



Innovations in retail payments: past, present and future...

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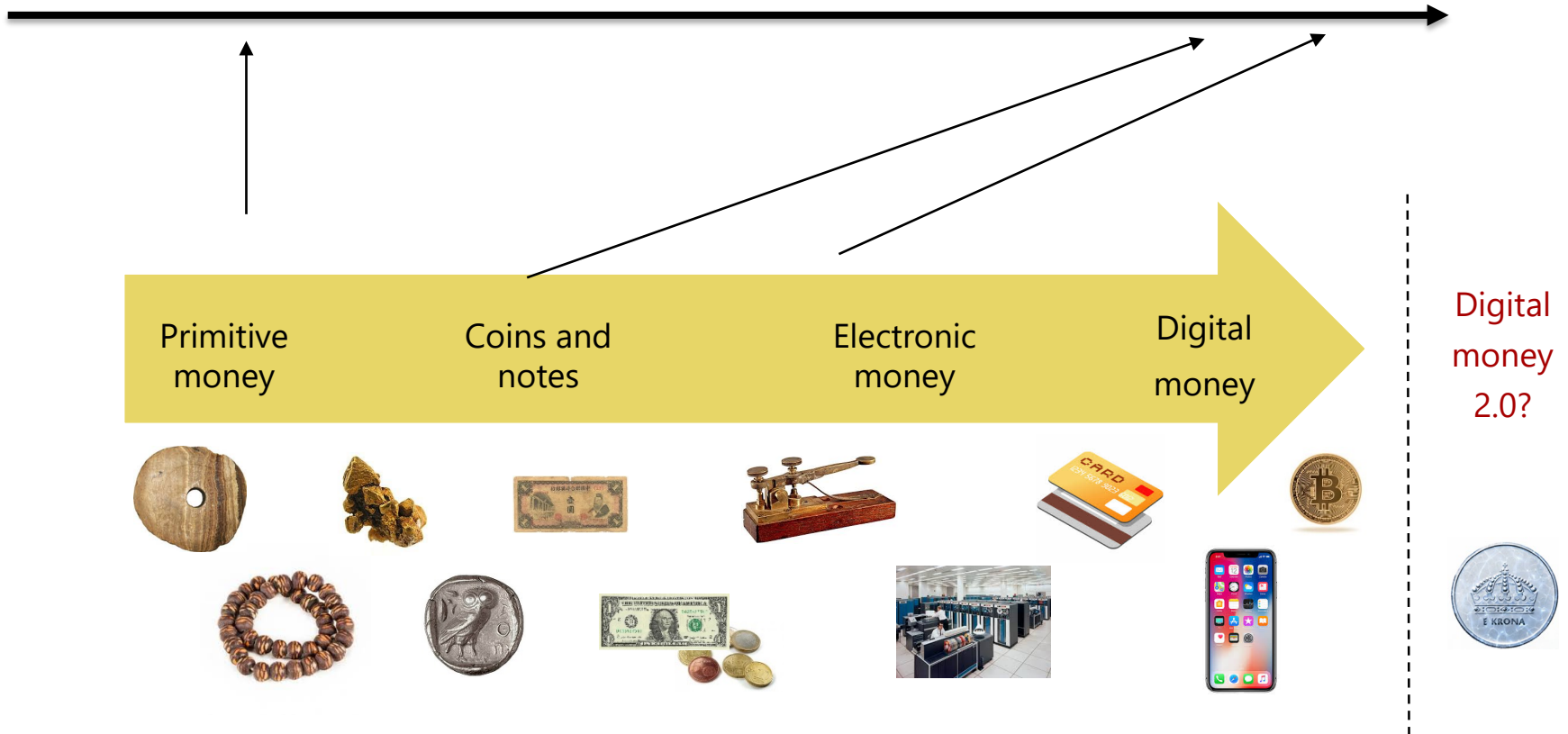
Outline and main messages...

- Retail payment systems are subject to constant technological evolution at the levels of instruments and infrastructure.
- Stablecoins (eg Libra) are a wake-up call about two well-known shortcomings of the current payment system: access and financial inclusion and cross-border payments.
- Payment systems are networks with externalities and increasing returns to scale, whose benefits are to be shared among a widest possible range of stakeholders; payment ecosystem should remain contestable and open, encourage new entrants and innovations, preventing monopoly rents.
- Competition between forms of global stablecoins reveals different ambitions / strategies to resolve these challenges; can cooperation between the private and public sectors find solutions?
- The BIS will be an active participant in these efforts via our research, the new Innovation Hub and BIS committees such as the CPMI.

Retail payments: history of technological innovation of instruments transacted

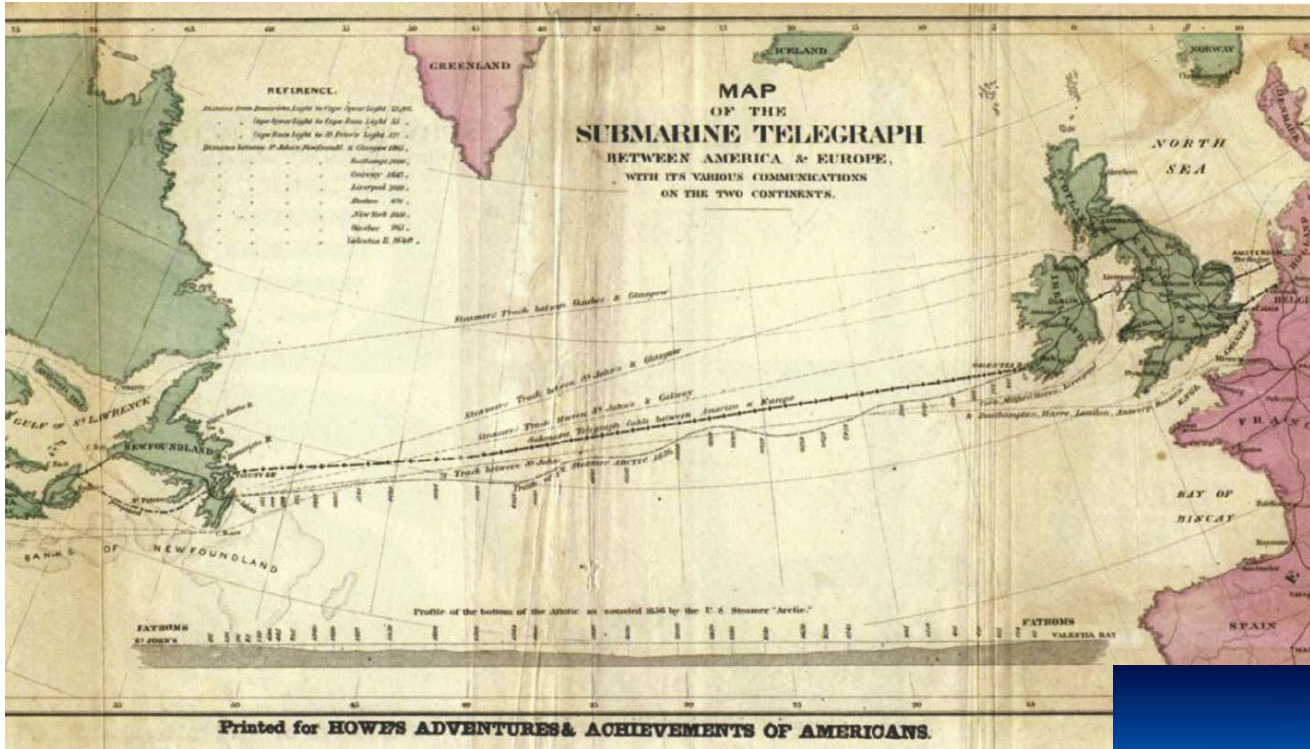
10,000 BC Time Line..... →

2,000



Digital money 2.0?

Retail payments: also a history of constant technological innovation of infrastructure



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Innovations in retail payments: past

Travelling back to medieval Antwerp

- Antwerp in 16th century – “the centre of the entire international economy”, Fernand Braudel
- Its success was supported by finance:
 - a highly efficient system for exchanging and clearing promissory notes
 - a legal technique of transferring debt obligations efficiently and safely
 - a dense network of merchants, making cross-border payments quite regularly

Benefiting from information technology

- New financial techniques and payment methods in medieval Europe benefited from an information technology innovation



- It helped to diffuse:
 - Mathematics for calculating interest rates and exchange rates
 - Double-entry bookkeeping

A few observations from the history

- Innovations have surged constantly to facilitate payments for both instruments and infrastructure
- Innovation often takes time to flourish
- Institutional arrangements ensure trust and social acceptance
- Pre-modern systems settled payments in commercial bank money, not central bank money; and were subject to instability

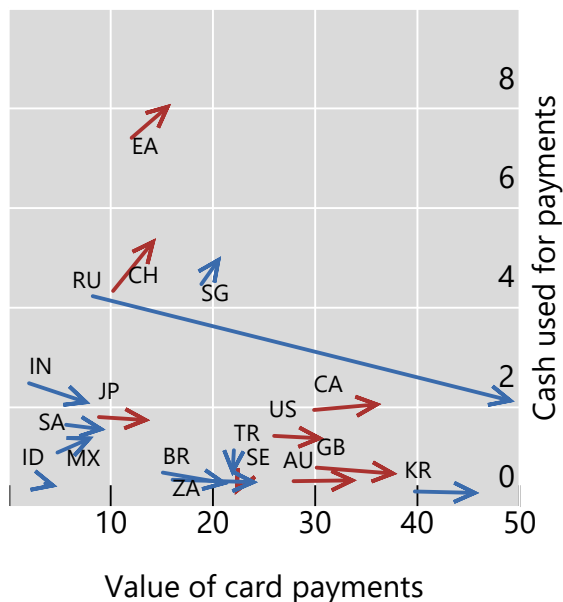


Innovations in retail payments: present "3Ps"

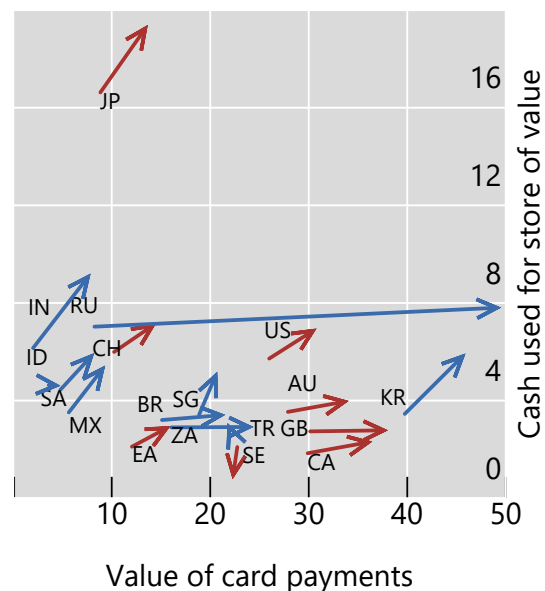
New payment behaviours or preference of consumers¹

As a percentage of GDP

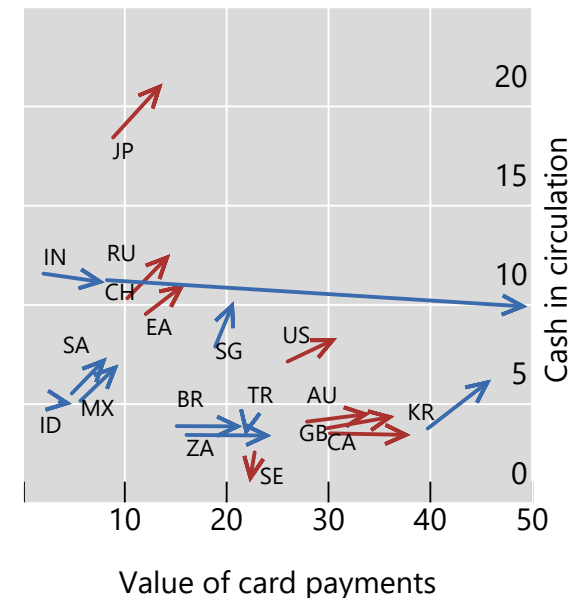
Small denomination²



Large denomination²



Total



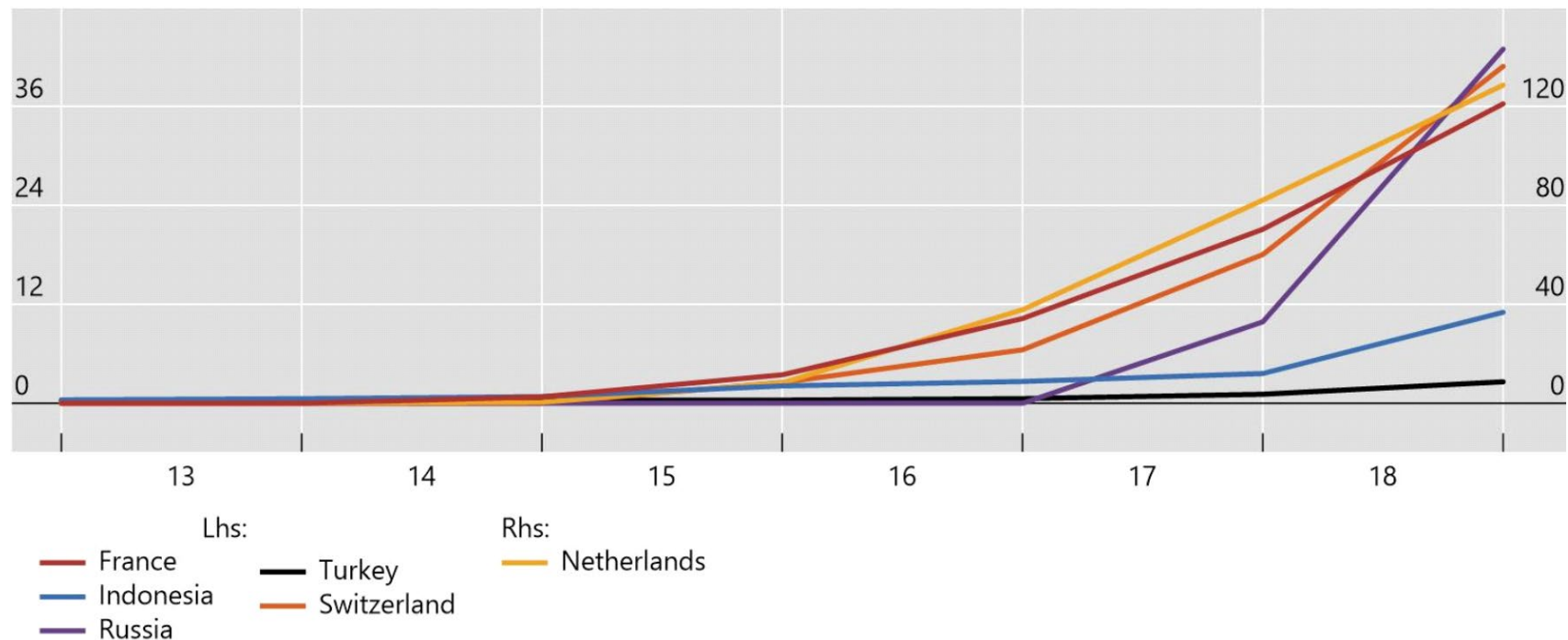
¹ 2012–18 changes. The start/end of an arrow represents 2012/2018. Data for Argentina and China are not comparable with those for other jurisdictions and are thus not shown. Data are not available for Hong Kong SAR. ² Banknotes no longer issued are not included in the calculations. For India, 2012–16 change due to demonetisation process. “Cash used for store of value” = the two largest-denomination notes for each jurisdiction. “Cash used for payments” = the rest of the notes and coins in circulation.

Source: CPMI Red Book. Bech, M and C Boar (2019): “Analysis of the 2018 Red Book Statistics”, November.

New payment behaviours or preference of consumers¹

Number per inhabitant per year

Contactless card payments

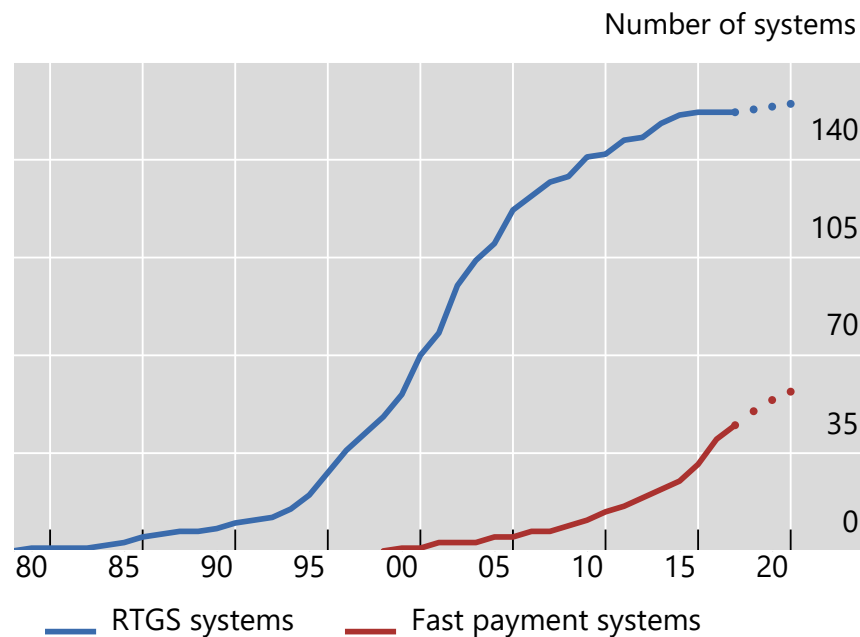


¹ Data not available for all CPI countries. ² The start/end of an arrow represents 2012/2018. The start date is 2013 for ID and 2014 for DE, ES, IT and NL.

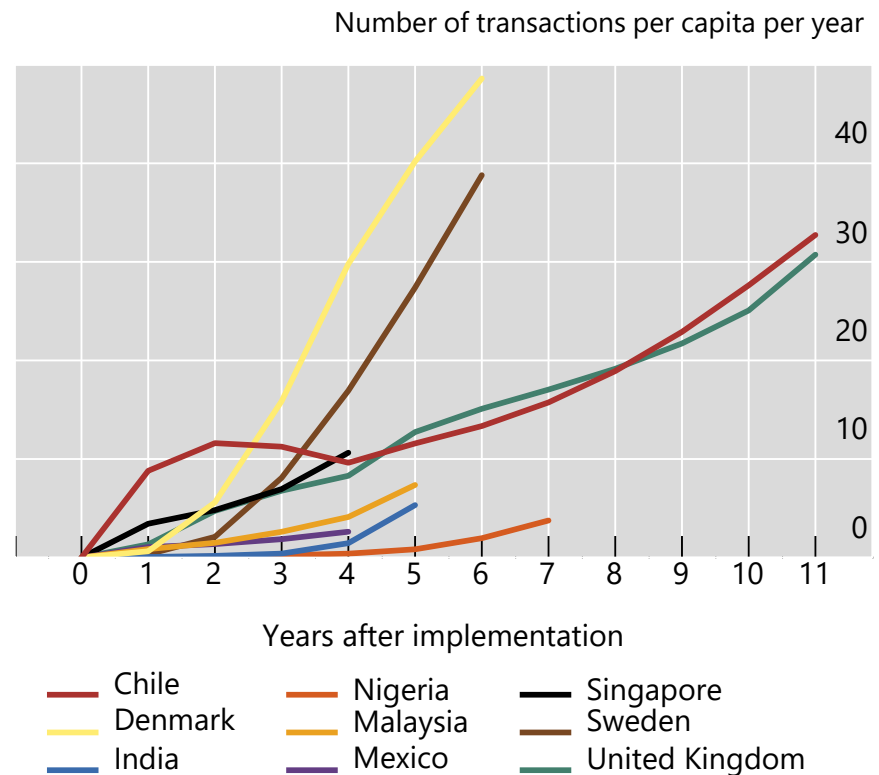
Source: CPI Red Book. Bech, M and C Boar (2019).

New platforms in retail payments

Diffusion of fast payments ¹



Use of fast payments

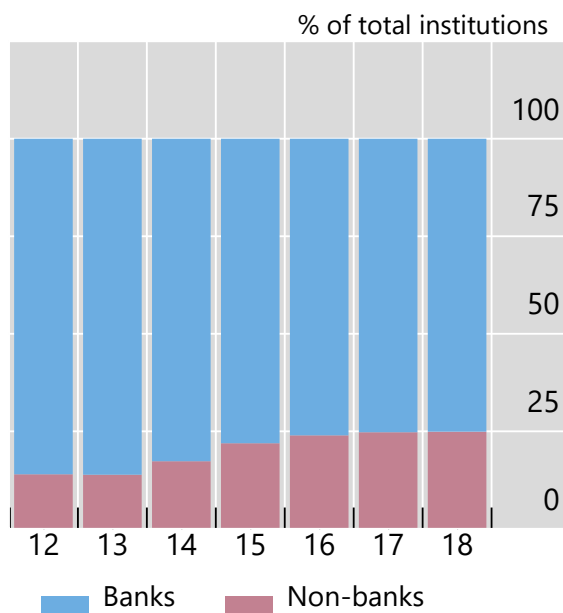


¹ The dashed part of the lines corresponds to projected implementation.

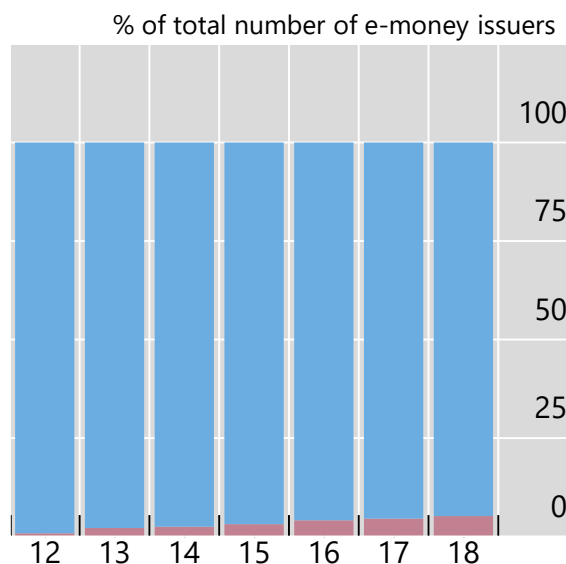
Sources: Bech, Shimizu and Wong (2017): "The quest for speed in payment", *BIS Quarterly Review*, March, pp 57-68; FIS (2018): *Flavors of Fast report 2018*, September; Bech, M and C Boar (2019); Instapay; national data.

New players in retail payments

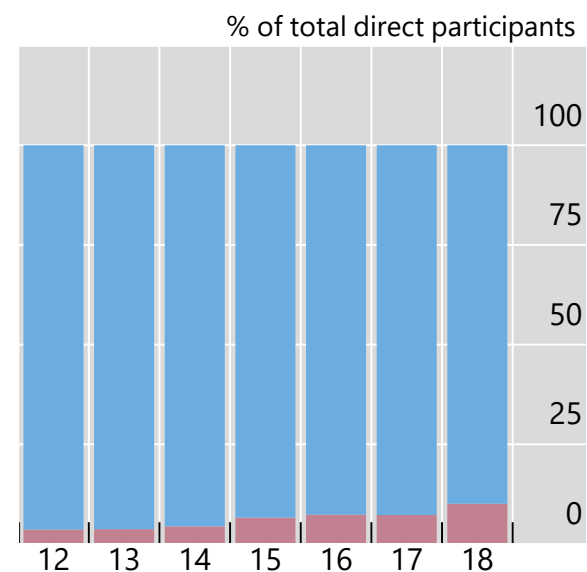
Institutions offering payment services/instruments



E-money issuers



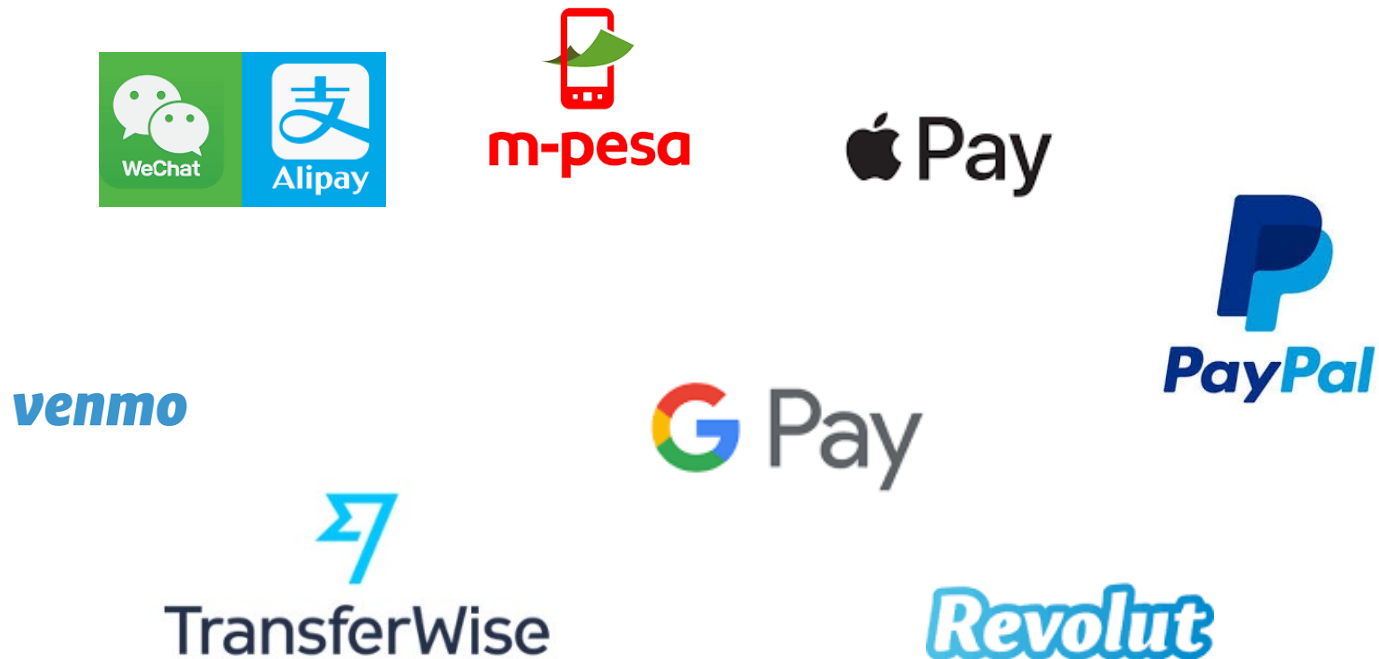
Direct participation in RTGS¹



¹ "Banks" includes central banks. "Non-banks" includes government, postal institutions, payment systems, central counterparties, securities settlement systems and other.

Source: CPMI Red Book. Bech, M and C Boar (2019).

Techs are increasingly moving into mobile payments

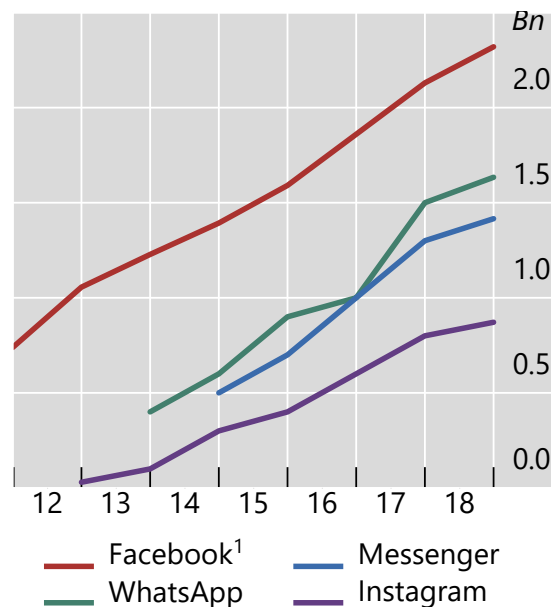


¹ Venmo is a mobile payments app owned by PayPal that integrates social media features. It is popular among college students in the US. ² Calibra is the mobile wallet that will run on top of the Libra network. ³ M-Pesa (M for mobile, pesa is Swahili for money) is a mobile phone-based money transfer, financing and microfinancing service, launched in 2007.

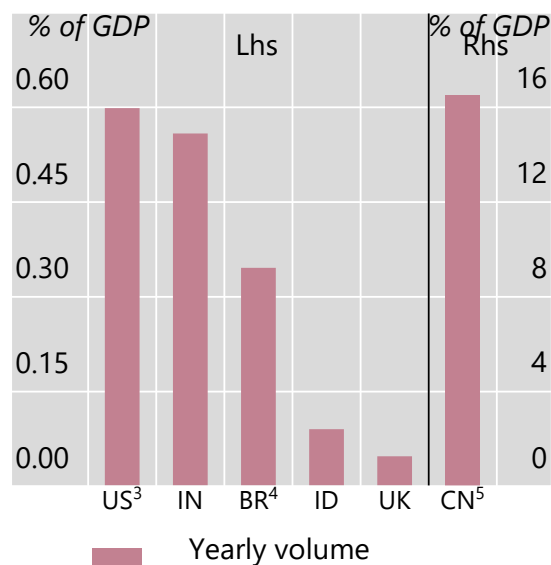
Big techs in payments could achieve global adoption...

...due to big techs' capacity for data analytics and large network of users

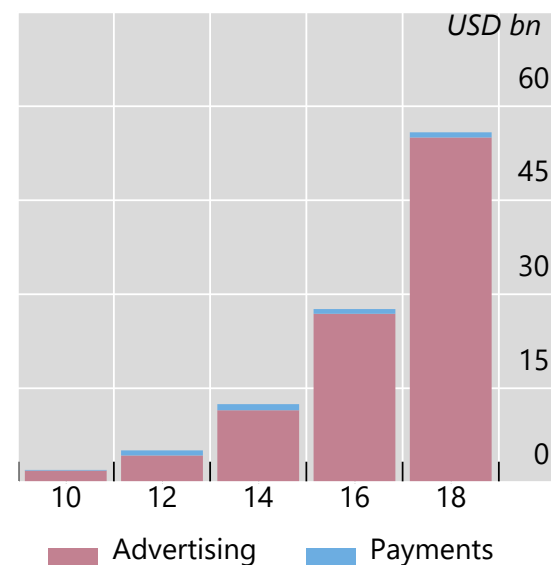
Monthly active users



Big tech mobile payment services²



Facebook's revenue



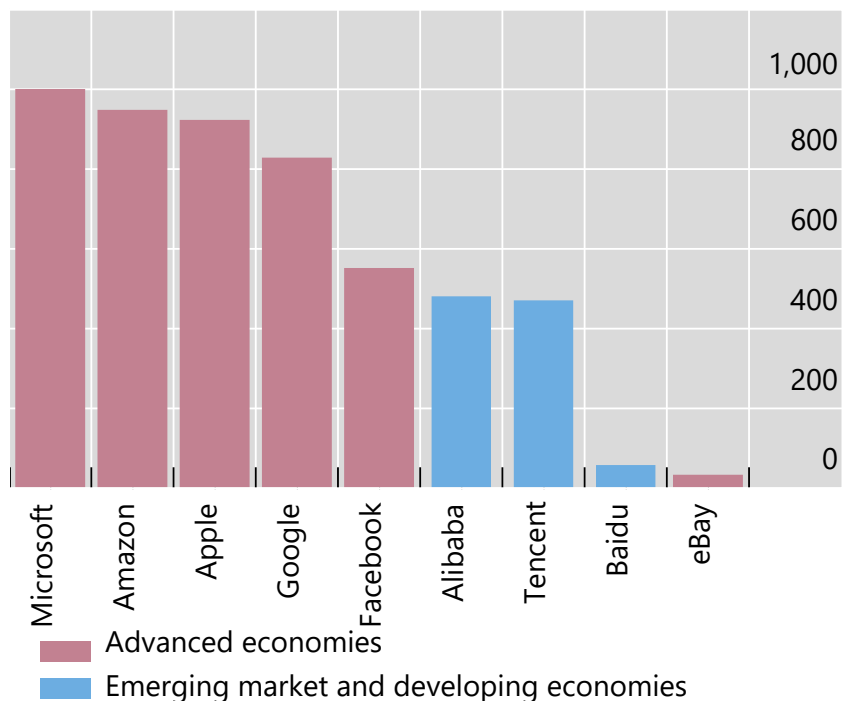
¹The numbers do not include Instagram or WhatsApp users unless they would otherwise qualify as such users. ² 2017 data. ³ 2016 data. ⁴ Estimate based on the public data for Mercado Libre. ⁵ Only mobile payments for consumption data (ie excluding mobile payments for money transfer, credit card payments and mobile finance).

Sources: J Frost, L Gambacorta, Y Huang, H S Shin and P Zbinden, "BigTech and the changing structure of financial intermediation", BIS Working Papers, no 779, April 2019; World Bank; Forrester Research; GlobalData; iResearch; Mercado Libre; Nikkei; Worldpay; S&P Capital IQ; companies' reports and announcements; national data; BIS calculations.

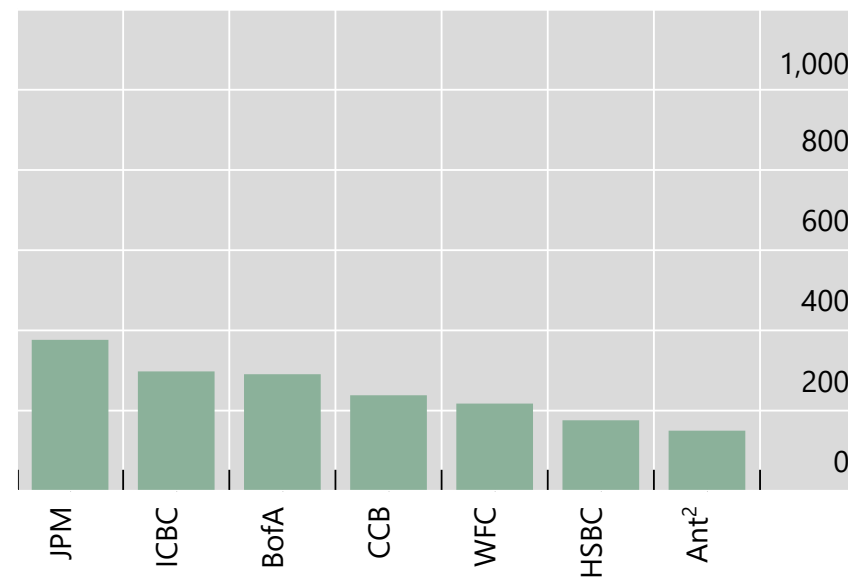
Market capitalisation of major financial groups and big tech firms¹

In billions of US dollars

Technology



Financial groups



Ant = Ant Financial; BofA = Bank of America; CCB = China Construction Bank; ICBC = Industrial and Commercial Bank of China; JPM = JPMorgan Chase; WF = Wells Fargo.

¹ Stock market capitalisation. ² The estimated value of Ant Financial was derived from the amount raised in the company's recent funding rounds times the stakes sold.

Sources: J Frost, L Gambacorta, Y Huang, H S Shin and P Zbinden, "BigTech and the changing structure of financial intermediation", BIS Working Papers, no 779, April 2019.



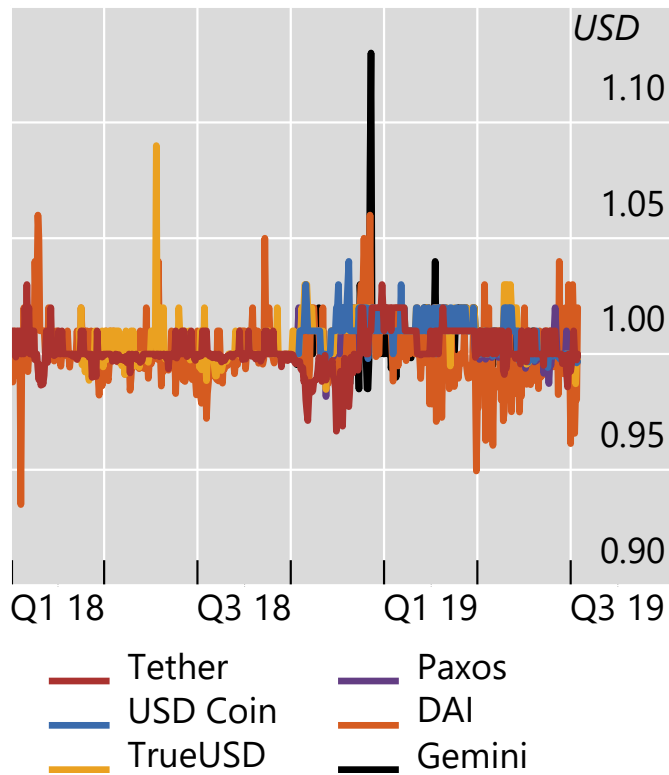
Into the future: Challenges ahead

Stablecoins – bringing crypto-assets closer to money

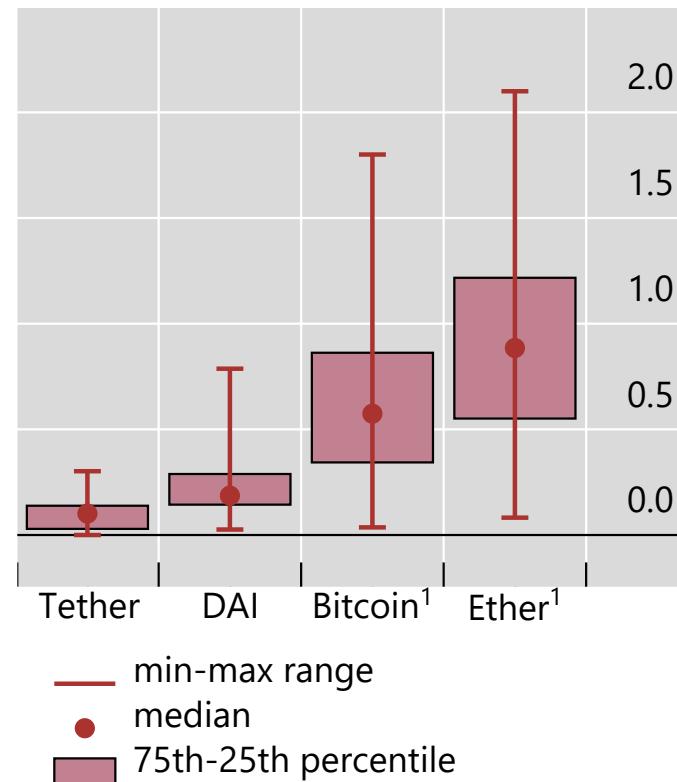
- Crypto-assets emerged recently but have volatile prices
- Stablecoins use a stability mechanism to promote trust in the coin, for example, by anchoring the coin to:
 - fiat currency
 - a reputable institution
 - other safe and liquid assets

"Stable" coins?

Price



Volatility ¹



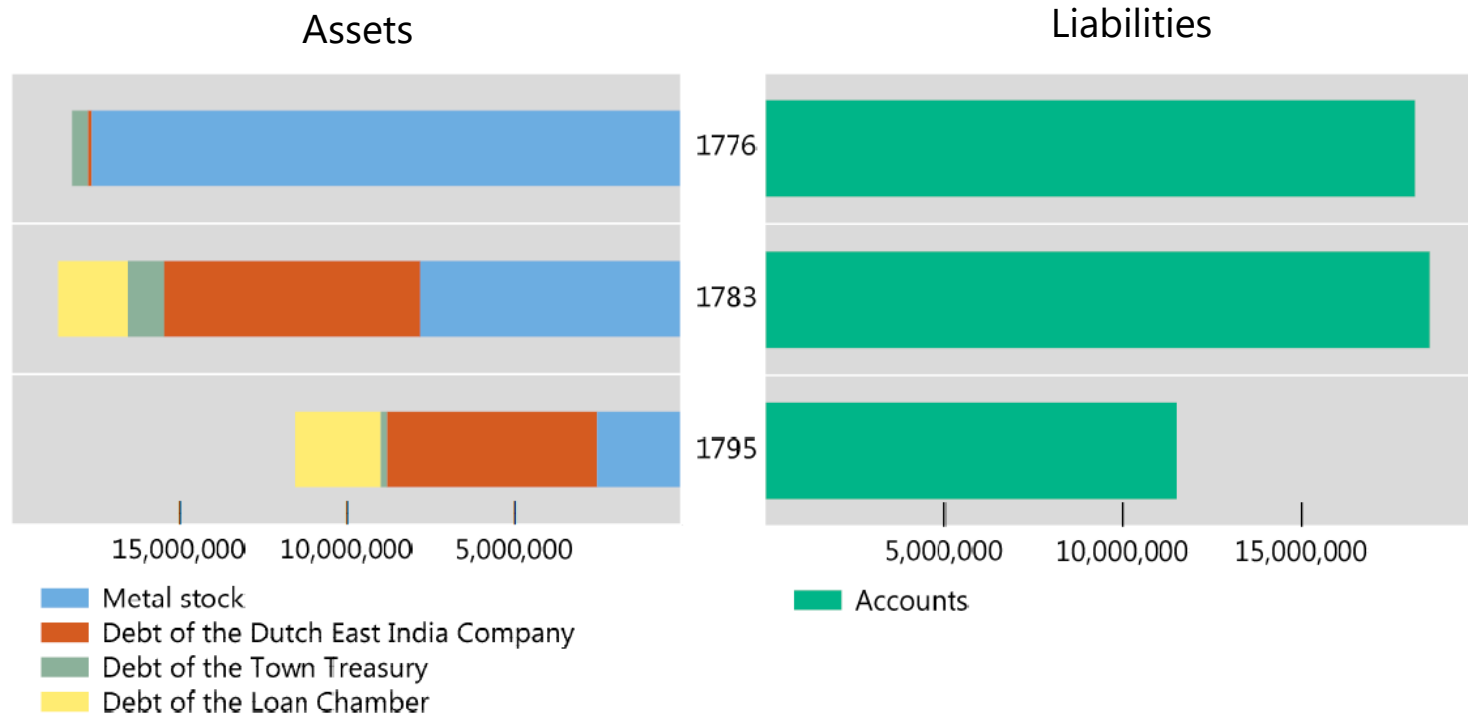
¹ Data are standardised 7-day rolling averages of historical volatility. Neither Bitcoin nor Ether are 'stablecoins'; they are included for reference.

Sources: coinmarketcap.com; Bullman, D et al, "In search for stability in crypto-assets: are stablecoins the solution?", Occasional Paper Series No 230, August 2019.

The Bank of Amsterdam (1609-1819) – an early stablecoin?



The Bank of Amsterdam balance sheet over time



Frost, J (BIS), H S Shin (BIS) and P Wierds (DNB): "The Bank of Amsterdam and the long-term sustainability of privately issued money", forthcoming.

G7 Working Group on Stablecoins: *Investigating the impact of global stablecoins, October 2019*

- Stablecoins introduce a host of potential challenges and risks from a public policy, oversight and regulatory perspective.

"Absolute prerequisite"

Legal certainty

Sound governance

Risks regardless of size

AML/CFT compliance

Safety of payments system

Cyber security

Data privacy/protection

Consumer/investor protection

Market integrity

Tax compliance

+ Challenges if global

Transmission of monetary policy

Financial stability risks

Fair competition

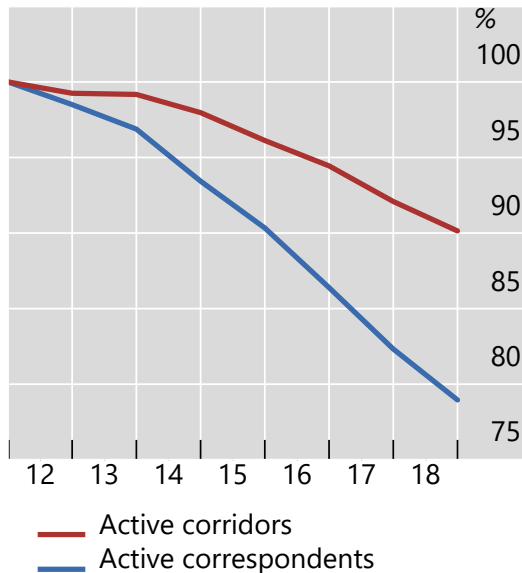
International monetary system

Currency substitution

A wake up call for innovation in cross-border payments

“There is a broad perception and anecdotal evidence that, compared with domestic payments, cross-border retail payments remain slow, costly and opaque, with heightened risks to manage.” CPMI, *Cross-border retail payments*, February 2018

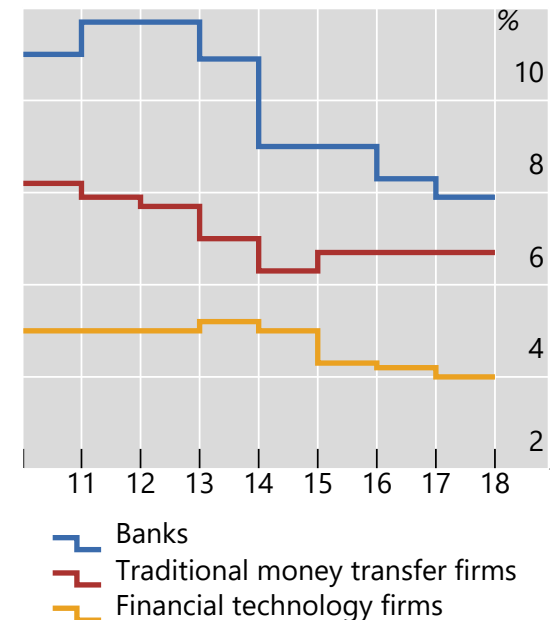
Decline in correspondent banking



Remittances volumes are rising



...at still high average costs¹



¹ Average total cost for sending \$200; figure adapted from *The Economist* (2019).

Sources: National Bank of Belgium; SWIFT BI Watch; *The Economist* (2019); World Bank, *Remittance Prices Worldwide*; World Bank; BIS calculations.

BIS Innovation Hub

- BIS created the **BIS Innovation Hub**, which will foster innovation and greater collaboration amongst the central banking community globally
- An increasing number of central banks are **improving their RTGS systems** and actively looking into **potentials of central bank digital currencies**
- With the BIS Innovation Hub, the BIS, together with its partners, is taking a leading role in **driving central banks' efforts**

BIS Innovation Hub: Hub Centres

- Three Hub Centres established so far: Hong Kong, Singapore and Switzerland
- For example, Singapore Hub Centre will look into foundational public digital infrastructures – the “**global stack**”, which will:
 - bring together people’s accounts in different financial institutions onto a single platform
 - make financial services more accessible to all
 - enable faster and cheaper payments

Payment systems as networks (infrastructure + instrument)

- Payment systems are networks, and networks exhibit **externalities** and **increasing returns to scale**
- Such network benefits should be **shared among a widest possible range of stakeholders**
- Our payment ecosystem should remain **contestable and open**, encourage new entrants and innovations, **preventing monopoly rents**

To conclude... History of payments... back to the future?

- **Technological innovation always facilitated payments...** from Middle-Age, metal coins, couriers, etc until modern systems with commercial banks handling private accounts, fiat money, RTGS, fast payment
- **Trust was addressed by institutional arrangements:** legal monopoly over issuance of sovereign money, central banks to address the financial instability associated with decentralised private payment arrangements, (relative) secure private/public infrastructures for transactions, physical then virtual...
- More **technological innovation response to challenges** of financial inclusion and cross-border payments: private crypto assets and big tech stablecoins; would they now dominate payments?
- **Improvements in virtual payments and infrastructure** does not necessarily mean that private stablecoins will substitute sovereign fiat money...

Need for coordination and role of the public sector

- **Coordination** is needed to overcome inertia with sub-optimal incumbent arrangements. But this is not easy especially in a cross-border context with a range of stakeholders
- A **potential role of the public sector** and an effective **symbiosis** of central bank payment systems and private sector systems
 - The public sector would provide an underlying infrastructure as a **public good**; and the private sector would compete and innovate for the benefit of customers
 - Innovation can also take the form of different types of sovereign fiat money; lots of discussions regarding CBDC
- Innovation could help to keep a **diversity of choices in payments** and also **foster greener payment instruments**

Thank you

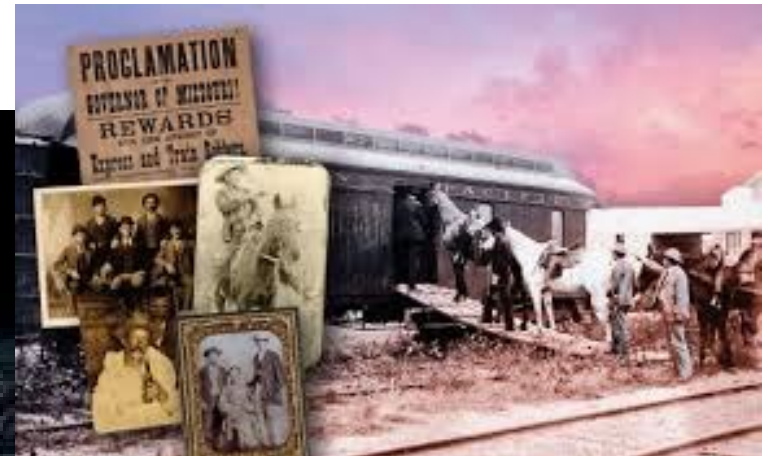


Annex



Security of payments

Security of payments in the past...



Evolution of security of payments: the authenticity of what?

