

CBDC, STABLECOINS AND BEYOND: A DEEP DIVE INTO NEW FORMS OF DIGITAL MONEY

CRYPTOTECHNOLOGIES, SMART PAYMENTS AND STABLECOINS WORKING GROUP

The Cryptotechnologies, Smart Payments and Stablecoins Working Group¹ of the Euro Banking Association conducted six discussion meetings in the second half of 2021 with experts from its member community and several guest speakers from the banking and tech community dealing with cryptocurrencies. The results of this discussion are summarised in this paper.

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INTRODUCTION

In 2021, the EBA Cryptotechnologies, Smart Payments and Stablecoins Working Group (CWG) published "Digital currencies: a first look at potential challenges and opportunities for banks" which explored how to prepare for and benefit from the emergence of cryptocurrencyenabled smart payments and manage the challenges that their adoption may present. Since the publication of the last report, the COVID-19 pandemic has accelerated and increased the usage of digital payments. While it is unclear to which extent consumer payment habits have changed permanently due to the pandemic, the past two years have shown that there is a need for further exploration of alternative, digital payment solutions, potentially including new forms of digital money.

But what are these new forms of digital money and how should banks prepare themselves for their implementation and adoption? In this paper, we discuss Central Bank Digital Currencies (CBDC) and privately issued stablecoins (either bank or third-party issued), both of which have become increasingly topical over the past year. According to the Atlantic Council's CBDC tracker, 81 countries are now exploring CBDC, compared to only 35 countries in May 2020.2 In July 2021, the European Central Bank (ECB) announced that it had launched the investigation phase for a digital euro project following months of experimental work, public consultation, and industry outreach, while other prominent central banks such as the Bank of England and the Federal Reserve have also started engaging their banking industries with a view towards developing their own CBDC.3 Meanwhile, the People's Bank of China has conducted advanced pilot projects for its e-CNY, which is expected to launch this year. Along with

Considering these trends, banks should familiarise themselves with relevant use cases, underlying technologies, and potential value-added services related to the adoption of CBDC and stablecoins as well as associated risks. Staying current and not missing any valuable information can be difficult in such a dynamic space. However, the importance of staying up to date with current developments cannot be overemphasised given the significant impact that they can have on the status quo. Navigating this space requires engagement, not only through industry for aand dialogue, but also through new types of public-private partnerships.4 With the outlook still unclear, banks should be proactive in engaging with a broad range of stakeholders.

This report aims to broaden the understanding of CBDC and stablecoins for EBA members and to better inform industry discussion and preparations for the possible implementation and adoption of these innovations. It aims to (i) clarify the potential use cases and benefits, (ii) outline key design choices necessary for CBDC and stablecoins, and (iii) highlight crucial areas for further research and engagement for central banks, commercial banks, and other relevant stakeholders.

growing interest in and development of CBDC, usage and adoption of privately issued stablecoins has increased significantly. Big Techs also remain a powerful market force in the space given the continued development of stablecoins.

² https://www.atlanticcouncil.org/cbdctracker/

https://www.ecb.europa.eu/press/pr/date/2021/html/ecb. pr210714~d99198ea23.en.html

An example of such a public-private partnership is the collaboration between the Federal Reserve Bank of Boston and the Massachusetts Institute of Technology (MIT) exploring a possible new digital dollar. https://dci.mit.edu/research/2022/2/3/mit-news-title

1 - ARE NEW FORMS OF DIGITAL **MONEY NECESSARY?**

The adoption of instant payments and open banking in many parts of the globe has helped to further digitalise payments and add value for consumers. Moreover, the proliferation of mobile money and digital wallets in developing markets has improved access to digital financial services for the unbanked. With so many digitalisation efforts in payment systems and transaction banking, some industry stakeholders may wonder why new instruments such as CBDC or stablecoins are needed. To answer this question, it is crucial to define the potential needs and use cases of any CBDC or stablecoin initiative. The key consideration here is whether these new forms of digital money offer better solutions to existing initiatives to modernise payment infrastructures and banking systems. It is of equal importance to weigh any potential benefits against the associated risks, such as – to name a few – the impact on credit creation, the resilience of the overall payments ecosystem and implications for environmental sustainability. This section explores these questions to offer further clarity around the "why" behind these innovations.

1.1 PROBLEMS THAT NEW FORMS OF **DIGITAL MONEY COULD SOLVE**

While there is tremendous public and private sector interest in exploring new forms of digital money, a lack of understanding of the specific problems that these new forms of digital money could effectively target remains. 6 However, some of the more general problems that could potentially be addressed via these new forms of digital currencies include the following:

Digitialisation of the economy. The increased digitalisation in many economies that has been accompanied by the decline in physical cash usage is quickly becoming a major policy issue. One logical consequence is to introduce a trusted means of payment issued by central banks that exists only in a digital context.7 Such an approach could be relevant not only for highly digitalised economies but also for rapidly digitalising cashbased economies.

Enhancement of international cross-border payments.8 Globally interoperable CBDC may offer an opportunity to simplify and enhance the performance of international cross-border payments through improved speed, cost, and accessibility.9 Similarly, stablecoins issued by global platforms have the potential to enable end users in different markets to conduct business and commerce. Moreover, the adoption of a payment instrument based on a shared infrastructure across network participants could reduce operational inefficiencies and allow for simpler and more automated back-office processes, many of which are currently happening manually and with the involvement of various intermediaries.

Lack of privacy when making digital **payments.** In a future state of the world in which almost everything is digitalised, privacy concerns may grow among consumers and businesses. While legislation like the General Data Protection Regulation (GDPR) in Europe has created a strong framework for data privacy and security, there is still a lack of digital payment solutions that have some degree of anonymity. The availability of a semi-anonymous CBDC or stablecoin would fill this gap, although the need for Know-Your Customer (KYC) and Anti-Money Laundering (AML) compliance would still need to be evaluated.

Continued lack of access to digital financial services for the unbanked. Financial inclusion remains a key policy issue in many markets, with a large swath of the global population still unable to access a bank account or make digital payments. Tokenised digital money, which may not require access to a bank account, could offer an alternative solution for giving underserved communities access to digital finance ecosystems.

1.2 ADDITIONAL POTENTIAL **BENEFITS OF ADOPTING NEW FORMS OF DIGITAL MONEY**

While CBDC and stablecoins are potentially powerful tools for addressing the problems associated with digital payments today, it is not yet entirely clear in how far they would add value beyond what current efforts to improve existing networks and infrastructures are in the process of delivering. For example, while the lack of interoperability between payment infrastructures is technically addressed through the adoption of common data messaging standards (e.g., ISO 20022), initiatives such as the Bank for International Settlements' Project Nexus and SWIFT's global payments innovation (SWIFT gpi) initiative also look at underlying business rules and agreements thereby tackling inefficiencies in crossborder payments at the scheme layer. Moreover, markets with a high adoption of mobile money and e-wallets have already seen major improvements in financial inclusion. 10 However, new forms of digital money not only target short-term issues in the financial services industry. A key argument for its adoption is the further benefits that could be generated through the development of programmable money and the further digitalisation of society. These additional benefits include the following:

Promote new types of programmable payments. While programmable payments already exist today, with direct debits as a prime example, the wide adoption of programmable CBDC or stablecoins could serve as the basis for a new type of digital economy and allow for the Internet of Things (IoT) to reach its full potential.

⁶ The majority of CBDC projects today, including the ECB's digital euro project, have indicated that any CBDC instrument would seek to complement, not replace, cash.

⁷ The Swedish Riksbank has cited the decline in physical cash usage as one of the reasons it is pursuing the issuance of an e-krona. https://www.riksbank.se/globalassets/media/rapporter/ekrona/2017/rapport_ekrona_uppdaterad_170920_eng.pdf

⁸ https://www.fsb.org/work-of-the-fsb/ financial-innovation-and-structural-change/ cross-border-payments/

⁹ Some form of standardisation would be a pre-requisite to avoid a fragmented global CBDC landscape and enable domestic CBDC to be interoperable.

¹⁰ https://www.mckinsey.com/~/media/mckinsey/industries/ financial%20services/our%20insights/mobile%20 money%20in%20emerging%20markets%20the%20 business%20case%20for%20financial%20inclusion/ mobile-money-in-emerging-markets.pdf

⁵ Some of the potential risks that new forms of digital money could bring were highlighted in a discussion paper by the Bank of England in mid-2021. https://www.bankofengland.co.uk/paper/2021/

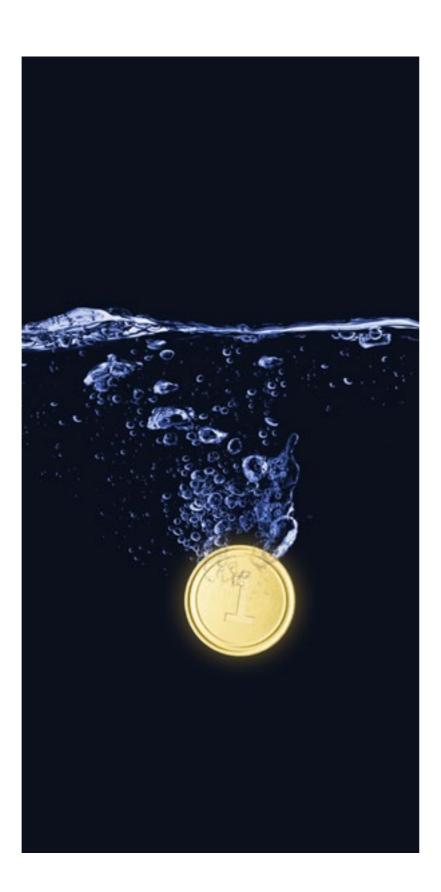
new-forms-of-digital-money

This could be achieved through DLT-based digital money or through more traditional technologies¹¹ such as APIs.¹² Programmable CBDC or stablecoins could be leveraged to improve user experience for utility bills or e-commerce transactions by making various processes faster and more efficient. Other uses could include split payments, where the transaction is automatically divided into parts (e.g., taxes), or conditional payments (e.g., funds disbursed for a car loan could only be used at car dealerships).

Facilitate direct disbursements. The wide availability of a digital cash equivalents has the potential to simplify the process of disbursing money to consumers and businesses, such as public benefits or insurance pay-outs. For example, a CBDC could allow the government to distribute stimulus funds more easily, thereby improving the effectiveness of fiscal stimulus during crises.

Create a new paradigm for regulatory supervision. CBDC and stablecoins could serve as the basis for increased transparency and improved supervision of crypto-asset service providers. This in turn could improve AML and Counter-Terrorist Financing (CTF) efforts to hinder the illicit flows of funds.

¹² https://www.federalreserve.gov/econres/notes/fedsnotes/what-is-programmable-money-20210623.htm



2. COMPARISON OF CBDC AND STABLECOINS

With a better understanding of the "why" behind new forms of digital money, this next section will dive into and distinguish the different types of alternative digital money to provide greater clarity regarding appropriate potential use cases and opportunities for banks in the future.

2.1 DIFFERENCES BETWEEN CBDC AND STABLECOINS IN TERMS OF DEFINITION

CBDC and stablecoins are often conflated but are quite different. CBDC is a risk-free liability of a central bank and a digital representation of fiat currency. In contrast, stablecoins are issued by a private entity within a closed-loop system. They can exist in two forms: first, as a form of third-party issued digital currency that is pegged to a reference currency (or asset, or a basket of currencies or assets); and second, as a digital representation of a demand deposit claim existing on a DLT-based network.¹³ In the case of the first form, the issuer aims to maintain a 1:1 peg to the reference currency by holding the equivalent amount of reserves, or through another form of collateralisation, while the second form is linked to demand deposit holdings.14

2.2 HISTORY AND MAIN DRIVERS

When Bitcoin and other cryptocurrencies first came onto the world stage, there was much interest in and optimism around how they would revolutionise payments. Although their volatility eventually hampered their adoption for payments purposes, many saw the potential of the DLT technologies underlying them to improve the speed, cost, and efficiency of making payments. In response, the idea of a DLT-based digital currency pegged to a reference currency was born, with the first public blockchain-based stablecoin issued in 2014.15 However, this type of stablecoin has remained largely a speculatory tool to date, with recent growth and adoption occurring simultaneously with the increase of the Decentralised Finance (DeFi) market. 16 Stablecoins issued by banks purely for fund transfers are very rare given regulatory and operational constraints, although there are a few examples (e.g., JP Morgan, Sygnum Bank).

Regarding CBDC, the general idea of allowing citizens direct access to digital central bank money has been floating around the field of economics for decades, long before CBDC was conceived. The announcement in the summer of 2019 of Facebook's foray into the space of digital currencies as well as the seriousness with which China has approached the e-CNY created a sense of urgency around potential threats from privately-issued digital currency to the existing global monetary order. Since then, many central banks have joined the CBDC bandwagon, including the five major benchmark currencies of the world.

^{11 &}quot;Demystifying programmable money: How the next generation of payment solutions can be built with existing infrastructure" – article by Erwin Kulk and Petra Plompen of EBA CLEARING: https://www.henrystewartpublications.com/jpss/v15

¹³ https://hbr.org/2021/08/ stablecoins-and-the-future-of-money

Other types of collateralisation of stablecoins could include commodity-based collateralisation or collateralisation via other cryptocurrencies. The value of stablecoins can also be maintained through algorithmic control of the stablecoins supply.

¹⁵ https://hedera.com/learning/what-is-a-stablecoin

¹⁶ https://www.imf.org/-/media/Files/Publications/ GFSR/2021/October/English/ch2.ashx

¹⁷ https://www.suomenpankki.fi/en/money-and-payments/ central-bank-digital-currency/

¹⁸ https://www.federalreserve.gov/newsevents/speech/ brainard20200205a.htm

¹⁹ https://www.bis.org/publ/bppdf/bispap114.pdf

2.3 RELIABILITY AS A STORE OF VALUE

As a risk-free liability of the central bank, there is no question as to the reliability of CBDC as a store of value. In contrast, the reliability of privately issued stablecoins solely relies on end-user trust in the issuer's ability to meet redemptions. Commercial banks issuing stablecoins are already subject to strict regulatory oversight and must meet stringent capital and liquidity requirements and offer deposit insurance. They also have access to central bank liquidity and therefore may be perceived as less likely to "fail". In contrast, the value of stablecoins issued by non-commercial banks is simply a matter of end-user trust in the issuing entity, generated through transparency around its reserve holdings and its commitment to meeting redemptions. Third-party issuers have adopted a range of strategies for creating end-user trust, such as having their reserve management processes externally audited.²⁰ If trust in the stablecoin issuer erodes, the issuer may be subject to runs.

2.4 KEY USE CASES

Most of the major CBDC projects today are retail focused, including the digital euro project, China's e-CNY, and Sweden's e-krona pilot. While the key use cases vary by project and jurisdiction, there has been much focus on facilitating use for consumers and households. There have also been several CBDC projects that have explored CBDC for wholesale use, particularly in the cross-border payments space. Some examples include Project Jasper in Canada, the Hong Kong Monetary Authority and Bank of

Thailand's Inthanon-LionRock and Project Ubin in Singapore.²¹

The limited data that exists regarding motivations for stablecoin usage suggest that key use cases at present are related to accessing DeFi and crypto-asset capital markets. However, stablecoins could arguably be used for any number of retail and wholesale use cases, from POS/e-commerce, to payroll, lending, and others.²² In the commercial bank space, JPMCoin is used to facilitate instant cross-border intrabank transfers and cheaper intra-day liquidity management for clients.²³ In 2020, Sygnum Bank launched a token referencing the Swiss franc (DCHF) that has been used to make e-commerce payments.²⁴

2.5 LEGAL CONTEXT IN EUROPE

In many jurisdictions, uncertainty regarding how crypto-assets and their providers will be treated by regulators has hampered implementation and adoption. Although Europe has an advanced framework for the regulation of digital payment services, with legislation like the EU's Electronic Money Directive (EMD2) and Second Payment Services Directive (PSD2), stablecoins and tokenised assets are out-of-scope of the current regulatory framework. The planned implementation of the EU's Regulation of Markets in Crypto-assets (MiCA) in 2022 will change this, adding token-based forms of e-money to the existing legislative framework and only allowing banks and Electronic

Money Institutions (EMI) to become issuers.²⁵ For stablecoins specifically, it will introduce a bespoke framework for issuers whose market volumes exceed "significant" thresholds, requiring such institutions to publish a white paper as well as strict due diligence requirements.

Comparison Table							
	CBDC	Private stablecoins					
Issuer	Sovereign	Banks	Unregulated third party (e.g., non-bank, BigTech, corporation, fintech, etc.)				
Definition	Digital representation of fiat currency	Digital representation of demand deposit claim, existing on blockchain rails	Cryptocurrency designed to have stable value against a reference currency or asset				
Store of value	Risk-free central bank liability, 1:1 exchange with fiat currency	Designed to be 1:1 with demand deposit claim. Strict regulatory regime serves as basis to preserve representation of deposit claim.	Designed to be 1:1 with reference currency or asset. Stability is achieved through buying back coins at par and holding highly liquid reserve assets to back obligations (or other methods) and perceived trust of the issuer.				
Key use cases to date	P2P transfers, POS/e- commerce, domestic/ cross-border interbank settlement	Cross-border intrabank payments, intra-day liquidity management for corporates	Providing access to Decentralised Finance (DeFi) and crypto capital markets				
Examples	Bahamian Sand Dollar, e-CNY (China), e-Naira (Nigeria)	JPM Coin, Sygnum's Digital CHF (DCHF)	USDC (Circle), potential successor of Diem (Facebook)				

²⁰ For example, US-based stablecoin issuer Circle publishes monthly reports of its reserve holdings, which are attested to by an external auditor.

²¹ https://www.pwc.com/gx/en/industries/financial-services/ assets/pwc-cbdc-global-index-1st-edition-april-2021.pdf

²² https://medium.com/stably-blog/ top-use-cases-and-benefits-of-stablecoins-4f1ceab57d00

²³ https://medium.com/coinmonks/ the-interesting-use-cases-of-jpm-coin-3cbe1b747e1f

²⁴ https://ico.li/galaxus-customers-can-now-shop-withsygnums-swiss-franc-stablecoin/

²⁵ https://eur-lex.europa.eu/legal-content/EN/ TXT/?uri=CELEX%3A52020PC0593

3. SYSTEM DESIGN AND FUNCTIONALITY

Despite the plethora of CBDC and stablecoin initiatives being pursued in Europe and beyond, there are only a few live implementations. The Bahamas Sand Dollar was the first live CBDC implementation in October 2020, and Nigeria's e-Naira went live in October 2021. China's e-CNY has also gone live with pilot projects in selected cities but has yet to go live nationally.

Outside of these few examples, much remains unknown about the ultimate system design and functionality for most CBDC and stablecoin projects. But despite these unknowns, many design principles can already be outlined based on current digitalisation initiatives, and the goals that CBDC and stablecoin initiatives have already outlined. Along these lines, the G7 recently published a policy brief outlining public policy principles for CBDC.²⁶ The next section will explore the major design principles and necessary functionality that can help guide the development and operation of CBDC and stablecoin networks.

3.1 COEXISTENCE WITH EXISTING INFRASTRUCTURES

CBDC and stablecoin networks will very likely develop alongside existing payment systems and other financial networks. Central banks in particular have stressed the fact that CBDC will be a supplement to existing infrastructures, not a replacement.²⁷ Even if a CBDC network expands and eventually leads to the shutting down of legacy payment systems in the long term, there will always be a need for these networks to

communicate with other systems to validate a customer's (digital) identity or integrate information that is relevant to a transaction (e.g., insurance, asset ownership, or tax registration information). As such, interoperability with other networks should be assumed for any CBDC or stablecoin network and become part of these networks' core functionalities from the outset.

This includes the need to interoperate between CBDC networks using centralised ledgers and DLT-based stablecoin networks as well as between CBDC or stablecoin networks and legacy payment systems. This may be enabled on the technical level through common APIs or protocols. There are many technology and design choices a central bank needs to make that will impact future interoperability.²⁸ However, the most complex issue to be solved will be the governance and scheme rules that determine how messages are exchanged between these networks, liability and indemnity for stakeholders interacting in as well as service levels for end users using different networks. CBDC may also serve as a "bridge network" between legacy payment systems and various stablecoin initiatives offered by banks or third-party payment providers.

3.2 ROLE OF INTERMEDIARIES

CBDC has the potential to drastically alter the composition of the financial services industry. A central bank-issued digital currency could be offered directly to end users by allowing consumers and businesses to hold digital wallets at the central bank, in parallel to the management of end-user payment accounts by banks and other payment service providers. Such a design could

lead to fundamental changes for the fabrics on which banking is built.

This is one of the reasons, amongst others, why no central bank is currently exploring offering retail CBDC directly to end users, and CBDC will almost certainly be distributed to end users via banks and other payment service providers – as is done today using flat currency in legacy payment systems. However, this does not mean that banks would see no impact from the potential adoption of new forms of digital money. Indeed, banks could see increased funding costs due to retail deposit outflows, which could have profound implications for the cost of credit and credit creation. While central banks and policy makers are certainly aware of these risks, it is worth emphasising their significance.

3.3 ACCESS

CBDC and stablecoins have the potential to expand access to digital financial services for the unbanked. However, achieving this is not a given and requires a holistic approach. Many factors must be considered in ensuring feasible access for consumers as well as businesses, including the cost of the devices required for using and storing digital currency (e.g., smartphones), access to and the reliability of mobile networks, as well as the technical abilities and skills of end users.

3.4 PRIVACY

The level of privacy accorded to end users is a key consideration for central banks as they develop their own digital currencies. For example, should all transactions include identifying information of both sender and receiver, or can transactions of smaller amounts allow for a level of anonymity that mimics the exchange of cash? The design choices

around privacy and anonymity will influence the interrelationship with privacy regulations such as the GDPR as well as regulatory requirements such as AML and sanctions screening.

3.5 SECURITY

Both a market-relevant stablecoin and a CBDC will be obvious high-level targets for large-scale cyber-attacks. Aside from the potential financial losses associated with such an event, the impact on the issuer's credibility would be significant. Therefore, cyber-security threats and mitigation solutions should be carefully assessed, with business continuity and disaster recovery planning being seen as critical to maintaining the resilience of any CBDC or systemically important stablecoin infrastructure.²⁹

3.6 FLEXIBILITY TO SCALE

All new financial infrastructures need to account for the need to scale transaction volumes as new participants join and end user adoption grows. This is as true for CBDC and stablecoin initiatives as it is for instant payment systems. Networks will have to scale not only volumes but functionality as well. Both CBDC and stablecoins aim to smooth not just digital commerce but digital interactions more broadly. This will require these networks to incorporate or embed functionality that goes beyond the mere exchange of funds. Examples of additional functionality include smart contracts, programmable money, digital identity services, and fraud prevention services among others. The type of additional functionality needed will evolve as use

²⁶ https://assets.publishing.service.gov.uk/government/ uploads/system/uploads/attachment_data/file/1025235/ G7_Public_Policy_Principles_for_Retail_CBDC_FINAL.pdf

²⁷ See the Bank of England's report, "Central Bank Digital Currency: Opportunities, challenges and design," March 2020, p. 6.

²⁸ Decisions to be made include but are not limited to: should the digital currency be token- or account-based? Should it be based on DLT and if yes, which kind?

²⁹ See Principle 4 of the G7's Public Policy Principles of Retail CBDCs: https://assets.publishing.service.gov.uk/ government/uploads/system/uploads/attachment_data/ file/1025235/G7_Public_Policy_Principles_for_Retail_ CBDC_FINAL.pdf

4. KEY IMPLICATIONS

expands and CBDC and/or stablecoins become integrated into other digital platforms. Any CBDC or stablecoin network being developed today will need to have a level of flexibility that allows these networks to evolve as digital services expand.

3.7 SUPPORT FOR OFFLINE PAYMENTS

As described in various reports by the Bank for International Settlements, offline payment support may improve operational resilience of a system as well as its acceptance and availability by offering a similar convenience to using cash. This feature would also be of particular importance for developing markets or remote geographies with unreliable internet access. A key consideration in the design of a CBDC system is the question whether the system should support offline payments as this will have a major impact on how transactions are recorded on the ledger, be it a DLT or centralised ledger.30 China's e-CNY supports payments from devices without online connectivity such as smart cards or passive devices.31 Offline payment support is a requirement of the ECB included in their October 2020 report on the digital euro and is likely to be a key feature of many CBDC projects.

The successful development of CBDC and stablecoin networks would be a game changer for financial services and the digital economy. But CBDC and stablecoins do not merely represent a new option for digital payments alongside legacy infrastructures and networks. The introduction of CBDC and stablecoins will have major implications for legal and regulatory frameworks, the reach of digital payments, and transaction banking business models.

Expanded access requires expanded supervision. By expanding access to digital payments and central bank funds to new players beyond banks, CBDC and stablecoins will necessarily expand supervisory duties for regional and national authorities. This will require a review and potential expansion of existing regulatory frameworks as well as a re-thinking of business processes and technology used in regulatory compliance. In Europe, existing regulatory frameworks such as the E-Money Directive and the second Payment Services Directive (PSD2) may also apply to CBDC, and the European Commission's Regulation of Markets in Crypto-Assets (MiCA) proposal seeks to cover crypto assets such as stablecoins. But even with proper regulatory frameworks in place, supervision of CBDC and stablecoins will provide an opportunity to re-think how regulatory supervision and regulatory compliance are practiced and a level playing field can be ensured. Regulators could benefit from more automated controls for supervision of digital currency transactions, while banks and non-bank payment service providers could automate compliance processes even more than today. While the introduction of CBDC and stablecoin will not require developing new supervisory frameworks from the ground up, they will require a new approach from regulators and the industry alike.

Impact on transaction banking business models and incentivising banks. The challenges of developing CBDC go beyond the design of a CBDC network and the governance and regulatory frameworks that surround it. While the ECB and other major central banks have publicly announced that they do not intend to bypass banks and other legacy payment service providers in the provision of CBDC, there is still much uncertainty around how to incentivise these service providers to use a CBDC and how banking business models will need to evolve as digital currencies are introduced into the market. With CBDC and stablecoins both existing alongside legacy currencies and payment systems, central banks and other stakeholders will have to explore how to incentivise payment service providers to use a digital currency. Traditional transaction banking business models that rely on transaction fees for payments are likely not appropriate in a world of always-on, instant digital payments – especially as smart payments and the machine-to-machine economy grow. Banks will need to work with regulators and other industry stakeholders to determine what drives revenue in a CBDC and stablecoin world. Central banks may explore whether to make a CBDC interest-bearing to spur adoption, although this has not been the case to date. Partnerships with merchants and digital platforms could also be pursued to make it easier for end users to send and receive stablecoins. Government agencies and public administration bodies will play a critical role in promoting the use of CBDC. If these issues are not tackled during the design phase of a CBDC network, there is a risk that adoption will be low and innovation in the digital currency space will be hampered.

Domestic vs. cross-border CBDC and stablecoin. The last decade has seen an explosion of payment system modernisation initiatives in domestic markets as well as

³⁰ https://www.ecb.europa.eu/euro/html/digitaleuro-report.

³¹ https://www.chinadaily.com.cn/a/202012/16/ WS5fd94b02a31024ad0ba9c08d.html

innovations in the cross-border space from players such as SWIFT, the Bank for International Settlements, and the G20.32 For both instruments, the cross-border dimension should be front and centre from the outset. As the purview of national central banks, most CBDC initiatives will first be aimed at domestic markets. But the inefficiencies and high cost of cross-border payments also offers a huge opportunity for CBDC. Ensuring crossborder CBDC functionality will require engagement between national central banks and payment service providers operating in multiple markets. Central banks could also engage with stablecoin providers offering cross-border digital currency to help determine how CBDC and stablecoin may complement each other in this space. A failure to address these issues could ultimately impede the effectiveness and benefits of CBDC and stablecoins for consumers and businesses alike.

³² https://www.fsb.org/wp-content/uploads/P131021-1.pdf







5. CONCLUDING OBSERVATIONS AND AREAS FOR FUTURE RESEARCH

The introduction of CBDC and stablecoins into the payments ecosystem is likely to result in greater competition from new entrants and third parties. There is still time for banks to experiment and explore potential use cases and investigate possible value-added services as well as any risks associated with new forms of digital money. Incumbent institutions should consider exploring ways to leverage their competitive advantages in the context of these technological developments.

Last, the CWG has identified several questions related to CBDC in general, a digital euro in particular, and the development of stablecoins, that would benefit from further exploration:

- Which types of intermediaries should be allowed to distribute a digital euro? Should non-banks be granted direct access? What would be the benefits and risks of doing so?
- How much privacy should end users be afforded in using a digital euro?
- Will a digital euro affect regulation and compliance issues such as reporting requirements and anti-money-laundering rules? How can regulators best support the adoption of a digital euro?
- What are the major challenges that a digital euro faces in terms of merchant acceptance? How could these challenges be mitigated? How should business models be adapted?
- How will usage of a digital euro be treated outside of the euro area but within the EU? How can a digital euro be positioned to increase the attractiveness of its use as an international form of payment in non-euro area countries with close linkages to the euro area?

- What will it take to transform a digital euro into programmable money? If programmable money (e.g., CBDC or stablecoin) is widely adopted, who will be authorised to program it? Who will verify or audit the programming instructions?
- Outside of DeFi and improved access to cryptocurrency markets, what are some potential cases for third-party issued stablecoins in Europe?
- What likely impact will MiCA and other regulations have on the development and adoption of stablecoins in Europe?
- How can interoperability between domestic CBDC be achieved? How can interoperability be enabled between CBDC, stablecoin and legacy systems?

As the development of new forms of digital money moves forward in Europe and beyond, the CWG will continue to identify key issues for exploration and engage with regulators and other industry stakeholders to help ensure that their introduction will help benefit the wider payments ecosystem.

GLOSSARY

The following definitions are based on Working Group discussions as well as references to industry authorities such as the BIS, ECB, and others.

Blockchain: A sub-set of distributed ledger technology (DLT) that records transactions and assets on a ledger in "blocks" of transactions that are linked together each time the ledger is updated. Blockchain is often used interchangeably with DLT in the financial services industry. While all blockchains are forms of DLT, not all DLTs are blockchains.

Central Bank Digital Currencies (CBDC):

The CPMI defines a CBDC as "a digital form of central bank money that is different from balances in traditional reserve or settlement accounts." A CBDC can leverage cryptotechnologies such as DLT/blockchain or be based on a centralised database. A CBDC can also be general use (retail) or only available to registered financial institutions (wholesale). Most CBDC initiatives today are retail CBDC. A CBDC differs from traditional fiat currency in that it does not have a physical equivalent and, in the case of retail CBDC, can be distributed to consumers and businesses (either through a financial institution or theoretically directly from a central bank).

Central bank money: Central bank money is a term used to refer to deposits held at the central bank and cash brought into circulation by the central bank. Central bank money refers to direct liabilities of the central bank.

Commercial bank money: Commercial bank money is a term that refers to the portion of a currency generated by commercial banks. Banks create commercial money through the use of fractional reserve banking to create account balances and make loans worth more than the value of the central bank money that they hold.

Cryptocurrency: A form of digital currency that uses cryptographic methods to validate and secure each transaction recorded to a decentralised ledger without a centralised authority.

Cryptotechnologies: A shared, uniform ledger that is replicated among all participants over a network of interconnected computers. Security and reliability are ensured using cryptography and control of the ledger is decentralised among participants in the network, meaning that there is no single authority responsible for updating and maintaining the ledger.

Digital currency: A currency that exists only in digital form and is exchanged through a digital network (i.e., there is no paper-based or other non-digital form of the digital currency). The legal status of a digital currency may vary depending on the issuer of the currency. A central bank-issued digital currency (CBDC) may have the same legal status as fiat currency, while privately issued digital currencies such as Bitcoin may not be legally recognised as currency and may rather be considered a digital asset.

Distributed ledger technology (DLT): A type of cryptotechnology that distributes data using a cryptographically secured consensus mechanism.

Smart contract: A protocol that enables a cryptocurrency to automatically execute a function stipulated in a contract once a trigger event occurs. For example, the exchange of ownership of an asset could occur automatically once a payment is executed. Smart contracts allow legally enforceable stipulations to be automated as part of the design code of a cryptocurrency or DLT network.

Programmable payment: A form of payment that leverages smart data and that can be made autonomously in real time without manual intervention. A programmable payment can be based on DLT/blockchain or on a centralised database model.

Stablecoin: A cryptocurrency whose value is tied to one or more fiat currencies or another stable asset to ensure a stable value.

Third party: An entity providing financial services that is neither a central bank nor a registered financial institution.

Fiat currency: A government-issued currency that is considered legal tender in a specific jurisdiction. Fiat currency can include both physical banknotes and coins as well as electronic reserves made available to financial institutions with a reserve account at the central bank. Fiat currency is fully backed by the government that issues it and is not backed by another commodity such as gold.

³³ BIS: "Central bank digital currencies: foundational principles and core features," 2020, p. 3. https://www.bis. org/publ/othp33.pdf

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