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Global Crisis

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Central bank digital currencies (CBDCs) - Risks and Opportunities for Developing Countries

by

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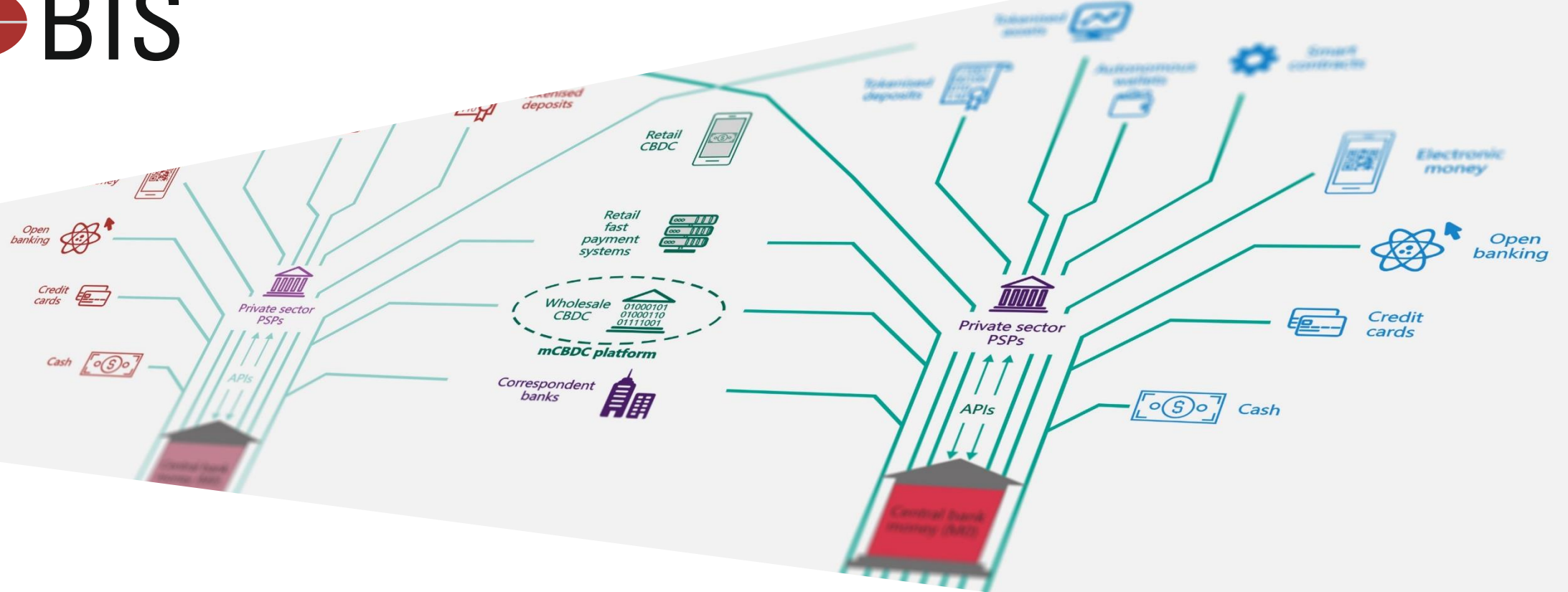


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BIS



CBDCs

Risks and Opportunities for Developing Countries

Priscilla Koo Wilkens

6th December 2022

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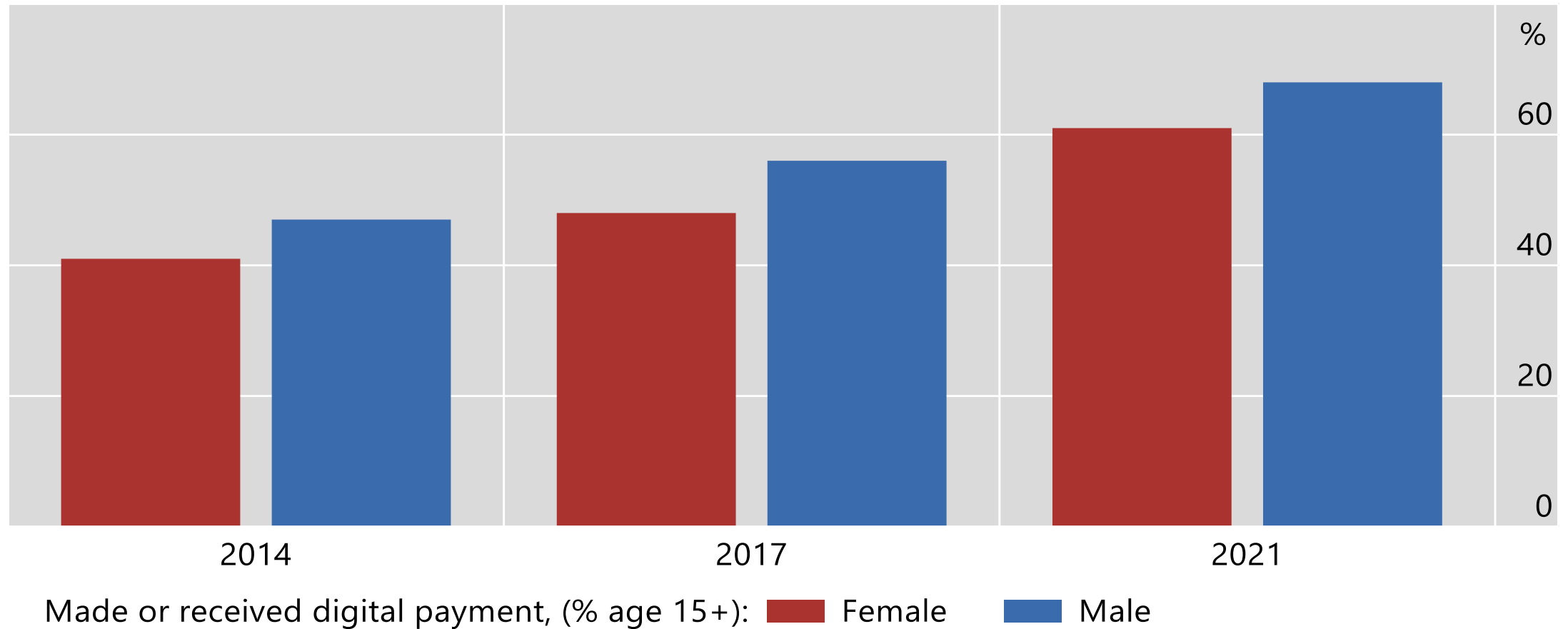
2020

2022




growth in digital payments

The Digital Era for the Monetary System



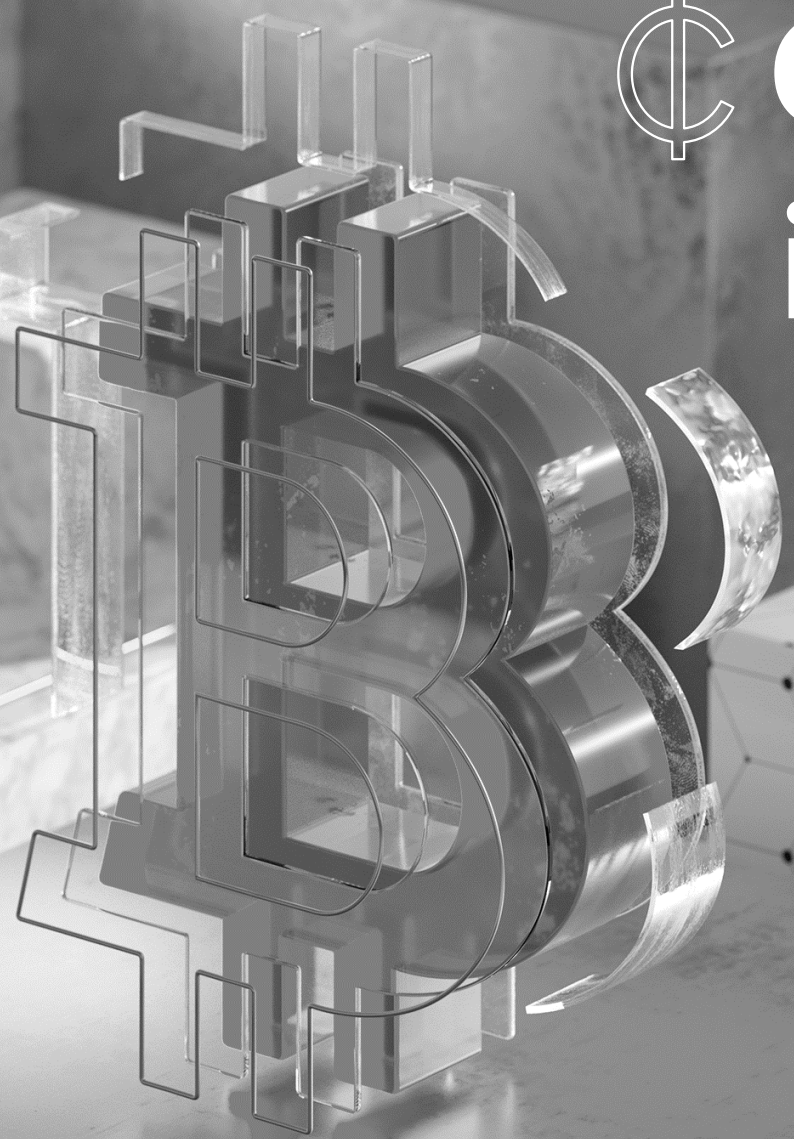
Source: World Bank, *Financial Inclusion Dataset*.



And then, **crypto**
came...



Crypto was introduced



31 Oct
2008



Crypto and Traditional Finance



stablecoins

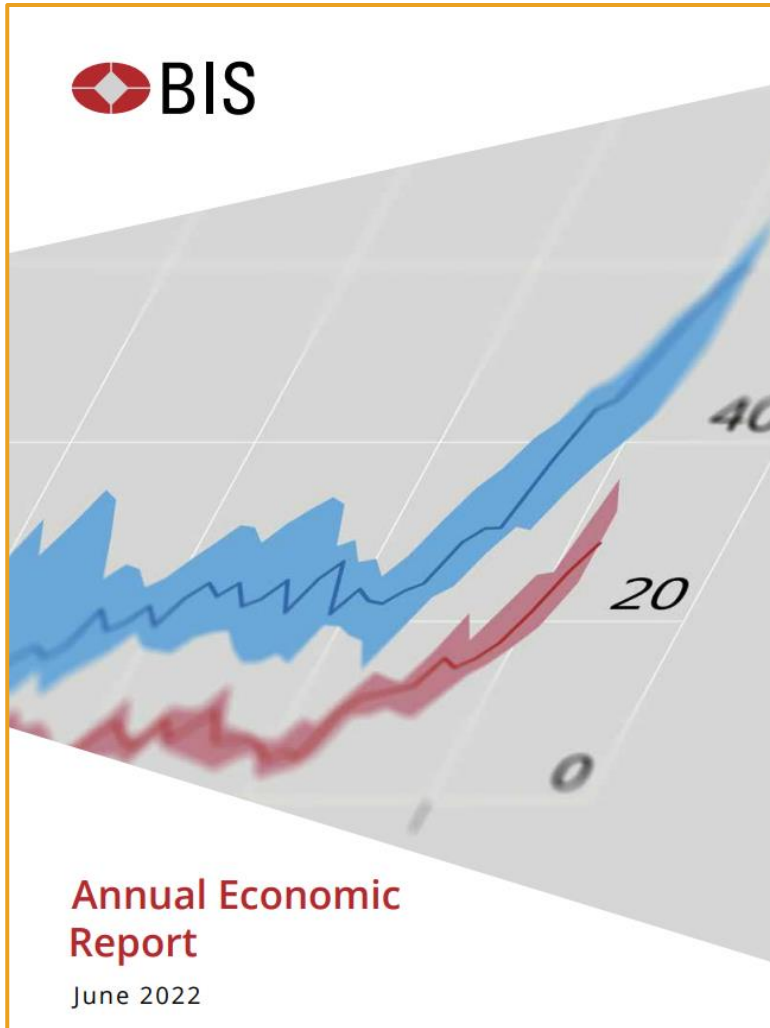


What are the **risks**?
What are the **opportunities**?



What do we want
from a **monetary**
system?

High Level Goals of the Monetary System



High-level goals of the monetary system Table 1

High-level goals	Today's monetary system	Crypto universe (to date)	Future monetary system (vision)
1. Safety and stability – money needs to perform fundamental functions: as a store of value, unit of account and medium of exchange	Sc of pu ac pe		
2. Accountability – public mandates and regulation should ensure that key nodes in the system are accountable and transparent to users and society	Su ov pr pu to		
3. Efficiency – the system should provide low-cost, fast payments and throughput	Do of fir re		New payment systems can significantly reduce payment costs and rents, supporting economic activity
4. Inclusion – the system should ensure universal access to basic services at affordable prices	M tra di		New service providers and interfaces can address barriers to inclusion and
5. User control over data – data governance arrangements should ensure users' privacy and control over data	Us ke nc ov		
6. Integrity – the system should avoid illicit activity such as money laundering, financing of terrorism and fraud	Pa su re pe fra		New technologies can help to better prevent illicit activity and improve on today's systems
7. Adaptability – the system should anticipate future developments and users' needs and foster competition and innovation	Pa ac ar te		ty, and in be offered through posits
8. Openness – the system should allow for seamless cross-border use	Dr bc sl		Multi-CBDC arrangements and other reforms mean cheaper, faster and safer cross-border transactions

Green denotes that a policy goal is broadly fulfilled, yellow that there is room for improvement and red that it is not generally fulfilled.

Source: BIS.

Safety and stability

Accountability

Efficiency

Inclusion

User control over data

Integrity

Adaptability

Openness

High Level Goals of the Monetary System

Safety and stability

Accountability

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Openness

High-level goals of the monetary system	today system	crypto (to date)	future system (vision)
1. Safety and stability – money needs to perform fundamental functions: as a store of value, unit of account and medium of exchange	Sovereign currencies can offer price stability, and public oversight has helped achieve safe and robust payment systems	Cryptocurrencies do not perform money's fundamental functions, and stablecoins need to import their credibility	Innovations grounded in trust in the central bank feature stable sovereign currencies and safe payment systems
2. Accountability – public mandates and regulation should ensure that key nodes in the system are accountable and transparent to users and society	Supervision, regulation and oversight tackle risks, promote competition and protect consumers, but public mandates may need to adapt to change	Crypto and DeFi create a parallel financial system to circumvent regulation, with no accountability to the general public	Clear mandates and regulation balance risks and benefits so as to harness innovation and stimulate efficiency
3. Efficiency – the system should provide low-cost, fast payments and throughput	Domestic payments are often expensive and financial institutions collect rents	High congestion and rents lead to costly transactions and new speculative incentives	New payment systems can significantly reduce payment costs and rents, supporting economic activity
4. Inclusion – the system should ensure universal access to basic services at affordable prices	Many people lack access to transaction accounts and digital payment instruments	Crypto and DeFi have not yet served to enhance financial inclusion	New service providers and interfaces can address barriers to inclusion and better serve the unbanked
5. User control over data – data governance arrangements should ensure users' privacy and control over data	Users trust intermediaries to keep data safe, but they do not have sufficient control over their data	Transactions are public on the blockchain – which will not work with "real names"	New data architectures can give users privacy and control over their data
6. Integrity – the system should avoid illicit activity such as money laundering, financing of terrorism and fraud	Payment systems are subject to extensive regulation, but illicit activity persists in cash and account fraud	Pseudo-anonymity is prone to abuse by illicit actors, and the DeFi sector is rife with fraud and theft; identification is needed	New technologies can help to better prevent illicit activity and improve on today's systems
7. Adaptability – the system should anticipate future developments and users' needs and foster competition and innovation	Payment systems are adapting to demands, but are not yet at the technological frontier	Programmability, composability and tokenisation give scope for new functions	Programmability, composability and tokenisation can be offered in a CBDC or through tokenised deposits
8. Openness – the system should allow for seamless cross-border use	Despite progress, cross-border payments are still slow, opaque and expensive	DeFi is by nature borderless and allows global transactions, but without adequate oversight	Multi-CBDC arrangements and other reforms mean cheaper, faster and safer cross-border transactions

Green denotes that a policy goal is broadly fulfilled, yellow that there is room for improvement and red that it is not generally fulfilled.

Source: BIS.

Achieving the Goals

High-level goals of the monetary system Table 1

High-level goals	Today's monetary system	Crypto universe (to date)	Future monetary system (vision)
1. Safety and stability money fundamentals should be sound and medium of exchange	Foreign currencies can be used as a store of value and medium of exchange through payment systems.	Cryptocurrencies do not have the same bank-like fundamentals as fiat currencies. Their credibility is based on their payment systems.	Clear mandates and regulation balance risks and benefits so as to harness innovation and stimulate efficiency.
2. Accountability mandates in the system are accountable and transparent to users and society	Supervisory regulations and public mandates may need to adapt to change.	DeFi creates a general public.	Clear mandates and regulation balance risks and benefits so as to harness innovation and stimulate efficiency.
3. Efficiency payments and throughput	Financial institutions collect rents.	High congestion and rents lead to costly transactions and new speculative incentives.	New payment systems can significantly reduce payment costs and rents, supporting economic activity.
4. Inclusion to basic payments	Users need to access to basic payments.	Crypto and DeFi have not yet served to enhance financial inclusion.	New service providers and interfaces can address barriers to inclusion and better serve the unbanked.
5. User control over data data go to users and control over data	Users trust intermediaries to hold their data.	Transactions are public on blockchains.	New data and user control over data.
6. Integrity the system should be secure and free from fraud and illicit activity such as money laundering and terrorism financing	Payment systems are subject to illicit activity such as money laundering and terrorism financing.	Pseudo-anonymity is prone to abuse by illicit actors, and the DeFi sector is rife with fraud and theft; identification is needed.	New technologies can help to better prevent illicit activity and improve on today's systems.
7. Adaptability the system should be able to evolve and foster innovation	Payment systems are subject to change.	Programmability and tokenisation can be offered in a CBDC or through tokenised deposits.	Programmability, composability and tokenisation can be offered in a CBDC or through tokenised deposits.
8. Openness the system should be open to cross-border transactions	Despite progress, cross-border transactions are costly and slow.	DeFi is by nature borderless and allows global transactions, but without adequate oversight.	Multi-CBDC arrangements and other reforms mean cheaper, faster and safer cross-border transactions.

Green denotes that a policy goal is broadly fulfilled, yellow that there is room for improvement and red that it is not generally fulfilled.

Source: BIS.

Safety and stability

Accountability

Efficiency

Inclusion

User control over data

Integrity

Adaptability

Openness

Regulation

Intermediation

Technology

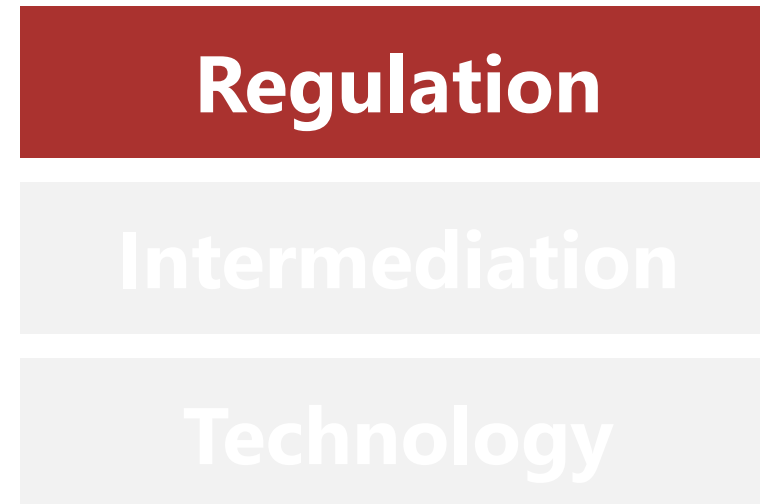
Regulation is Imperative!

High-level goals of the monetary system Table 1

High-level goals	Today's monetary system	Crypto universe (to date)	Future monetary system (vision)
1. Safety and stability – money markets and payment systems are fundamental to the store of value, unit of account and medium of exchange	Sovereign currencies can be used in bank payment systems	Cryptocurrencies do not have a central bank or issuer, which may affect their credibility	Payments grounded in digital currencies may be used in bank payment systems
2. Accountability – public mandates in the system are accountable and transparent to users and society	Supervision, regulation and public mandates may need to adapt to change	DeFi create a system with no accountability to the general public	Clear mandates and regulation balance risks and benefits so as to harness innovation and stimulate efficiency
3. Efficiency – payments and throughput should be high	Financial institutions collect rents	High congestion and rents lead to costly transactions and new speculative incentives	New payment systems can significantly reduce payment costs and rents, supporting economic activity
4. Inclusion – the system should be accessible to basic services at affordable prices	Monetary institutions and digital payment instruments	Crypto and DeFi have not yet served to enhance financial inclusion	New service providers and interfaces can address barriers to inclusion and better serve the unbanked
5. User control over data – data governance should be clear and control over data	Users trust intermediaries to protect their data	Transactions are public on blockchains	New data architectures can help to better control data
6. Integrity – the system should be free of illicit activity such as money laundering and fraud	Payment systems are subject to extensive monitoring and account fraud	Pseudo-anonymity is prone to abuse by illicit actors, and the DeFi sector is rife with fraud and theft; identification is needed	New technologies can help to better prevent illicit activity and improve on today's systems
7. Adaptability – the system should adapt to new developments and foster competition and innovation	Payment systems are not designed for innovation	Programmability, interoperability and tokenisation give scope for new applications	Programmability, composability and tokenisation can be offered in a CBDC or through tokenised deposits
8. Openness – the system should allow cross-border transactions	Despite progress, cross-border transactions are not fully integrated	DeFi is by nature borderless and allows global transactions, but without adequate oversight	Multi-CBDC arrangements and other reforms mean cheaper, faster and safer cross-border transactions

Green denotes that a policy goal is broadly fulfilled, yellow that there is room for improvement and red that it is not generally fulfilled.

Source: BIS.



Risks in changing the 2-tier system are large

High-level goals of the monetary system Table 1

High-level goals	Today's monetary system	Crypto universe (to date)	Future monetary system (vision)
1. Safety and stability – money markets and payment systems are fundamentally sound, and there is a store of value, unit of account and medium of exchange	Sovereign currencies can be used in a wide range of payment systems	Cryptocurrencies do not have a central bank or issuer, and their value is based on their own network of users. Their stability is based on their credibility	Payments grounded in digital currencies can be used in a wide range of payment systems
2. Accountability – public mandates and regulations in the system are accountable and transparent to users and society	Supervision, regulation and public mandates may need to adapt to change	DeFi create a system with no accountability to the general public	Clear mandates and regulation balance risks and benefits so as to harness innovation and stimulate efficiency
3. Efficiency – payments and throughput should be high	Financial institutions collect rents	High congestion and rents lead to costly transactions and new speculative incentives	New payment systems can significantly reduce payment costs and rents, supporting economic activity
4. Inclusion – the system should be accessible to basic financial services at reasonable prices	Monetary institutions provide access to digital payment instruments	Crypto and DeFi have not yet served to enhance financial inclusion	New service providers and interfaces can address barriers to inclusion and better serve the unbanked
5. User control over data – data governance should be clear and control over data should be transparent	Users trust intermediaries to protect their data	Transactions are public on the blockchain	New data architectures can help to better prevent illicit activity and improve on today's systems
6. Integrity – the system should be free from illicit activity such as money laundering and fraud	Payment systems are subject to extensive supervision and account fraud	Pseudo-anonymity is prone to abuse by illicit actors, and the DeFi sector is rife with fraud and theft; identification is needed	New technologies can help to better prevent illicit activity and improve on today's systems
7. Adaptability – the system should adapt to new developments and foster competition and innovation	Payment systems are subject to extensive supervision and account fraud	Programmability, interoperability and tokenisation give scope for new applications	Programmability, composability and tokenisation can be offered in a CBDC or through tokenised deposits
8. Openness – the system should allow cross-border transactions	Despite progress, cross-border transactions are still difficult	DeFi is by nature borderless and allows global transactions, but without adequate oversight	Multi-CBDC arrangements and other reforms mean cheaper, faster and safer cross-border transactions

Green denotes that a policy goal is broadly fulfilled, yellow that there is room for improvement and red that it is not generally fulfilled.

Source: BIS.

Safety and stability
Accountability
Efficiency
Inclusion
User control over data
Integrity
Adaptability
Openness



What do we want from Technology?

High-level goals of the monetary system Table 1

High-level goals	Today's monetary system	Crypto universe (to date)	Future monetary system (vision)
1. Safety and stability – money should be safe and sound, and the system should be resilient to shocks and have a store of value, unit of account and medium of exchange	Sovereign currencies can be used as a store of value, unit of account and medium of exchange. Payment systems are subject to supervision and regulation.	Cryptocurrencies do not have a store of value, unit of account or medium of exchange. Their credibility is based on their underlying technology and the reputation of the issuer.	Payments grounded in digital currencies can be safe and sound. Clear mandates and regulation balance risks and benefits so as to harness innovation and stimulate efficiency.
2. Accountability – public mandates and public mandates should be transparent to users and society	Supervision, regulation and public mandates may need to adapt to change.	DeFi create a system with no accountability to the general public.	Clear mandates and regulation balance risks and benefits so as to harness innovation and stimulate efficiency.
3. Efficiency – payments and throughput should be high and costs low	Financial institutions collect rents.	High congestion and rents lead to costly transactions and new speculative incentives.	New payment systems can significantly reduce payment costs and rents, supporting economic activity.
4. Inclusion – the system should be accessible to basic services at affordable prices	Mobile payments can enhance financial inclusion.	Crypto and DeFi have not yet served to enhance financial inclusion.	New service providers and interfaces can address barriers to inclusion and better serve the unbanked.
5. User control over data – data governance should be clear and control over data should be transparent	Users trust intermediaries to protect their data.	Transactions are public on the blockchain.	New data architectures can help to better prevent illicit activity and improve on today's systems.
6. Integrity – the system should be free from illicit activity such as money laundering and fraud	Payment systems are subject to supervision and regulation.	Pseudo-anonymity is prone to abuse by illicit actors, and the DeFi sector is rife with fraud and theft; identification is needed.	New technologies can help to better prevent illicit activity and improve on today's systems.
7. Adaptability – the system should be able to adapt to new technologies and foster competition and innovation	Payment systems are subject to supervision and regulation.	Programmability and tokenisation give scope for new applications.	Programmability, composability and tokenisation can be offered in a CBDC or through tokenised deposits.
8. Openness – the system should be able to support cross-border transactions	Despite progress, cross-border transactions are still costly and slow.	DeFi is by nature borderless and allows global transactions, but without adequate oversight.	Multi-CBDC arrangements and other reforms mean cheaper, faster and safer cross-border transactions.

Green denotes that a policy goal is broadly fulfilled, yellow that there is room for improvement and red that it is not generally fulfilled.

Source: BIS.



What do we want from Technology?

High-level goals of the monetary system Table 1

High-level goals	Today's monetary system	Crypto universe (to date)	Future monetary system (vision)
1. Safety and stability – money market and payment systems should be safe and sound, and medium of exchange	Sovereign currencies can be used as a store of value, and payment systems	Cryptocurrencies do not have a central bank or issuer, and their stability is based on their credibility	Payment systems grounded in digital currencies
2. Accountability – public mandates in the system are accountable and transparent to users and society	Supervision, regulation and public mandates may need to adapt to change	DeFi create a system with no accountability to the general public	Clear mandates and regulation balance risks and benefits so as to harness innovation and stimulate efficiency
3. Efficiency – payments and throughput	High congestion and rents	High congestion and rents	New payment systems can
4. Inclusion – the system should be accessible to basic financial services at reasonable prices	Financial institutions	Financial institutions	Financial institutions
5. User control over data – data governance should be clear and control over data	Users trust intermediaries with their data	Users trust intermediaries with their data	Users trust intermediaries with their data
6. Integrity – the system should be free from illicit activity such as money laundering and fraud	Payment systems are subject to extensive activity account fraud	Pseudo-anonymity is prone to abuse by illicit actors, and the DeFi sector is rife with fraud and theft; identification is needed	New technologies can help to better prevent illicit activity and improve on today's systems
7. Adaptability – the system should adapt to future developments and foster competition and innovation	Payment systems are not designed for future developments	Programmability and tokenisation give scope for new applications	Programmability and tokenisation can be offered in a CBDC or through tokenised deposits
8. Openness – the system should allow cross-border transactions	Despite progress, cross-border transactions are not fully open	DeFi is by nature borderless and allows global transactions, but without adequate oversight	Multi-CBDC arrangements and other reforms mean cheaper, faster and safer cross-border transactions

Green denotes that a policy goal is broadly fulfilled, yellow that there is room for improvement and red that it is not generally fulfilled.

Source: BIS.

Technology

Efficiency

Flexibility

Privacy *with integrity*

Technological Options

Technology

Efficiency

Flexibility

Privacy with integrity



Distributed
Ledger
Technologies



11 projects on CBDC

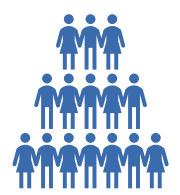


Technology

needs governance

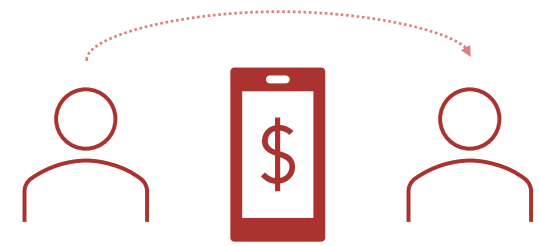
The Impacts of Pix

16th Nov
2020



80% of the adult population
initiated or received

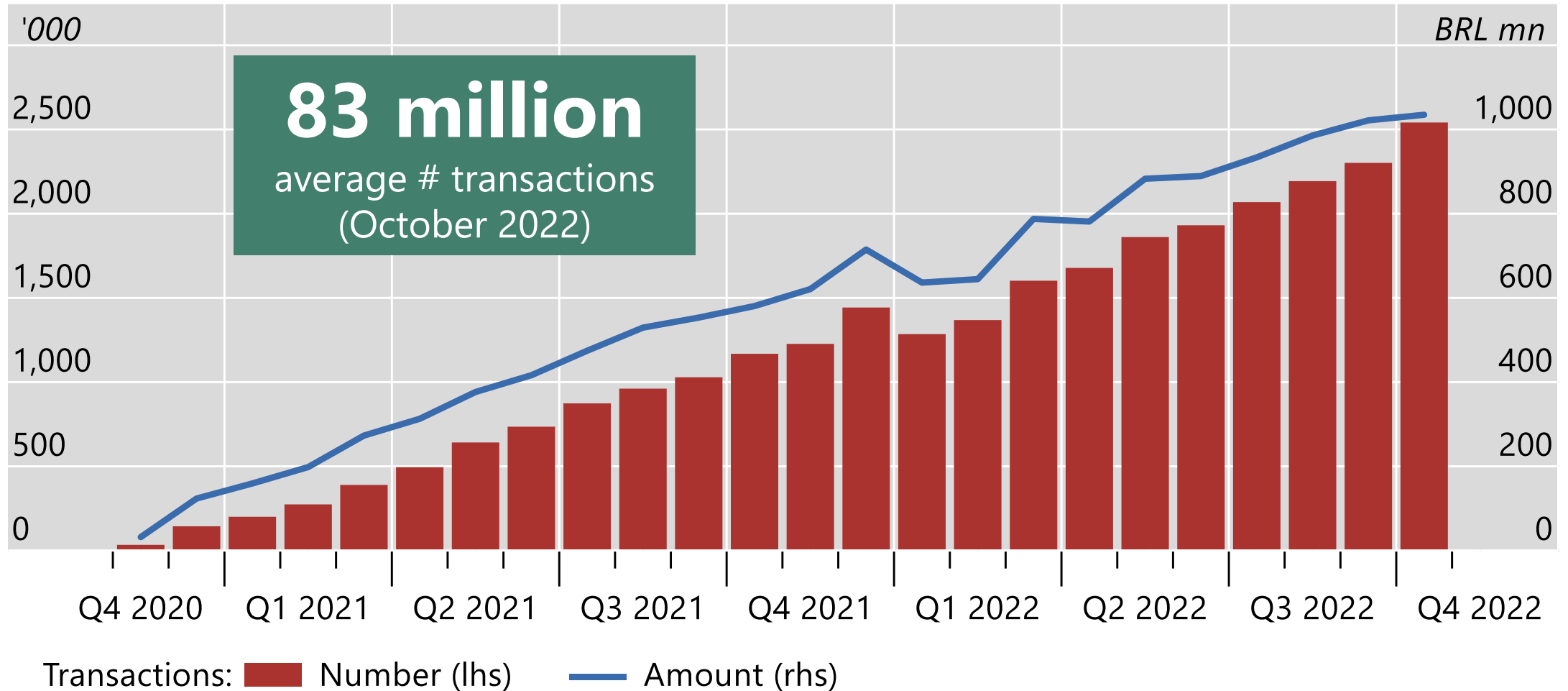
> **64 million**



1st transfer

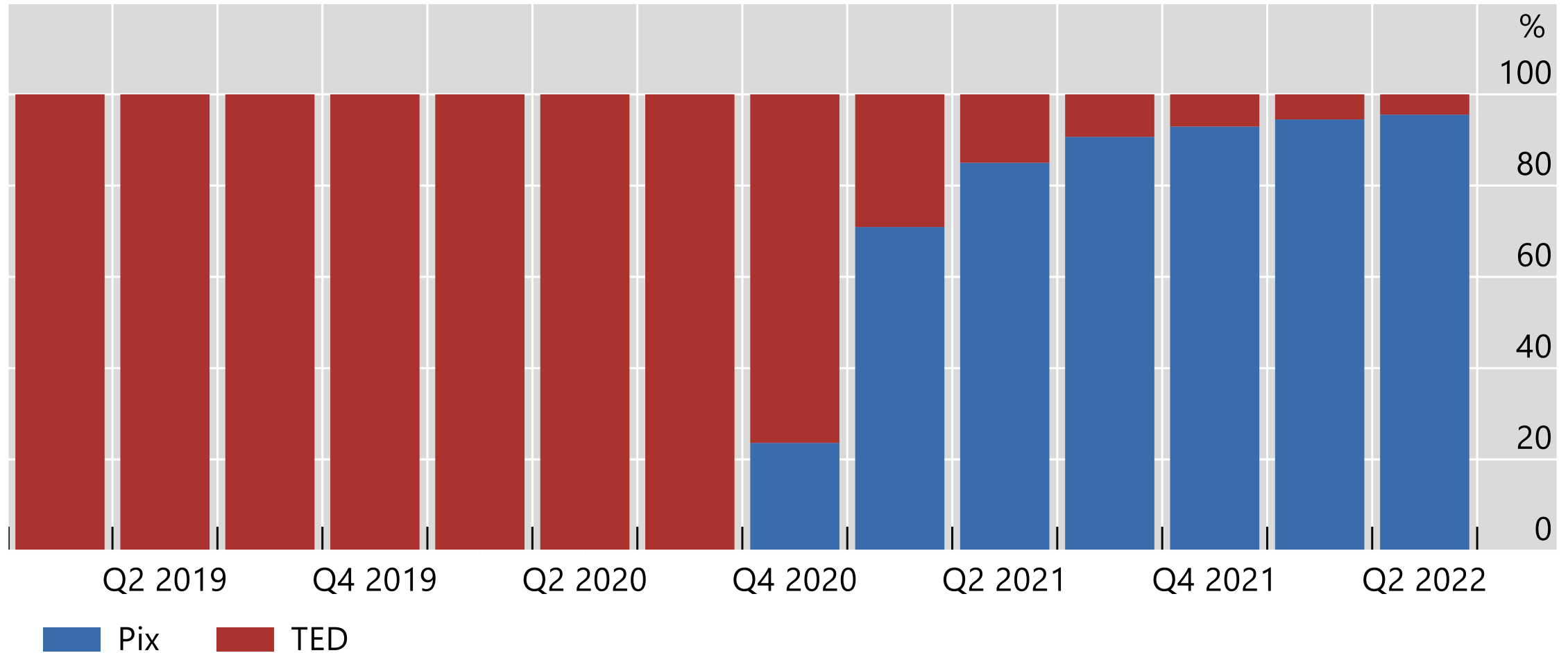
Source: Central Bank of Brazil

Pix Growth



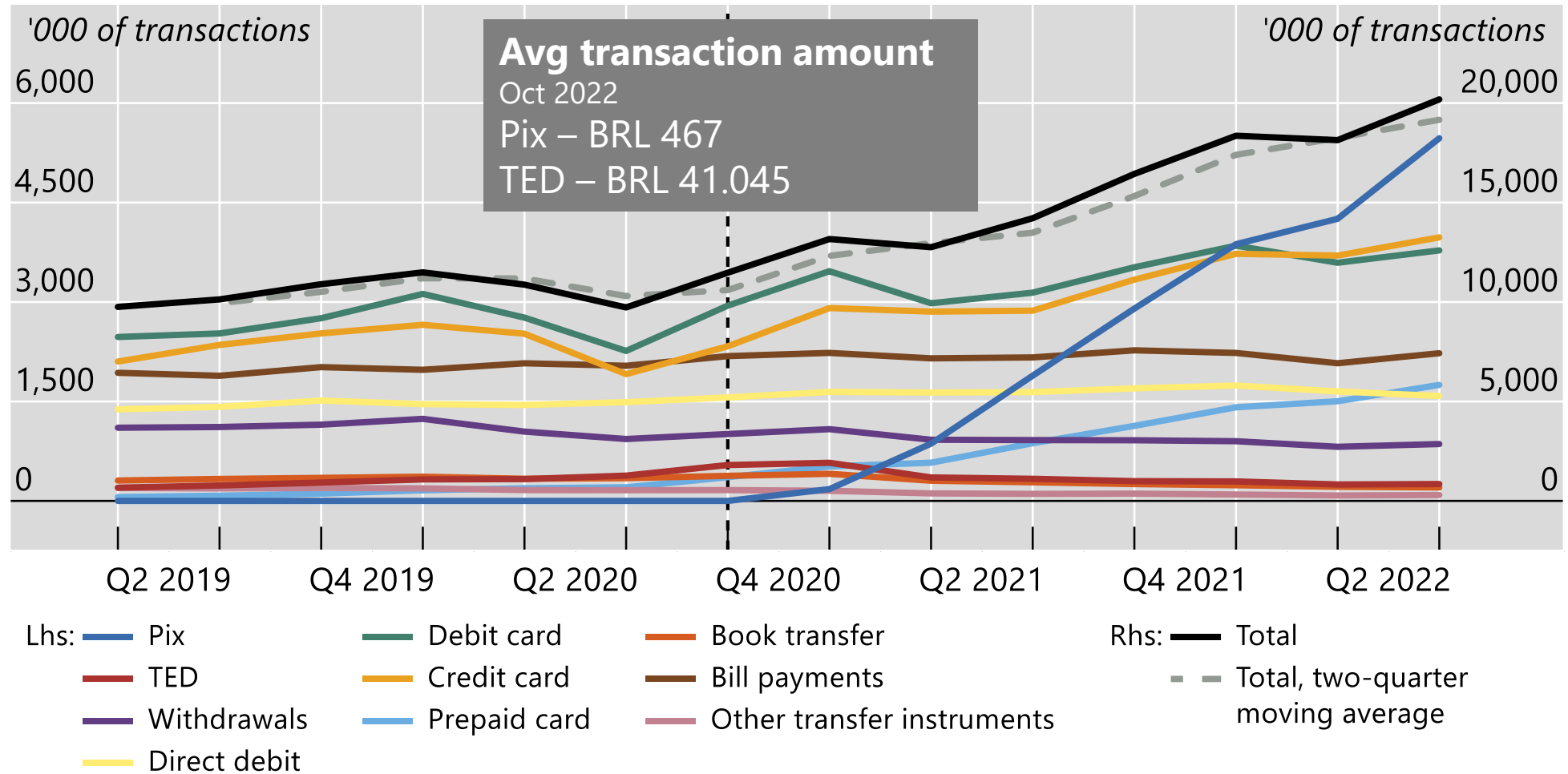
Source: Central Bank of Brazil

Pix and TED (Previous credit transfer instrument)



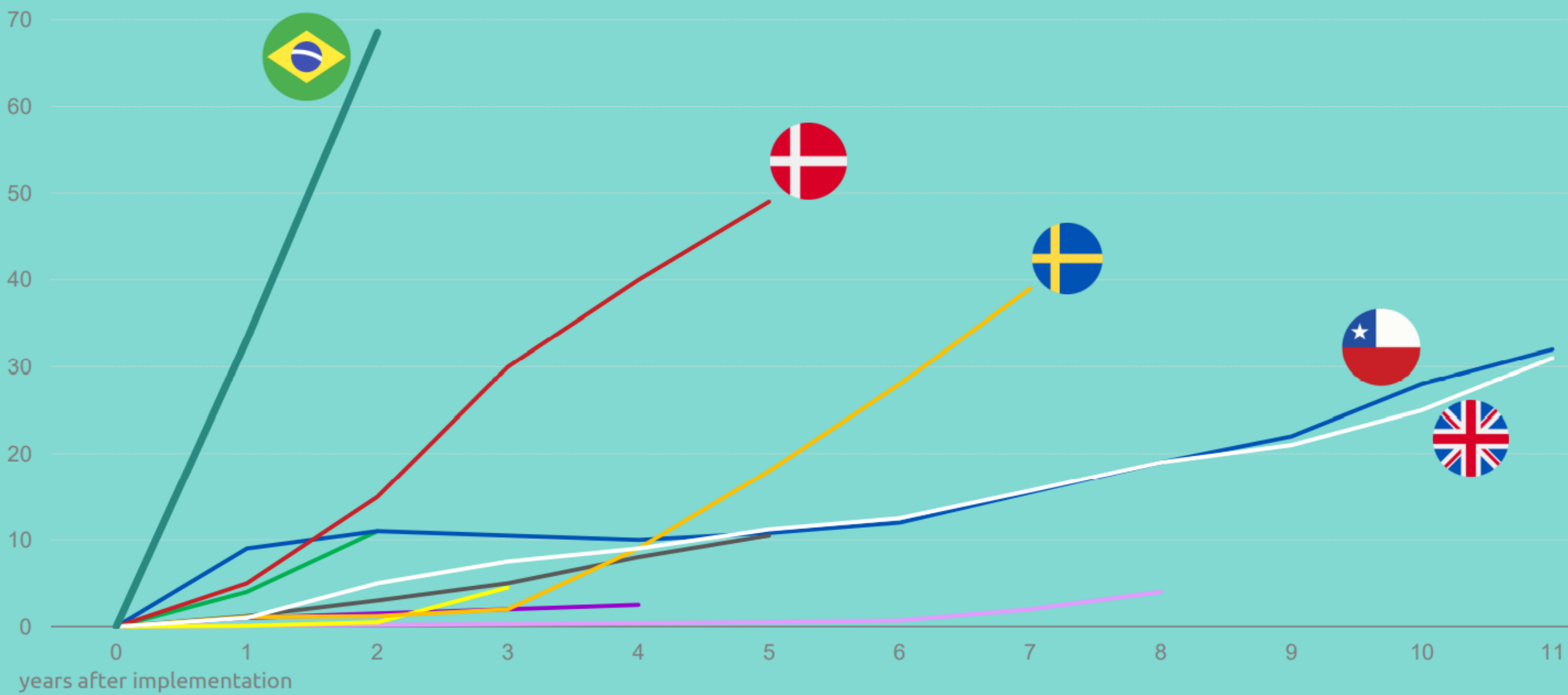
Source: Central Bank of Brazil

Pix and Other Instruments



Source: Central Bank of Brazil

Number of transactions per capita



Source: Bech, Hancock e Zhang (2020) and Central Bank of Brazil for Pix

- Nigeria
- India
- Australia
- Singapore
- Chile
- Sweden
- Denmark
- UK
- Mexico
- Brazil

The Role of the Regulator



The Role of the Regulator



Competition

Participation of large payment service providers

Financial Inclusion

Low cost policy

Standardised **user experience**

Efficiency and Interoperability

Co-creation approach to address market failures

... among others

Sources: Duarte, Angelo, et al. Central Banks, the Monetary System and Public Payment Infrastructures: Lessons from Brazil's Pix. BIS Bulletin, no 52; Brandt, C and B Lobo (2021): "Pix: the Brazilian fast payments scheme", *Journal of Payments Strategy and Systems*, vol 15, no 4, December.

CBDCs – Technology, Governance, and Regulation





Thank you