



Extract
Payments
and market
infrastructures
in the digital era

(currently being updated)

CHAPTER 20

**The role and contribution of innovation
for payment instruments
and market infrastructures**

**The role of central banks
and other public authorities
(section 3)**

Updated in May 2022



[...]

3. The role of central banks and other public authorities

3.1. Encouraging innovation within a framework of trust

Aware of the benefits of financial innovation, central banks have launched numerous initiatives to foster its development and exploit its full potential. As the guarantors of financial stability and the proper functioning of market infrastructures, central banks also preserve confidence in the financial system. Their role therefore also consists in creating the conditions of trust necessary for the development of innovation. This responsibility is reflected in each of the central banks' main tasks: market infrastructure operator, regulator and catalyst.

As **market infrastructure operators**, the Eurosystem and the Banque de France have developed several initiatives that seek to take advantage of technological innovations with the aim of improving efficiency and reducing the operating costs of these infrastructures.

Thus, the Eurosystem has developed a central bank money settlement service for instant payments, TIPS (Target Instant Payments Settlement), which has been operational since November 2018. The term "instant payments" refers to all payments that can be made 24 hours a day, 7 days a week, with an immediate transfer of value, credit to the beneficiary's account and the ability to reuse the funds. The introduction of instant payments in the euro area constitutes an innovation for the 340-million-person market of the 19 euro area countries (similar payment systems already exist in countries such as the United Kingdom (Faster Payments), Singapore (Fast and Secure Transfers – FAST), Denmark (Express transfers) and Australia (New Payment Platform – NPP)).¹ TIPS is a good illustration of how the Eurosystem both adapts to market developments and innovations by enabling private actors to take advantage of them, while relying on Eurosystem infrastructures capable of implementing them, and works towards

the harmonisation and interoperability of European payment markets.

It is also in connection with this function played by market infrastructure operators that central banks have launched experiments in recent years on the development of a central bank digital currency (see below), which also aims more broadly at preserving the role that central bank currencies play in ensuring the stability of the payment system.

In the face of innovation, public authorities are considering adapting regulations in such a way as to enable economic stakeholders (businesses, users) and the system as a whole to fully benefit from the efficiency and savings brought about by technological progress, while at the same time protecting consumers, preserving financial stability and ensuring that innovation benefits all parties, particularly in the form of new services and cost reductions. This balance can only be achieved by means of appropriate and proportional rules, based on the risk profile of the service provided and not on the nature or legal status of the service provider. Central banks are promoting a tiered approach according to the size of the entities supervised and the risk they represent.

Finally, as **catalysts**, Eurosystem central banks and the European Central Bank (ECB) remain attentive to the industry's efforts to develop new innovative services and processes. To this end, they participate in various bodies (the Euro Retail Payments Board – ERPB and the Advisory Group on Market Infrastructures for Payments – AMI-Pay) bringing together the various players in the payments and market infrastructure ecosystem. Wherever such efforts may appear to have the potential to improve the efficiency of financial markets and payment services while respecting financial stability, the Eurosystem may actively support them and facilitate their implementation. In this line, the ECB has given its full support from the outset to the European Payments Initiative (EPI) project, initiated by 16 European banks. This project should reduce the fragmentation

¹ See the report of the Committee on Payments and Market Infrastructures (CPMI) from December 2021, *Developments in retail fast payments and implications for RTGS systems (bis.org)*.

of retail payments and the dependence on non-European solutions through the deployment of a pan-European solution for card payments (see Chapter 2, Box 5).

3.2. Central bank digital currency

3.2.1. Definition, motivations, opportunities and risks

Discussions regarding the issuance of a central bank digital currency (CBDC) have gained momentum in recent years as the economy has become increasingly digitised and the use of cash for transactions has continued to decline. A CBDC would take the form of a direct claim on the central bank that would be made available and circulate in digital form among all economic agents, like banknotes and coins do today.

The notion of CBDC raises two different issues depending on whether one is looking at it from the perspective of interbank payments (so-called “wholesale” payments) or retail payments. But despite this common conceptual distinction between retail CBDCs and wholesale CBDCs, there is in fact a continuity between these two uses, as a wholesale CBDC is likely to facilitate the circulation of retail CBDCs through the distribution networks of financial intermediaries.

As regards interbank settlements, the issuance of a CBDC would consist in the introduction of an instrument similar to reserves, which could only be held by actors authorised to participate in the large-value payment system. The difference would then lie mainly in the technology used for the issuance and circulation of this instrument. Several central banks, including the Banque de France, are considering the possibility of issuing and exchanging a CBDC based on distributed ledger technologies and have been looking at the implications that such a scenario would have for the financial ecosystem, financial stability

and monetary policy. The issuance of an interbank CBDC could improve the efficiency and fluidity of payment systems and market infrastructures, for example by facilitating the traceability and reconciliation of transactions.

Regarding retail payments, the main focus is on making available to the public a paperless payment instrument that is a direct claim on the central bank. A CBDC would be complementary to currency, the only form of central bank money used for retail payments and only existing in physical form (coins, banknotes), and would contrast by its public nature with traditional paperless payment instruments, which represent claims on commercial banks or electronic currency institutions. The purpose of issuing a retail CBDC would therefore be to offer users a new and complementary form of public money that is liquid, risk-free, accessible to all and adapted to the digital economy.

The issuance of a retail CBDC in the euro area raises many legal and other questions, including the legal basis under which the Eurosystem can undertake this task as well as its status as legal tender.

In July 2021, the Eurosystem launched an investigation into the digital euro, in which the Banque de France is fully involved. The project, which is scheduled to last two years, is complex and aims to specify users’ expectations, define the characteristics and functionalities of the digital euro and clarify how it will be distributed by financial intermediaries. It should also facilitate the assessment of the economic effects and the potential impact that a digital euro would have on the market, particularly on the payments ecosystem. The initiative seeks to explore how to provide European citizens with a new form of public money that is innovative and fully secure, simple to use and easily accessible to all, and that ensures financial inclusion and the protection of privacy.

Box 3: Comprehensive overview of the central bank digital currency initiatives around the world

Over the last few years, an increasing number of central banks have committed to undertaking central bank digital currency (CBDC) projects, whether aimed at interbank transactions (wholesale CBDC) or retail transactions (retail CBDC). According to the database CBDC Project Index, which is updated regularly by the Bank for International Settlements (BIS), 68 CBDC projects were underway at central banks at the start of 2022, 28 of which were in the pilot testing phase and three were operational.¹

Initially, certain central banks focused on wholesale CBDC. For example:

- the European Central Bank (ECB) and the Bank of Japan launched their Stella project in 2016;
- the Monetary Authority of Singapore launched its Ubin project in 2016;
- the Bank of Canada launched its Jasper project in 2016;
- the Bank of Thailand launched its Inthanon project in 2018.

Other central banks focused on retail CBDC. The two most emblematic examples of this are undoubtedly China, where work began in 2014 (see Box 4 on the Chinese project e-CNY), and Sweden, where work began in 2017 (see below).

Following the launch of the Libra stablecoin project by Facebook in mid-June 2019, retail CBDC projects have expanded around the world.

At the start of 2020, the BIS and seven central banks (Bank of Canada, ECB, Bank of Japan, Bank of Sweden, Bank of England, Swiss National Bank and the Federal Reserve System) formed a group with the aim of sharing experience acquired during their retail CBDC projects. This group published its first report in October 2020 entitled [CBDC: foundational principles and core features](#), followed by three reports in September 2021 entitled [CBDC: system design and interoperability](#), *“CBDC: user needs and adoption”* and *“CBDC: financial stability implications”*.

The central banks in this group have achieved the following:

- The **Bank of Canada** has published a series of a study and research notes on retail CBDC since 2020 and in March 2022 announced [a collaboration with MIT](#) (Massachusetts Institute of Technology) as part of a CBDC project.
- The **ECB** published a report on a digital euro in October 2020, which has served as the basis for a public consultation, the [results](#) of which were published in April 2021. In July 2021, the Governing Council of the ECB [decided](#) to launch a digital euro project with a two-year investigation phase. As part of this investigation phase, the ECB published a [report](#) in March 2022 on the preferred payment methods of citizens. The topic of the digital euro has been regularly raised by the European Parliament at hearings with leaders of the ECB. In April 2022, the European Commission also opened a [consultation](#) on a digital euro.
- The **Bank of Japan** published a report in October 2020 entitled [The Bank of Japan’s Approach to Central Bank Digital Currency](#) outlining its CBDC approach as well as a pilot test programme split into several phases. In March 2022, it announced that phase one of this programme was complete and that phase two would begin in April 2022.

¹ See https://www.bis.org/publ/work880_data_jan22.xlsx For a methodological presentation of the CBDC project index, see eBIS Working Paper No. 880 (August 2020) *“Rise of the central bank digital currencies: drivers, approaches and technologies”*. Note that other entities are also monitoring CBDC projects via the CBDC tracker: see, for example, [Central Bank Digital Currency \(CBDC\) Tracker](https://www.atlanticcouncil.org/cbdctracker/), <https://www.atlanticcouncil.org/cbdctracker/> and [Home – Kiffmeister](#)

- The **Bank of Sweden** has been faced with a major decline in the use of cash for many years and launched its CBDC project **e-krona** in 2017. In February 2020, it launched a pilot test programme focused on both the technical and legal aspects of the project. A report on the execution of **phase one** was published in April 2021. A report on **phase two** was published in April 2022. In its **press release** announcing the project's entry into phase three, the Bank of Sweden nevertheless stated that "No decision has yet been taken on whether to issue an e-krona or on what technical solution or legal framework it might be based"
- The **Bank of England** (BoE) launched an **initial public consultation** in March 2020 on retail CBDC, for which the **summary of responses** was published in June 2021. Also in June 2021, the BoE launched a **second consultation**, the scope of which was wider as it focused on the new forms of digital money, namely, systemic stablecoins and CBDC. The **summary of responses** to this second consultation was published in March 2022, at which point the BoE indicated that a third consultation would be launched in 2022.
- The **Swiss National Bank** published several working papers on retail CBDC in 2021, while working in parallel on its wholesale CBDC projects – in particular the Helvetia project (in collaboration with the BIS) and the Jura project (in collaboration with the BIS and the Banque de France).
- In the **United States**, the commitment to this topic has been increasing over the last few years. During a roundtable organised by the ECB in November 2020, Jerome Powell, President of the Federal Reserve, summed up his opinion as follows:
 - (1) There is no need for retail CBDC in the United States because (i) there has been no real decline in the use of cash and (ii) the American payment system works well and is being modernised through the FedNow instant payment project.
 - (2) The Federal Reserve has nevertheless made a point of remaining at the forefront of research on the technology.
 - (3) However, a CBDC raises many questions and there is still a lot of work to be done before a decision can be made with regard to issuing a CBDC.

In short, with regard to CBDC, Jerome Powell has frequently said "We do not need to be the first but we need to get it right"

Then in March 2021, the American Congress adopted a **CBDC Study Act** inviting the Federal Reserve to advance its CBDC projects, due to geopolitical reasons in particular ("the US should strive to maintain its leadership in financial technology and ensure that the US dollar remains the predominant reserve currency in the world economy").

In January 2022, the Federal Reserve launched a public consultation on the basis of a discussion paper (**Money and payments: the US Dollar in the age of digital transformation**) that was deliberately non-prescriptive ("the paper is not intended to advance a specific policy outcome and takes no position on the ultimate desirability of a US CBDC") and calling for a wide consultation ("The Federal Reserve will seek input from a wide range of stakeholders that might use a CBDC or be affected by its introduction").

In March 2022, the US President Joe Biden signed an executive order on **Ensuring Responsible Development of Digital Assets** devoted in part to the regulation of crypto-assets but also emphasising the urgency of CBDC projects.

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“Explore a US CBDC by placing urgency on research and development of a potential US CBDC, should issuance be deemed in the national interest. The Order directs the US Government to assess the technological infrastructure and capacity needs for a potential US CBDC in a manner that protects Americans’ interests. The Order also encourages the Federal Reserve to continue its research, development, and assessment efforts for a US CBDC, including development of a plan for broader US Government action in support of their work. This effort prioritizes US participation in multi-country experimentation, and ensures US leadership internationally to promote CBDC development that is consistent with US priorities and democratic values.”

In addition, at the multilateral level, in October 2021, the G7 adopted 13 principles applicable to retail CBDC worldwide with the aim of avoiding any risks to financial stability, monetary policy and spillovers, as well as ensuring data protection, cybersecurity, competition, AML/CTF, environmental protection and financial inclusion.

Other central banks, besides the Chinese Central Bank (see Box 4), that have also commenced retail CBDC projects include Russia and Ukraine:

- The **Bank of Russia** published a report in October 2020 entitled [A digital ruble](#) which served as the basis for a public consultation, and for which the summary of responses was published in April 2021. In February 2022, it issued a press release indicating that the first phase of its pilot test programme was completed in 2021 and that the tests will continue in 2022.
- The **National Bank of Ukraine**, which began CBDC projects in 2016, published a report at the start of 2019 entitled “Analytical report on the e-hryvnia pilot project.” It then launched a public consultation, for which the [summary of responses](#) was published in July 2021.

Three central banks had an operational CBDC at the start of 2022:

- The **Central Bank of the Bahamas**, which commenced its CBDC projects in 2016, followed by a pilot test phase beginning at the end of 2019, will go down in history as the first central bank to have launched its digital currency, the [sand dollar](#), in October 2020.
- The **Central Bank of Nigeria** launched its digital currency, the [eNaira](#), in October 2021.
- The **Eastern Caribbean Central Bank (ECCB)** launched its digital currency, [DCash](#), at the start of 2022.

Box 4: The Chinese central bank digital currency project (e-CNY or e-yuan) ¹

History

Originally called DC/EP (Digital Currency Electronic Payment) then renamed e-CNY (or e-yuan), the Chinese central bank digital currency (CBDC) project was launched in 2014 by the People’s Bank of China (PBOC). In 2017, the PBOC formed a Digital Currency Institute in charge of leading the project. After an analysis and design phase, the project entered the pilot phase at the start of 2020 and the geographic perimeter has gradually extended to include the major Chinese metropolitan areas.

¹ The Chinese project has prompted many publications, but until recently it was not possible to obtain them from primary sources (namely, from the PBOC), or at least not in English. This gap was filled with the publication of a *white paper* by the PBOC in July 2021 and with a series of talks by *Changchun Mu*, Director General of the Digital Currency Institute of the PBOC, at international conferences, as well as a speech by Governor *Yi Gang* on the e-yuan.

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Primary objectives

The e-yuan project seeks to offer a public alternative to the private mobile payment solutions Alipay and WeChat Pay, which largely dominate the Chinese market. It is part of a concerted effort aimed at having greater control of these Big Tech companies, particularly through regulatory developments that limit their market share.

The project also provides a response to the marked decline in the use of fiat money in payments. Its objective is to strengthen financial inclusion through the supply of basic financial services to as many people as possible, including those who do not have a bank account, which is believed to be around 10 to 20% of the Chinese population.

Definition

The PBOC defines the e-yuan as follows:

«The e-CNY is the digital version of fiat currency issued by the PBOC and operated by authorised operators. It is a value-based, quasi-account-based and account-based hybrid payment instrument, with legal tender status and loosely coupled account linkage. It is the central bank's liabilities to the public.»

Primary features

1 –The e-yuan has certain features in common with fiat money:

- Legal tender
- Settlement upon payment
- Non-remuneration: this absence of remuneration, combined with detention limits, is also aimed at reducing disintermediation risks
- No collection of fees («the PBOC does not charge any fees from authorised operators nor from end-users, and the authorised operators do not charge any fees from individual users»).

2 –The e-yuan is based on a two-tiered system:

- First level (Tier 1): the PBOC issues the e-yuan to a limited number of intermediaries, known as authorised operators (banks and payment service providers (PSP)). The PBOC also ensures the interconnection between these authorised operators and maintains a register of the transactions, synchronised regularly with the systems of the authorised operators.
- Second level (Tier 2): the authorised operators distribute the e-yuan to the end users, who can open wallets that they can access via a physical device or a mobile app. The authorised operators execute the payments on their own infrastructure, recording the transactions and updating the account balances.

3 –The e-yuan has a dual off-line payment function allowing payments to be made offline between two phones or two cards.

Progress report

Launched at the start of 2020 in four cities, the pilot tests gradually been expanded to 11 cities. In January 2022 in the run-up to the Winter Olympic Games in Peking (February 2022), the e-yuan was launched in

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app stores, causing a great deal of excitement. In April 2022, the PBOC announced that the scope will be expanded once more to include 11 additional cities.

Even though the large-scale tests conducted since the start of 2020 were successful, the PBOC remains very prudent with regard to a possible live launch date for the e-yuan, as explained by Changchun Mu in February 2022:

«Although we already have a large number of population to draw on this trial, it is still a small percentage of users comparing with Alipay and Tenpay and comparing with the traditional electronic payment instruments. We will still advance the e-CNY pilot with no preset timetable for the final launch, but we are watching criteria like the user experience and the security or robustness of the system, and also the efficiency of the business model.»

Questions raised about the e-yuan

Anonymity and privacy

The PBOC has opted for the managed anonymity concept – in other words anonymity for small amounts. With this concept, wallets are classified into four categories according to their level of confidentiality and their amount limits (detention and transaction).

The wallets in category four can be simply opened on the basis of a mobile phone number, but have very low amount limits: 2,000 yuans (around 285 euros) per transaction; 5,000 yuans (around 715 euros); maximum balance of 10,000 yuans (around 1,430 euros).

A recently enacted Chinese law to protect personal data prohibits telephony companies from communicating the identity of the holder of the telephone number to the authorised operators, and even to the central bank, except in the event of an illicit transaction. Therefore, even with category four wallets, there is no absolute anonymity.

Is the digital yuan likely to be used for cross-border payments?

Although the PBOC is currently focusing on domestic use of the e-yuan, it is nevertheless exploring the possibility of cross-border use, particularly by taking part in the «m-CBDC bridge» project with other central banks, under the auspices of the BIS Innovation HUB of the Bank of International Settlements.

However, to avoid any negative impact on the international monetary and financial system, the PBOC has defined three principles, as summarised in the following by the director in charge, Changchun Mu:

- **No disruption:** *the e-CNY supply by the PBOC should not disrupt the other central banks' currency sovereignty and their ability to fulfill their own mandate for monetary and financial stability.*
- **Compliance:** *all cross-border arrangements should comply with the regulations and laws of the jurisdictions concerned, such as capital management, foreign exchange mechanism and AML/CFT regulatory requirements.*
- **Interoperability:** *we will adopt the currency conversion on the virtual border between different wallets. All the e-CNY will be converted into the local currencies to be sent to the corporates or the individual users in the foreign country. That will minimise the financial risks such as currency substitution.*

3.2.2. An approach through experimentation

The learning-by-doing approach adopted by most central banks

It is generally accepted that work on a digital currency would be incomplete if it were to remain purely theoretical. Public consultations and exchanges with market stakeholders set up by several institutions have significantly contributed to this work. Beyond these initiatives, many institutions have gone a step further and adopted a learning-by-doing approach, in partnership with private and public market players. This approach consists in conducting experiments aimed at giving concrete reality to the CBDC and its possible uses without nonetheless giving it legal existence. However, it is important to note that the concept of experimentation covers far more diverse aspects than the term might initially suggest.

The methods of experimenting with systems based on a shared ledger that have been chosen by the various institutions aim to “get closer to reality” by using different criteria: they may include implementing a technical platform based on the target technologies, reproducing end-to-end business processes on the platform, involving ecosystem actors or testing how the platform interacts with existing systems.

Indeed, different approaches have been used in the experiments conducted to date. The interbank CBDC experiment conducted in 2020 by the Innovation Hub of the Bank for International Settlements (BIS) with the Swiss National Bank and SIX, Switzerland’s Central Securities Depository, has opted for a “proof of concept” based on test environments close to the production environments, involving the target users and focusing on real operations. For its long-term Ubin experiment (2016-20), the Monetary Authority of Singapore (MAS) has opted for an approach of successive prototypes demonstrating the feasibility of several interbank CBDC use cases (payment, delivery versus payment, payment versus

payment) across several target technologies. A similar approach is used for the retail CBDC experiments conducted by the Eurosystem, where different issuance models are tested on a purely technical basis, without the actual issuance of money or involvement of target users.

The experiments can thus be conducted on fictitious data or on real data: in the latter case, the operations conducted in the experimentation have legal consequences, for example, transfers of assets between experiment participants. The Banque de France was the first to conduct interbank CBDC experiments, including the implementation of a CBDC “under real conditions”

Experiments under real conditions at the Banque de France

For the implementation of its CBDC experimentation programme, the Banque de France has selected a varied panel of partners that include foreign central banks, leading commercial banks, market infrastructure managers and Fintechs. This diversity of views within the financial sector has allowed for a clear understanding of the use cases of a CBDC and its potential impact on the financial ecosystem. The tests conducted under real conditions focused on delivery versus payment (DvP), payment versus payment (PvP) transactions, and cross-border payments involving, in most cases, tokenised financial assets.

The programme showed how an interbank CBDC could help secure the development of tokenised financial markets by providing stakeholders with the benefits of distributed ledger technology, in particular distributed ledger-based end-to-end processing of tokenised securities settlement and payment-versus-payment transactions, including cross-border transactions, while benefiting from secure central bank money settlement for the transactions made in this manner. Many jurisdictions are considering issuing a CBDC to support cross-border transactions and cross-currency payments, a

context where the experiments have shown that the interoperability of CBDCs with each other could contribute to simplifying and improving the performance and accessibility of such transactions and payments.

As the Banque de France follows a technology-agnostic approach, its experiments have made it possible to test various technologies, whether private or public DLTs implemented on open or proprietary protocols. The experiments have shown that, regardless of the underlying technology, an interbank CBDC can be an effective means of payment for the multiple use cases envisaged. They also confirmed that central banks can retain control of the CBDC over these different types of DLTs, in particular by exploiting the programmability features of central bank money provided by this technology.

The conclusions of this first experimental programme conducted in 2020 and 2021, which were the subject of a report² and a press release³ published on the Banque de France website, confirm the intuitions that prompted the Banque de France to launch the programme: an interbank CBDC would maximise the benefits expected by the market from the use of DLT for interbank transactions by giving market participants a secure means of settlement in central bank money, thus eliminating any counterparty risk, in compliance with the European and international rules implemented after the 2008 crisis. As regards the methodology, the experiments with market participants have proven to be a valuable tool to test, under real conditions, the selected use cases and help develop the definition of what a future interbank CBDC could look like.

For these reasons, the Banque de France will continue its experimental programme in 2022. In particular, the programme will look more closely at cross-border payments and interoperability issues between DLT and conventional systems, while providing technical answers to performance, environmental and security issues, which are crucial for the market scaling of the tested solutions. This new work will help assess the

benefits and risks of issuing an interbank (or wholesale) CBDC for the Eurosystem.

3.3. Managing the risks

3.3.1. Ensuring the proper functioning of market infrastructures and their compatibility

While the current wave of technological innovations and the emergence of new stakeholders are creating opportunities for the financial industry in general and for market infrastructures and payment systems in particular, they also pose specific operational, legal and financial risks and challenges that financial system regulators, supervisors and oversight bodies need to address.

Regulators ensure that market infrastructures function properly and comply with applicable regulations. While regulations must distinguish between the functions performed, they must remain agnostic as to the technology used to provide these functions or services. To the extent that a settlement and delivery service meets the definition provided by the Central Securities Depository Regulation (CSDR)⁴ (see Chapter 12), such service must comply with the regulation, irrespective of the technology used, blockchain or another. Similarly, the status of the actor providing the service should not be taken into account. Whether the actors are new entrants or well-established, performing roles in market infrastructures requires them to comply with the relevant regulations, such as with the Settlement Finality Directive (SFD),⁵ CSDR, the European Market Infrastructure Regulation (EMIR)⁶ or the Systemically Important Payment Systems (SIPS) Regulation.⁷

Beyond ensuring neutrality towards the technology and the actors, the most advanced initiatives applying blockchain to back-office operations⁸ raise two more specific implementation issues: compliance with the principle of delivery versus payment (DvP) (see Chapters 5 and 18) and the use of central bank money as a settlement asset (see Chapter 5).

2 Available at https://www.banque-france.fr/sites/default/files/media/2021/11/09/821338_rapport_mnbc-04.pdf

3 Available at <https://www.banque-france.fr/communique-de-presse/la-banque-de-france-publie-son-rapport-des-experimentations-de-monnaie-numerique-de-banque-centrale>

4 Regulation (EU) No. 909/2014 of the European Parliament and of the Council of 23 July 2014 on improving securities settlement in the European Union and on central securities depositories.

5 Directive 98/26/EC of the European Parliament and of the Council of 19 May 1998 on settlement finality in payment and securities settlement systems.

6 Regulation (EU) No. 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories.

7 Regulation of the European Central Bank (EU) No. 795/2014 of 3 July 2014 on oversight requirements for systemically important payment systems.

8 Improvement of the commercial paper processing chain, back-office solution for listed and unlisted SME securities, solution for monitoring fund liabilities, etc.

With respect to delivery versus payment transactions, initiatives based on blockchain technology and offering a solution for transferring an asset in exchange for a payment should be able, if they are developed effectively, to provide assurance of the “all-or-nothing” execution of both legs of such processed transactions. In fact, it is this mechanism that ensures the elimination of settlement risk (or principal risk), i.e. non-payment when the asset has already been delivered, or non-delivery when payment has already been made. To satisfy this requirement, blockchain technology-based solutions need to be able to either have the securities and the settlement asset (money) on the same platform (integrated system) or ensure a close interconnection between the platforms used to process the securities on the one hand and the settlement asset on the other (interfaced system).

The Principles for Financial Market Infrastructures (PFMI, see Chapter 17) consider the safest settlement asset is central bank money, and this should be used wherever possible. This requires that solutions based on blockchain technology have access to central bank money, and thus meet the central bank’s access criteria.

These two requirements are fundamental to ensure the security and efficiency of market infrastructures. For initiatives with a securities settlement and delivery dimension, responding to these imperatives may result in the use of the T2S settlement and delivery platform (see Chapter 14), which can be used for DvP in central bank money. This requires ensuring the security and efficiency of back-office operations, while allowing the issuance of financial instruments in the form of tokens (“tokenisation”) and the use of blockchain technology.

In addition, it seems reasonable to expect that, even if blockchain technologies become the norm for payment and settlement systems, achieving this status would be a gradual process, thus opening up a period of cohabitation between blockchain infrastructures and “traditional”

infrastructures. It may be even more reasonable to assume that this cohabitation would become permanently established and operate in complementary domains. It is therefore important that careful consideration be given to the consequences of this cohabitation. It may indeed result in risks such as the fragmentation of assets owned by the actors in multiple systems or the multiplication of standards. At the other end of the spectrum, it can also be seen as an opportunity to benefit from the “best of both worlds”, such as the performance of traditional systems to process large volumes of transactions combined with the promises of flexibility and cost reduction from systems built on blockchain technology.

3.3.2. Protecting consumers and investors

Innovations in the area of payments and market infrastructures tend to be focused on the interconnection of actors and the circulation of data, as encouraged by the Payment Services Directive (PSD2). Innovations are deployed in an environment particularly exposed to cyber risks, which have grown immensely over the last few years.

These risks are sparking considerable concern sector-wide, including for proven market infrastructures and payment technologies, particularly online card payments, which account for more than two-thirds of all card payment fraud in France. Moreover, the most recent technologies that have not yet been tested on a large scale, such as blockchain, are likely to create new market security and integrity risks that warrant early and continuous monitoring.

As regards crypto-assets specifically, the anonymity associated with the issuance and transfer mechanisms of most crypto-assets gives rise to the risk of these assets being used for criminal purposes (online sale of illegal goods and services, payment of ransoms, etc.), and for money laundering and the financing of terrorism. The custody of crypto-assets is subject to significant cyber risks and offers no security or protection for

these assets. It is therefore essential that the offering of crypto-assets comes with a warning of the risks to consumers and investors, and that the intermediaries be obliged to comply with the requirements of the Anti-Money Laundering and Counter-Terrorism Financing (AML/CTF) framework.

In France, the PACTE law⁹ governs the provision of digital asset services by subjecting intermediaries to the relevant rules concerning AML/CTF. Under the French system, after obtaining the assent of the *Autorité de contrôle prudentiel et de résolution* (ACPR), **token** issuers must register with the Financial Markets Authority (AMF). They can then apply for AMF approval, which will ensure that the offering incorporates guarantees to protect investors and prevent any abuse. This approval is optional, although issuers that have not obtained AMF approval will not be able to sell to the general public. The provisions of the PACTE law on crypto-assets are to be reviewed in line with the proposed European Markets in Crypto-Assets Regulation (MiCA) (see Section 3.4.2 on the MiCA regime).

As a result of these developments, regulations will need to be constantly reviewed to maintain a fair balance between innovation and security, so as to meet several objectives: benefiting fully from the potential efficiencies and savings brought about by innovation, protecting consumers, preserving financial stability and making sure that all parties can benefit from innovation, particularly in the form of new services and cost reductions. This balance can only be achieved by means of appropriate and proportional rules, based on the risk profile of the service provided and not on the nature or legal status of the service provider.

3.4. Promoting a suitable regulatory framework

3.4.1. International projects

To counter the risks created by crypto-assets, including stablecoins, while taking technological developments into account,

regulators around the world have been examining the adequacy of their national laws. The generally held view is that although the regulations are agnostic in relation to technology, they still do not enable the identified risks to be addressed with certainty, and are based on premises that radically innovative technologies, such as blockchain, call into question. To restore legal certainty, there is therefore a need for clarification. In addition, in a world of cross-border payments and financial asset trading, the modification of national systems must involve implementing regulatory principles commonly accepted at the international level. An overall coherence is required to avoid regulatory arbitrage and address risks currently not covered, such as those relating to fair competition and the transmission of monetary policy. A regulatory approach by activity (same activity, same rules) contributes towards ensuring a level playing field with the other actors within a business segment, and helps prevent regulatory arbitrage risks. However, this kind of approach does not appear to sufficiently address the systemic challenge of the projects, in particular the potential porosity (transfer of resources, data and risks) between their different regulated activities, which are thus separately regulated, and their extremely strong growth as a result of significant networking effects. A complementary approach of regulating by entity would therefore be needed to regulate the entity globally, in light of their dominant and systemic nature.

Consequently, following the announcement of the Diem project (formerly known as Libra) – which was abandoned at the start of 2022 – the finance ministers and governors of the G7 central banks had agreed that the initiatives regarding stablecoins would need to meet the highest regulatory standards, be subjected to increased supervision and monitoring, and that any regulatory differences would need to be evaluated and dealt with as a priority. In the meantime, the G7 has requested that no stablecoin projects be launched until the legal, regulatory and supervisory risks have been satisfactorily dealt with through the adoption of clear and

⁹ Law 2019-486 of 22 May 2019 relating to the growth and transformation of companies <https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000038496102/> The PACTE law, which today provides a framework for the provision of crypto-asset services in France, will be replaced by provisions comparable with those of the MiCA Regulation that will cover the same scope.

appropriate legislation proportionate to the risks. Following these announcements, the Financial Stability Board (FSB) published a report in October 2020 identifying ten recommendations for the regulation and supervision of global stablecoins (GSCs).¹⁰ The international standard setting bodies (FATF, BCBS and CPMI-IOSCO) are incorporating these recommendations into the sector standards concerning AML/CTF norms, as well as prudential norms and market infrastructure supervisory norms.¹¹ In its report of February 2022, the FSB reasserted its intention to continue monitoring the evolution of GSCs and closely follow the concrete implementation of its recommendations.¹²

These principles form the basis of an international consensus that will need to be reflected in the regulation and practices of supervisors at the national level. With regard to prudential concerns, the BCBS has released its proposals concerning the prudential treatment of crypto-assets other than central bank digital currencies (CBDC) for public consultation.

3.4.2. European projects: MiCA, CSDR pilot regime and revision, DORA

European regulators are involved in this approach. On 24 September 2020, the European Commission presented a package of digital finance measures in the framework of its new industrial strategy for Europe. It includes two European proposed regulations, one of which relates to markets in crypto-assets (Markets in Crypto-Assets (MiCA) regulation)¹³ and the other aimed at establishing a pilot regime for market infrastructures based on distributed ledger technology¹⁴ (DLT pilot regime). Besides these two legislation projects is a European proposed regulation for digital operational resilience – the Digital Operational Resilience Act (DORA).¹⁵

MiCA regulation

The MiCA proposed regulation is aimed at setting up a harmonised and complete

European regulatory framework. It will govern crypto-asset issuers and crypto-asset service providers, and establish a supervisory system shared at the national and European levels, making it possible to subject crypto-assets to a regulatory framework that will serve to protect the financial system as well as European users. To this effect, the MiCA regulation, as drafted by the European Commission, distinguishes between three categories of crypto-assets for which more specific provisions are proposed: two types of stablecoins, (i) asset-referenced tokens (ART) (crypto-assets pegged to several legal currencies or other types of asset) and (ii) electronic money tokens (EMT) (crypto-assets pegged to one single legal currency and subject to the electronic monetary system) and (iii) the “other crypto-assets” category, which includes utility tokens (which grant a purchasing right on the product financed by initial coin offering (ICO) fundraising). The purpose of distinguishing between (i) and (ii) is to adjust the regulation of stablecoins depending on the nature of their underlying asset. According to the “same business, same risks, same rules” principle, the prudential system for EMTs would essentially be the same as that applicable to electronic money issuers, whereas the system for ARTs is less restrictive (no general reimbursement obligation on the part of the issuer). MiCA also provides for the status of “significant” ART and EMT issuers, subject to stricter requirements.

For these three types of crypto-assets, MiCA includes requirements relating to rules for issuance, governance, equity, information and protection of investors, management and custody of assets from the reserve, orderly business termination plan and resolution. Furthermore, MiCA governs the supply of crypto-asset services. It subjects service providers to prudential and organisational requirements for the custody of their clients’ crypto-assets and funds, conflicts of interest and outsourcing. Crypto-asset issuers and crypto-asset service providers will need to be established in the EU and obtain prior authorisation from the competent national authority. The regulation also includes provisions aimed at preventing market abuse.

10 FSB, “Regulation, Supervision and Oversight of ‘Global Stablecoin’ Arrangements”, 13 October 2020. A monitoring of the implementation of its recommendations has been performed by the Regulatory Issue of Stablecoins (RIS) working group of the FSB: [Progress report on the implementation of the FSB high-level recommendations](#), October 2021.

11 CPMI-IOSCO formed a group in which the Banque de France participates to analyse the applicability of the Principles for Financial Market Infrastructures (PFMI) to the associated transfer of stablecoins, and launched a public consultation (October to December 2021) on its draft report which concluded that the PFMI are applicable to the transfer of systemic stablecoins. Link to the CPMI-IOSCO public consultation on the supervision of GSCs, 6 October 2021.

12 See [Assessment of Risks to Financial Stability from Crypto-assets \(fsb.org\)](#)

13 Regulation proposal on markets in crypto-assets, and amending Directive (EU) 2019/1937 (Com/2020/593 final).

14 Regulation proposal on a pilot regime for market infrastructures based on distributed ledger technology (COM/2020/594 final).

15 Regulation proposal on the digital operational resilience of the financial sector, amending Regulations (EC) No. 1060/2009, (EU) No. 648/2012, (EU) No. 600/2014 and (EU) No. 909/2014.

The pilot regime

The purpose of the proposal for a regulation regarding the pilot regime is to create an exceptional and temporary regulatory framework that enables multilateral trading facilities (MTF) and securities settlement systems (SSS) to experiment using DLT in the form of security tokens to transfer transferable securities. The regulation includes giving the competent national authorities the power to authorise exemption requests from the provisions applicable under the Markets in Financial Instruments Directive (MiFID 2)¹⁶ and the Central Securities Depositories Regulation (CSDR)¹⁷ that might be incompatible with the use of DLT. The European Securities and Markets Authority (ESMA) would play the role of coordinator for experiments at the European level, without the power of issuing binding opinions on the competent national authorities.

The pilot regime would satisfy three objectives: (i) facilitate the development of a secondary market for tokenised financial instruments, (ii) promote the use of DLT in the post-market domain and (iii) determine whether it is appropriate, following the test phase, to modify the EU legislation in force to support innovation.

From this point of view, the introduction of the pilot regime as envisaged by the

European Commission in its “Digital finance package” facilitates conducting tests of real significance on the issuance of securities currently subject to the CSDR. By easing the terms for the issuance and transfer of these securities under certain conditions, the proposed regulation allows for the finality of book entry transfers of these securities on the shared ledger itself, thereby removing the restriction for their replication in a system maintained by a CSD.

DORA

Ultimately, the proposal for DORA is intended to ensure that virtually all the entities in the financial sector (including the banking/ insurance sector, administrators of reference indexes and crypto-asset service providers and issuers) implement the necessary guarantees to mitigate the risks of cyber-attacks. The regulation is aimed at requiring all companies to put suitable measures in place to resist all kinds of IT-related disruptions and threats. To this end, it establishes a direct oversight framework for critical IT providers by financial supervisors, including cloud IT service providers.

The Commission seeks to completely deploy the regulatory framework by 2024, in particular by proposing the delayed entry into force of MiCA 18 months after its publication, in order to give private actors time to adapt to the new legislation.

16 Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Directive 2002/92/EC and Directive 2011/61/EU.

17 Regulation (EU) No. 909/2014 of the European Parliament and of the Council of 23 July 2014 on improving securities settlement in the European Union and on central securities depositories and amending Directives 98/26/EC and 2014/65/EU and Regulation (EU) No 236/2012.

Box 5: The regulation of crypto-assets: focus on the United Kingdom and the United States

United Kingdom

The British government adopted an ambitious digital strategy ([the UK digital strategy](#)) in March 2017 aimed at making the United Kingdom “the best place in the world to start and grow a digital business”

Under this strategy, the crypto-asset regulation projects were launched in March 2018 by the British authorities, with the implementation of a crypto-assets taskforce in which Treasury, the Financial Conduct Authority (FCA) and the Bank of England (BoE) participated. The conclusions of this taskforce, as published in its [final report](#) in October 2018, can be summarised as follows:

.../...

“DLT has the potential to deliver significant benefits in both financial services and other sectors. The three authorities will continue to support its development and will take action to: (a) mitigate the risk that cryptoassets pose to consumers and market integrity; (b) prevent the use of crypto assets for illicit activity; (c) guard against threats to financial stability that could emerge in the future; and (d) encourage responsible development of legitimate DLT and cryptoasset-related activity in the UK.”

Following this report, the three authorities continued to pursue their projects. For example:

In January 2019, the **FCA** launched a consultation which led to the publication of [Guidance on Crypto-assets](#) in July 2019, aimed, in particular, at clarifying the distinction between crypto-assets subject to regulation and those that are not, as well as the resulting obligations.

In its Financial Stability Report of [December 2019](#), the BoE adopted the principle “Where stablecoins are used in systemic payment chains as money-like instruments, they should meet standards equivalent to those expected of commercial bank money”.

The **BoE** launched a [consultation](#) in June 2021 on new forms of digital money, addressing both global stablecoins and CBDC (see *supra*, Box 3). The [summary of responses](#) to this consultation was published in March 2022, and on the same day the BoE published a [report](#) by its Financial Policy Committee (crypto-assets and decentralised finance) that analysed the risks of crypto-assets to financial stability and proposed a series of indicators to monitor these risks. On 4 April 2022, the Deputy Governor of the BoE and the Chief Executive Officer of the Prudential Regulation Authority, published a declaration (a “Dear CEO” letter) reminding banks and investment companies exposed to activities involving crypto-assets, especially bitcoin and stablecoin, of their prudential obligations and announcing the launch of an investigation into their exposure to crypto-assets.

The **Treasury** (HMT) launched a [consultation](#) in January 2021 on the regulation of crypto-assets (UK regulatory approach on crypto-assets and stablecoins). The [summary of responses](#) to this consultation was published on 4 April 2022. The conclusions drawn by the Treasury are summarised as follows in the document’s introduction:

“This response document confirms the government’s intention to take the necessary legislative steps to bring activities that issue or facilitate the use of stablecoins used as a means of payment into the UK regulatory perimeter, primarily by amending existing electronic money and payments legislation. The rationale for doing this is that certain stablecoins have the capacity to potentially become a widespread means of payment including by retail customers, driving consumer choice and efficiencies. It is, further, the government’s intention to consult later this year on regulating a wider set of cryptoasset activities, in view of their continued growth and uptake worldwide.”

On the same day (4 April 2022), the British government published a [press release](#) reaffirming the goals that were previously set forth in the UK digital strategy in 2017:

“The government has today announced moves that will see stablecoins recognised as a valid form of payment as part of wider plans to make Britain a global hub for cryptoasset technology and investment (...). This is part of a package of measures to ensure the UK financial services sector remains at the cutting edge of technology, attracting investment and jobs and widening consumer choice.”

.../...

United States

Faced with a fast-growing market and a regulatory framework that is not harmonised at the federal level, crypto-asset regulation work was launched in July 2021, led by the President's Working Group on Financial Markets. This group, presided by the US Department of the Treasury, is composed of the Securities and Exchange Commission (SEC), the Federal Reserve (FED) and the Commodity Futures Trading Commission, and involves the Federal Deposit Insurance Corporation (FDIC) and the Options Clearing Corporation (OCC). Its [report on stablecoins](#) was published in November 2021 and its primary recommendations can be summarised as follows:

- stablecoin issuers should be insured depository institutions;
- custodial wallet providers should be subject to appropriate federal oversight;
- stablecoin issuers should comply with limits on their affiliation with commercial entities.

Furthermore, inter-agency collaboration (OCC, FED, FDIC) was demonstrated in the second semester of 2021, through the organisation of a series of [policy sprints](#) focusing on crypto-asset-related activities conducted by the banking sector. The entities agreed on a roadmap to clarify in 2022 which of the crypto-related activities conducted by this sector will be authorised.

In March 2022, the US President Joe Biden signed an executive order on [Ensuring Responsible Development of Digital Assets](#) and CBDC (see above, Box 3). It defines, in particular, the objectives of the United States (to establish a framework of confidence while reinforcing American leadership in this segment) and outlines a coordination mechanism between the different departments and federal agencies to produce different analyses of the risks and consequences of the development of crypto-assets. In this respect, this executive order invites the Secretary of the Treasury to prepare a report on the regulation of digital crypto-assets by October 2022, based in particular on the analyses already conducted by the President's Working Group on Financial Markets.¹

The overall spirit of this executive order is summarised as follows in the [fact sheet](#) issued by the White House:

“The rise in digital assets creates an opportunity to reinforce American leadership in the global financial system and at the technological frontier, but also has substantial implications for consumer protection, financial stability, national security, and climate risk. The United States must maintain technological leadership in this rapidly growing space, supporting innovation while mitigating the risks for consumers, businesses, the broader financial system, and the climate. And, it must play a leading role in international engagement and global governance of digital assets consistent with democratic values and US global competitiveness.»

¹ “Within 210 days of the date of this order, the Secretary of the Treasury should convene the FSOC and produce a report outlining the specific financial stability risks and regulatory gaps posed by various types of digital assets and providing recommendations to address such risks (...) The report should take account of the prior analyses and assessments of the FSOC, agencies, and the President's Working Group on Financial Markets, including the ongoing work of the Federal banking agencies, as appropriate.” (Executive Order, Section 6 b).”