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Article

CEMLA's survey on central bank digital currencies in Latin America and the Caribbean

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CEMLA's survey on central bank digital currencies in Latin America and the Caribbean

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ABSTRACT

In late 2021 and early 2022, CEMLA conducted a thorough survey involving 12 central banks to analyze key aspects related to the potential implementation of a Central Bank Digital Currency (CBDC). The findings revealed prevalent issues and objectives regarding digital payments in the region, as well as promising avenues for central bank involvement. However, it highlighted the challenges of creating a universal CBDC framework due to significant disparities among neighboring countries. Nonetheless, the collaborative research approach promises valuable insights for future efforts. To protect participant anonymity, each country's responses were anonymized with randomly assigned letters.

The survey extensively examined awareness and understanding of CBDCs across diverse stakeholders in Latin American nations, including the general public, corporations, and financial institutions. These insights could shape educational campaigns and communication strategies, enabling policymakers and central banks to effectively share information about CBDCs.

Moreover, this research effort sheds light on public perceptions, expectations, and concerns about CBDCs in Latin America. By exploring various dimensions such as awareness, interest, adoption potential, concerns, preferences, and regulatory considerations, the survey offers a comprehensive understanding of the CBDC landscape in the region. This holistic approach provides valuable insights for policymakers, central banks, and stakeholders to navigate the complexities of CBDC implementation effectively and responsibly.

1. Introduction

Central Bank Digital Currencies (CBDCs) have emerged as a focal point of global interest, igniting discussions among policymakers, academics, and financial stakeholders. Within the landscape of Latin American countries, conducting a survey on CBDCs serves a multifaceted purpose, pivoting on the specific objectives and interests of the conducting organization or researchers.

In the ever-evolving realm of financial innovation, CBDCs have become a subject of considerable expectation and debate. Latin America, renowned for its diverse economies and complex financial landscapes, stands at a crossroads, facing the prospect of integrating CBDCs into its monetary systems. This survey seeks to critically examine the multifaceted implications of CBDC adoption in Latin America, addressing the promises and perils that lie ahead.

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The survey seeks to delve into the awareness and comprehension levels of CBDCs among a diverse array of stakeholders, spanning from the general populace to businesses and financial institutions across 12 Latin American nations.¹ The insights gleaned from this endeavor hold the potential to shape the contours of educational campaigns and communication strategies, empowering policymakers and central banks to effectively disseminate information about CBDCs.

Moreover, the research document at hand stands as a testament to its contribution in unraveling the intricate tapestry of public perceptions, expectations, and concerns surrounding CBDCs in Latin America. By delving into facets such as awareness levels, interest, adoption potential, concerns, preferences, and regulatory considerations, it paints a comprehensive picture of the CBDC landscape within the region.

As central banks and governments in Latin America embark on the CBDC journey, it becomes imperative to scrutinize the underlying motivations, potential consequences, and the broader impact of these digital currencies. While proponents argue that CBDCs have the potential to enhance financial inclusion, reduce transaction costs, and provide more efficient tools for monetary policy, skeptics raise concerns about privacy, security, and the potential to exacerbate existing economic disparities.

The literature review embedded within this research draws upon the invaluable insights garnered from similar surveys conducted by central banks and monetary authorities across the globe. The European Central Bank (ECB) (European Central Bank, 2020), Bank of Canada (Bank of Canada, 2021), Federal Reserve System in the United States (Federal Reserve Board, 2021), and People's Bank of China (PBOC) (People's Bank of China, 2021) are among the key protagonists shedding light on diverse perspectives on CBDCs, encompassing preferences, concerns, and the intricate interplay of technological implications. Additionally, recent papers on CBDCs contribute to the ongoing discourse on the topic (Arauz et al., 2021; Morales-Resendiz et al., 2021; Zhou, 2023).

To enhance the discussion, the survey is meticulously organized into five key sections, each crafted to explore distinct facets of the CBDC narrative. These sections cover a range of topics, from the broader aspects of general and institutional considerations to the nuanced intricacies of technical factors and other domestic elements crucial to CBDC implementation.

Finally, the research culminates in a compelling array of findings, offering profound insights into pivotal themes such as the allure of CBDCs for fostering financial inclusion (Demirgüç-Kunt et al., 2022), the overarching concerns revolving around privacy, the tantalizing prospects of cost reduction in currency distribution, and the indispensable need for infrastructural fortification to underpin widespread CBDC adoption. In Latin America, where monetary stability and economic growth have been elusive goals for many nations, the introduction of CBDCs represents a pivotal moment that demands thorough analysis and scrutiny. This critical survey is not an exercise in promoting or discrediting CBDCs, but rather a diligent examination of their potential role in a region with distinctive economic, social, and political contexts. As we venture into this survey, we invite you to navigate the complex terrain of CBDCs in Latin America with a critical lens. By shedding light on the inherent challenges and prospects, we hope to provide policymakers, researchers, and the wider public with a nuanced understanding of the intricate web of issues surrounding CBDCs in this dynamic and diverse region.

The document is structured as follows: Section 2 provides a brief summary of the main findings, followed by a detailed analysis of each response to the questionnaire in Section 3. Appendix A contains the original questionnaire. The document concludes with some final remarks in Section 4. It is important to note that the responses of each bank are included in Appendix B. Additionally, it should be mentioned that the responses in Appendix B are presented in randomized order to ensure impartiality and confidentiality.

2. Brief summary of general findings

The emergence of Central Bank Digital Currencies (CBDCs) represents a digitized form of national fiat currency, under the governance and issuance authority of central banks. Unlike decentralized cryptocurrencies such as Bitcoin, CBDCs are regulated and issued by central banking authorities. Engineered to enhance secure and efficient payment systems, CBDCs offer potential benefits including increased financial inclusivity, decreased transaction costs, and expanded monetary policy options. They exist in wholesale forms for interbank settlements and retail versions accessible for public transactions. Growing interest in CBDCs is driven by rising digital payment adoption, the prominence of private cryptocurrencies, and efforts to modernize financial systems. Many central banks globally are actively exploring or implementing CBDC initiatives, indicating significant interest in this area.

In Latin America, several countries and institutions have embarked on pilot projects and initiatives to explore the potential of digital assets and Central Bank Digital Currencies (CBDCs), see Fig. 1. Uruguay initiated a pilot project called e-Peso to explore the feasibility of adopting a CBDC. Led by the Central Bank of Uruguay (BCU), the e-Peso pilot aimed to assess technical, economic, and regulatory aspects of implementing a CBDC, focusing on testing digital currency for retail transactions, peer-to-peer transfers, and interoperability with existing payment systems. Similarly, the Eastern Caribbean Central Bank (ECCB) conducted a pilot program for CBDC adoption called DCash. Collaborating with Bitt Inc., the ECCB aimed to provide a secure and efficient digital payment solution for the Eastern Caribbean region, testing DCash for retail purchases, peer-to-peer transfers, and bill payments. Meanwhile, El Salvador made headlines in June 2021 by becoming the first country to adopt Bitcoin as legal tender. The Bitcoin Law aimed to promote financial inclusion, facilitate international remittances, and stimulate economic growth, integrating Bitcoin into El Salvador's financial infrastructure, including the launch of the Chivo wallet. Despite facing praise for innovation and empowerment and criticism for volatility and regulatory challenges, El Salvador continued its Bitcoin adoption efforts, exemplified by projects like Bitcoin City. These initiatives reflect a growing interest in digital assets and CBDCs across Latin America, with countries exploring

¹ They will not be named, as some of them requested anonymity.

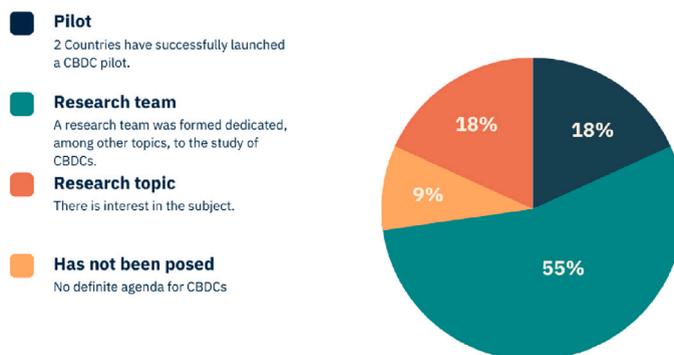


Fig. 1. State of research in surveyed countries.

Table 1

The table emphasizes common points and challenges identified among the surveyed central banks.

Common points	Challenges
There are several shared topics of interest that can facilitate cooperation.	Each country has its own characteristics, resources and necessities, so they will require a unique CBDC model (if they decide so).
Several countries have remote and hard access areas, and sending cash there is expensive. CBDCs may have a use case here.	Remote communities often lack internet connection, among other basic services, and although mobile data penetration is higher, some mobile phones may lack the technical requirements to support a digital wallet.
Good adoption rate in certain sectors of the population.	Culturally, there is a marked preference for cash, as well as a distrust in digital money.
Many countries see financial inclusion as a potential use case for CBDCs.	Most countries expressed concerns regarding privacy.
The cost of printing money, and moving it through the country, specially for large ones, can be reduced by a generalized use of CBDCs	A generalized CBDC requires a major infrastructure, which will also be expensive
A cross-border CBDC can improve the cost and use of remittances.	This could also facilitate an informal dollarization.
In most countries, the central bank is the sole authority for minting physical cash, and it has a legal responsibility for maintaining and updating the financial system, as well as ensuring that the population has access to money.	There is much to be done before digital money can be minted as a central bank official currency.
Central Banks in the region consider their RTGS systems to be efficient.	They can be improved with 24/7 functionality and instant payments.
Most central banks in the region consider cryptocurrencies to be too unstable to be used as a common currency for trading.	There is a lack of regulation in this topic.
There is expectation that Blockchain and Distributed Ledger Technologies (DLT) can facilitate the technical implementation.	The experimentation on this technologies is in very early stages.

different approaches to harnessing the potential benefits of blockchain technology and cryptocurrencies for financial inclusion, efficiency, and economic development.

The survey on CBDCs in Latin America highlights several key insights, see [Table 1](#). It underscores the potential for collaboration among countries to facilitate cooperation, while recognizing the importance of tailoring CBDC models to each country’s unique characteristics and needs. In remote areas, CBDCs are seen as a solution to expensive cash transfers, although challenges such as limited internet access and cultural preferences for cash remain barriers to adoption. Despite these challenges, CBDCs are viewed positively for their potential to enhance financial inclusion, with privacy concerns being a prominent issue that requires robust protections. While CBDCs offer opportunities for cost savings in currency production and distribution, significant infrastructure investment is necessary for implementation. Additionally, there is recognition of the potential for cross-border CBDCs to improve remittance costs.

Technologically, blockchain and Distributed Ledger Technologies (DLT) are seen as promising for CBDC implementation, though experimentation in this area is still in early stages. While Real-Time Gross Settlement (RTGS) systems are efficient, there is room for improvement in functionality and speed. The survey highlights stable political systems and democratic governance structures in surveyed countries, which could support CBDC exploration. However, limited engagement between central banks and legislative or executive branches suggests a need for more proactive collaboration in policymaking. For further analysis of CBDCs, Ref. [BIS \(Bank for International Settlements\) \(2020\)](#), [IMF \(International Monetary Fund\) \(2021\)](#), [ECB \(European Central Bank\) \(2020\)](#), [Carapella and Flemming \(2020\)](#) and [Bank of England \(2020\)](#) provides additional insights.

3. Analysis of each question

3.1. Country generalities

3.1.1. Geography

The descriptions of these 12 Latin American countries reveal a diverse range of geographic and demographic features that significantly influence their financial and cash management landscapes. These characteristics include varying sizes, from small countries to one of the largest in the world, geographic challenges such as mountainous terrain, islands, and remote areas, disparities in rural and urban populations, with percentages ranging from 24% to 61.7% living in urban areas, a broad spectrum of municipalities, provinces, and regions affecting the distribution and management of physical cash, limited access to public and private services in rural and remote areas, which can increase the costs of financial service provision, regional disparities that hinder access to financial services, causing differences between regions, rugged surfaces, high mountain ranges, and volcanoes, creating obstacles for financial services and driving up costs. The varying characteristics of these countries underline the unique challenges and opportunities faced by each in the context of CBDCs and cash management. Understanding these factors is crucial for policymakers and financial institutions seeking to navigate the complex financial landscapes of Latin America.

3.1.2. Political

Across these countries, several key political characteristics related to CBDC decisions are evident. All 12 countries operate as democracies, emphasizing the importance of political representation and participation in governance. The central banks are institutions independent of the central government, responsible for core mandates such as currency issuance, free from political intervention. Multiple stakeholders within these democratic nations hold the potential to influence CBDC issuance decisions.

Interest in CBDC decisions is evident within these democratic settings. The countries maintain stable political systems with strong democracies, characterized by multiparty elections and a separation of powers among the executive, legislative, and judicial branches. The Central Bank serves as the sole issuer of the sovereign currency, establishing it as the legal tender. These democracies are open to financial innovations, indicating a willingness to explore new financial technologies.

Positive relations between the Legislative Assembly and other state powers promote cooperation and understanding, facilitating decision-making. Addressing matters related to CBDC issuance within the financial system is recognized as a complex undertaking. Central Banks have not actively engaged with members of Congress or the Executive Branch regarding their interest in CBDCs. Constitutional provisions underscore the countries as sovereign, democratic, independent republics with representative governments. Central banks are decentralized entities, potentially granting them significant authority over CBDC decisions. These political characteristics provide a comprehensive overview of the democratic nature, governance structures, and key considerations that may influence the path of CBDC adoption in these Latin American countries.

3.1.3. Economic

Economic activities in these countries are primarily related to agriculture, trade, manufacturing, and services, with a focus on commodity-based exports. A significant informal sector exists, representing a substantial portion of the workforce, ranging from approximately 22% to 83% of the total employment (see Fig. 2). Most economic activity is concentrated in urban areas, with the services sector being a major contributor, accounting for nearly 70% of the total economy (International Labour Organization, 2023).

Some countries possess abundant natural resources, including oceanic oil fields, diversified industrial sectors, strong private sectors, and active participation in international commodities markets. Informal labor markets account for a considerable share of the workforce, ranging from around 20.8% of GDP to as high as 60.1% in the labor market (World Bank, 2023).

These countries exhibit stable macroeconomic conditions, including low levels of indebtedness, stable inflation rates, and steady economic growth over the past two decades. The adoption of electronic or digital payment methods is incipient, with a significant reliance on cash. Limited financial inclusion and low financial education are noted.

Despite a minor increase due to the pandemic, the use of electronic or digital payment forms is not widespread, partly due to the need for appropriate technology and internet connectivity. The acquisition of technology and connectivity services is challenging, especially for those with limited economic resources. Some countries have experienced substantial economic growth since 2010, with major activities including construction, local manufacturing, commerce, and hospitality sectors. Micro, small, and medium enterprises represent a large proportion of firms and the workforce. Remittances also play a significant role in the economy, as shown in Fig. 3.

The informality issue is not the primary focus of CBDC projects in these countries, with varied goals for their implementation. These economic characteristics offer insights into the diverse economic landscapes within these Latin American countries, highlighting key factors that may influence the adoption and use of CBDCs and the broader financial ecosystem.

3.1.4. Technological

In these Latin American countries, there is a notable presence of high connectivity and mobile phone penetration. However, this technological landscape is characterized by a significant urban-rural divide, with robust connectivity primarily in urban areas and limited access in remote regions. The degree of internet connection varies, with some countries showing high numbers of connections in major cities but lacking coverage in distant locations, which may pose challenges for the implementation of a CBDC.

Several countries have a surplus of mobile telephone lines, even one of them surpassing their total population, with a substantial portion of the population having access to 4G mobile broadband. Fiber optics technology provides internet access to around 84% of municipalities, contributing to reliable internet infrastructure.

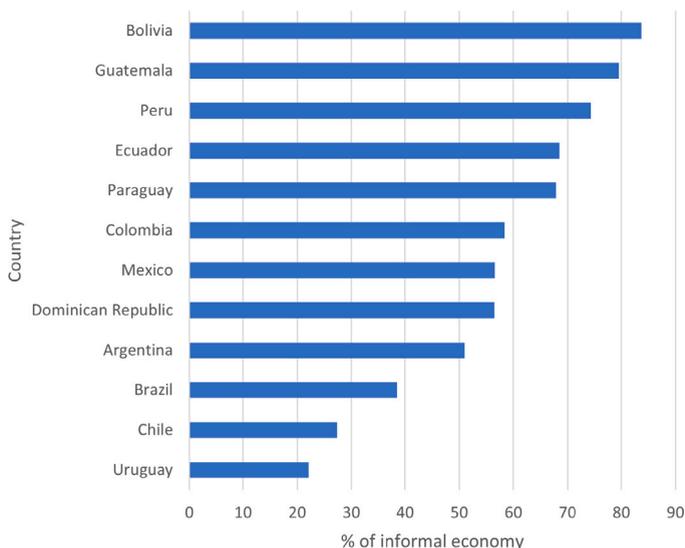


Fig. 2. Proportion of informal employment in total employment 2022.

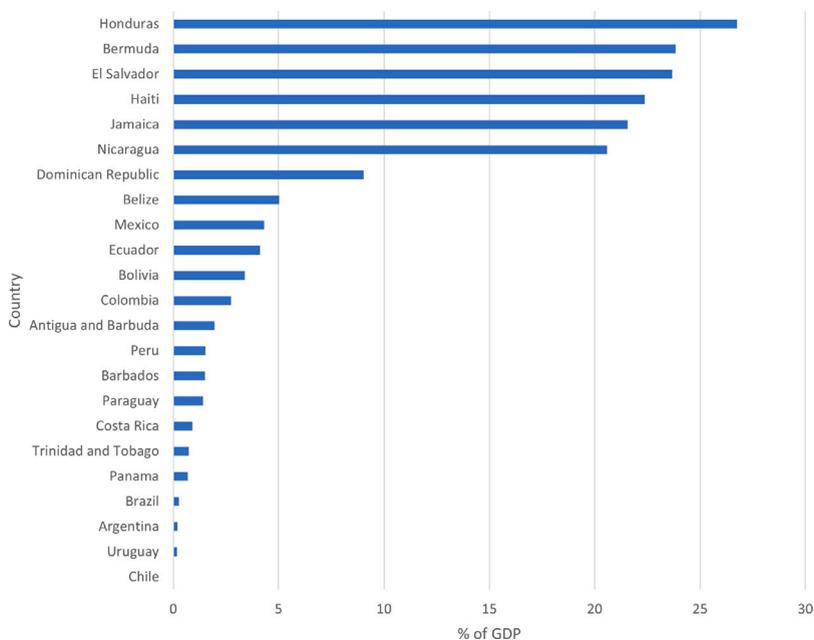


Fig. 3. Personal remittances, received (% of GDP) 2022.

Rural–urban disparities are evident, with higher rates of internet and mobile phone connectivity in urban areas. Some countries have made substantial efforts to maintain high technological standards, resulting in increased mobile device usage and internet access. The presence of financial technology companies, including mobile wallets, remittances, payment bridges, and digital credit, is notable.

However, challenges exist, including limited internet access for a significant portion of the population, often with 2G technology (which may be unsuitable for a digital wallet), and a low density of fixed internet subscribers. Despite these challenges, there is comprehensive cell phone coverage across all municipalities, with mobile internet coverage for a significant portion of the population.

These diverse technological characteristics in the region have the potential to impact the adoption and use of CBDCs and financial technology in these Latin American countries.

3.1.5. Sovereign currency

In these 12 Latin American countries, the degree of sovereignty of the national currency is generally high, and it is not considered a decisive factor in the potential implementation of a CBDC. While some high-value transactions, such as real estate operations, are often settled in US dollars, there is a historical context of macroeconomic volatility leading to a process of assets substitution. This history raises concerns about the potential risk of “digital dollarization” with the introduction of CBDCs.

Legal tender is strictly issued by the Central Bank in most countries, and the official currency is the legal tender. Dollarization varies across the countries, with some adopting the US dollar as legal tender or having a fully dollarized economy. A particular case is El Salvador, where Bitcoin circulates as legal tender alongside the official currency.

In one country, There is low currency substitution compared to other Latin American countries in some nations, indicating high confidence in the domestic currency and the credibility of the Central Bank. However, the level of dollarization is significant in certain countries, with a considerable portion of deposits denominated in dollars.

In summary, these countries exhibit a range of currency characteristics, from high sovereignty and limited dollarization to fully dollarized economies. The potential impact of introducing CBDCs is influenced by the historical context of currency usage and the degree of confidence in the domestic currency and Central Bank credibility.

3.2. What other factors do you think will benefit or affect the implementation of a CBDC in your country?

In these 12 Latin American countries, several factors will either benefit or affect the adoption of CBDCs:

- Affect

1. **Drawbacks of CBDC Implementation:**

Challenges include limited access to digital technology, changes in legislation, implementation costs, potential bank runs, among others.

2. **Barriers to Widespread Adoption:**

Challenges include low access to banking services, informality, widespread use of cash, and the population’s limited access to financial knowledge and products in the population. Financial education and cultural aspects also play a role in hindering widespread CBDC adoption.

3. **Competitive Threats:**

Competition with the banking sector and potential lack of public adoption are identified as major threats to CBDC projects.

4. **Cultural Preferences for Cash:**

Cultural preferences in certain sectors favoring cash transactions may slow down CBDC adoption.

5. **Infrastructure and Security Concerns:**

Power outages, cyberattacks, fraud and internet access and connectivity problems, especially in remote areas, pose challenges for a CBDC adoption. Low levels of digital financial education are additional concerns.

6. **Lack of Financial Literacy/Trust in CBDC:**

Poses a barrier as a significant portion of the population may lack understanding or trust in CBDC.

7. **Country-Specific Considerations:**

Varying levels of progress in digital payments influence the central bank’s decision on CBDC implementation. Technology limitations, competition with banks, and the population’s technological literacy are important considerations.

8. **Incentives to Avoid Formal Payment Means:**

Encourages the use of informal means of payment, potentially hindering CBDC adoption.

9. **Technology and Regulatory Challenges:**

The CBDC may lack applications in the current payment system, but integrating DeFi tools could promote innovation. However, regulatory challenges need careful consideration.

- Benefit

1. **Benefits of CBDC Adoption:**

Innovation, security, efficiency, and decreased use of cash. It can also detect illegal activities such as money laundering.

2. **Potential Benefits of CBDC Implementation:**

It can lower the cost of money management, reduce the need for physical travel to access financial services, and expedite payment processes.

3. **Promotes financial inclusion:**

If properly designed a CBDC can support the modernization of low-value payment systems improving the efficiency of the payment systems in terms of costs, and boosting financial inclusion, giving the population that is not banked access to efficient payment schemes, discouraging the use of physical money and promoting competition.

4. **Monetary Policy Tools and Improved Payment Services:**

Adoption of CBDCs could provide new monetary policy tools, promote competition, enhance payment services, and reduce costs for transfers and payments.

Table 2

The response of each bank to each topic, with 10 indicating the highest importance.

Bank objectives	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8	Average
Monetary policy	10	1	10	9	10	10	10	10	8.75
Financial stability	10	7	9	10	8	10	9	10	9.13
Banking supervision	0	7	0	8	3	0	3	8	3.63
Payment systems development	10	8	8	7	10	0	9	10	7.75
Financial integrity	0	7	0	6	3	0	7	7	3.75
Financial inclusion	10	8	0	7	8	7	5	7	6.50
Consumer protection	5	7	0	6	3	0	5	7	4.13
Competition	7	9	0	3	3	0	3	7	4.00
Cybersecurity	8	7	0	5	6	0	3	8	4.63

3.3. What are the Central Bank's objectives with respect to banking and financial system? (rank the various options)

In response to the question, it was found that among the 12 countries surveyed, only eight central banks responded. These central banks primarily focus on three main objectives: monetary policy, financial stability, and the development of payment systems. These core responsibilities underscore the central banks' commitment to managing the money supply, ensuring the stability of the financial system, and promoting the efficient functioning of payment mechanisms to support economic activities. See [Table 2](#).

3.4. Which other authority share the responsibility of the banking and financial system?

Central banks, ministries of economy, and various superintendencies collaboratively oversee and regulate the banking and financial systems. Responsibilities include ensuring the stability, integrity, and proper functioning of institutions such as banks, insurance companies, and credit cooperatives. Specific entities, such as the Financial Information Unit, focus on areas like anti-money laundering. The regulatory framework involves multiple boards and committees issuing regulations to maintain system integrity and stability. Overall, these measures aim to promote financial stability, protect consumer rights, and prevent illicit financial activities.

3.5. Is the Central Bank autonomous?

The autonomy of the Central Bank is emphasized in various ways across nations. In some cases, it is described as an autarchic organization, while others define it as a legal entity with administrative, budgetary, and technical independence. Specific laws may establish and outline the autonomy of the Central Bank, with a primary focus on achieving price stability. Organic laws and regulations in different countries affirm the full autonomy of the Central Bank, describing it as a decentralized entity of the state or an autonomous public institution of a technical nature. The General Law of Public Administration and the Law of the Central Bank often reinforce the autonomy of the institution, highlighting functional and administrative independence governed by its own constitutive laws and regulations. In some cases, a broader framework, such as the Monetary and Financial Administration, grants autonomy to institutions like the Monetary Board, Central Bank, and Superintendence of Banks, allowing them functional, organizational, and budgetary independence for fulfilling specified functions under the Monetary and Financial Law.

a. How much autonomy does the central bank have in the design, development and implementation of a CBDC?

The autonomy of central banks varies across nations. Some central banks possess complete and exclusive legal authority for currency issuance, while others have partial autonomy, necessitating coordination and approval from the national government. Certain countries grant absolute autonomy to central banks for CBDC development, while others face legal barriers, requiring congressional regulations for issuance. Collaborative efforts with national financial entities are observed in electronic payment systems in some cases. Full autonomy in CBDC design and research is present in certain countries, contingent on legislative amendments for implementation. Meanwhile, legislative limitations in other countries only allow research on CBDCs but not their issuance. The autonomy of the Monetary and Financial Administration, encompassing the Monetary Board and the Central Bank, is emphasized for fulfilling designated functions. Reforms to existing laws are often seen as prerequisites for promoting CBDC development, with some countries expressing the need for consultations with the public and stakeholders during the eventual CBDC launch. Overall, the extent of autonomy in CBDC initiatives reflects a diverse regulatory landscape across Latin American countries.

b. Is there any current barrier impeding the Central Bank to issue a CBDC? Has this been discussed internally?

The landscape is varied, with some countries indicating no internal analysis but asserting the absence of legal barriers for CBDC implementation. Others note the need for amendments to existing laws, though the topic has not been extensively discussed. Internal discussions in certain countries emphasize the necessity of legal reforms to explicitly authorize CBDC issuance, especially when current laws focus on physical currency. Legal barriers are perceived in cases where the existing law only authorizes physical banknotes and coins, lacking clarity for digital currencies. Ongoing debates in certain countries revolve around amending laws to accommodate digital formats. Specific countries highlight the absence of legal powers for the Central Bank to issue any currency, indicating a potential barrier. Issues such as the role of the Central Bank in digital currency and the need for amendments to

Monetary and Banking Laws are underscored in some nations, with societal preferences for physical cash and low technological literacy identified as significant challenges. Other countries assert the absence of legal or technological barriers. Constitutional provisions in one country tie legal circulation to physical notes and coins issued by the Central Bank. Lastly, potential barriers may depend on the project's design, with considerations such as restrictions on opening Central Bank accounts for non-banking agents. Overall, the barriers to CBDC issuance vary, encompassing legal, technological, and societal dimensions across these Latin American countries.

c. Has your central bank explored the possibility of designing and implementing a CBDC in some form in the past?

The exploration of CBDC design and implementation in Latin American countries varies. Some countries have not explored the possibility of CBDC, while others, like Ecuador, implemented a digital currency pilot from 2015 to 2018. Country 7 engages in ongoing research and preliminary studies, signing agreements for feasibility and impact assessments. Country 8 discussed CBDC internally but has not initiated a formal project, while Country 9 began exploration in 2021, forming a task force to analyze prerequisites. Country 10 has not explored CBDC, and Country 11 conducted a pilot to test technology and connections. Country 12 maintains an ongoing research agenda to assess CBDC implications, considering different design options' pros and cons.

3.6. What is the current design of your monetary system and what are the problems with it?

In Country 1, the Central Bank issues legal tender, relying on banks and financial intermediaries for secondary money creation and lending activities. Country 2 emphasizes an organized central banking system with no major reported problems. Country 3's Financial System, managed by a National Monetary Committee, includes the autonomous Central Bank responsible for monetary policy and financial stability. In Country 4, the legal tender is represented by physical cash issued by the central bank, following an inflation targeting scheme. Country 5's Central Bank operates independently, overseeing monetary policy execution under the Ministry of Economy and Public Finance. Country 6 describes a conventional monetary system with emission monopoly and financial intermediation within legal reserve limits. Country 7 reports a dollarized monetary system, regulated and overseen by the Central Bank. Country 8 outlines a monetary system guided by constitutional and legal frameworks, utilizing various policy instruments. Country 9's Central Bank manages a high-value payment system, while retail payment services are provided by other entities. Country 10 follows an Inflation Targeting regime, with limited financial intermediation entities. Country 11 utilizes the U.S. dollar as legal tender, with the Central Bank supplying notes and coins, facing challenges in working capital quantification and fractional currency provision. Overall, each country exhibits distinct features and considerations in its monetary system design and operation.

3.7. Where does the central bank sit with respect to issuance of sovereign currency and the country's government?

In Latin American countries, the Central Bank universally holds the exclusive responsibility as the sole issuer of the sovereign currency. This authority is outlined in various legal provisions, such as monetary laws, constitutions, and organic laws governing the Central Bank. The Central Bank's role encompasses the issuance of coins and banknotes, ensuring legal tender status, circulation, and withdrawal within the country's territory. However, in some instances, legal restrictions may limit the Central Bank's ability to conduct inorganic issuance, particularly in the context of CBDC schemes, where backing by a specific currency, such as the United States dollar, may be required. Overall, the Central Bank's monopoly on currency issuance is a consistent feature across these Latin American nations.

3.8. How does the central bank interface with banks and other regulated financial entities?

In Latin American countries, the Central Bank plays a crucial role in regulating and overseeing the financial system, including commercial banks and other regulated financial entities. The scope of its responsibilities encompasses the supervision of payment systems, authorization, monitoring, and supervision of financial institutions, and the provision of financial services. The interaction involves collaboration with other regulatory bodies, periodic meetings to address concerns affecting the financial system, and the administration of systems such as the National Electronic Payment System. Each country has a unique regulatory framework, with the Central Bank playing a pivotal role in maintaining financial stability and ensuring the proper functioning of payment systems.

3.9. What is the state of the technology and infrastructure for payments between the Central Bank, banks and other regulated financial entities?

The state of technology and infrastructure for payments between the Central Bank, banks, and other regulated financial entities in Latin American countries exhibits variations. In one country, the national payment system relies on two-decade-old technology, processing deferred payment instructions using TXT format messaging. Another country's Central Bank owns and operates large value and instant payment systems with ongoing developments. Retail payment systems in one nation are managed by the private sector and settle through the Central Bank's Real-Time Gross Settlement System (RTGS), integrating various payment instruments. In another country, the RTGS serves as the central axis, operating as a liquidator for other payment systems, while clearing houses for credit card operations are mainly managed by the private sector. In a different country, the Central Bank administers the RTGS, and the Automated Clearing House (ACH) is in the hands of the private sector. Wholesale payments are processed through the

Central Bank-administered RTGS in one country, while retail payments involve a commercial company constituted by multiple banks, with compensation settled in the RTGS. Another country's retail payment systems, including Electronic Funds Transfers and Interbank Electronic Check Clearing House, are managed by the private sector, while the Central Bank oversees the SINPE. In yet another country, all retail payment systems are run by the private sector, with the Central Bank managing only the RTGS system for wholesale payments. In a different nation, the Central Bank exclusively owns the Payment and Securities Settlement Systems, encompassing various payment and securities settlement systems, including the Real-time Gross Settlement and Instant Payments System.

a. What are the main weaknesses the Central Bank can identify from these arrangements?

The weaknesses identified by Central Banks in various Latin American countries regarding their payment arrangements include limitations in system access for non-bank financial service providers, monopolistic practices and delays in interconnection, challenges in the evaluation of payment systems, absence of real-time gross settlement systems in some cases, and identified weaknesses requiring legal reforms for integration of new participants, achieving interoperability, providing 24/7 transfer services, reducing costs, and improving cross-border payments. Additionally, challenges encompass competition, access, interoperability, functionality, and risk management in the payments ecosystem, along with limited operating hours for certain services. Overall, these weaknesses reveal regulatory, operational, and competitive obstacles in the payment systems across the region.

b. Does the central bank interface directly with payments service providers?

The interaction between Latin American central banks and payment service providers (PSPs) varies across countries. In some cases, there is direct access for a broad range of entities, including banks, financial companies, and mobile network operators, to operate within the national payment system. PSPs, defined as legal entities engaged in fund transfers and payments, can participate directly. In contrast, certain countries do not allow PSPs direct access to the Real-Time Gross Settlement (RTGS) system for wholesale payments; instead, they must interoperate through financial entities and use retail payment systems. Some central banks directly regulate and oversee fintech companies, allowing them access to central bank systems, while others maintain an undefined position on the matter. The interaction may also involve direct oversight and interaction with private administrators of payment systems, such as central securities depositories. In specific cases, central banks regulate and authorize non-banking institutions providing payment services, including those using electronic money. The extent and nature of the interaction depend on the regulatory frameworks and policies established by each central bank.

3.10. How is your wholesale payment system, do you consider it developed or does it need to be made efficient?

The assessment of wholesale payment systems in Latin American countries varies. Some countries express satisfaction with their well-developed and efficient systems, such as a large-value payment system (CUD) employing RTGS methods, a developed STR system with ample liquidity, and an important and efficient SINPE system. Others acknowledge areas for improvement, including extending operating hours for RTGS systems, enhancing liquidity management tools, and exploring improvements to credit mechanisms. Despite these variations, there is an overall acknowledgment of the importance of these systems in facilitating interbank transactions and efficient treasury management.

a. From an operational point of view, is the current Central Bank system (RTGS) for bank reserves and settlement efficient? What does it need or how could it improve?

The operational efficiency of the Central Bank systems (RTGS) for bank reserves and settlement is generally viewed positively across Latin American countries. The systems are considered efficient, allowing real-time payments, interbank operations, and effective treasury management. Some countries emphasize the need for modernization, suggesting improvements like 24/7 operation, interoperability, and enhanced functionality. Projects for system adaptation to international standards, risk control mechanisms, and continuous functional improvement are underway to meet evolving financial landscapes and global standards. Overall, the systems are functional, secure, and undergoing continuous improvements to align with international best practices.

3.11. How much competition is there in your financial and payment services industry?

Across Latin American countries, the financial and payment services industry exhibits a trend of decreasing concentration over the last 5 years. The Central Banks actively promote financial democratization through reforms and technological evolution. Payment services are primarily offered by banks, financial technology providers, and at least an additional ACH entity in the region. Various financial institutions, including banks, insurance companies, retirement funds, and financial companies, provide digital services. Additionally, a mix of supervised and unsupervised entities, such as brokerage houses, credit card issuers, and microfinance providers, contribute to the diverse landscape of financial products and services available in the region.

a. Are there issues with dominance of certain systems or providers that are causing a lack of innovation?

Across various Latin American countries, the issues related to dominance in financial and payment services vary. Some countries have implemented regulatory changes to extend the scope to other PSPs, aiming to promote competition and innovation. Challenges include access problems, high fees, and strict risk control measures imposed by certain system providers.

In the retail payment sector, private sector dominance raises concerns about monopolistic practices, anti-competitive behavior, and delays in interconnection and interoperability projects. However, in some regions, the introduction of public payment systems has increased competition and inclusivity.

Access to Financial Market Infrastructures (FMIs) is generally open, fostering competition, and payment institutions directly compete with banks. Dominance by state and large private banks is acknowledged, but it does not necessarily limit the development of new services in some areas.

Concerns exist about private banks' control over clearing systems and electronic transfers, potentially limiting innovation due to high tariffs and restricted access. Access and interoperability issues between different payment processors are noted in some regions.

Clearing house access is restricted for certain entities, impacting the rates for payment services. In specific countries, the management of retail payment systems by commercial companies constituted by multiple banks raises concerns about limited innovation and potential barriers for new participants.

While some regions highlight limitations in competition with a small number of private banks, others note thriving competition and innovation driven by the emergence of new payment providers. Overall, the landscape varies, reflecting diverse challenges and opportunities across Latin American countries.

b. How can you assess the operation and coverage of the domestic retail payment system? Do you consider it developed or does it need to be made efficient?

The evaluation of domestic retail payment systems in Latin American countries reveals a varied landscape. While some systems are considered efficient and safe, with a focus on promoting financial inclusion and competition, there are also identified areas for improvement. These include the need for expanded coverage in rural areas, efforts to enhance efficiency, and challenges related to the dominance of the banking sector. Government-led initiatives and the adoption of mobile and card-based payment services demonstrate ongoing developments in the digital payments landscape. Overall, the assessments highlight both positive aspects and areas for advancement in the Latin American retail payment ecosystem.

3.12. Do the current cross-border payment services meet all of the users' needs? What other services can you satisfy with cross border transactions?

The assessment of current cross-border payment services in Latin American countries varies. Some countries acknowledge limited information on the topic, while others highlight challenges such as high costs and paperwork associated with existing services. A particular case is El Salvador, where the implementation of Bitcoin as legal tender in one country has facilitated cost-free and immediate international payments through the "Chivo Wallet". Inefficiencies, high costs, and the absence of interoperability channels are common concerns in several countries, prompting ongoing improvements. Regional initiatives like the Payment Interconnection System aim to enhance cross-border payments within Central American countries. Despite some inefficiencies, remittance recipients often have immediate access to funds, and there are possibilities for additional services like currency trading. Overall, the evaluation reflects a mix of strengths and challenges in the current state of cross-border payment services across Latin America.

3.13. What are the major issues for the monetary policy and financial stability that can be jeopardized by the current state of the domestic and cross-border payments infrastructures?

The current state of domestic and cross-border payment infrastructures in Latin American countries generally does not pose immediate issues for monetary policy and financial stability. However, there are considerations for potential challenges in the future. The widespread adoption of stable-coins or global stable-coins, if it occurs, could impact monetary policy and financial stability in one country. The increase in electronic payment methods, especially during the COVID-19 pandemic, has been viewed positively, but it raises concerns about the growing exposure to cyber-security risks. For countries using the US dollar as legal tender, a potential shortage of the dollar at an international level could affect national and cross-border payments. While domestic financial market infrastructures and retail payment environments are generally stable, the emergence of stable-coins, crypto assets, and decentralized finance is being closely monitored for potential impacts on monetary policy and financial stability. Ongoing efforts are in place to enhance cyber risk detection and contain potential risks to the payment system and, by extension, monetary policy and financial stability.

a. Are the payment channels/instruments (e.g. RTGS services) for banks easily available and developed to contribute to an effective monetary policy transmission?

Payment channels, particularly RTGS services, are uniformly accessible and well-developed across Latin American countries. They play a crucial role in facilitating effective monetary policy transmission. The availability and efficiency of these systems enable seamless settlement of high-value transactions, short-term liquidity provision, and contribute to the overall effectiveness of monetary policy operations. The use of these systems is mandated by Central Bank regulations, ensuring the participation of all authorized institutions. Additionally, specialized services, such as those provided by the SINPE platform, contribute to the proper functioning of monetary and exchange policies, incorporating risk mitigation mechanisms. Overall, these payment channels are integral to the monetary landscape, allowing for real-time fund transfers and immediate impact on monetary aggregates.

b. How is financial stability and integrity ensured with the current infrastructure?

Financial stability and integrity in Latin American countries are ensured through a combination of liquidity mechanisms and regulatory measures. The Central Bank plays a crucial role in providing liquidity to commercial banks, with mechanisms available for both intraday and overnight needs. Regulatory oversight and supervision, including the regulation of deposit insurance systems, contribute to stability. Various liquidity sources, such as the Integrated Liquidity Market and alternative channels like Liquidity Fund and Bilateral Credit Lines, support payment system participants. Additionally, mechanisms like reserves requirements, intraday repos, and standing facilities are available to meet liquidity needs, promoting overall stability. The Real Time Gross Settlement system ensures immediate and irrevocable settlement of operations, mitigating systemic risk. Business continuity planning and the free use of reserve accounts further enhance the functioning of the Payment System. The Central Bank conducts repo operations and utilizes open market operations, changes in legal reserve requirements, and interventions to manage liquidity and promote financial stability.

3.14. Regarding capabilities and legal requirements, what are the technical competencies and experience of running payment infrastructure? Is the same for the Central Bank and the private sector?

In Latin American countries, the roles and competencies in payment infrastructure differ between the Central Bank and the private sector. The Central Bank typically operates critical systems like RTGS and STR, ensuring stability and supervision. It also sets regulatory frameworks to govern both the public and private sectors. While the private sector often leads innovations in payment services, there is a clear distinction in technical competencies, with the Central Bank maintaining regulatory oversight. Legal requirements are standardized, and the Central Bank plays a multifaceted role, acting as a regulator, supervisor, participant, administrator, and service provider in the payment system.

a. Is there any relevant experience of working with emerging technologies (DLT)?

In Latin American countries, experiences with emerging technologies, specifically DLT, vary. While some countries have not engaged with DLT, others, like one Central Bank, have actively researched and developed prototypes, particularly for autonomous clearinghouses and CBDCs. A few countries have noted the incorporation of DLT by financial technology providers, but, in general, there is limited or no substantial experience with DLT across these regions.

b. How would new forms of money like e-money system could fit (or not) under current legal designations?

In Latin American countries, regulations and legal frameworks vary regarding new forms of money like e-money systems. Some countries have recently updated their payment system regulations to define terms like virtual assets and electronic money, with the latter described as monetary value for conducting payments stored in electronic or magnetic media. Interoperability is emphasized in one country, suggesting integration into existing systems. There is a consensus in some places about the need for specific regulations for these new forms of money, while others assert that they would have the same legal and regulatory status as existing forms of issued money. The legal status of stable-coins or crypto assets also varies, with some countries having regulations for e-money but not for more general stable-coins or crypto assets. In one case, the Congress holds the authority to determine legal tender status and its convertibility. Some countries already consider e-money as an authorized payment instrument, and the issuance of electronic money is regulated. The concept of an Electronic Payment Instrument (Mobile Wallet) is mentioned in one country, which could be implemented and authorized by the Central Bank. In various countries, regulations and laws define electronic money and provide the Central Bank with the authority to regulate entities providing payment and transfer services. Additionally, one country has approved regulations for Payment Services Financial Technology Providers, covering various services, including digital wallets, mobile sales points, electronic money, virtual currencies, and funds transfers.

3.15. How are the following forms of money (or emerging forms of money) utilized in your economy and what are the trends you are observing?

a. Cash

Cash remains the dominant and most frequently used form of money across Latin American countries, particularly for small transactions. It is widely utilized in both formal and informal sectors, and the preference for cash is often influenced by factors such as lower income, education level, and limited access to electronic payment methods. Despite the growing use of instant payment methods and some reductions observed in cash usage, it continues to play a significant role in daily transactions. The trends suggest that while electronic payment methods are gaining traction, cash still holds a strong presence, especially in regions with a large unbanked population and informal economic activities.

b. Bank deposits

Various forms of money are utilized in Latin American countries, reflecting diverse economic landscapes. Bank deposits are widely used for saving purposes, accessing debit cards, and conducting electronic transfers. While cultural habits historically led to a significant use of cash, regulatory incentives and new technologies (like Pix in Brazil) have driven changes, encouraging the use of savings accounts. The percentage of banked individuals varies across countries, with growing trends in online and mobile banking (see Fig. 4). National and foreign currencies, including cash, play substantial roles in payment means, with digital operations relying on balances deposited in the financial system. The utilization of accounts for savings, utility bill payments, salary reception, and various transactions demonstrates the multifaceted use of bank deposits. Despite some regions having limited access to financial institutions, efforts are being made to increase inclusion and reduce dependence on cash.

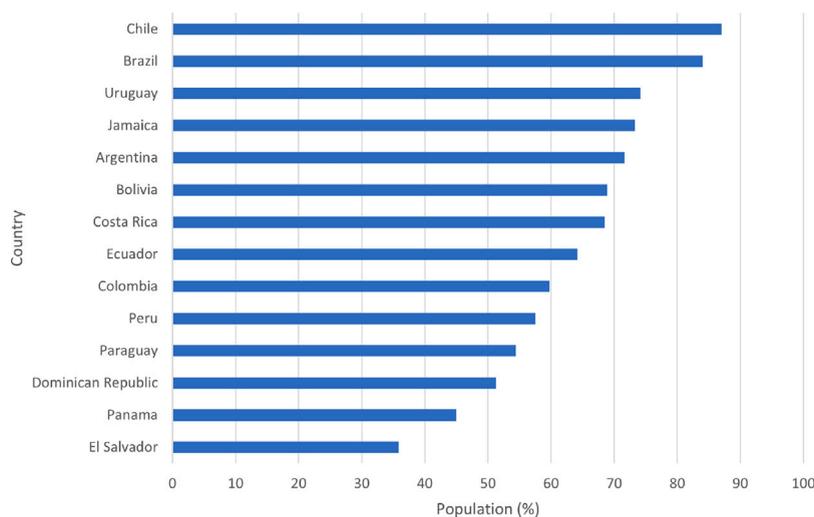


Fig. 4. Account ownership at a financial institution or with a mobile-money-service provider (% of population ages 15+) 2021.

c. Central bank reserves

Central bank reserves in Latin American countries, including Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, and Paraguay, serve as crucial financial instruments primarily accessible to banks and regulated financial entities. These reserves have diverse applications, ranging from facilitating cross-border payments and recording deposit movements to responding to withdrawals and unexpected contingencies. The specific mechanisms and types of accounts vary across countries, reflecting the multifaceted roles played by central bank reserves in the financial systems of each nation.

d. E-money

Across various Latin American countries, electronic money (e-money) is playing a significant role in reshaping financial landscapes. The panorama, regulation and development can be summarized as follows:

- Panorama

- a. **Multiple Providers in Operation:**

- In some countries, both banks and non-bank entities operate as electronic money providers, offering services through mobile wallets and prepaid cards.

- b. **Digitization Triggered by the Pandemic:**

- The COVID-19 pandemic and the growth of payment institutions have accelerated the digitization of financial systems, leading to increased financial inclusion.

- c. **Prepaid Cards for Specific Use Cases:**

- Prepaid cards, authorized for specific purposes like public transport payments, are in use. However, the overall adoption of prepaid cards might be relatively low in certain countries.

- d. **Digital Payments Competing with Bank Deposits:**

- In some nations, the use of digital payments, especially e-money, has grown significantly, posing competition to traditional bank deposits.

- Regulation

- a. **Draft Bills and Regulatory Developments:**

- Ongoing developments include draft bills for the regulation of electronic money operating entities. Regulatory authorities actively participate in shaping the legal landscape for e-money.

- b. **Regulation and Financial Inclusion:**

- Regulatory frameworks vary, with some countries having specific regulations for electronic money entities. There is a focus on financial inclusion, particularly targeting unbanked populations.

- Development

- a. **Instant Payment Systems Boosting E-money Use:**

- Introduction of instant payment systems, such as PIX in Brazil, has substantially increased the use of electronic money, with a remarkable growth rate observed from 2016 to 2021.

b. Growing Acceptance of Digital Payments:

Digital payments, including those facilitated by non-bank service providers, are gaining widespread acceptance. Initiatives like the “fast payment system” contribute to the popularity of interoperable instant payments.

c. Potential for Rural Financial Inclusion:

In countries where e-money is still in its infancy, there is recognition of its potential as a tool for financial inclusion, especially in rural areas.

d. Rapid Growth of Electronic Wallets:

Electronic wallets, a relatively new form of payment, have witnessed rapid growth, with emerging providers aiming to include small and medium-sized businesses in their transaction circuits.

These trends collectively signify a dynamic shift towards digital payment methods, reflecting both regulatory efforts and market-driven initiatives to reshape the financial ecosystems across Latin American countries.

e. Cryptocurrencies

Across various Latin American countries, the utilization of cryptocurrencies varies. The panorama, regulation and development can be summarized as follows:

• **Panorama****a. Limited Information and Increasing Investor Interest:**

Limited information is available regarding cryptocurrency usage. However, there is an increasing interest from investors in buying and selling crypto-assets, despite lacking regulation by central authorities.

b. Rising Popularity as Financial Assets:

While not recognized as a type of money, crypto-assets are gaining popularity as financial assets for investment purposes. Trading volumes are on the rise, and the issuance of cryptocurrency-backed ETFs in stock exchanges is drawing attention.

c. Legal Tender Adoption for Financial Inclusion:

In a notable case, a country adopted Bitcoin as legal tender, aiming to provide financial solutions to a large part of the population. The digital wallet associated with this adoption facilitates retail payments and remittance tasks.

d. Cryptocurrencies Used as Financial Assets:

Cryptocurrencies are not authorized as a form of money in some countries but are used as financial assets for investment purposes.

e. Official Position of “Vigilant Tolerance”:

In one country, the official position is described as “vigilant tolerance”, signifying that there is no prohibition on the use of cryptocurrencies. However, the responsibility for their use falls entirely on the individuals or entities engaging in crypto transactions.

• **Regulation****a. Cryptocurrencies Not Authorized for Payments:**

Cryptocurrencies are generally not authorized as a form of money or for use in the payment system. Central Banks, like in some countries, restrict their use in official transactions.

b. Cryptocurrencies Not Authorized for Transactions:

In certain countries, cryptocurrencies are available but not authorized by monetary authorities. The usage for transactions is reported to be minimal.

c. Regulatory Frameworks Under Development:

Regulatory frameworks for cryptocurrency providers are under development in some countries. The regulatory approval process includes authorization for services related to virtual assets or currencies.

• **Development****a. Central Bank’s Open Position and Study on CBDC:**

Some Central Banks maintain an open position regarding crypto assets, emphasizing that any transactions with virtual assets are at the responsibility and risk of the involved parties. Some Central Banks are actively studying the feasibility of issuing their own digital currency or CBDC.

These trends collectively illustrate a diverse landscape in Latin America regarding the adoption, regulation, and utilization of cryptocurrencies, with some countries embracing them for financial inclusion and investment opportunities while others exercise caution or lack explicit regulatory frameworks.

3.16. What is the prevalence of cash in your economy?

In various Latin American countries, the prevalence of cash in the economy remains significant, with some observations and trends:

1. Promotion of Electronic Means of Payment:

While cash is the most used form of money, there are efforts, including regulatory frameworks, to promote electronic means of payment such as Electronic Fund Transfers, Debit Cards, and E-wallets.

2. Survey Results on Payment Instrument Usage:

Survey results indicate that cash remains the dominant form of payment, with over 75%–88% usage for routine monthly payments. Debit cards, credit cards, and other instruments constitute a smaller share of the total value exchanged for goods and services.

3. High Prevalence Despite Digital Payment Rise:

Despite the rise of digital payment channels, cash continues to be highly prevalent, exceeding 90% in terms of the most frequent form of payment, regardless of purchase value or service type.

4. Cash Dependence and Financial Inclusion Challenges:

The population exhibits a high dependence on cash for transactions, particularly in rural areas and among individuals with lower income and education levels. Financial inclusion challenges contribute to this reliance on cash.

5. Decreasing Use of Cash:

In some cases, there is a reported trend of decreasing cash usage, replaced by electronic means of payment such as electronic transfers, debit and credit cards, and e-money.

6. Factors Influencing Cash Use:

Factors influencing cash use include the significant informal economy, with approximately 20.8% of GDP produced by the informal sector. The preference for cash is influenced by factors like liquidity preferences and limited access to financial services.

7. Quadrupling of Cash in Circulation:

Between 2010 and 2020, the estimated amount of cash in circulation quadrupled, while immediate demand deposits almost doubled. This growth in cash circulation may be linked to factors like the informal economy and limited access to formal financial services.

8. Intense Use of Cash in Informal Transactions:

The informal economy is significant in some countries, with approximately 20.8% of GDP produced by the informal sector. This leads to an intense use of cash in transactions, with a high liquidity preference coefficient and a substantial percentage of currency issue relative to GDP.

9. Cash Dominance in Unbanked Population:

The dominance of cash is emphasized by the majority of the population being unbanked and having limited access to financial services. The prevalence of informal commerce, often cash-based, contributes to the continued use of cash.

Overall, while some countries observe a decreasing trend in cash usage, the widespread reliance on cash is evident, driven by factors such as financial inclusion challenges, informal economies, and a preference for cash in various types of transactions.

a. How expensive is it to produce and manage cash?

In Latin American countries, the costs associated with cash production and management vary across different dimensions. These include the social impact on transaction costs, procurement processes with international bidding, average production and transportation costs, budget allocation by central banks, logistical challenges in dollarized economies, annual costs for bills and coins, importation expenses with average costs, the yearly cost of money issuance, import dependency, and a lack of available data on the costs associated with using cash. These factors collectively contribute to the complex landscape of cash-related expenditures in these economies.

b. How does this relates to objectives on financial inclusion or efficiency in the financial and payments services industry?

The relationship between cash usage and financial inclusion or efficiency in various Latin American countries is intricate and multifaceted. There is a diverse range of approaches and perspectives across these nations. Some emphasize a trade-off between cash and electronic payment instruments, expecting increased e-money usage to diminish the need for cash production. Others actively promote digital payments as a means to enhance financial inclusion, especially among lower-income populations. Several countries are working to efficiently satisfy the demand for cash while simultaneously encouraging alternative payment mechanisms. Progress in financial inclusion, marked by increased access to digital financial services, is often linked to a reduction in cash usage. Efforts to promote electronic payment services are seen as opportunities to improve the efficiency of national payment systems. However, the prevalence of cash in certain countries remains a limiting factor for the widespread adoption of new payment methods, impacting initiatives for greater financial inclusion. Overall, the common thread is a commitment to lowering costs and improving efficiency as a means to expand financial inclusion across these nations.

3.17. What is the current legislation around financial consumer protection?

The legislation surrounding financial consumer protection in Latin American countries is diverse, reflecting varying approaches and regulatory frameworks. Some countries have specific laws and regulations dedicated to protecting financial consumers, addressing aspects such as data protection, privacy, and dispute resolution. Others may have broader consumer protection laws that encompass financial services. The objectives often include reducing the use of cash and promoting an inclusive financial system. Overall, the regulatory landscape reflects a commitment to safeguarding consumers' rights in financial transactions, with each country adopting its legal measures and structures to achieve this goal.

3.18. Regarding the main component, what would be the consensus for your Central Bank?

a. Network topology consensus

The choice of network topology consensus for Central Banks in Latin American countries varies based on considerations such as scalability, safety, traceability, reliability, and transparency. Some countries emphasize the need for a highly technical and in-depth investigation to evaluate different design alternatives within the entire space of DLT when considering alternatives to existing payment systems. The objectives for CBDCs often involve combining the performance of a centralized system with the absence of a single point of failure characteristic of decentralized systems. Specific approaches include centralized networks, closed and permissioned networks, distributed networks for availability protection, and hierarchical structures, with layers involving the Central Bank, PSPs, and end-users. The choice between centralized and decentralized solutions may depend on the desired functionalities, such as programmability and smart contract applications.

b. Immutability and failure tolerance consensus

The consensus mechanisms for ensuring immutability and failure tolerance in Central Banks across Latin American countries vary:

- **Proof of Work:** Selected by one country, it involves resource-intensive algorithms for consensus.
- **Proof of Authority:** Selected by two countries, it uses simple and resource-efficient consensus algorithms. The Central Bank serves as a validating node, with other institutions and regulators potentially participating as additional nodes or observers.
- **Proof of Stake:** Selected by one country, it avoids the energy expenditure associated with mining and ensures that operators are also system participants.
- **Permissioned Blockchain with a Notary Node:** Selected by one country, it involves a permissioned blockchain with a "notary" node responsible for validating double spending and confirming transaction completion. The data model is immutable, and data integrity can be independently validated by all network participants through cryptographic means. Any attempt to modify information would be evident.

c. Gossiping consensus (Global-local)

The use of gossiping consensus mechanisms (Global-local) for Central Banks in Latin American countries varies:

- **Need for Further Research:** One country indicates that more research is required to define the specifics of gossiping consensus.
- **Local Consensus Agreement:** Another country prefers a local consensus agreement, allowing them to define rules under which sets of transactions are independently updated by nodes in the network.
- **Direct Messages and No Gossip-based Protocols:** In one case, direct messages are used for communication between the Central Bank, PSPs, and their users. Gossip-based protocols are not employed.

d. Consensus by agreement:

The approach to Consensus by agreement for Central Banks in Latin American countries varies:

- **Need for Further Research:** One country mentions that more research is required for the definition of Consensus by agreement.
- **Deterministic, Asynchronous:** Another country specifies a deterministic and asynchronous approach for their consensus mechanism.
- **Deterministic:** A third country emphasizes the need for determinism in their consensus mechanism, requiring immediate confirmation or rejection of transactions and adherence to predefined rules for new blocks.
- **Asynchronous:** One country simply mentions an asynchronous approach for their consensus mechanism.

3.19. What are the transition capabilities that your central bank could have or has?

a. Data structure in the Block-header

The approach to transition capabilities for the Data structure in the Block-header for Central Banks in Latin American countries varies:

- **Patricia Merkle Tree:** One country highlights the use of Patricia Merkle Tree, offering faster and more flexible validation of transactions and the ability to store more information than the binary Merkle tree.

- **Binary Merkle Tree:** Two countries mention the use of Binary Merkle Tree for structuring information in block headers.
- **Corda Approach:** Another country, utilizing Corda, explains that transactions are not structured in blocks, and they do not use a block header. Corda employs a cryptographic chain of transactions, and transactions are represented by Merkle trees.
- **Decision Pending:** One country mentions that the structure will be decided based on the technology chosen for CBDC issuance.

b. Transaction model

- **UTXO (Unspent Transaction Outputs):** Two countries mention the utilization of UTXO for their transaction model. This model allows for atomic transactions and provides privacy to users.
- **Traditional Ledger:** One country emphasizes the use of a traditional ledger for atomic recording of transactions in the blockchain, preventing untrustworthy data and double spending.
- **Research Pending:** One country notes that more research is required to define their transaction model.

c. Server storage

- **Full Nodes:** Three countries mention the use of full nodes. One country specifies having certified data centers and on-premise storage infrastructure for full nodes.
- **Thin Nodes Capabilities:** Two countries state the use of thin nodes capabilities. One country highlights the heterogeneity of nodes in their prototype, with different types of storage for Central Banks, PSPs, and end users.

d. Block storage

- **More research is required for its definition:** One country expresses the need for further research to define block storage capabilities.
- **Transactions:** Three countries mention storing only transactions. Transactions contain sets of inputs and outputs that help identify the emitter(s) and receiver(s) of specific transactions.
- **User Balance:** Two countries express preferences for storing user balances. One country suggests having a global state that comprises the balances of all users, using transactions solely to update the state of the balance.

e. Limits to scalability (number of transactions, number of nodes, number of users and block confirmation time)

Responses from different Latin American countries regarding scalability limits for Central Banks indicate varied approaches. One country expresses the intention of having a system without scalability limits, while another emphasizes the impact of various elements on scalability. The need for evaluations, potential trade-offs, and the impossibility of specifying the mechanisms in use are highlighted. Another country mentions explorations to enhance the performance of a specific technology (Corda) in a test environment but does not specify scalability limits. One country simply states that further research is required to define scalability limits.

3.20. What would be the configuration of your native currency/tokenization?

Responses from different Latin American countries regarding the configuration of their native currency/tokenization suggest varying perspectives. One country indicates a preference for a “tokenized” asset rather than a native asset, with the management and supply mechanism dependent on the Central Bank’s objectives. Another mentions modeling a digital version of the legal currency in a developed prototype. However, there is a consensus that further research is needed to define the specific configuration of the native currency/tokenization.

a. Native asset

The responses from Latin American countries regarding the configuration of their native asset vary. Some countries explicitly mention having their own convertible currency, while others, like the CB team in one country, expect the Digital Real to serve as a native asset in their CBDC system. Additionally, one response notes an own convertible currency, primarily for converting digital G coin to fiat currency. In certain instances, the need for further research is acknowledged to define the native asset.

b. Asset supply management

The responses from different Latin American countries regarding the configuration of their asset supply management indicate variations. Some mention a limited deterministic approach, which allows determining the maximum number of coins issued and delimits the scope of use and growth. One country specifies an unlimited deterministic model. Another country notes that the supply is managed by the central bank, and the specific approach is described as limited deterministic. Overall, there is a preference for deterministic models with limitations on the supply of the digital currency.

c. Tokenization

The responses from different Latin American countries regarding the configuration of tokenization vary. One country mentions the term “Tokenization” without specifying further details. Another country indicates that more research is required to define CBDC tokenization in the country. There is an expectation from one country for a widespread use of tokenization, encompassing private stable-coins and other tradable assets. Another response mentions tokenization with 3rd party add-ons. In contrast, a different country states that there is currently no tokenization, expressing uncertainty about the added value of tokens in their context.

3.21. What would be the extensibility you are looking for?

a. Interoperability

- **Implicit Interoperability:** One country emphasizes the importance of implicit interoperability, allowing smart contracts to specify various conditions for exchanging information with external systems and interfaces.
- **Explicit Interoperability:** Another country favors explicit interoperability, suggesting a more defined and direct approach to interoperability.
- **Implicit Interoperability for National Payments Systems:** A country expresses a preference for implicit interoperability, especially for interacting with various types of national payment systems using specific standards.
- **Explicit Interoperability for Electronic Money:** Another country highlights the importance of explicit interoperability, particularly concerning interoperability with other forms of electronic money. This includes interest in interfaces and protocols accessible to third parties for developing compatible digital wallet solutions.
- **More Research Required:** One response indicates that further research is needed to define the specific requirements for interoperability.

Overall, the countries vary in their preferences for implicit or explicit interoperability, with considerations for national payment systems, electronic money, and the need for additional research in this context.

b. Interoperability

- **Explicit Interoperability with API Usage:** One country expresses a preference for explicit interoperability, suggesting the definition of parameters to exchange data between systems, possibly utilizing APIs for the exchange.
- **More Research Required:** Another response indicates that further research is needed to define the specific requirements for interoperability.
- **Explicit Interoperability with Current Systems:** One country highlights the importance of explicit interoperability, especially with the central bank's current systems. This includes a particular interest in interoperability with the Real-Time Gross Settlement (RTGS) system, acknowledging their coexistence for an extended period. Successful prototypes have been conducted in this context.
- **No Interoperability:** A country states that it does not require interoperability, indicating that there is no need for interaction with other blockchains.

Overall, the countries vary in their preferences for explicit intraoperability, with considerations for API usage, integration with existing systems, and the absence of a need for interaction with other blockchains.

c. Governance

Different Latin American countries propose varied governance models for a CBDC. These models include adherence to current national financial system standards, an alliance mode involving entities with common business demands, a technical mode with a proprietary Central Bank Currency, emphasis on security and transparency in an alliance mode, Central Bank control in a prototype, and a general preference for the alliance mode. The approaches highlight diverse strategies for governing CBDCs, considering factors such as collaboration criteria, technical rules, security, and transparency.

d. Script language

Some countries emphasize the need for more research to define the script language. Others express a preference for a Turing complete script language, allowing for broader functionality and flexibility. Additionally, one country specifies a preference for a non-Turing complete script language but with the ability to incorporate external data. These preferences reflect considerations of the desired level of completeness and capabilities in the script language for CBDC implementation.

3.22. What would be essential for your bank in terms of security and privacy? Do you prefer

a. Data encryption (SHA-2, SK-SNARKS or other, if so which one)

One country highlights the use of SK-SNARKS as a method to ensure secure fund transactions while keeping account information confidential. Another country emphasizes the importance of system security, citing the use of SHA-2 as a familiar and well-established encryption algorithm used by the Central Bank. These responses reflect a focus on advanced encryption techniques and established algorithms to ensure the security and privacy of CBDC transactions and data.

b. Data privacy (built in data privacy, add-on data privacy or other, if so which one)

The responses from different Latin American countries regarding essential elements for security and data privacy in a CBDC highlight common themes. One country emphasizes the need for built-in data privacy, requiring encrypted transactions with limited access to data, ensuring a high degree of confidentiality accessible only by authorized parties. Another country stresses the fundamental role of data privacy in protecting both the Central Bank's and customers' information, with built-in data privacy reflecting current practices. Additionally, a developed prototype explores alternatives for user identification, and the use of cryptography ensures data integrity and transaction validation. The focus is on strong privacy protection, user-friendly approaches, and the prevention of data breaches.

3.23. In terms of identity management, what do you prefer?

a. Access layer and control layer

The responses from various Latin American countries regarding identity management in the context of CBDC emphasize a preference for permissioned private blockchains. This choice is motivated by the desire for centrally-coordinated changes, control enforcement, and enhanced cybersecurity. The decision on public or private access to the CBDC depends on the scope of the implemented system. The countries highlight the importance of read and write, as well as consensus management rights, being granted by a centralized organization in a permissioned private blockchain. Some countries also mention the possibility of using both permissioned public and private blockchains, allowing for flexibility in the design and security considerations. The prototype in one country utilizes a private permissioned blockchain, with potential openness for public verification of blockchain information.

b. Identity layer

The responses from different Latin American countries regarding identity management in the context of CBDC reveal a preference for a KYC/AML (Know Your Customer/Anti-Money Laundering) approach. This ensures compliance with national regulations and facilitates the validation of participants and their data from authoritative sources. Some countries emphasize the importance of maintaining user privacy and actions within the legal requirements of the country. Additionally, there is a mention of a hybrid approach, combining KYC/AML for certain transactions or users with the allowance for anonymous transactions in other use cases, particularly for low-value transactions. The identity layer is recognized as having different onboarding options with varying limitations on amounts or transaction numbers based on the guarantees provided by each method.

3.24. For the encoding and charging and rewarding system, which is most desirable for your system?

a. Codebase

The responses from different Latin American countries regarding the encoding, charging, and rewarding system for their CBDC indicate a diversity of preferences. While one country favors a closed-source codebase, emphasizing the mitigation of potential bugs or unreported issues, another country expresses a preference for open-source solutions. There is also a mention of using a closed-source language specifically for in-house developments within the Central Bank.

b. Charging and rewarding system

One country emphasizes the absence of fees, attributing it to the private nature of the solution in a permissioned network and the presence of an identity layer. Another country suggests that more research is required for a definitive definition of the charging and rewarding system for their CBDC.

3.25. Regarding your country's infrastructure and economy?

a. How good is infrastructure for:

The surveyed Latin American countries present a varied landscape in terms of infrastructure and economic indicators:

1. **Internet Connectivity:** Ranges from good to very good, with widespread adoption of 4G and varying levels of fiber optics and fixed internet accessibility.
2. **Electricity Coverage:** Generally high, with a focus on renewable energy in some countries.
3. **Mobile Usage:** Mobile phone ownership is prevalent, with a mix of prepaid and postpaid plans. Some countries show high smartphone penetration.
4. **Technology Adoption:** Diverse levels, with notable instances such as the Pix system adoption, digital wallet usage, and the introduction of Bitcoin as legal tender in specific countries.

Despite the overall positive indicators, challenges exist, including digital gaps, uneven access in rural areas, and disparities in technology adoption across different socioeconomic groups. The countries are actively addressing these challenges through initiatives like digital transformation cabinets and improved digital infrastructure.

b. Are existing legal and regulatory requirements compatible with the issuance of CBDC? What potential legal or regulatory obstacles exist as limitations to a CBDC implementing?

While some countries report no obstacles, others highlight challenges and considerations. Coordination has been successful in certain cases, involving discussions on legal adjustments, particularly in terms of legislation and mandates. Legal limitations include the absence of a current legal framework, the need for reforms, and discussions at the legislative level to enable CBDC issuance. Key considerations involve potential obstacles such as data privacy, interoperability challenges, and regulatory compliance. Overall, the landscape varies, reflecting the nuanced legal and regulatory environments across different countries in the region.

3.26. *Is there demand and interest in CBDC between the domestic financial and payments industry? Have you surveyed this? Relatedly, which parts of the public or private sector require it, in your economy? What is the support that the Central Bank senior management gives to this issue?*

Some countries report interest from the private sector in implementing CBDC as part of smart payment platforms, with initial guidelines generating interest from financial and payment industry participants. Dialogue and deliberations are ongoing, with the Central Bank showing support for the development of CBDC alongside private money.

However, in some cases, countries have not noticed significant demand or interest in CBDC. The topic is in the early stages of analysis, and surveys have not been conducted to gauge the position of private banks or the public. Senior management in some Central Banks supports research and exploration of the CBDC issue, with ongoing discussions in different forums.

Overall, the landscape reflects a mix of interest and stages of exploration, with some countries actively engaging in dialogues and others at the preliminary stages of analyzing the potential for CBDC.

3.27. *In relationship to question 19, what are the risks or fears of implementing a CBDC that you foresee in your country? Are they well-studied risks or do you consider that they could deserve special attention? How is the resilience of your payment system?*

1. Preliminary Assessment:

In one country, the CB is in the initial phase of studying the feasibility of CBDC, and specific risks are not yet concluded. Risks are directly related to the scope and type of CBDC under consideration.

2. Reputational and Security Risks:

Reputational risks in case of failures and security risks are foreseen in another country. The ability to implement CBDC is also a concern.

3. Ongoing Assessment:

Some countries are currently focused on a preliminary assessment, without a consensus on probable characteristics and technical aspects. Evaluation of advantages, disadvantages, and potential risks for the financial and monetary system is pending.

4. Security and Resilience:

Security risks, including double spending, are acknowledged in one country. The competition with existing payment methods is recognized, but CBDC is seen as potentially adding resilience to the system.

5. Financial Stability and Cyber Risks:

Financial stability issues, potential competition with banking deposits, and cyber risks are highlighted in another country. The importance of avoiding disruptions and maintaining the central bank's reputation is emphasized.

6. Efficiency Impact and Resilience:

Risks related to financial intermediation and the efficiency impact on the payment system are considered relevant in a specific country. The resilience of the payment system is emphasized.

7. Technology, Reputation, and Operational Risks:

Technological, reputational, and operational risks are anticipated in one country, emphasizing the need for special attention. Pilot program failures in other central banks are noted as cautionary examples.

8. Specific Risks and Infrastructure Improvement:

Risks such as inorganic emission, liquidity risk, and the risk of illegal activities are highlighted in another country. Work is underway to improve technological infrastructure and enhance resilience in the payment system.

Overall, the responses reflect a combination of identified risks, ongoing assessments, and considerations for the resilience of existing payment systems. The potential technological, reputational, and operational challenges associated with CBDC implementation are areas of special attention.

3.28. *Thinking about all aspects of this exploratory analysis. What are the areas and points where you think/expect a CBDC can be useful for your country?*

1. Smart Payment Platform Integration:

Making CBDC a cornerstone of a smart payment platform, coexisting with other forms of liquidity, to keep up with technological evolution, foster innovation, and enhance the efficiency of the retail payment system.

2. Efficiency and Financial Inclusion:

Improving the efficiency, safety, and resilience of the payment system is seen as a potential objective. CBDC issuance by the central bank could deepen financial inclusion, reduce illicit transactions, and address the trend towards reduced cash usage.

3. Monetary Policy Impact:

CBDC is expected to impact monetary distribution efficiency, reduce the cost of monetary material, and influence monetary policy, intermediation, and payment system development.

4. Extensibility and Scripting Language:

Allowing extensibility actions, including the development of a scripting language for third-party contributions, could renew perspectives around existing payment systems.

5. **Efficient National and Cross-Border Payments:**
CBDC is anticipated to promote money circulation through efficient national payments, increase efficiency in cross-border payments, and reduce the risks associated with managing physical money.
6. **Retail CBDC for Financial Inclusion:**
Implementing a Retail CBDC accessible to the public is seen as a way to promote financial inclusion, foster an efficient payments system, and reduce issuance costs.
7. **Interoperability and Electronic Payments:**
CBDC is expected to favor interoperability, enhance agility in electronic payments, and provide valuable information on population consumption in various markets, including international remittances and agriculture.
8. **Financial Inclusion and Electronic Payments:**
CBDC is anticipated to increase financial inclusion, encourage electronic payments, and reduce the costs associated with cash issuance.
9. **Payment System Efficiency and Wholesale Market Boost:**
CBDC is viewed as a tool to improve payment system efficiency, facilitate instant payments, and contribute to a more efficient financial system. From a wholesale perspective, it could boost the interbank and foreign exchange market.
10. **Financial Inclusion, Sovereignty, and Risk Mitigation:**
CBDCs are seen as instruments to increase financial inclusion, protect monetary sovereignty, and mitigate risks associated with the private issuance of digital currencies.

These expectations highlight the multifaceted potential of CBDC in addressing various financial and economic objectives, including efficiency, financial inclusion, and innovation.

3.29. *What is the knowledge, experience or do you have experts studying CBDC? Is there a CBDC-related research agenda in your country? How do you think we could support you for the analysis of a CBDC? What do you expect from us in this exploratory research project?*

1. **Interest and Follow-Up:**
Some central banks, like in the first case, express senior management interest in deepening their study and following the development of CBDC. There is no specific agenda, but staying informed is a priority.
2. **Expertise and Internal Research:**
Another country has a team of experts actively studying and applying Distributed Ledger Technology (DLT) with a focus on CBDC. They have conducted internal assessments, including possible backup solutions and Proof of Concepts (POCs) using various blockchain technologies.
3. **Early Stage Analysis and Need for Support:**
Several countries emphasize that the analysis of CBDC is in the early stages, and any available support is considered necessary for progressing in this area.
4. **Research Agenda and Regional Integration:**
One country outlines an analytical research agenda related to CBDC attributes, benefits, architectures, and risks. They see CEMLA playing a crucial role in systematizing and disseminating lessons learned from CBDC experimentation across the region, fostering knowledge exchange between central banks.
5. **Financial Innovation Center Involvement:**
In one case, the Financial Innovation Center is responsible for studying CBDC. While there is no proposed development agenda, they acknowledge the potential value of studies like CEMLA's in shedding light on new developments.
6. **Previous CBDC Implementation and Financial Inclusion Goals:**
One country implemented a CBDC mechanism in the past and seeks to define a new model based on international experience. Their goal is to promote financial inclusion by providing efficient payment schemes and discouraging the use of physical money.
7. **Task Force and CEMLA's Essential Role:**
Another country formed a task force in the second quarter of 2021 for CBDC research. They highlight the essential role of CEMLA's advice during the research phase, given its extensive knowledge about Latin America's central banks in this area.
8. **Limited Knowledge and Expectation to Learn:**
Some countries admit to having little knowledge of CBDC issues and express the expectation to learn more through projects like CEMLA's.
9. **Central Bank's Research Project and CEMLA's Support:**
In one case, the central bank has decided to work on a research project in 2022 on the potential implications of CBDC. They express that CEMLA's support will be crucial to gaining clarity on CBDC-related aspects.
10. **Interest in Achieving Objectives:**
Another country expresses a keen interest in understanding how CBDC issuance can contribute to achieving the central bank's objectives related to the modernization and healthy development of the payment system.

4. Final remarks

In exploring the landscape of Central Bank Digital Currencies across 12 diverse Latin American countries, this survey has illuminated critical insights into the region's attitudes and advancements regarding CBDC adoption. Across the spectrum of economic development and financial infrastructures, a clear trend emerges: growing interest and exploration of CBDCs as potential catalysts for financial inclusion, efficiency, and sovereignty.

Evident from this comprehensive survey is the varied approach among nations, reflecting nuanced priorities, technological readiness, and regulatory landscapes. While some countries are advancing steadily, laying foundations for CBDC development aligned with their economic needs and technological capacities, others remain in exploration phases, considering the multifaceted implications before committing to implementation.

Common threads emerge in the perceived benefits of CBDCs, notably in enhancing financial inclusion, fostering innovation in payment systems, and bolstering monetary sovereignty. However, challenges loom large, encompassing technological readiness, regulatory frameworks, interoperability concerns, and public acceptance.

As we navigate this dynamic landscape, collaboration among governments, financial institutions, and technology partners becomes imperative. Sharing insights, best practices, and addressing common challenges collectively will pave the way for a smoother and more inclusive integration of CBDCs into the Latin American financial ecosystem.

The road ahead for CBDC implementation in Latin America is multifaceted, requiring a delicate balance between innovation, regulation, and collaboration. This survey serves as a starting point, shedding light on the region's aspirations, challenges, and opportunities in embracing the future of digital currencies.

CRedit authorship contribution statement

Gerardo Hernández del Valle: Writing – original draft. **Karla Chua Mejía:** Writing – original draft. **Bernardo Paniagua Zabal:** Writing – original draft. **Matias Alfredo Gutierrez Girault:** Validation. **Pablo Villalobos González:** Validation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary material related to this article can be found online at <https://doi.org/10.1016/j.latcb.2024.100135>.

References

- Arauz, Andrés, Garratt, Rodney, Diego, F., Ramos, F., 2021. Dinero electrónico: The rise and fall of Ecuador's central bank digital currency. *Lat. Am. J. Cent. Bank.* 2 (2).
- Bank of Canada, 2021. *Understanding Central Bank Digital Currency: Surveying Canadians*. Staff Analytical Note No. 2021-4.
- Bank of England, 2020. Central bank digital currency: Opportunities, challenges and design. Available at: <https://www.bankofengland.co.uk/paper/2020/central-bank-digital-currency-opportunities-challenges-and-design-discussion-paper>.
- BIS (Bank for International Settlements), 2020. Central bank digital currencies: foundational principles and core features. Accessed via: <https://www.bis.org/publ/othp33.htm>.
- Carapella, Francesca, Flemming, Jean, 2020. Central Bank Digital Currency: A Literature Review. FEDS Notes, Board of Governors of the Federal Reserve System, Washington, <http://dx.doi.org/10.17016/2380-7172.2790>, November 09, 2020.
- Demirgüç-Kunt, Asli, Klapper, Leora, Singer, Dorothe, Ansar, Saniya, 2022. The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19. World Bank, Washington, DC, <http://dx.doi.org/10.1596/978-1-4648-1897-4>, License: Creative Commons Attribution CC BY 3.0 IGO.
- ECB (European Central Bank), 2020. Report on a digital euro. Accessed via: https://www.ecb.europa.eu/pub/pdf/other/Report_on_a_digital_euro~4d7268b458.en.pdf.
- European Central Bank, 2020. *Public Attitudes Towards Digital Currency in the Euro Area*. ECB Occasional Paper Series No. 247.
- Federal Reserve Board, 2021. Survey of consumer payment choice. Accessed via: https://www.federalreserve.gov/paymentsystems/scpc_about.htm.
- IMF (International Monetary Fund), 2021. Central bank digital currencies: Opportunities, risks, and challenges. Accessed via: <https://www.imf.org/en/Topics/fintech/central-bank-digital-currency/virtual-handbook>.
- International Labour Organization, 2023. SDG labour market indicators (ILOSDG) [database]. Retrieved from: <https://ilostat.ilo.org/topics/informality/#> [Access November 2023].
- Morales-Resendiz, Raúl, Ponce, Jorge, Picardo, Pablo, Velasco, Andrés, Chen, Bobby, Sanz, León, Guiborg, Gabriela, Segendorff, Björn, Vasquez, José Luis, Arroyo, John, Aguirre, Illich, Haynes, Natalie, Panton, Novelette, Griffiths, Mario, Pieterz, Cedric, Hodge, Allister, 2021. Implementing a retail CBDC: Lessons learned and key insights. *Lat. Am. J. Cent. Bank.* 2 (1).
- People's Bank of China, 2021. Research on digital currency. Accessed via: <http://www.pbc.gov.cn/diaochatongjishi/145921/145923/index.html>.
- World Bank, 2023. World bank staff estimates based on IMF balance of payments data, and world bank and OECD GDP estimates [database]. Retrieved from <https://data.worldbank.org/indicator/BX.TRF.PWKR.DT.GD.ZS> [Access November 2023].
- Zhou, Cheng, 2023. Evaluating the effectiveness of monetary policy for retail central bank digital currency. *Lat. Am. J. Cent. Bank.* <http://dx.doi.org/10.1016/j.latcb.2023.100111>.