • Decree No. 3.355 • Decree No. 3.353	
Peru	• Securities Market Agency • Peruvian Central Reserve Bank • Banking, Insurance, and Pension Fund Manager Agency	2	Official press releases: • BCRP official press release • SMV official press release	• Draft Law 1042/2021-CR
Bolivia	• Financial System Supervision Authority • Bolivian Central Bank	3	Official press release: • BCB official press release	
Ecuador	• Central Bank of Ecuador • Bank Superintendency	3	Official press release: • BCE official press release	

Country	Relevant regulators	Regulatory stance*	Laws/official stance	Initiatives
Uruguay	• Central Bank of Uruguay	2	Official press release: • BCU official press release	• Draft Law to regulate Cryptoassets • Draft Law 547/2021 • Conceptual framework issued by the Central Bank
Bahamas	• Securities Commission of the Bahamas	1	Cryptoasset framework: • Digital Assets and Registered Exchanges Act	
Nicaragua	• Central Bank of Nicaragua	1	Cryptoasset framework: • Resolution CD-BCN-XXV-1-221 • Resolution No. CD-BCN-XXXIX-1-21	
Paraguay	• Ministry of Industry and Trade	2	Official press release: • BCP official press release	• Bill of Law S-2110314 (vetoed by the President)
Panama	• Ministry of Trade and Industry	2	Official press release: • SBP official press release	• Bill of Law 782 • Bill of Law 697

** Regulatory stance:*

- 1: A jurisdiction with a cryptoasset-specific regulation. It has a holistic (going beyond anti-money laundering and tax-specific provisions) cryptoasset regulatory framework, or the regulation of cryptoassets is segmented in other existing laws and policies for the financial sector.
- 2: A jurisdiction that does not yet have a cryptoasset-specific regulatory framework but is launching one or more initiatives to regulate cryptoassets.
- 3: A jurisdiction with no cryptoasset regulation but has officially addressed cryptoassets.

Disclaimer: The information in this table is simply an overview and is not exhaustive. It was last updated in December 2022.

Appendix 2 Approaches to defining cryptoassets

Examples of cryptoasset definitions from LAC jurisdictions

Country	Definition
Mexico	Article 30 of the FinTech Law: 'The representation of value registered electronically and used among the public as a means of payment for all types of legal acts and whose transfer can only be carried out through electronic means. In no case shall virtual assets be understood as legal tender in national territory, foreign currency or any other asset denominated in legal tender or foreign currency.'
Brazil	RFB Normative Ruling No. 1,888/19: 'Digital representation of value denominated in its own unit of account, the price of which can be expressed in local or foreign currency, traded electronically using cryptography and distributed registration technologies, used as a form of investment, value transfer instrument or access to services, and that is not recognized as a currency.'
Argentina	UIF Resolution: 'Digital representation of value that can be digitally traded and functions as a medium of exchange; and/or a unit of account; and/or a store of value but does not have legal tender status in any jurisdiction and is neither issued nor guaranteed by any government or jurisdiction.'
Uruguay	Official press release and a law initiative of the Central Bank: 'A digital representation of value (or contractual rights) that can be stored, transferred and traded electronically using distributed record-keeping technologies (including blockchain or blockchain technology) or other similar technologies.'
Nicaragua	Resolution CD-BCN-XXV-1-221: 'A digital representation of value, which can be traded or transferred digitally, and can be used for payments or investments. Virtual assets do not include digital representations of fiat currency, securities, and other financial assets.'
Bahamas	Official press release and a law initiative of the Central Bank: 'Digital asset means a digital representation of value distributed through a DLT platform where value is embedded or in which there is a contractual right of use and includes without limitation digital tokens.'

Examples of cryptoasset definitions that address different types of cryptoassets

Country	Definition
Singapore	Payment Services Act: The Monetary Authority of Singapore describes two important definitions: • Digital payment token: 'Any digital representation of value (other than an excluded digital representation of value) that: (i) is expressed as a unit; (ii) is not denominated in any currency, and is not pegged by its issuer to any currency; (iii) is, or is intended to be, a medium of exchange accepted by the public, or a section of the public, as payment for goods or services or for the discharge of a debt; (iv) can be transferred, stored or traded electronically; and (v) satisfies such other characteristics as the Authority may prescribe.' • Excluded digital representation of value: 'A digital representation of value that is prescribed by the Authority as an excluded digital representation of value.'
Switzerland	ICO Guidelines: The Swiss Financial Market Supervisory Authority (FINMA) categorises tokens into three groups: • Payment tokens: 'Tokens may in some cases only develop the necessary functionality and become accepted as a means of payment over a period of time.' FINMA does not treat payment tokens as securities but does require financial intermediaries to comply with AML regulations. • Utility tokens: 'Intended to provide digital access to an application or service.' Utility tokens do not qualify as securities if their sole purpose is to give an application or a service digital access rights and if it can already be used in this way at the point of issue. • Asset tokens: 'Represent assets such as participations in real physical underlyings, companies, or earnings streams, or an entitlement to dividends or interest payments.' FINMA regards asset tokens as securities, meaning securities law requirements exist for trading these tokens.
United Kingdom	Cryptoasset guidance: The Financial Conduct Authority (FCA) distinguishes between three types of tokens: • Exchange tokens: 'These are not issued or backed by any central authority and are intended and designed to be used as a means of exchange.' Exchange tokens fall outside the regulator's governing perimeter. • Utility tokens: 'These tokens grant holders access to a current or prospective product or service but do not grant holders rights that are the same as those granted by Specified Investments.' Utility tokens may be within the regulatory perimeter if they meet the definition of e-money. • Security tokens: 'These are tokens with specific characteristics that mean they meet the definition of a Specified Investment like a share or a debt instrument.' Security tokens fall entirely under the FCA's remit if they meet the definition of a specified investment.

Appendix 3 CBDC engagement stage and motivation

Country	Engagement stage	Motivation
Mexico	Planned for 2024[146]	The Mexican Central Bank's payments strategy: • 'Open accounts for banked and unbanked people to increase financial inclusion. • Expand payment possibilities in the economy that are fast, secure, efficient and interoperable. • Have a versatile asset for implementing different functionalities, such as automation mechanisms, fostering innovation.'
Brazil	Planned for 2024[147]	General guidelines for a Brazilian CBDC issued by the central bank: • 'Keep up with the dynamic technological evolution of the Brazilian economy. • Enhance the efficiency of the retail payment system. • Foster new business models and other innovations based on technological advances. • Favor Brazil's participation in regional and global economic scenarios, increasing efficiency in cross-border transactions.'
Argentina	Exploring	Decree 207/2022: • Consider recent and future innovations, including advancements of digital environments for transactions and payments, emergence and proliferation of blockchain technology and digital assets.
Colombia	Exploring	Central bank press release: • 'Analyse and evaluate the convenience and risks of issuing a CBDC.' • 'Understand the implications of the use of CBDC in cross-border payments.'
Chile	Exploring	Preliminary evaluation of a CBDC issuance in Chile: • 'Foster competition and innovation.' • 'Have more significant influence over the system's evolution, which could be an effective way to address the challenges and opportunities [in the field of payments].' • 'Reduce the risk of mass use of money denominated in other units of account.' • 'Integrate cross-border payments and the development of high-value payments in the financial system.'
Trinidad and Tobago	Exploring	From the working paper Caribbean Currency Convertibility in an Era of Central Bank Digital Currency and the Financial Stability Report 2020, both issued by the Central Bank of Trinidad and Tobago: • 'Facilitate currency convertibility with the express purpose of promoting intra-regional trade.' • Reduce the 'threat of losing monetary sovereignty'. • 'Improve operational efficiency and prudential surveillance. • Reduce financial exclusion and enhance macro-financial supervision.'
Peru	Exploring	Central bank report CBDC: Promoting digital payments in Peru: • 'Promote access to and use of digital payments by the unbanked population.' • 'Generate significant efficiency gains in the Peruvian payments market by facilitating interoperability and incentivising greater adoption of digital payments and reduced use of cash.' • 'Strengthen the effectiveness of monetary policy by promoting financial inclusion.' • 'Contribute to preserving the achievements of lower dollarisation in retail payments.' • 'Promote financial innovation in a regulated environment by facilitating the operations of new market players.' • 'Promote the introduction of programmable payments.'
Uruguay	E-peso pilot, concluded[148]	The presentation 'Uruguayan e-Peso on the context of financial inclusion': The Central Bank of Uruguay launched the pilot after the Uruguayan government declared financial inclusion as a priority and approved the financial inclusion law.
Eastern Caribbean	DCash, since 2019	The ECCB Digital EC Currency Pilot official website: • Some of the objectives are to 'increase opportunities for financial inclusion, growth, competitiveness and resilience for citizens of the Eastern Caribbean Currency Union' and address the following issues: • 'The relatively high cost of current payment methods and banking services. • Inadequacy of banking services in addressing various customers' needs. • Inefficient processes of settling cheque transactions, which slow the pace of commerce.'
Ecuador	Dinero electrónico pilot, concluded[149]	Central bank resolution, central bank press release: • 'Seek efficiency in payment systems to promote and contribute to the country's economic stability.' • Promote financial inclusion. • Reduce the use of cash.

146 https://www.forbes.com.mx/economia-banxico-lanzara-moneda-digital-2024/

147 https://www.youtube.com/watch?v=Z483fB6YZ14

148 https://www.bcu.gub.uy/Sistema-de-Pagos/Documents/Vigilancia/Libros/CBDC%20march2022.pdf

149 https://www.bce.fin.ec/images/BANCO_C_ECUADOR/PDF/Dosier-prensa-dinero-electronico-22-03-2018.pdf

Country	Engagement stage	Motivation
Haiti	Exploring	The presentation 'Why Haiti's central bank is considering CBDC' by the Governor of the Bank of the Republic of Haiti: • 'Foster innovation and security in the payment system.' • 'Promote financial inclusion.' • 'Foster interoperability.' • 'Conduct monetary policy more efficiently.' • 'Increase seigniorage.' • 'Increase compliance with AML/CFT.' • 'Reduce the use of cash.' • 'Offer the necessary local platform in case of natural disasters.'
Honduras	Exploring	Central bank press release: • 'Adopt technological innovation for payment and financial services.'
Paraguay	Exploring	The report Moneda Digital del Banco Central: Implicancias para la Estabilidad Financiera y la Política Monetaria en Paraguay: • Create a 'solid, technological, secure and efficient foundation for the payment system.' • Increase financial inclusion and innovation. • Reduce costs and increase efficiency in the payment system.
Jamaica	JAM-DEX, since 2022[150]	Central bank press release: • 'Increase financial inclusion.' • 'Provide another means for efficient and secure payments.' • 'Improve cash-management processes and reduce costs.'
Bahamas	Sand Dollar, since 2020	The Sand Dollar's official website: • 'Improve outcomes around financial inclusion and access. • Make the domestic payment systems more efficient.' • 'Reduce the size of legitimate but unrecorded economic activities in the informal sector.' • 'Strengthen national defences against money laundering and other illicit activities.'

150 https://boj.org.jm/say-hello-to-jam-dex/

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