BBVA | Research

Central Bank Digital Currencies in LatAm

An assessment of the differential factors for adoption (Scenarios and probability of adoption)

Índice

01 CBDC definition and scenarios of adoption

02 Scenarios assessment for LatAm

03 Appendices

01

CBDC definition and scenarios of adoption

Introduction

- The potential implications of the adoption of a Central Bank Digital Currency (CBDC) is a topic of increasing interest
- Efficiency, financial inclusion, formality, financial stability and monetary policy are some factors that can be affected
- There are several papers that address those issues from different perspectives. In this line, BBVA Research developed a project aimed to analyze: attributes and types of CBDC, scenarios of adoption according to different types of CBDCs and its probability of implementation and impact on stakeholders
- The current project must be considered as a continuation of the previous one, and is focused in the application of the identified scenarios for LatAm that can drive to different outcomes in terms of probability and impact of adoption of the scenarios defined in the previous project.

What are CBDCs?

- CBDCs are Central Bank-issued instruments that combine cryptography and DLTs to achieve four possible general goals:
    - Improve interbank settlement
    - Digitize cash to improve efficiency in management and payments
    - Develop a new monetary policy tool to overcome zero-bound interest rates
    - Increase surveillance and reduce financial system instability
- In regions like LatAm, mostly composed by developing countries, the adoption of a CBDC can pursue additional goals, such as:
    - Financial inclusion by allowing access to transactional banking services through simple mobile networks and devices
    - Informality reduction by increasing traceability of transactions and, in some cases, paving the way to bancarization
    - Reduction of costs associated with the issuance and transportation of cash due to security issues, dimension of countries or complex orography

Cash characteristics can now be digitally replicated and modified using a CBDC

Cash	CBDC		
P2P	P2P		
Universal	Universal	OR	Restricted
Anonymous	Anonymous	OR	Identified
Non Yield Bearing	Non Yield Bearing	OR	Yield Bearing

Four design options lead to four main scenarios

A	CBDC for interbank settlement	Restricted	Identified	Non yield-bearing

› Centralized CB ledger is substituted by a distributed ledger to improve wholesale payments

B	CBDC similar to cash	Universal	Anonymous	Non yield-bearing

› CBDC reduces cash management issues and improves efficiency in payments

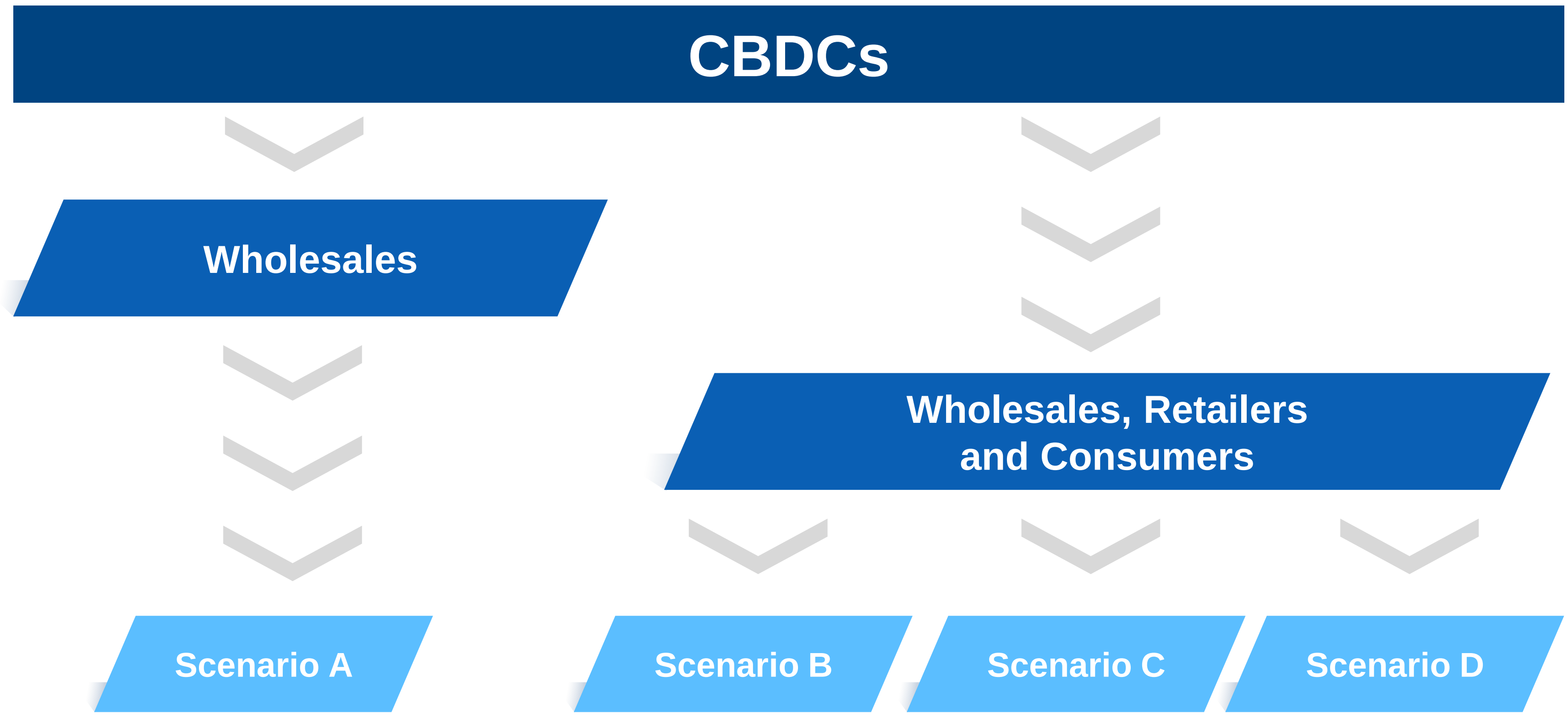
C	CBDC as new policy tool	Universal	Anonymous	Yield-bearing

› A yield-bearing CBDC allows CB to overcome zero-bound interest rates

D	CBDC as public deposit in CB	Universal	Identified	Non yield-bearing

› An identified CBDC increases surveillance and reduces financial system instability

CBDCs: restricted scenario (A) is very different from universal scenarios (B, C and D)



Main factors to assess adoption of a CBDC

A

- **Current operation of the wholesale payment system:**
  - Availability
  - Cyberattacks
  - Speed
  - Costs
  - Control by banks
- **Appetite for innovation (competition)**
- Cost of transfers for final users
- Cost of implementation of the new CBDC infrastructure
- Impact on wholesale payments business of banks

B

- **Impact on financial inclusion**
- **Informality**
- **Use of cash**
- **Current technological infrastructure**
- **Degree of digitalization**
- **Remittances volume**
- **Private virtual currencies usage**
- **Cost of implementation of the new CBDC infrastructure**
- **Impact on deposits and credit (multiplier)**
- Current efficiency of payment systems
- Cost of transfers
- Cost of managing cash
- Appetite for innovation (competition)

C

- **Monetary policy flexibility (financial repression)**
- **Use of cash**
- **Current technological infrastructure**
- **Degree of digitalization**
- **Remittances volume**
- **Private virtual currencies usage**
- **Cost of implementation of the new CBDC infrastructure**
- **Impact on deposits and credit (multiplier)**
- Current efficiency of payment systems
- Informality
- Cost of transfers
- Cost of managing cash
- Appetite for innovation (competition)
- Capital control incidence
- Impact on financial inclusion

D

- **Illicit activities volume (tax evasion, money laundering)**
- **Banking system instability**
- **Use of cash**
- **Current technological infrastructure**
- **Degree of digitalization**
- **Remittances volume**
- **Private virtual currencies usage**
- **Cost of implementation of the new CBDC infrastructure**
- **Impact on deposits and credit (multiplier)**
- Current efficiency of payment systems
- Private virtual currencies usage
- Informality
- Cost of transfers
- Cost of managing cash
- Degree of bancarization (impact on financial inclusion)

Governments /Central Banks Commercial banks Final users

The relative weight of these factors depends on the geography where the CBDC would be adopted. Bolded factors are those which we consider to be most important for LatAm.

02

Scenarios assessment for LatAm

Scenario A – Main factors in LatAm

Restricted CBDC: adoption will be driven by improvements in efficiency, resilience, and the degree of competition of current wholesale payment system

Current operation of the wholesale payment system

- The implementation of a type A scenario is fundamentally determined by the potential improvement in the **efficiency (in terms of cost and speed) and resilience under cyber attacks** of current wholesale payment systems. This is true both in developed and developing countries. Therefore, the **probability of implementation in LatAm countries** (as in any other geography) **is positively correlated to the inefficiency and cyber-risk of the current system**, even taking into account the cost of deployment of the new technology

Appetite for innovation (competition)

- Adopting a DLT-based CBDC infrastructure for wholesale payments facilitates the incorporation of new entrants to the system, and that is one of the reasons for adoption in countries where the authorities try to promote competition in financial services in order to boost innovation. Therefore, **the degree of willingness to foster competition by authorities and resistance of incumbents is an important factor** to bear in mind when trying to fully leverage the benefits of the scenario

Scenario A – Conclusions and final remarks for LatAm

The most likely scenario: beneficial net effect due to efficiency and resilience gains; market structure and regulation as main obstacles

- We take as given that **positive welfare gains** are derived from a new **superior technology** (DLT): lower **costs,** cyber **resilience** and higher **velocity**
- Thus, **higher probability** of adoption **in countries with less efficient wholesale payment systems,** as is currently the case for some countries in LatAm
- Efficiency gains have **at least to make up for the costs of infrastructure changes.**
- Current **market structures and regulation** could block a potential growth in competition and **prevent cost reduction to be transferred to final wholesale user's** (lower fees)
- **Authorities should overcome resistance from incumbents** to allow non-banking competitors to enter the space in order to ensure that final users benefits as well, but in a **leveled regulatory playfield**
- Probability of adoption of this scenario is high in comparison with scenarios B, C and D because **there are not significant downsides for stakeholders**
- Also, it is the logical point of entry to pilot the use of DLTs by central banks because of the restricted environment and the controlled costs of implementation: it is a **reasonable first step towards B, C or D**

Common elements for scenarios B, C and D – Main factors in LatAm

There is a common ground when adopting a universal CBDC in LatAm

Necessary conditions

- **Cost of implementation** of the new CBDC infrastructure, such as the cost of technology and **population skills requirements**. **Skills for using the required technology** will be a challenge, so simple **digital solutions are needed** (Apps)

Technological infrastructure (degree of digitalization)

- A **country with better infrastructures** would be able **to adopt a CBDC with a higher probability**
- The implementation of a CBDC requires **the existence of a set of technological infrastructures for the final users** to be able to access the system
- Some countries in **LatAm lack this kind of infrastructures** in parts of their territories
- These include **mobile networks and/or fixed broadband** and devices like **smartphones or feature phones**

Use of cash (cash/deposits ratio)

- In Latam, **cash is highly used** in relative terms
- A universal CBDC will be equivalent to a “digital cash” so **countries where analog cash is more used** probably will have a **greater incentive to adopt it**
- **Advantages** in terms of operability, security and distance to access points

Common elements for scenarios B, C and D – Main factors in LatAm

There is a common ground when adopting a universal CBDC in LatAm

Internal Remittances

- LatAm economies, as other developing countries, **rely relatively more on remittances**
- **Transfers should be cheaper** than with traditional systems

Increasing private virtual currencies usage

- Some countries in LatAm **are examples of the increasing use of bitcoin**
- Private virtual currencies like bitcoin are gaining traction, becoming **potential competitors** of the country currency, which could **accelerate the adoption of a CBDC**

Dollarization

- In LatAm, dollarization is **a latent phenomena**
- **Lack of CDBC desirability** or credibility among users may trigger **risks of higher dollarization** levels

Scenario B– Main factors in LatAm

Universal CBDC: an alternative to foster financial inclusion and to reduce the cost of managing cash

Financial inclusion

- From the **consumer** perspective: - Payments: **easy access** to money from everywhere. -Savings: easy and immediate contact with accounts/wallets but security is an issue. -Credit: since the virtual currency is anonymous, **credit scorings will be difficult to assess if information is lost due to anonymity**
- Some **concerns arise on the quality of such type of financial inclusion. Regulation will be key**
- From the **financial industry** perspective: **Efficiency gains** in the payment and transfer system. Savings: if banks keep the wallet keys, **new businesses could emerge**. Credit should continue managed by the financial system

Informality

- **LatAm has a high informal economy.** An anonymous CBDC would be an **incentive for people to use** this as a financial tool since it is a more efficient alternative
- In spite of anonymity, if CDBC becomes a deposit in the financial system, for credit purposes, it could be identified and taxed correspondingly

Use of cash (cash/deposits ratio)

- **A more efficient technology:** The CBDC in this scenario is equivalent to a "digital cash" so countries where cash is more used probably will have a greater incentive to adopt it because it has advantages in terms of operability. **In Latam, cash is highly used and managing it is expensive: increasing potential gains**

Scenario B – Conclusions and final remarks for LatAm

Medium likelihood: potential increases of informality

- The **most prefered scenario for retailers and consumers** under a CBDC adoption since it is similar to cash but more efficient. It is the least disruptive
- Although it is an option to foster financial inclusion (and a superior alternative to cash) **deposit security is still an issue** if the CBDC is outside the formal financial system. How is going to keep the **wallet's password**?
- **New businesses can emerge** for the financial system: password custody, money exchange, etc... (payrolls, direct debit of debt collection)
- The **convertibility** with cash is an issue that need to be solved. Convertibility facility with cash must be full and guaranteed either through intermediaries or the CB
- **More competence and more efficient system** might generate **lower fees, fostering financial inclusion**
- **Broadbase welfare gains:** it increases both **financial inclusion** (trust, documentation, costs) and **efficiency.** However, an important concern is how to deal with **informality**, taxation and KYC-AML regulations. Uncertainty in how to approve credit. **Anonymity** could be questioned by public.

Scenario C – Main factor for Latam

Yield-bearing CBDC: enhancing the reach of monetary policy tools

Monetary policy flexibility

- Interest-bearing CBDC enhance the reach of monetary policy through a **direct transmission channel to the economy**
- It provides **more flexibility for monetary policy,** through **charging CBDC with negative yields, if removing** the zero lower bound (ZLB) in rates is needed
- Negative interest-bearing CBDC is **akin to fiscal policy,** and this **higher CB power to achieve inflation goals** could collide with other public interests or goals
- In LatAm, a negative yields to CBDC tenders is **likely to trigger massive dollarization**, even more if cash is abolished.
- Currently, **removing the ZLB is not a real advantage** for LatAm. Unlike developed countries, **equilibrium interest rates are not so close to zero**, while inflation has trespassed the lower-bound of target only a few times (mostly in CHL, PER and COL)
- Positive yield-bearing CBDC would **compete with commercial banks** (sight) deposit funding, **increasing banking borrowing costs and reducing the money and credit multiplier.** In Latam, banking credit represent a lower percentage of the GDP than in DM.

Scenario C – Conclusions and final remarks for LatAm

The less likely scenario: the ZLB is still a non-binding restriction in LatAm

- This scenario **has the lowest probability of adoption** in LatAm, although it is **a particular case** of scenario B. Nowadays, removing **ZLB of interest rates it is not a need** in LatAm
- If negative yield would apply, this scenario increases the **risk of fiscal dominance** while CBs **credibility issues may arise**
- Increased **risk of dollarization,** even more if cash is abolished
- It is likely that **short-term funding** of commercial banks to be **more volatile and expensive**
- **Fairness** related issues if cash is abolished: risk of **displacing population and increasing inequality** in regions that rely more on analog cash and have poor technology infrastructure

Scenario D– Main factors in LatAm

Identified CBDC: tackling the informal economy and financial instability in LatAm

Illicit activities volume (incl. tax evasion and money laundering)	• Is expected that **countries with a high prevalence** of these behaviors would **greatly benefit** from a non-anonymous CBDC • LatAm is well known by its **high degrees of corruption and** levels of **informal economy** • An **identified CBDC reduces anonymous payments** while the **surveillance and monitoring power** of authorities would be higher • Any kind of activity trying to **omit or avoid regulatory compliance, would be narrowed**
Banking system instability	• An **identified CBDC** is **equivalent to a deposit** that can be secure at the Central Bank • In the case of banks instability, **individuals and firms can run to CBs custody.** The **advantages for financial stability would be greater** if cash is abolished • CBs could have the **role of reallocating the CBDCs** through the financial system • Countries in LatAm with **financial instability histories,** could be more tilted to adopt an identified CBDC **to deal with bank runs**

Scenario D – Conclusions and final remarks for LatAm

Low likelihood: risks of a public “narrow banking” and the costs of a crippled banking system

- **Welfare gains** mostly for end users due to **likely improved financial inclusion** in LatAm added to an overall economy benefit with **lower illegal activities**

- Gains can also come from **reduced financial instability** but CBCDs reallocation mechanism could offset financial stability advantages due to **discretionality and increased moral hazard in the financial system**

- Risks that **an identify CBDC** in LatAm **could be avoided as a transactional currency.** This can **reduce their usage desirability** while fostering **competition for alternative cash** preferences, such as analog cash, a popular private cryptocurrency or even **further dollarization** in the region

- In the case that cash is abolished, **dollarization** and private cryptocurrency usage **could be more extreme**

Scenario D – Conclusions and final remarks for LatAm

Low likelihood: risks of a public "narrow banking" and the costs of a crippled banking system

- The **augmented pressure over commercial banks funding costs,** which is **detrimental for loans output and borrowers**
- The criterion with which the central bank will reallocate CBDC liquidity to financial institutions, opens space for **new rules and policy instruments, as well as new risks and uncertainties**
- **One way to take greater advantages** of the potential benefits from this scenario is to **abolish only high denomination cash.** We name this alternative scenario as D'

Further considerations

CBDC in LatAm: competition among other legal tender (crypto)currencies

- **With others analog legal tender cash (i.e. dollarization):** A latent phenomenon in the region. Regardless of the level of identification, if the CBDC lacks of both credibility and desirability among users, it could trigger a greater preference for the dollar or cash -or other liquid asset
    - Identified CBDC (scenario D): informal economy actors could use the dollar as an alternative asset to continue with informal activities. Also formal agents who value privacy (desirability)
    - Anonymous CBDC (scenarios B or C): only the lack of trust in governments -or over local financial systems- could increase the preference for alternative cash

Further considerations

CBDC in LatAm: competition among other legal tender (crypto)currencies

- **With others CBDC:** If access is universal (from abroad), only relative desirability and issuer credibility will encourage foreign demand for the CBDC
    - If competing CBDC is more credible and anonymous, the foreign demand for crypto-reserves will be relatively higher (i.e. US issuing a CBDC)
    - If competing CBDC is more credible but identified, the relatively high foreign demand for foreign cryptocurrency could be offset by lack of desirability
- A CBDC issued by a credible competitor could encourage a CBDC adoption across LatAm in order to face such competition. Moreover, this likelihood could be higher if happens to be a competitor with an anonymous CBDC

Conclusions and remarks
The relative probability of adoption in LatAm

Scenario A

It is the most probable because it provides benefits to all stakeholders, it has the lowest implementation costs, and it is natural to start here even if the final goal is to end in a universal CB cryptocurrency

Scenario B

Is more probable than C and D because it is less disruptive. This scenario helps transactional financial inclusion and reduces the use of cash, although informality could grow

Scenario C

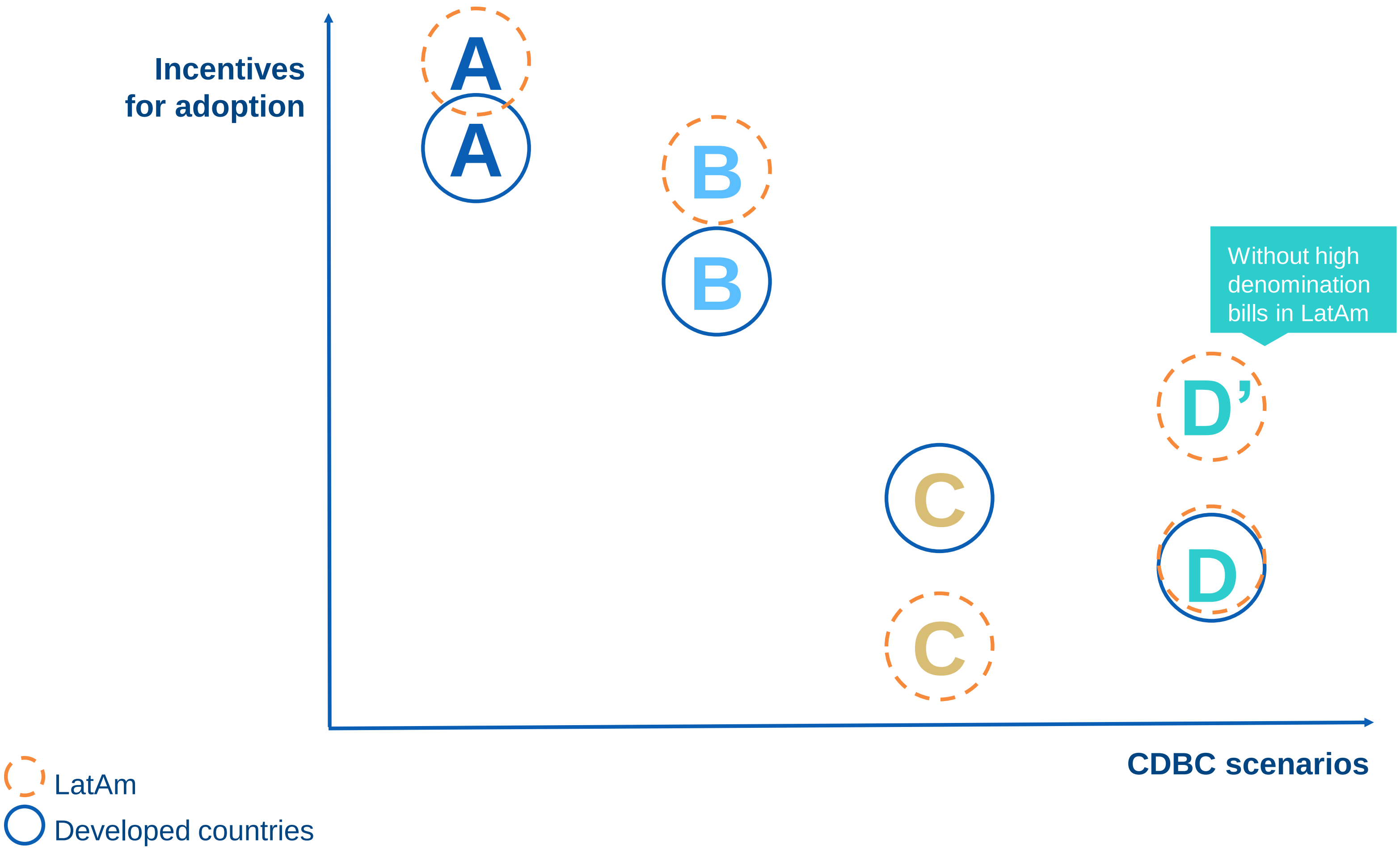
It is the least probable in LatAm since its most outstanding benefit, of addressing the ZLB, does not apply to this region

Scenario D

It has low probability of success if cash is not eliminated because the high preference for cash in LatAm driven by informality and lack of trust in the formal financial system

An alternative version of D without high-denomination bills could have a slightly higher probability since it allows to preserve the majority of advantages of these scenario

Conclusions and remarks
The relative probability of adoption: LatAm vs developed countries



03

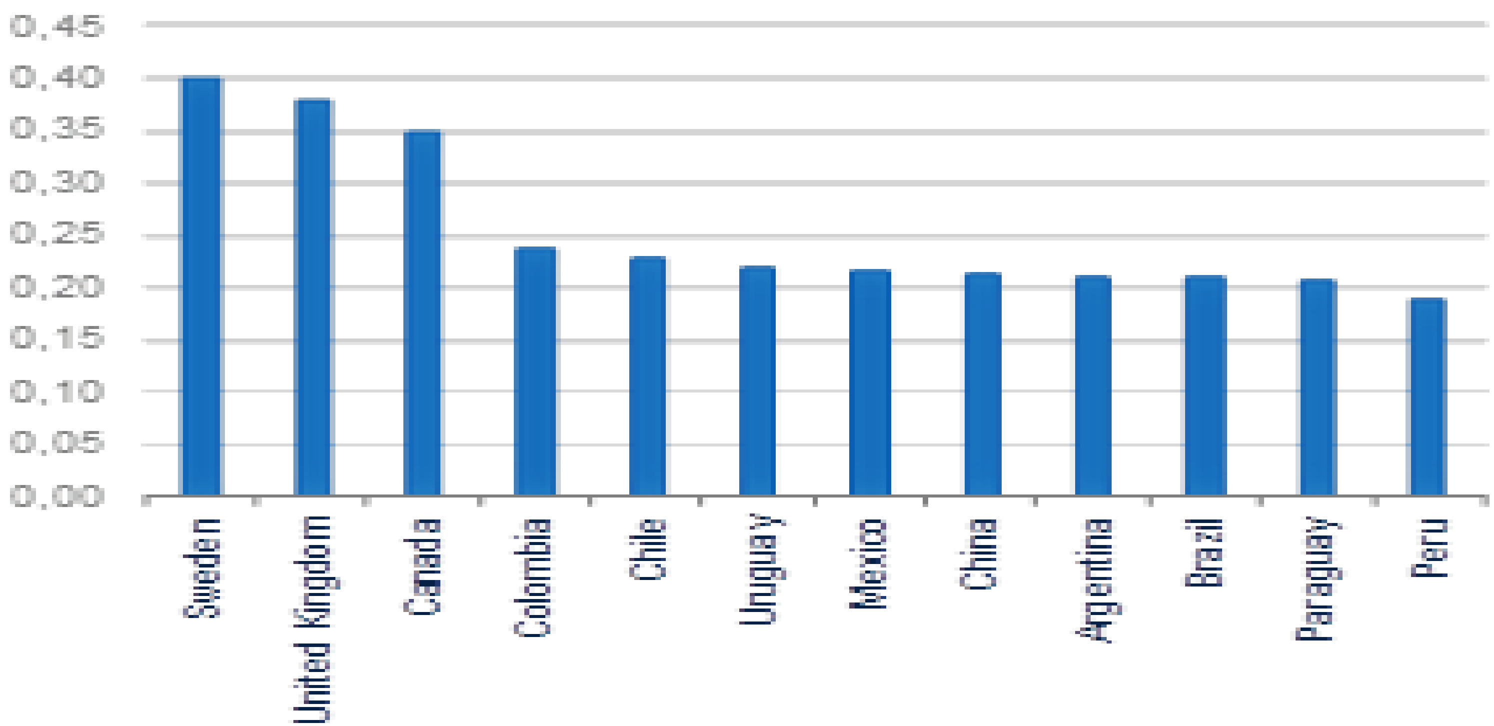
Appendix

A

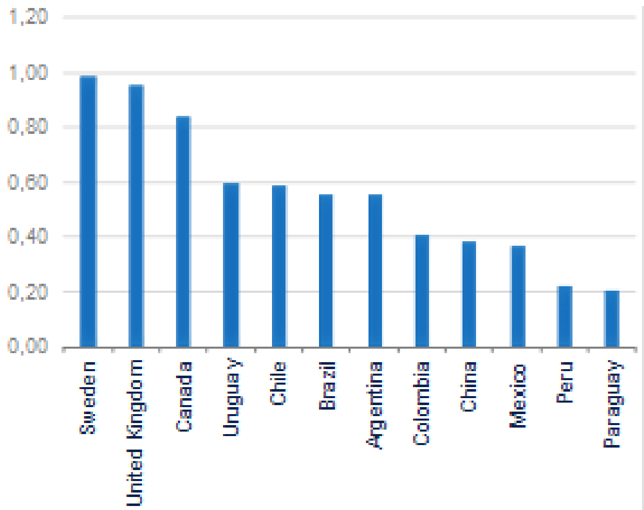
Financial inclusion, informality and users digitalization

Back

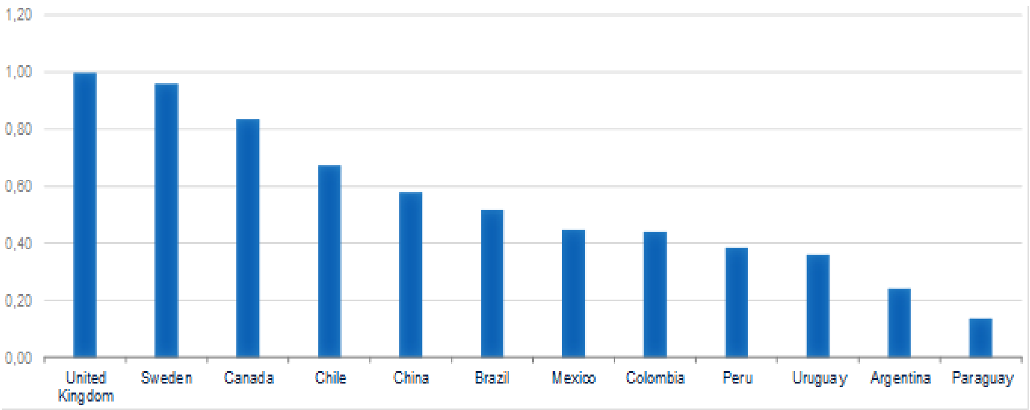
Infraestructura digital



Adopción de consumidores

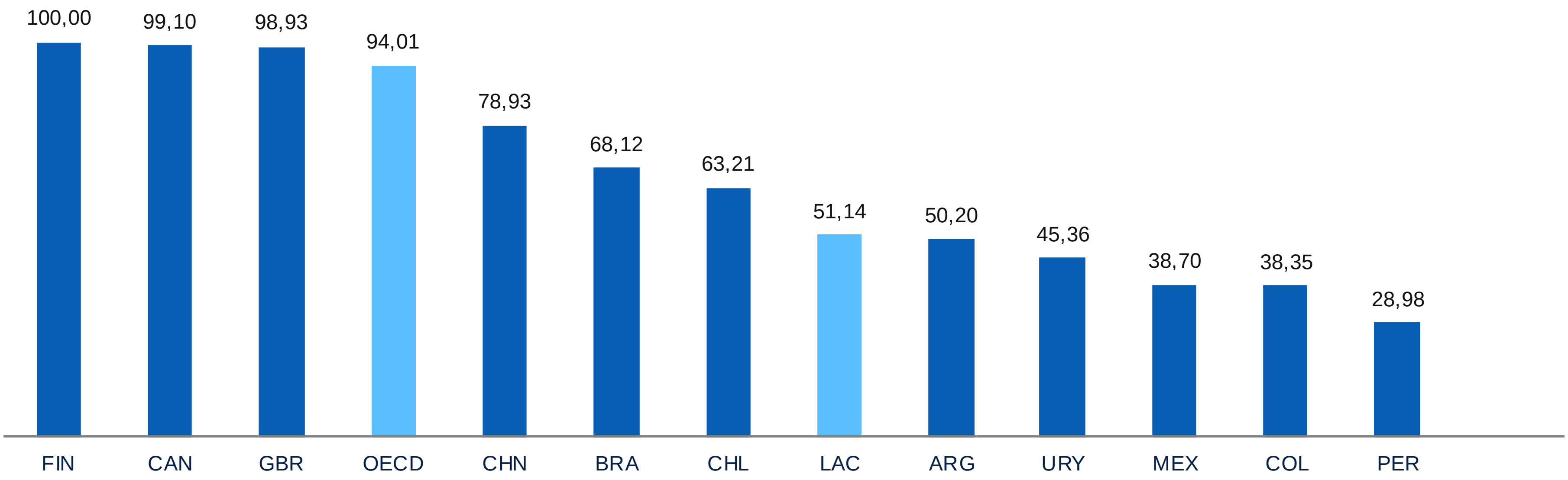


Adopción de empresas



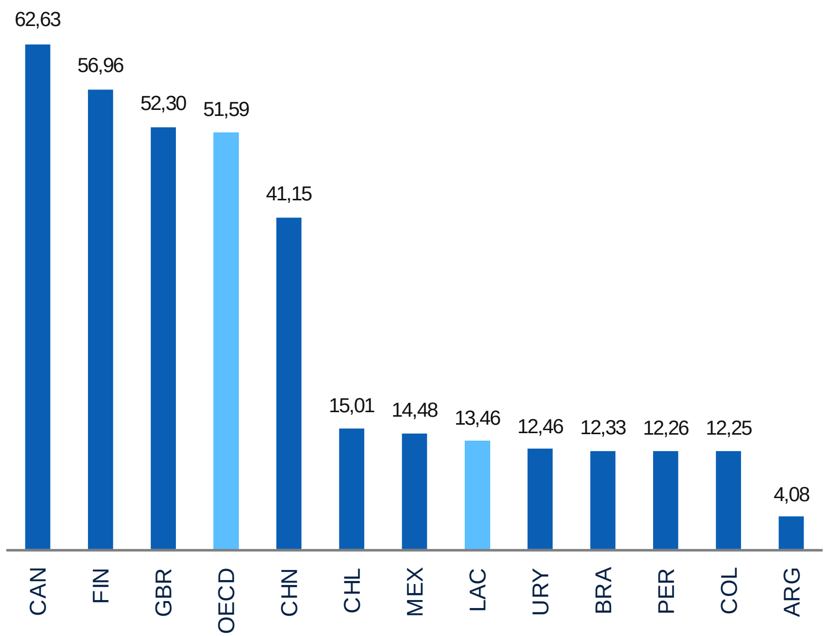
Account at a Financial Institution

% of adult population (+15)



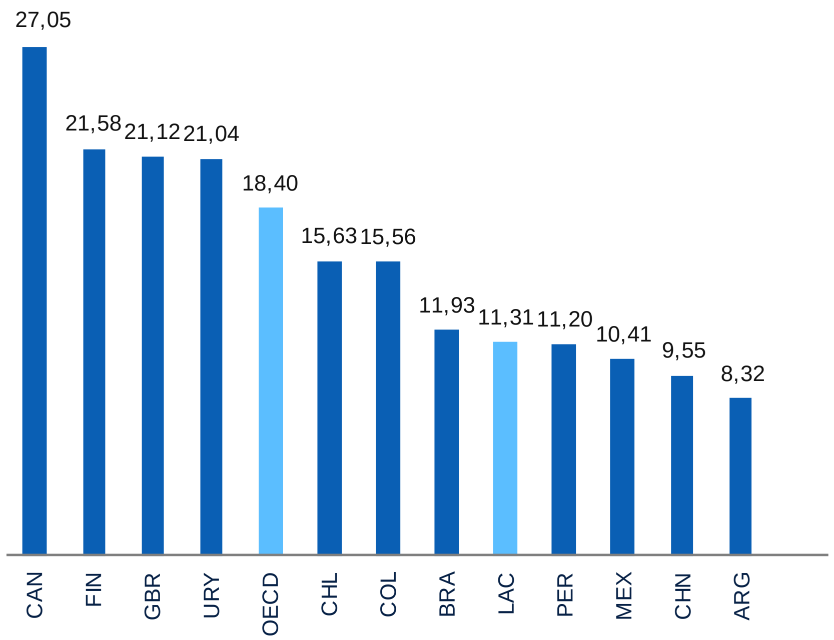
Formal savings

% of adult population (+15)



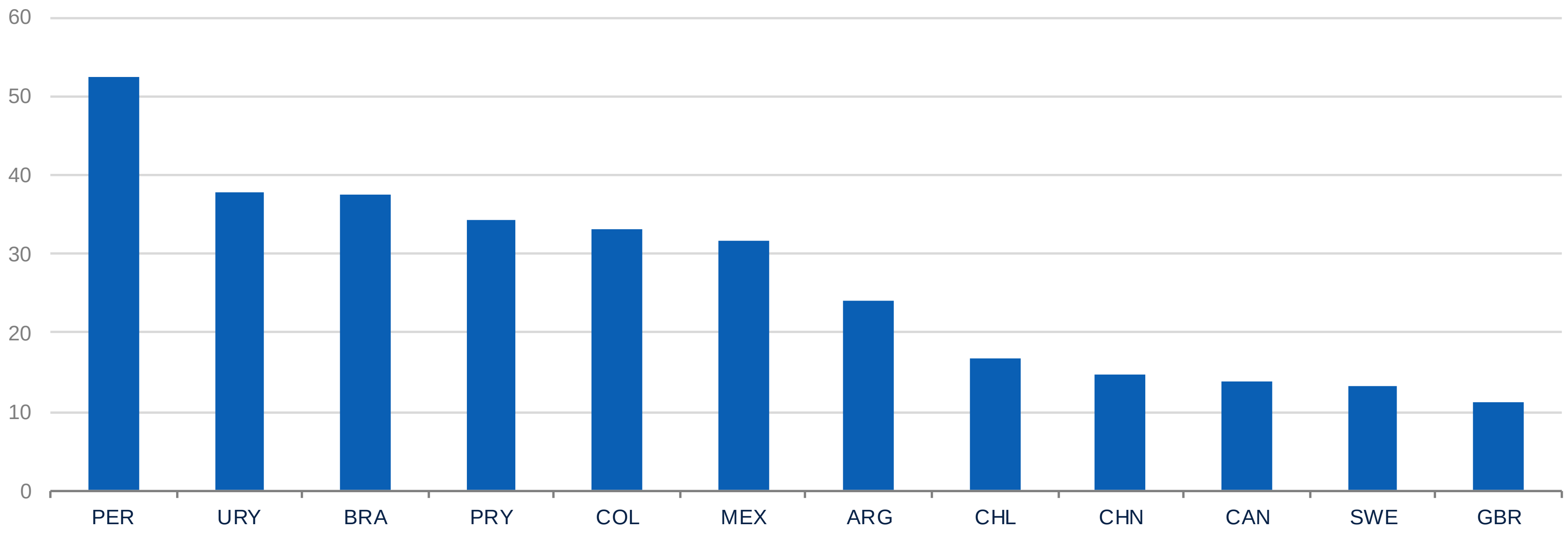
Formal borrowing

% of adult population (+15)



Back

Informal Economy



Digital banking in latam

País	Uso de internet (2014)	Uso de teléfono móvil (2014)	Uso de Smartphone (2014)	Uso de banca electrónica (2014)*	Uso de comercio electrónico (2014)*
Argentina	59.71	82.21	41.95	23.02	26.86
Brazil	49.15	86.74	27.28	26.83	32.11
Chile	74.29	93.12	63	42.2	35.69
China	58.49	97.07	57.23	47.32	55.93
Colombia	56.29	88.82	30.32	19.22	18.47
India	14.48	81.04	17.85	25.87	25.12
Mexico	47.81	73.92	38.08	17.41	12.11
Peru	45.45	77.39	20.93	15.45	12.73

* De los adultos que usan internet o tienen Smartphone, quienes hacen e-banking o e-commerce

B

Private digital currency usage

Private virtual currencies usage (*)

Country	Number of nodes	Population	Nodes/100,000p	VC investment	Bitcoin Potential Index
Brazil	53	208.133.000	0,0255	--	17
Mexico	10	123.364.426	0,0081	3.89 $m	66
Colombia	3	49.434.200	0,0061	--	84
Argentina	21	44.044.811	0,0477	11.5 $m	1
Peru	1	31.826.018	0,0031	--	50
Venezuela	6	31.431.164	0,0191	--	2
Chile	5	17.373.831	0,0288	0.4 $m	154
Uruguay	2	3.493.205	0,0572	--	16

(*) Focused on Bitcoin usage because of its leadership in the virtual currencies market
Sources: Bitnodes, National Official Population Data, Coindesk

Regulation

Virtual currencies regulation

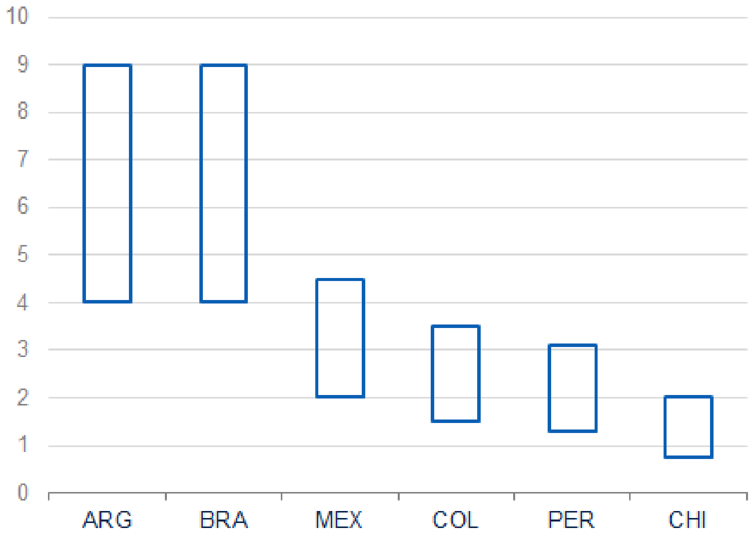
- Virtual currencies are legal (are not regulated) in the selected countries. The only countries in LatAm banning bitcoins are Bolivia and Ecuador.
- The (still in draft stage) FinTech Law in Mexico allows for the use of certain "virtual assets" by financial institutions. Those allowed "virtual assets" will be decided by Banxico.

C

Equilibrium real interest rates

Monetary policy: Natural or Neutral interest rate

Natural real interest rate (NRII): Selected countries

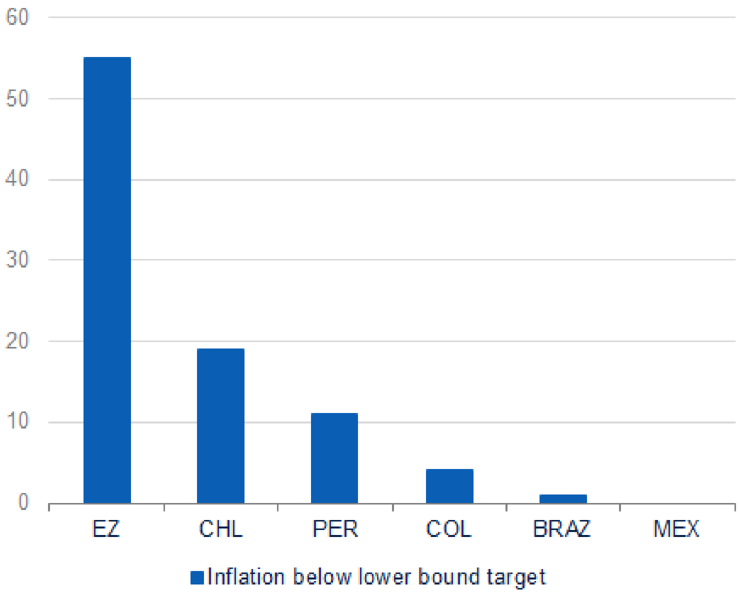


Upper side of the bar=Maximum NRIRrate . Lower side of the bar: Minimum NRIR

Source: IMF, BCRA and BBVA Research

Times that CPI below lower bound inflation target

(% of times)



Source: National statistics, CB and BBVA Research

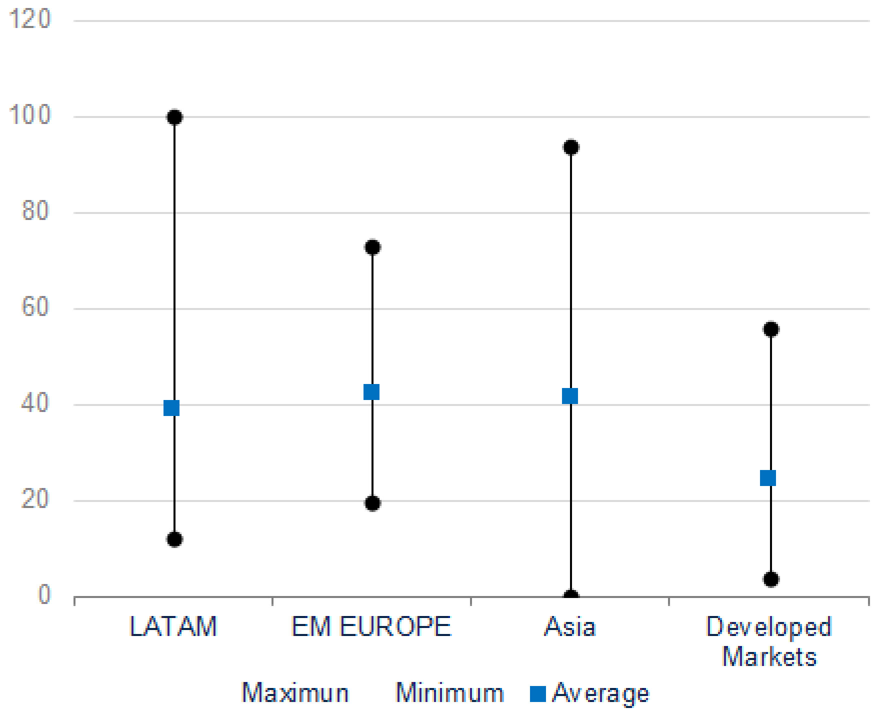
Natural real interest rate has decreased in Latin American countries, underpinned by inflation targeting monetary policy and decreasing risk premium. However, younger population than in developed countries should prevent natural rate to trend to Zero in most Latam. Chile and Peru the ones closer to Zero

D

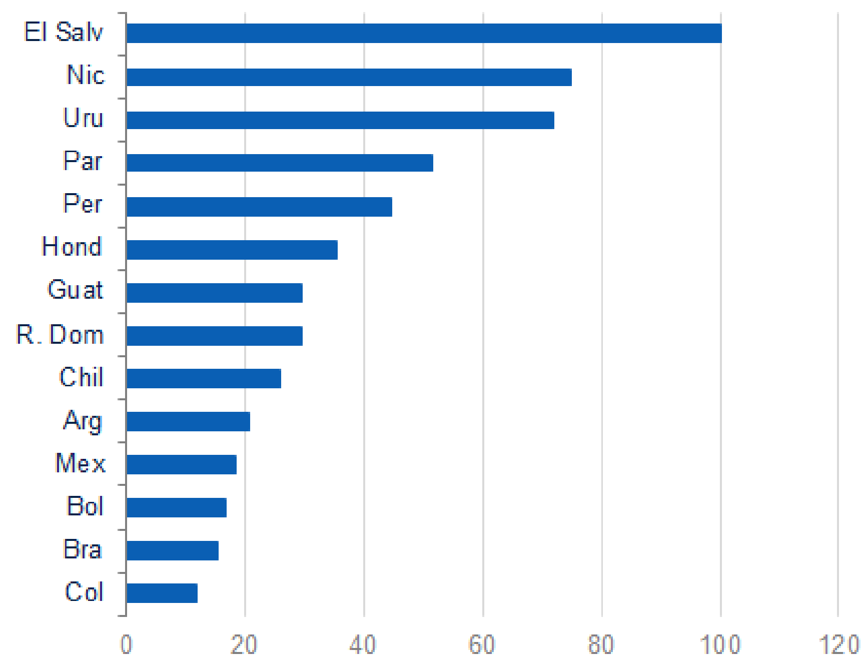
Scope for wholesale markets: deposits and debt

Dollarization

Foreign-Currency-Denominated Liabilities to Total Liabilities



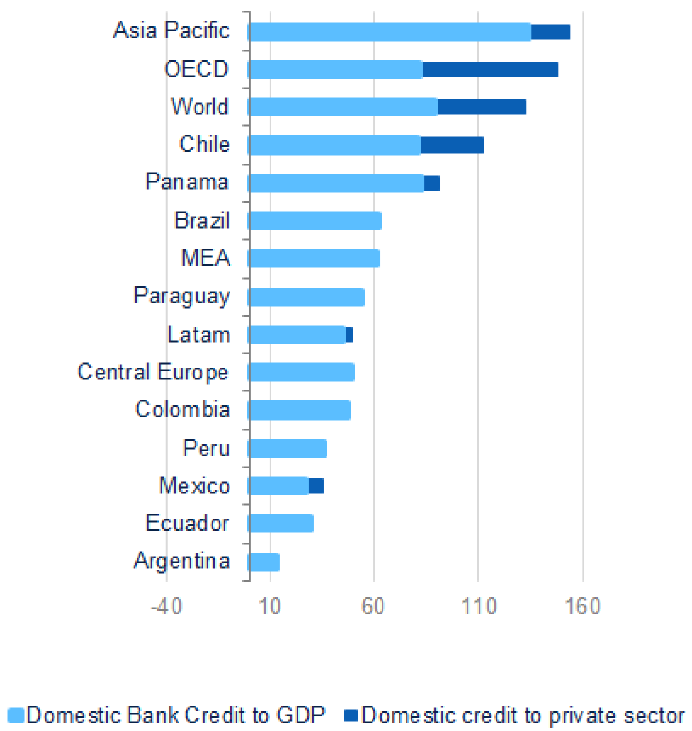
Foreign-Currency-Denominated Liabilities to Total Liabilities



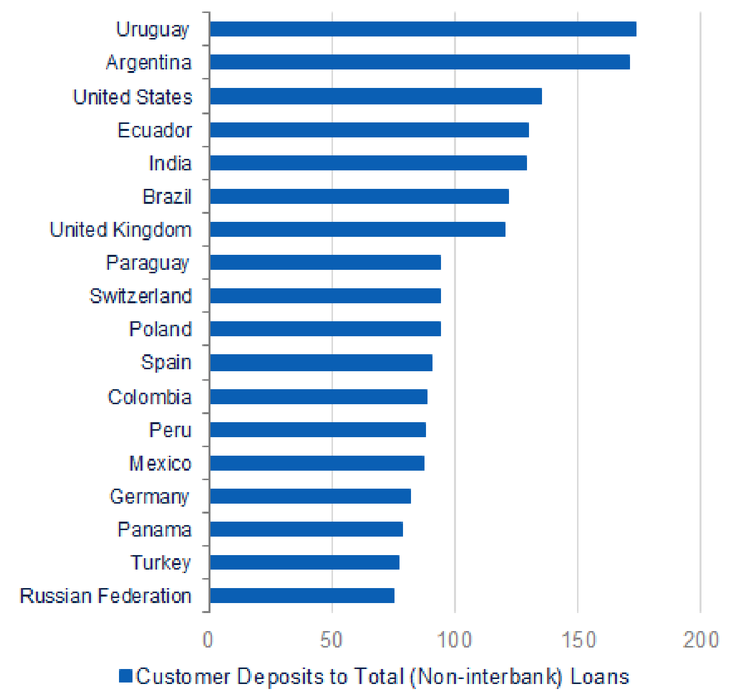
Source: Fuente: IMF, FSIs and BBVA Research

Credit and deposit by Country

Domestic credit
(% GDP)



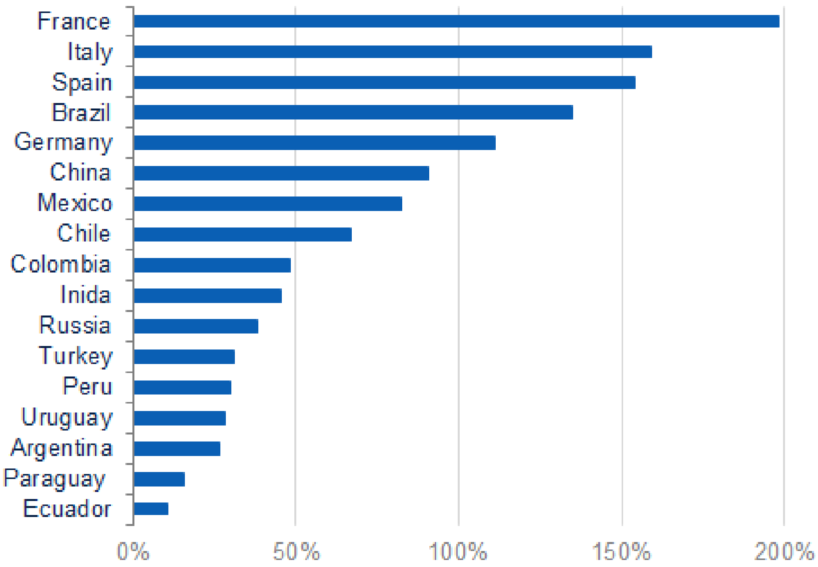
Customer deposits to total non-interbank loans
(%)



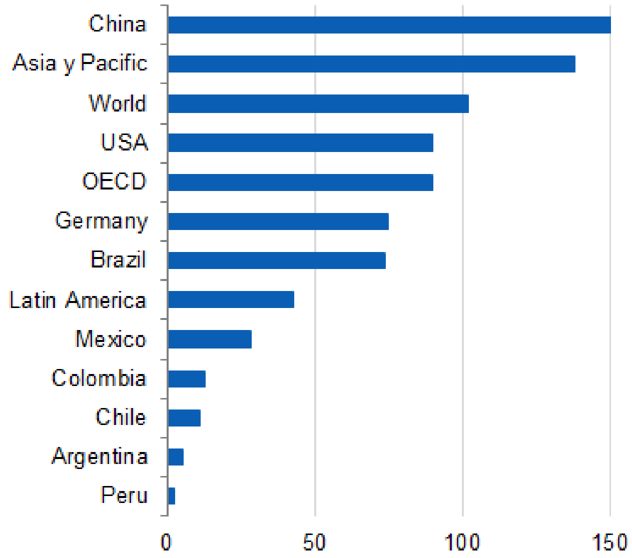
Source: World bank 2016

Wholesale debt market

Debt markets
(% of GDP)



Stocks traded, turnover ratio of domestic shares
(%)



Source: IMF, BIS and Data Market