

IANUS

Diritto e Finanza



UNIVERSITÀ
DI SIENA
1240

Rivista di studi giuridici

<https://www.rivistaianus.it>



ISSN: 1974-9805

n. 22 - dicembre 2020

DIGITAL EURO: OPPORTUNITY OR (LEGAL) CHALLENGE?

Pier Mario Lupinu

DIGITAL EURO: OPPORTUNITY OR (LEGAL) CHALLENGE?°

Pier Mario Lupinu¹

*PhD Candidate in Banking and Finance Law,
University of Luxembourg - Università degli Studi Roma Tre*

«The euro belongs to Europeans and we are its guardian. We should be prepared to issue a digital euro, should the need arise.» (C. Lagarde, European Central Bank)

Al giorno d'oggi, nell'area dell'euro vi sono due modi in cui la banca centrale fornisce denaro alla propria economia. Il primo consiste nell'emissione di banconote, mentre il secondo si esprime attraverso l'accreditamento elettronico dei depositi sui conti correnti che gli istituti di credito detengono presso la banca centrale. Negli ultimi cinque anni, a seguito sia dell'aumento della digitalizzazione dell'economia moderna sia dell'esempio di economie egemoniche (come la Cina), la possibile introduzione di una nuova forma di moneta per fornire un mezzo di pagamento sicuro e stabile ai cittadini dell'area dell'euro ha avuto il potere di creare un interesse crescente verso soluzioni così ambiziose. Di conseguenza, in un futuro molto prossimo potremmo sperimentare un modo diverso in cui funziona il denaro. Ci riferiamo al mondo inesplorato delle valute digitali della banca centrale (central bank digital currencies - CBDC). Mentre i progetti per la creazione di valute digitali della banca centrale stanno esplodendo in tutto il mondo, tale interesse è guidato da vari motivi che verranno analizzati in questo saggio, tra cui la necessità di reagire a iniziative private per la creazione di criptovalute e stablecoin e, una crescente domanda di strumenti e prodotti finanziari digitali veloci e interconnessi.

Nell'area dell'euro, anche se è stato recentemente avviato il dibattito per la creazione di un Euro digitale, la BCE ha dimostrato di essere già impegnata in indagini, consultazioni pubbliche e discussioni con «focus group» con l'obiettivo di fornire a cittadini, imprese e intermediari uno strumento di pagamento «pubblico» adatto ad una nuova era digitale. In questo quadro, il ruolo di una valuta digitale della banca centrale dell'Eurosistema sarà analizzato da un punto di vista giuridico. In primo luogo, a parte le ragioni sopra menzionate che hanno portato alla creazione di una CBDC, sarà fondamentale esaminare la struttura e il «design» dell'Euro digitale, insieme ai suoi obiettivi e alle esigenze dei suoi utenti. Di conseguenza, mentre indagheremo sul quadro giuridico che consentirà l'introduzione di questa moneta digitale, attraverso una leggera revisione di modelli simili adottati (o in adozione) da altri paesi, cercheremo di valutare se delle problematiche giuridiche potrebbero ostacolare la realizzazione di questo progetto o la sua effettiva attuazione, soprattutto per quanto riguarda l'impatto sulla politica monetaria, il ruolo internazionale dell'euro e il settore bancario.

In the euro area today, there are two ways in which the central bank provides money to its economy. The first consists in the issue of physical banknotes, while the second is expressed through the electronic accreditation of deposits on current accounts that credit institutions hold at the central bank. In the last five years, following both the increase in the digitalisation of the

° Double blind peer-reviewed paper.

¹ PhD Candidate in Banking and Finance Law at University of Luxembourg and Roma Tre University, supported by the Luxembourg National Research Fund (FNR) – 10965388.

modern economy and the example of hegemonic economies (such as China), the possible introduction of a new form of currency to provide a safe and stable mean of payment to citizens of the euro area has had the power to create a growing interest towards such ambitious solutions. As a result, in the very near future we could experience a different way in which money works. We refer to the uncharted world of central bank digital currencies (CBDC). While projects for the creation of central bank digital currencies are booming all around the world, such interest is driven by various reasons that will be analysed in this paper, including the need to react to private initiatives for the creation of cryptocurrencies and stablecoins and, an increasing demand for fast and interconnected digital financial instruments and products.

In the euro area, even if the debate for the creation of a Digital Euro has recently started, the ECB has proven to be already engaged in investigations, public consultations, and discussions with focus groups with the aim to provide European citizens, firms, and intermediaries with a “public” payment instrument suitable for a new digital era. In this framework, the role of a Eurosystem central bank digital currency will be analysed from a legal perspective. First, apart from the abovementioned reasons leading to the creation of a CBDC, it will be crucial to examine the structure and design of the Digital Euro, together with its objectives and the needs of its users. Consequently, while investigating on the legal framework which will permit the introduction of this digital currency, through a light review of similar models adopted (or in adoption) by other countries, we will seek to assess whether legal issues might hinder the realisation of this project or its actual implementation, especially concerning the impact on monetary policy, the international role of the euro and the banking sector.

Summary:

1. Introduction
2. Background
3. The birth of alternative currencies
4. From alternative to crypto (and digital) currencies
5. Road to the Digital Euro
6. Models of CBDC and the Digital Euro
7. Features and risk accompanying the adoption of the Digital Euro
8. Key legal challenges
9. Concluding remarks

1. Introduction

A challenging and forward-looking project such as the digitalisation of central bank money has the potential to act as an engine for the growth of a sector that suffers from the absence of a big player able to compete with internal and external market rivals, other central bank digital currencies and private initiatives as cryptocurrencies and stablecoins of a global reach. We already briefly signalled that, in the euro area, the project of issuing this new form of money is the result of two main reasons. First, the need of more digital, fast and accessible means of payment which is the product of a strong digitalisation of our economies, accompanied by a considerable decrease in the use of cash, especially driven by the ongoing pandemic and, second, a steady increase of online purchases. Making payments more digital is not only a key concern for the European economy as such but, as we will see, it will have strong implications with regards to the international role of the euro.²

At the same time, crypto assets, an innovative and entirely private type of money, are aiming at positioning themselves as a parallel form of mean of payment next to the traditional ones, those made through central bank or commercial bank money. This particular innovation in the panorama of currencies and means of payment is raising, among others, financial stability concerns. The real possibility of BigTechs (i.e., Google³ and Facebook⁴) joining the race to create their own private currencies creates the risk to disrupt monetary sovereignty, which has been in the hands of public institutions for centuries and which would have an impact that goes way beyond monetary policy or the economy as such. Scholars agree on additional risks that can be brought by crypto currencies, which range from «counterparty risk, liquidity

² The influence of a Digital Euro for the international role of the euro is explored in EUROPEAN CENTRAL BANK, *The international role of the Euro*, June 2021. Available online at: <https://www.ecb.europa.eu/pub/ire/html/ecb.ire202106~a058f84c61.en.html> and PASSACANTANDO, *Could a digital currency strengthen the euro?*, May 2021, *LUISS Policy Brief*, 9. Available online at: <https://sep.luiss.it/sites/sep.luiss.it/files/Could%20a%20digital%20currency%20strengthen%20the%20euro.pdf>.

³ See JOHNSON, *Google Goes Blockchain? New Deal Opens A Door To Crypto*, May 2020, *Forbes*. Available online at: <https://www.forbes.com/sites/coryjohnson/2020/05/27/google-goes-blockchain/?sh=1f75b42a6593>.

⁴ In 2019, Facebook's CEO Mark Zuckerberg announced a stablecoin project called Libra. See LIBRA ASSOCIATION MEMBERS, *White Paper*, 2020. Available online at: https://wp.diem.com/en-US/wp-content/uploads/sites/23/2020/04/Libra_WhitePaperV2_April2020.pdf.

risk and business continuity»⁵, together with an issue which is under the eyes of everyone, their strong exposure to volatility. Those unconventional market developments have had the «benefit» to create awareness among central banks and policy makers of the need to reflect and possibly intervene on the issue. While central banks have always shown their willingness to support financial innovation, they should always guarantee, in line with their main objectives, financial stability and widespread access to money and payment systems, together with duties such as the prudential monitoring in order to avoid malfunctions of markets and intermediaries.

Concerning the structure of this paper, we believe that next to the theoretical analysis of forms and tools that are going to compose the Digital Euro, in order to identify legal issues, we need to provide the necessary space to discussions and experiments that central banks inside and outside Europe have undertaken to assess the validity of such innovative project for the future of payments. Indeed, technical issues relating to accessibility, security and privacy are of equal importance: the success and approval (i.e., degree of trust) of the Digital Euro among citizens and, ultimately, the credibility of the ECB itself will depend on how they will be addressed. More in detail, as we will focus on legal issues surrounding the project of a Digital Euro, it will be instrumental to proceed analysing all the various arguments according to the reasons for which the ECB might be definitively persuaded to adopt such digital currency. In brief, having in mind the report on the digital euro⁶ as a reference base, we will take into account different design options, for example, related to an online or offline system or whether such system will depend on a centralised interface owned and managed by the central bank or if it will function through a series of authorised intermediaries.

Therefore, what will convince the ECB to definitively engage in the adoption of a Digital Euro? Several options are envisaged and will be analysed in this paper. Here we will shortly introduce them.⁷ First of all, taking example

⁵ FASQUELLE, *CBDC: how central banks approach innovation*, February 2021, in *ESCB Legal Conference 2020*, 183. Available online at: <https://www.ecb.europa.eu/pub/pdf/other/ecb.escblegalconferenceproceedings2020~4c11842967.en.pdf>.

⁶ EUROPEAN CENTRAL BANK, *Report on a digital euro*, October 2020. Available online at: https://www.ecb.europa.eu/pub/pdf/other/Report_on_a_digital_euro~4d7268b458.en.pdf.

⁷ Apart from what analysed in this paper, the BIS provides a brief but concise analysis of the benefits of CBDC for current monetary systems. See BANK FOR INTERNATIONAL SETTLEMENTS, *CBDCs: an opportunity for the monetary system*, 2021, *BIS Annual Economic Report 2021*. Available online at: <https://www.bis.org/publ/arpdf/ar2021e3.pdf>.

from the case of Sweden,⁸ the ECB could be motivated as a result of a significant decline in the use of cash throughout the Eurosystem and a subsequent preference for digital means of payment. In this case, we argue that a Digital Euro would need to allow offline solutions,⁹ which are closest to cash and that will be particularly useful for vulnerable groups. Such model should also be free of charge and anonymous,¹⁰ raising obstacles that are going to be examined in the text. Another reason could be a serious advancement of a foreign “competing” CBDC (as the Chinese Digital Yuan) or, especially, private initiatives (as stablecoins) that could become widely used in the euro area. This would have implications for trade and, therefore, for the international role of the euro. The one who will lead the race, once all major economies will adopt their own CBDC, could have a significant advantage at the world stage. Additionally, monetary sovereignty could be put at risk if private digital currencies will be able to provide financial services with more attractivity in comparison to public solutions. This could weaken national monetary policy and become a threat for central banks and their autonomy, being one of their fundamental features. Also, whoever entity or platform, public or private, that will “host” the largest share of transactions will definitely gather a prominent position in consideration to the amount of sensitive data that it will store. Undeniably, we all have learned that today’s value of data is almost countless.

As a consequence of the competition that the ECB would have to face (or that is already facing), it would have to consider building a currency that performs better than private services. Apart from the user-friendliness, the Digital Euro could outperform private currencies by better mitigating risks such as cyberattacks or failures of technological infrastructure due to extreme events like pandemics or natural disasters.¹¹ Likewise, it will be crucial to

⁸ GIFF, *The risks (and benefits) of Sweden’s proposed e-krona*, June 2020, *Europeanceo*. Available online at: <https://www.europeanceo.com/finance/the-risks-and-benefits-of-swedens-proposed-e-krona/>.

⁹ Offline solutions would also facilitate the recognition as legal tender. See BINDSEIL, *Issuing a digital euro*, 2020, *ESCB Legal Conference 2020*, 177. Available online at: <https://www.ecb.europa.eu/pub/pdf/other/ecb.escblegalconferenceproceedings2020~4c11842967.en.pdf>.

¹⁰ Although it acknowledges that some degree of regulatory oversight is needed, the ECB supports the anonymity of the Digital Euro. See ARNOLD, *Digital euro will protect consumer privacy, ECB executive pledges*, June 2021, *Financial Times*. Available online at: <https://www.ft.com/content/e59e5d61-043a-4293-8692-f8267e5984c2>.

¹¹ Cfr. EUROPEAN CENTRAL BANK, *Report on a digital euro*, 33-34.

maintain resilience of the payment system and the separation from ordinary payment systems that are already in place.

In our opinion, one of the main issues that are under examination in this paper is the recognition of the Digital Euro as legal tender. Other legal matters concern more practical aspects as the distribution, access to the currency and supervision. Furthermore, as we will see towards the end of this paper, we will identify implications both for monetary policy and the banking sector. Concerning the former, monetary policy could benefit of a more effective implementation through the establishment of a direct relationship between the central bank and the general public, favoured by the digitalisation of money. However, for the latter, the disintermediation of payment systems might represent a threat to euro area banks and, consequently, to financial stability. Therefore, those issues require further analysis in order to make certain that the creation and the development of the Digital Euro will operate in parallel, or synergy with the banking sector, but not against it.

2. Background

It is important to state that, in the current panorama of the means of payment, virtual or digital currencies would exist along other forms of dematerialised money, we refer to currency having legal tender not existing in physical form or, in other words, e-money (or mobile money). While public and private law discipline official currencies regardless of whether they are in the form of cash or in a dematerialised form (i.e., on bank accounts), in most jurisdictions we do not encounter regulation of crypto or virtual currencies that have been recently developed and that enjoy great circulation in markets. When we speak of private virtual cryptocurrencies, Bitcoin usually comes first to our minds for its underlining technology which characterises specific protocols that express the form in which these alternative currencies circulate.¹² In order to better understand the role of these new virtual currencies, we need to do a step behind. First of all, we should analyse what is meant for money through its traditional and legal notion. This can be done from a functional and from a legal point of view. The former is typically related to the economic approach, in relation to its function as a unit of

¹² On difference between Bitcoin and electronic money, see ROTMAN, *Bitcoin Versus Electronic Money*, January 2014, *Consultative Group to Assist the Poor*, World Bank. Available online at: <https://openknowledge.worldbank.org/bitstream/handle/10986/18418/881640BRI0Box30WLEDGENOTES0Jan02014.pdf?sequence=1>.

account, a medium of exchange (or a form of payment) and a store of value, meaning something that can be stored and spent in the future. Alongside traditional forms of money, we can make use of private or alternative currencies, which are digital, as cryptocurrencies, but not exclusively.

From a legal point of view, what qualifies money as being an official currency having a legal tender is the function that becomes relevant in payments, represented by the fact that whatever payment is made using an official currency, it will lawfully discharge the payer.¹³ This means that the payment will discharge his/her debt and the creditor is obliged to accept such payment, if made in official currency. In the field of private law, an official currency is associated with principles of public order regulating the payment of debts or the repayment of loans. According to such rules, inspired by the principle of nominalism¹⁴ and expressly qualified in national codes (or specific statutes), when a person receives a sum in national tender, unless there is a different agreement among the parties, he/she is entitled to repay and be lawfully discharged when giving back the exact same sum undertaken as an obligation, even if several years pass from the first payment, therefore regardless of inflation.

3. The birth of alternative currencies

Having set the above framework, it is possible now to speak about (dematerialised) assets or digital/virtual entities which aim to embed the function of money. We should warn that such assets do not necessarily coincide with what is official money from a legal point of view, as explained in the previous section. In order to clarify the legal boundaries in which virtual assets are moving, it is useful to make a parallel with ordinary banknotes. The latter are authorised by our legal systems via norms that are based on principles associated the idea of the sovereign as the entity which guarantees that there is trust in a specific medium of exchange. This is associated with traditional ideas of money of intrinsic value (i.e., gold or silver coins) tied to the material which it was made of. With the evolution of the economy, we gradually began to see the birth of notes of exchange and paper money until

¹³ See Commission Recommendation of 22 March 2010 on the scope and effects of legal tender of euro banknotes and coins, OJ L 83, 30.3.2010, 70.

¹⁴ See MILTON MARTIN, *The Principle of Nominalism*, April 1963, 14 *Philosophical Studies: An International Journal for Philosophy in the Analytic Tradition*. Available online at: https://www.jstor.org/stable/4318440?seq=1#metadata_info_tab_contents.

we reached the current dematerialisation of money, for which the material is not important as it is tied only to the national entity, the central bank which ensures that there is trust in the money that circulates. Likewise, we experienced several developments concerning means of payment, from those consisting in coins with intrinsic value, to paper money and other titles representing value that, starting in 1920s and 1930s, and following the Bretton woods agreements¹⁵ signed the end of gold standards. In brief, this system worked via national currencies (i.e., pound, dollar) that could be converted into a certain fix amount of gold, having an intrinsic value. This means that pound bills that were circulating represented a title with an underlining value in gold. However, when the gold standard was abandoned,¹⁶ we remained with is known as fiat (or paper) currency. Arguably, all of these circumstances created the basis for the creation of modern payment systems, for the circulation of dematerialised money and, as a result, for the creation and circulation of alternative or, at the moment, unofficial forms of money. More into detail about modern payment systems, we should distinguish between official ones carried out by intermediaries (e.g., private banks) and the so-called surrogates of official currency. While the first are guaranteed by central banks and include recognised, disciplined and regulated “ordinary” payments systems (e.g., bank transfers), the others, created under private initiatives, are used for payments which perform the function of means of exchange and that qualify as e-money.¹⁷ Nevertheless, they exist and are regulated under EU level legislation¹⁸ which states that it is considered as electronic money a «stored monetary value as represented by a claim on the issuer which is issued on receipt of funds for the purpose of making payment transactions».¹⁹ This

¹⁵ GHIZONI, *Creation of the Bretton Woods System*, November 2013, *Federal Reserve History*. Available online at: <https://www.federalreservehistory.org/essays/bretton-woods-created>.

¹⁶ RICHARDSON, KOMAI AND GOU, *Roosevelt's Gold Program*, November 2013, *Federal Reserve History*. Available online at: <https://www.federalreservehistory.org/essays/roosevelts-gold-program>.

¹⁷ See EUROPEAN CENTRAL BANK, *Electronic Money*. Available online at: https://www.ecb.europa.eu/stats/money_credit_banking/electronic_money/html/index.en.html

¹⁸ See EUROPEAN COMMISSION, *E-money*. Available online at: https://ec.europa.eu/info/business-economy-euro/banking-and-finance/consumer-finance-and-payments/payment-services/e-money_en.

¹⁹ Article 2(2) Directive 2009/110/EC of the European Parliament and of the Council of 16 September 2009 on the taking up, pursuit and prudential supervision of the business of electronic money institutions amending Directives 2005/60/EC and 2006/48/EC and repealing Directive 2000/46/EC (e-Money Directive). Please note that Article 2(2) refers to Directive 2007/64/EC has been repealed by Directive (EU) 2015/2366 (PSD2).

intermediary ensures that against the payment of funds in the official currency, it will take care of making the payment order, for this reason this system is sometimes been defined as “open system” for the possibility to make the payment to anybody.

The circulation of dematerialised money is the natural consequence of the fact that we have allowed values to be stored in bank accounts available to be transferred in a non-physical manner which, as a result, has opened the possibility for non-official or alternative forms of money to be created and to circulate. This last point is interesting when we look at private digital currencies. When talking about the latter, we refer to a wider category, that of alternative currencies. Alternative currencies can be digital (e.g., Bitcoins) or physical (e.g., Sardex).²⁰ For the sake of this study we will focus on the digital model, but it is important to state that both types are non-official currencies which are not (yet) recognised by States. For the time being, they enjoy a certain recognition to circulate in the digital platforms which support them. However, they cannot be considered at the same level as official currencies, because they’re mostly unregulated by national and international bodies, although they follow rules established by the private organisation, companies, or programmers that created them. The increasing attention towards them is not only related to their innovativeness but also with regards to the fact that many of them are convertible with official currencies²¹ despite such conversion is not guaranteed by central banks, or governments.²² In this sense, States, central banks and (more generally) monetary authorities are not stopping the possibility for such digital currencies to circulate and for consumers in their States (or Member States if we refer to the Eurosystem) to purchase and exchange them with fiat currency.²³ From a legal point of view,

²⁰ Sardex can be considered as a pure mean of payment which, unlike Bitcoin, deals strictly with goods and services that can be exchanged, using Sardex, within its local community. It is present on the financial scene of the island of Sardinia, in Italy, since 2008 with the aim to give a pulse to the local economy that had been strongly hit by the Global Financial Crisis. See POSNETT, *The Sardex factor*, September 2015, *Financial Times*. Available online at: <https://www.ft.com/content/cf875d9a-5be6-11e5-a28b-50226830d644>.

²¹ Including the euro.

²² The case of El Salvador which recently announced the recognition of Bitcoin as legal tender is definitely curious. See RENTERIA, WILSON AND STROHECKER, *In a world first, El Salvador makes bitcoin legal tender*, June 2021, *Reuters*. Available online at: <https://www.reuters.com/world/americas/el-salvador-approves-first-law-bitcoin-legal-tender-2021-06-09/>.

²³ However, it is important to mention that certain States, as for example China, are taking an active stance against cryptocurrencies created and managed by private companies (such as Bitcoin) by prohibiting its banks and payment institutions to «providing services related to cryptocurrency

we could frame those activities in the sphere of transactions between natural persons or legal entities within their freedom to conclude lawful contracts. While this has numerous advantages which have been largely mentioned in this paper and in almost all the conferences and discussions on digital currencies, one of the main side effects for consumers and businesses which engage in such type of digital transactions is the possibility to incur various risks as counterparty risk, fraud and volatility. Thus, in the name of the digitalisation of our economies, by virtue to the absence of an official regulation, recognition and/or authorisation, we have opened to the highest risk represented by the possibility of the loss of the funds “invested” (or converted into digital currencies) without the protection granted by States as it happens, for example, to bank deposits.²⁴

4. From alternative to crypto (and digital) currencies

After having described how we arrived at the conception of alternative currencies and, especially, of virtual/digital currencies, we can now concentrate our attention on cryptocurrencies, in order to closely approach the market and financial innovation reasons that have encouraged the birth of CBDC. Cryptocurrencies are named after the cryptographic technologies which are used to certify related transactions. Such cryptocurrencies are the product of protocols which have been developed, Bitcoin being the prominent one, on the base of a distributed ledger technology (DLT). Such technology allows for two models, meaning that the entity wishing to create a digital currency can choose between a centralised model, which can be public or private, or a decentralised model.²⁵ The Distributed Ledger Technology is a database distributed on different nodes or IT devices, which participate separately and independently in the network, where they replicate and save a copy of the ledger. What is important is the complete absence of a central authority in command, there is no arbitrator, and each node that proceeds with the registration and the rescue, works independently.

transactions», especially mentioning the possible speculative nature of such investments. See SHEN AND SIU, *China bans financial, payment institutions from cryptocurrency business*, May 2021, *Reuters*. Available online at: <https://www.reuters.com/technology/chinese-financial-payment-bodies-barred-cryptocurrency-business-2021-05-18/>.

²⁴ We refer here to the 100.000€ threshold of protected deposits by the Deposit Guaranteed Schemes in the European Union. See Directive 2014/49/EU of the European Parliament and of the Council of 16 April 2014 on deposit guarantee schemes.

²⁵ Bitcoin belongs to this group.

The principle on which the DLT is based is consent through voting. At each update, each node performs a vote to ensure that the majority agrees with the conclusion reached. Consent is the algorithm that, once resolved, automatically allows the database to be updated on all nodes, which will receive a copy. We must highlight that blockchain is, essentially, a special form of DLT. Blockchain, in fact, is the only form of DLT that uses a chain of blocks to provide consent to the distributed ledger. Likewise, also blockchain, as it is managed by peer-to-peer networks, can exist without any central authority and uses an algorithmic consensus to proceed with the database update. This feature is of a particular importance for our study, as the absence of a central control is a big source of risk for existing private virtual currencies. When shaping the Digital Euro, the ECB should have to take into account this issue as it needs to preserve ownership and control over monetary policy tools, including this CBDC.

The rise of the blockchain technology can be attributed to the launch by Satoshi Nakamoto of a white paper in 2008 on Bitcoin,²⁶ at the moment, the world's most famous cryptocurrency. However, blockchain technology allows a variety of uses and interactions other than cryptocurrencies, one of the leading being the smart contracts. All the uses which are related to financial products and instruments can be included in the sphere of the Decentralized Finance (DeFi), which differs from traditional finance due to the absence of intermediaries and central authorities, such as central banks, which, among other things, are involved in authorising and supervising the entities that deal with today's private finance. As we said, while blockchain is "out" around 10 years, DeFi is a relative recent concept of a blockchain-based finance dating late 2018.²⁷ DeFi is an ensemble of protocols which allow financial development, thus with a similar objective compared to traditional financial products with whom DeFi is in competition, because it collects funds without those being in the hands of a single company, entity, or owner. While the traditional financial system is based on intermediaries (i.e., banks) the DeFi system has the objective to put in contact all the users that want to use financial instruments without going through intermediaries (peer to peer). In this sense,

²⁶ See NAKAMOTO, *Bitcoin: A Peer-to-Peer Electronic Cash System*, 2008. Available online at: <https://bitcoin.org/bitcoin.pdf>.

²⁷ The term DeFi, short for decentralized finance, was born in an August 2018 Telegram chat between Ethereum developers and entrepreneurs including Inje Yeo of Set Protocol, Blake Henderson of 0x and Brendan Forster of Dharma. Cfr. RUSSO, *What Is Decentralized Finance?: A Deep Dive by The Defiant*, September 2020, *Coinmarketcap.com*. Available online at: <https://coinmarketcap.com/alexandria/article/what-is-decentralized-finance>.

surplus units will go to deficit units similarly to what happens in the financial markets, without the intervention of an intermediary exercising the delegated monitoring function which is typical of banks. However, while financial markets are regulated and under the supervision of central authorities, DeFi products are permissionless and decentralised. Such alternative currencies are considered fully convertible and, therefore, being part of an open system, which means that private currencies claim to be convertible to fiat currencies at any time, considering that they “work” in a digital environment which operates (in general)²⁸ without interruption, unlike the stock market where world’s official currencies are exchanged during the “opening hours” of such regulated markets. Those are issues that the ECB will have to take into account when it will have to choose the form of the Digital Euro, as it will have balance benefits and risks to answer to the new demands of the European citizens in terms of environmental protection, financial stability and resilience of the payment systems’ infrastructure. The approach of the regulators towards digital currencies has been that of running behind and sometimes “chasing” private initiatives. This is not an isolated case but, on the contrary, it is what usually happens when we talk about financial innovation and regulatory arbitrage.²⁹ In addition, public organisations issued warnings³⁰ and undertook

²⁸ Digital currencies are not entirely exempt from blockades as they are subject to the proper functioning of the servers where the blockchain, or better, the DLT environment in which they are created and “stored”. Indeed, in case of power shutdowns, system failures and other similar events can interfere with their performance. In addition, cryptocurrencies have been systematically under attack for environmental concerns related to their strong energy consumption, which in turns increased their volatility and exposure to losses. See CUTHBERTSON, *Bitcoin price: Did a power cut in China cause crypto collapse?*, April 2021, *Independent*. Available online at: <https://www.independent.co.uk/life-style/gadgets-and-tech/bitcoin-price-china-power-cut-b1834446.html> and ROWLATT, *How Bitcoin's vast energy use could burst its bubble*, February 2021, *BBC*. Available online at: <https://www.bbc.com/news/science-environment-56215787>.

²⁹ Regulatory arbitrage on cryptocurrencies had already been flagged in 2019. On the matter, see MANAA ET AL., *Crypto-Assets: Implications for Financial Stability, Monetary Policy, and Payments and Market Infrastructures*, May 2019, *ECB Occasional Paper No. 223*. Available online at: <https://www.ecb.europa.eu/pub/pdf/scopops/ecb.op223~3ce14e986c.en.pdf>.

³⁰ See the EUROPEAN BANKING AUTHORITY, *Warning to consumers on virtual currencies*, EBA/WRG/2013/01. Available online at: <https://www.eba.europa.eu/sites/default/documents/files/documents/10180/598344/b99b0dd0-f253-47ee-82a5-c547e408948c/EBA%20Warning%20on%20Virtual%20Currencies.pdf?retry=1> and EUROPEAN SUPERVISORY AUTHORITIES’ JOINT WARNING, *ESMA, EBA and EIOPA warn consumers on the risks of Virtual Currencies*, March 2021. Available online at: <https://www.eba.europa.eu/sites/default/documents/files/documents/10180/2139750/313b7318-2fec-4d5e-9628-3fb007fe8a2a/Joint%20ESAs%20Warning%20on%20Virtual%20Currencies.pdf?retry=1>.

studies so as to identify whether such digital transactions or investments in digital (private) currencies could be subject to taxation.³¹ What is clear and unanimous among all these regulatory attempts is that we are experiencing a lack of uniformity, even if there are ongoing projects and efforts to fight fragmentation.³² Indeed, this issue has been flagged both by the Group of 20 (G20)³³ and, subsequently, by the Financial Stability Board (FSB).³⁴ When talking about regulatory aspects, the major concern that emerges from current debates is that the ensemble of the digital currencies of private nature do not enjoy the status of legal tender in major economies as they did not receive such recognition. Apart from rare exceptions, they are not universally accepted, and this should not be confused with the fact that they are currently allowed to circulate in private platforms. Indeed, this is one of the main reasons why central banks and governments all over the world are joining the race for the possible adoption of CBDC. Nevertheless, even if they are proliferating at a fast pace, their worldwide market allocation is still limited³⁵ also due to the fact that they are banned or in the process to be banned in many countries. The circulation of “money” lacking the status of legal tender is an

³¹ In 2015, following a request for a preliminary ruling from the Swedish Supreme Administrative Court concerning the possibility to consider transactions exchanging fiat currencies into Bitcoin (or vice versa) to be taxed under Value added tax (VAT) rules, the European Court of Justice in Case C-264/14, ECLI:EU:C:2015:718, ruled that «the exchange of traditional currencies for units of the ‘bitcoin’ virtual currency and vice versa [...] are transactions exempt from VAT» also definitely labelling Bitcoin as a currency and not as a “simple” property. However, this does not mean that Bitcoins are exempt from any taxes. Bitcoin and similar virtual currencies are exempt from VAT, but they are under the consideration of each EU Member State fiscal regime, which means that these transactions are taxed, or not in different ways and percentages. For example, in Germany if the amount of the transaction is below 600 euros it is exempted from tax, but even if the amount is higher than that, it is sufficient to keep possession of these currencies for at least one year to avoid paying taxes. See Einkommensteuergesetz (EStG) § 23 Private Veräußerungsgeschäfte. Available online at: https://www.gesetze-im-internet.de/estg/_23.html.

³² A study from the Bank for International Settlements (BIS) tries to give some indication for a wider and harmonised regulation of cryptocurrencies, see AUER AND CLAESSENS, *Regulating cryptocurrencies: assessing market reactions*, September 2018, BIS QUARTERLY REVIEW. Available online at: https://www.bis.org/publ/qtrpdf/r_qt1809f.pdf.

³³ See GROUP OF 20, *Communiqué, G20 Finance Ministers and Central bank Governors Meeting, Buenos Aires*, March 2018. Available online at: https://www.mof.go.jp/english/policy/international_policy/convention/g20/180320.htm.

³⁴ See FINANCIAL STABILITY BOARD, *Crypto-assets: Report to the G20 on work by the FSB and standard-setting bodies*, July 2018. Available online at: <https://www.fsb.org/wp-content/uploads/P160718-1.pdf>.

³⁵ Check THOMSON REUTERS, *Cryptocurrencies by country*, October 2017. Available online at: <https://www.thomsonreuters.com/en-us/posts/news-and-media/world-cryptocurrencies-country/>.

important source of risk for the economy of the Eurosystem not only for the fragility, the lack of regulation and the volatility of cryptocurrencies and stablecoins, but for the fact that they are putting themselves as a competitor for the provision of financial services along those related to payment services (e.g., loans, mortgages) and, most of all, for future issues related to a smooth provision of monetary policy by the central bank.

5. Road to the Digital Euro

The Digital Euro should not be confused with stablecoins which represent, as we stated, one of the main causes that are motivating central banks towards the creation of centralised digital currencies. Stablecoins³⁶ are composed of tokens linked to a collateral of a fix value, deposited in a smart contract or in a bank which acts as a custodial. Nowadays, different types of stablecoins exist. They range from fiat-based stablecoins (i.e., USDT Tether); commodity-backed stablecoins as Venezuelan's Petro,³⁷ which is linked to the country's oil and mineral reserves; crypto-backed stablecoins; and seigniorage-style stablecoins. Early versions of stablecoins have been created on the Ethereum blockchain with the following scheme: in principle,³⁸ for every dollar deposited, a token of equal value was "mined" in the blockchain. Therefore, the value should have been of one Tether for every dollar. On the contrary, the Digital Euro is supposed to be released directly by the ECB as it would have had to print physical euros. In this sense, the Digital Euro is not linked to physical euros, but it represents itself "ordinary" euros, with the main difference being the different infrastructure where the Digital Euro is created and distributed.³⁹ That is why, in 2018, following Venezuela's experiment, discussions intensified around the introduction of the so-called Central Bank

³⁶ For a comprehensive taxonomy and description of stablecoins, see BULLMANN, KLEMM AND PINNA, *In search for stability in crypto-assets: are stablecoins the solution?*, August 2019, *European Central Bank Occasional Paper Series*, 230. Available online at: <https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op230~d57946be3b.en.pdf>.

³⁷ ROSALES, *Radical rentierism: gold mining, cryptocurrency and commodity collateralization in Venezuela*, July 2019, *26 Review of International Political Economy*. Available online at: <https://doi.org/10.1080/09692290.2019.1625422>.

³⁸ However, price moves captured the attention of US prosecutors. Cfr. ROBINSON AND SCHOENBERG, *Bitcoin-Rigging Criminal Probe Focused on Tie to Tether*, November 2018, *Bloomberg*. Available online at: <https://www.bloomberg.com/news/articles/2018-11-20/bitcoin-rigging-criminal-probe-is-said-to-focus-on-tie-to-tether>.

³⁹ As described in the course of the text, the distribution is still unclear.

Digital Currencies (CBDC), also referred to as “sovereign digital currencies”.⁴⁰ All the features, forms, elements and critical points which have been described above have the purpose of leading us to discover and assess what brought central banks to embrace such technological innovation and what are the legal challenges which they will have to engage in. In addition, the analysis of digital currencies will serve as base point to cross reference the features that will be taken into account also for the creation and/or adoption of CBDC. Scholars are unanimous in stating that the growing interest and development of private initiatives linked to virtual currencies⁴¹ have had the consequence of enhancing competition and pressure over central banks and governments for the engagement in considering the adoption of CBDC, which has been also fostered by the current COVID-19 pandemic that further increased the use of digital payments⁴² (i.e., credit card payments and online purchases) and the requests of consumers and businesses of an even more digitalised and interconnected economy. As a result, a number of proposals have been undertaken by several States, for example, in Sweden with the Sveriges Riksbank proposing the e-krona. Among all the parties involved in this project, China can be definitely considered at the forefront, since it has also recently announced to be ready to issue its first CBDC called Digital Yuan, which takes its name from the official Chinese currency. Indeed, the central bank already delivered the Digital Yuan as a first test which involved ordinary consumers. They received a small quota of the digital currency in order to be able to make payments for purchases in shops using an app released from the same central bank.⁴³

⁴⁰ For a comprehensive study of the development and the sources of CBDC, see DIDENKO AND BUCKLEY, *The Evolution of Currency: Cash to Cryptos to Sovereign Digital Currencies*, 2019, 42 *Fordham International Law Journal*, 4. Available online at: <https://ir.lawnet.fordham.edu/ilj/vol42/iss4/2>.

⁴¹ Among those initiatives we should also consider the project of Facebook to introduce its own virtual currency, called Libra. This pressure can be evaluated in 2019’s speech by Yves Mersch on this particular stablecoin. See MERSCH, *Money and private currencies: reflections on Libra*, December 2019, in *Building bridges: central banking law in an interconnected world, ECB Legal Conference 2019*. Available online at: <https://www.ecb.europa.eu/pub/pdf/other/ecb.ecblegalconferenceproceedings201912~9325c45957.en.pdf?258d648ffc11be39f9d927e5c13f393f>.

⁴² On the topic, see AUER, CORNELLI AND FROST, *Covid-19, cash, and the future of payments*, April 2020, *BIS Bulletin*, 3. Available online at: <https://www.bis.org/publ/bisbull03.pdf>.

⁴³ See AREDDY, *China Creates Its Own Digital Currency, a First for Major Economy*, April 2021, *Wall Street Journal*. Available online at: <https://www.wsj.com/articles/china-creates-its-own-digital-currency-a-first-for-major-economy-11617634118>.

Since this paper focuses on the Digital Euro, we are slowly getting closer the entrance at stake of the European Central Bank in the panorama of CBDC. The ECB, therefore, was not only “pushed” by new trends in the economy, by new requests from citizens and businesses and by concerns of a possible competition with private initiatives. Due to the strong engagement of several other countries and major economies all over the world, among which China is definitely leading the “race”, the ECB decided to step in and explore the feasibility of issuing a Digital Euro. Following a consolidated path for the adoption of new policies in the financial sphere and beyond, a taskforce of experts has been put in place by the ECB with the responsibility to give some first answers to the multitude of questions, doubts, uncertainties and curiosities related to the world of public digital currencies. The work of this taskforce was published as a «Report on a digital euro»⁴⁴ in October 2020. The report contains detailed information about the status of the project for a future adoption of a Digital Euro,⁴⁵ the arguments supporting the introduction of such CBDC, and the risks associated with it. An important section is devoted to the ongoing work at the international stage, where the ECB is cooperating with the central bank of Canada, the Bank of England, the Bank of Japan, the Sveriges Riksbank and the Swiss National Bank, with the coordination of the Bank for International Settlements, discussing, carrying out surveys and exchanging models with the objective of trying to build CBDC which are going to be as uniform as possible, in order to avoid future market disruptions and the fragmentation of the provision of payment services across the cooperating parties and beyond.⁴⁶ Those discussions intensified since 2019 but they have started some years earlier with one element being a fix matter of concern from the very beginning, the preservation of financial stability. We argue that the reason why financial stability is worrying all the parties involved in such project is because we are not talking only as a new form for centralised digital payments, but we need also to refer to a tool for the provision of monetary policy which, in our views, represents the most sensitive issue together

⁴⁴ EUROPEAN CENTRAL BANK, *Report on a digital euro*, October 2020. Available online at: https://www.ecb.europa.eu/pub/pdf/other/Report_on_a_digital_euro~4d7268b458.en.pdf.

⁴⁵ A preliminary goal for a decision on a possible adoption was set for the second part of 2021.

⁴⁶ EUROPEAN CENTRAL BANK, *Central bank group to assess potential cases for central bank digital currencies*, January 2020, *Press release*. Available online at: https://www.ecb.europa.eu/press/pr/date/2020/html/ecb.pr200121_1~e99d7946d6.en.html.

with the recognition as legal tender. The proliferation of private digital currencies and the possible adoption of public (official) ones raises the need to preserve the current official currency. In this sense, it was made clear, at least for what regards the Digital Euro, that its adoption will not substitute cash or other non-physical existing official forms of money. Differently, the Digital Euro aims at providing a cheap, safe, riskless, and stable alternative which should respond to new needs, at the same time non conflicting with the existing monetary architecture of the Eurosystem. Therefore, while ensuring to not create an obstacle to innovation, the ECB aims to enlarge the accessibility to this new form of money, in principle,⁴⁷ to everyone. The access to the Digital Euro is also linked to the use, or not, of intermediaries which will also raise concerns of financial exclusion as there is a size of the population that does not hold a bank account and that settles payments and related obligations only via cash. In such case, the Riksbank in its project to issue an “e-krona” took into serious consideration its social impact and, therefore, the fight against financial exclusion, acknowledging that «[t]he digital era might [...] mean a form of financial exclusion for certain groups»⁴⁸ to whom this digital currency should be addressed, as they might be left out in the future by private players.⁴⁹ We welcome the willingness of the ECB to proceed in the same direction and to suggest models of a Digital Euro that will facilitate inclusion.⁵⁰

⁴⁷ This specification is necessary to underline that the degree of accessibility of the Digital Euro will depend on the form and model which will be chosen by the ECB, especially when referring to online or offline solutions, features that will directly affect its inclusiveness. Drawing an easy parallel with cash, this still represents the easiest and most accessible type of money. However, cash has proven to be lagging behind innovation and new exigencies, which on their side will have to answer also to financial exclusion needs.

⁴⁸ See ARMELIUS, HANNA ET AL., *The rationale for issuing e-krona in the digital era*, 2020, 2 *Sveriges Riksbank Economic Review*, 12. Available online at: https://www.riksbank.se/globalassets/media/rapporter/pov/artiklar/engelska/2020/200618/2020_2-the-rationale-for-issuing-e-krona-in-the-digital-era.pdf.

⁴⁹ See INTERNATIONAL MONETARY FUND, *The Pros and Cons of Central Bank Digital Currency: Insights from the Riksbank's E-Krona Project*, March 2021, 62 *IMF Staff Country Reports: Sweden*. Available online at: <https://www.library.imf.org/view/journals/002/2021/062/article-A001-en.xml?ArticleTabs=fulltext> and HANNA, ARMELIUS ET AL., *The e-krona and the macroeconomy*, 2018, *Sveriges Riksbank Economic Review*, 3. Available online at: <https://www.riksbank.se/globalassets/media/rapporter/pov/artiklar/engelska/2018/181105/20183-the-e-krona-and-the-macroeconomy.pdf>.

⁵⁰ See EUROPEAN CENTRAL BANK, *Report on a digital euro*, October 2020, 39. Available online at: https://www.ecb.europa.eu/pub/pdf/other/Report_on_a_digital_euro~4d7268b458.en.pdf.

6. Models of CBDC and the Digital Euro

Following the analysis of the reasons and objectives accompanying the creation of CBDC, and therefore, the Digital Euro, it is important to determine on what they consist of. To address such question, it is useful to make reference to the language of the BIS. Regrettably, the answer is not what is expected from a product which is desired to be uniform. Indeed, the report highlights that ‘there will be no “one size fits all” CBDC’,⁵¹ meaning that all the domestic projects and solutions foresee different forms and characteristics connected to different priorities, which in turn will create divergences that will have to be tackled through «cooperation and coordination [that] are essential to prevent negative international spillovers».⁵² In order to deep our analysis on why central banks are working on the adoption of CBDC with different aims and objectives, alongside the reasons mentioned above, we need to focus on four elements of this rationale, meaning the users, the architecture, the technology and the scope. According to what terms central banks are building the currency in line with the above elements, then a variety of models of CBDC will come up.

Concerning the users, we need to mention which category will make most of its use, meaning citizens who will be using the currency for retail payments. About the architecture, we can talk about a decentralised type of virtual currency, on the model of cryptocurrencies or a centralised type where the central bank will be the one to authorise and assign a status to the currency.⁵³ On the technology, it is possible to build a virtual currency by making use of the blockchain technology with the means described above, although this is not the only option. Systems through which citizens can make use of digital currencies can be also closed systems which, for example, require authorisation or permission to access. Lastly, there can be a variety of scopes. Whether the central bank aims at creating a new form of money, monetary policy can be one of the leading scopes. Otherwise, if the main objective is the creation of a new payment system, for example having a parallel mean of

⁵¹ See BANK FOR INTERNATIONAL SETTLEMENTS, *Central bank digital currencies: foundational principles and core features*, 2020, Report no 1. Available online at: <https://www.bis.org/publ/othp33.pdf>.

⁵² Ibid.

⁵³ In this case the central bank could also assign the status to a currently non-official currency. Although this sounds unlikely due to the need to ensure the stability of monetary policy.

payment alongside cash, or credit cards, the features of the CBDC will clearly differ.

7. Features and risk accompanying the adoption of the Digital Euro

In light of the above, when analysing how the Digital Euro should look like, it is necessary to refer to the ECB report on a digital euro. What we can extract from this “bible” is that, as already mentioned, the Digital Euro is supposed to «be introduced alongside cash [and] it would not replace it»,⁵⁴ it should be always and fully convertible with all the other official existing forms of euro.⁵⁵ Likewise, it will be used for retail purposes, meaning that for its users will represent a parallel, or additional mean of payment to what is cash now. In order to satisfy the same or similar conditions that cash offers to its users, the digital solution would need to answer to a high number of requirements than those of ordinary means of payment, the majority of which have legal implications. A first requirement, already mentioned above, is the accessibility. It is important to analyse how can the ECB ensure that the Digital Euro will be accessible and available to the largest possible extent. When constructing and adopting such digital currency, the ECB would have to make sure that there will be no categories of citizens which will be left behind, especially those that are already facing troubles in accessing ordinary financial services and that, for example, do not hold a bank account or are not in possession of digital means. Consequently, the ECB will have to take into account principles of non-discrimination and equal treatment when deciding between the provision of the Digital Euro via «an account-based system or as a bearer instrument»,⁵⁶ the latter referred also to as a token-based system which could be DLT based, even though the ECB claims itself as not interested in the use of this technology.⁵⁷

Next to the accessibility, the ECB will have to concentrate on the architecture supporting the digital currency. We are here in the territory of the safety and stability of the currency. When talking about safety of digital platforms or services, it is easy to think straight away about the resilience of

⁵⁴ EUROPEAN CENTRAL BANK, *Report on a digital euro*, October 2020, 2. Available online at: https://www.ecb.europa.eu/pub/pdf/other/Report_on_a_digital_euro~4d7268b458.en.pdf.

⁵⁵ Ibid.

⁵⁶ EUROPEAN CENTRAL BANK, *Report on a digital euro*, 29.

⁵⁷ Indeed, the report states that a «bearer digital euro would not have to use DLT.» Cfr. EUROPEAN CENTRAL BANK, *Report on a digital euro*, 29.

the system from risks which vary from cyber-attacks to other types of system disruptions,⁵⁸ which would endanger the smooth function of the platform, the stability of the price of the currency and the possibly cause the loss of the users' funds. Therefore, the Digital Euro should encompass all the necessary features to be protected against such risks and this can be a point of strength for the Digital Euro as private digital currencies and their digital wallets have been proven to be sensitive to hackings and frauds, an exemplary case is that of the South Korean's cryptocurrency exchange Bithumb.⁵⁹ We argue that, while, in principle, system disruptions should be avoided through safeguarding the stability and resilience of the digital architecture, at the same time, the ECB will have to ensure a mechanism by which the user would have its balance of Digital Euro restored. Undeniably, this is an outcome that in order to be achieved will need several considerations that go beyond the nature of the digital platform. However, the authorities can take example from existing features for certain credit card payments.⁶⁰ Furthermore, as we are talking about a currency which is owned and issued directly by the central bank, we suppose that it would enjoy its guarantee and, which we consider an absolute synonym of security. A similar guarantee is already present in other ordinary means of payment and is taken for granted, especially concerning the money deposited in bank accounts. However, taking such relationship of trust for granted is an error, because it has been widely experienced in the past that, in case of a strong disruption of the economy, for example, due to a series of failures or crises of financial institutions,⁶¹ citizens would opt for so-called bank runs⁶² to be able to recover their deposits, thus creating a vicious circle

⁵⁸ Including, electric or server-related disruptions. On the overall matter, see CARSTENS, *Digital currencies and the future of the monetary system*, January 2021, *Bank for International Settlements*. Available online at: <https://www.bis.org/speeches/sp210127.pdf>.

⁵⁹ See CHOUDHURY, *South Korean cryptocurrency exchange Bithumb says it was hacked and \$30 million in coins was stolen*, June 2018, *CNBC*. Available online at: <https://www.cnbc.com/2018/06/19/south-korea-crypto-exchange-bithumb-says-it-was-hacked-coins-stolen.html>.

⁶⁰ In the US, this issue related to credit card payments was solved through the adoption of the Fair Credit Billing Act, 15 U.S.C. 1666-1666j. Available online at: <https://uscode.house.gov/view.xhtml?req=granuleid%3AUSC-prelim-title15-chapter41-subchapter1-partD&edition=prelim>.

⁶¹ As it happened during the last Global Financial Crisis. On the matter, see HELLEINER, *Understanding the 2007–2008 Global Financial Crisis: Lessons for Scholars of International Political Economy*, 2011, *Annual Review of Political Science*, 14. Available online at: <https://www.annualreviews.org/doi/abs/10.1146/annurev-polisci-050409-112539>.

⁶² See MERRIAM-WEBSTER, *Definition of run on the bank*. Available online at: <https://www.merriam-webster.com/dictionary/run%20on%20the%20bank>.

that will bring the sovereign into a default because of a serious breach in the monetary system.

Another aspect that the ECB will have to take into account is privacy. This principle of privacy plays a prominent role as it is one of the main features characterising cash as a mean of payment, which is anonymous and cannot be traced. Certainly, the Digital Euro would have to entail certain characteristics of cash, but the way in which privacy and confidentiality will have to be preserved needs to be different.⁶³ While cryptocurrencies running on blockchain enjoy discretion,⁶⁴ the Digital Euro will have to encompass some degree of control, for instance, to prevent money laundering or terrorist financing. Current “official” digital payments allow the recognition of the identity of the payer, which is used also for tax purposes. However, having in mind recent declarations of ECB representatives, this problem could be bypassed limiting the amount of Digital Euro that each user would have available in his/her own “wallet”.⁶⁵ This solution will be not free from consequences as the Digital Euro could be restrained only to retail users, ruling out businesses. Issues related to data are not only linked to anonymity but also to the protection of both the identity and the data related to the transactions that are being made. As a matter of fact, banks have shown on several occasions to be targets of data breaches and cyberattacks by hackers and criminal organisations, that then expose sensitive data on the web or use them as threats to demand ransom money or even use them to withdraw money from checking accounts using viruses or other similar tools. The Digital Euro will have to prove to be resistant to this type of data leaks that could compromise the funds of its users and the stability of the entire system.

8. Key legal challenges

In our opinion, concerns related to the status of legal tender represent the leading legal challenge for the adoption of the Digital Euro and, in general, the main issue accompanying this new form of money.⁶⁶ In light of the report

⁶³ See ARNOLD, *Digital euro will protect consumer privacy, ECB executive pledges*, June 2021, *Financial Times*. Available online at: <https://www.ft.com/content/e59e5d61-043a-4293-8692-f8267e5984c2>.

⁶⁴ Only the so-called oracles and programmers of the protocols in the blockchain are able to access data. However, responsibilities have not yet be assigned by regulators.

⁶⁵ See EUROPEAN CENTRAL BANK, *Report on a digital euro*, 28.

⁶⁶ We find useful to flag that some scholars state the possibility for a CBDC to be issued without the need to obtain a legal tender status. However, such solution would entail several

of the ECB taskforce, the Digital Euro can qualify as legal tender.⁶⁷ theoretically, EU primary law⁶⁸ does not prohibit or exclude for the possibility of issuing a Digital Euro as legal tender. Nonetheless, the ECB flagged that the legal basis would depend on the design.

Indeed, the report explains that the Digital Euro could be issued by the Eurosystem on the basis of the combination of Article 127(2) TFEU,⁶⁹ which assigns the definition and implementation of the monetary policy to the European System of Central Banks (ESCB),⁷⁰ and several articles of the Statute of the ESCB, depending on the design chosen. Four options are on the ground. Whether the Digital Euro will «be issued as an instrument of monetary policy, akin to central bank reserves, and only accessible to central bank counterparties»,⁷¹ apart from Article 127(2) TFEU, Article 20 of the Statute of the ESCB, will give the opportunity to the Governing Council to decide over «other operational methods of monetary control».⁷² A Digital Euro «made available to households and other

private entities through accounts held with the Eurosystem»,⁷³ could be hypothetically allowed by Article 17 of the Statute⁷⁴ but it will be insufficient as legal basis. If it was going «to be issued as a settlement medium for specific types of payment, processed by a dedicated payment infrastructure only accessible to eligible participants»⁷⁵ which, however, represents a design not in line with the inclusivity advocated above, the ECB would be able to provide the facility or platform for such digital payment system. Lastly, in our opinion Article 127(2) TFEU would be better suited to work in relation with Article

practical problems. We argue that this is not in line with our view of the Digital Euro as an official form of currency in a different form than cash but with equal rights. Cfr. PAPANASCHALIS, *Retail central bank digital currency: a (legal) novelty?*, 2020, *ESCB Legal Conference 2020*, 205. Available online at: <https://www.ecb.europa.eu/pub/pdf/other/ecb.escblegalconferenceproceedings2020~4c11842967.en.pdf>.

⁶⁷ See SIEKMANN, *Legal tender in the euro area*, 2018, 122 *IMFS Working Paper Series*. Available online at: <https://www.econstor.eu/bitstream/10419/178212/1/1019897406.pdf>.

⁶⁸ EUROPEAN CENTRAL BANK, *Report on a digital euro*, 24.

⁶⁹ OJ C 202, 7.6.2016, pp. 102-103.

⁷⁰ The ESCB is formed by the ECB and the national central banks (NCBs) of all the EU Member States, regardless of the fact that they have adopted the euro. See EUROPEAN CENTRAL BANK, *ECB, ESCB and the Eurosystem*. Available online at: <https://www.ecb.europa.eu/ecb/orga/escb/html/index.en.html>.

⁷¹ EUROPEAN CENTRAL BANK, *Report on a digital euro*, 24.

⁷² Protocol (No 4) attached to the EU Treaties “on the Statute of the European System of Central Banks and of the European Central Bank” (Consolidated version, OJ C 202, 7.6.2016, p. 230-250).

⁷³ EUROPEAN CENTRAL BANK, *Report on a digital euro*, 24.

⁷⁴ OJ C 202, 7.6.2016, p. 230-250.

⁷⁵ EUROPEAN CENTRAL BANK, *Report on a digital euro*, 24 and 33.

22 of the Statute⁷⁶ to permit the ECB to issue a Digital Euro «as an instrument equivalent to a banknote»,⁷⁷ being harmonious to the mostly suitable model for its users, according to the principles, objectives and needs analysed above. Moreover, if the ECB would consider the digital euro in equal terms as euro banknotes, Article 128(1) TFEU would allow its issuance by virtue of the Eurosystem's «exclusive right to authorise the issue of euro banknotes».⁷⁸ Whilst the above options are clearly linked to specific designs of the Digital Euro, if we refer solely to the need of ensuring the status of legal tender, the report suggests that Article 128(1) TFEU⁷⁹ together with Article 16 of the Statute⁸⁰ would suffice to grant such status.⁸¹

However, another important question of legal nature needs to be examined, the legal framework applicable to the Digital Euro. Indeed, it is crucial to understand if (and which) existing legislation would apply to this future virtual currency. We have already talked about money laundering threats that can impact the Digital Euro. Likewise, we have to consider in what terms that existing AML legislation at the European level should apply to it.⁸² Even if having in mind the limits to the use of the Digital Euro described above, in case of the involvement of the existing network of financial institutions in the distribution of the currency, the authorities will need to apply reporting requirements to those institutions,⁸³ similarly to what currently happens to ordinary transactions. Moreover, financial institutions included in such network will be subject to a strict Eurosystem supervision. Existing expertise in the private sector will have a positive impact to the application of existing rules, even though the exact degree of application will have to be discussed in the appropriate focus groups. Furthermore, considering the relevance of data protection and confidentiality, as described above, in legal terms and in light

⁷⁶ OJ C 202, 7.6.2016, p. 230-250.

⁷⁷ EUROPEAN CENTRAL BANK, *Report on a digital euro*, 24.

⁷⁸ OJ C 202, 7.6.2016, p. 230-250.

⁷⁹ OJ C 202, 7.6.2016, p. 103.

⁸⁰ OJ C 202, 7.6.2016, p. 230-250.

⁸¹ EUROPEAN CENTRAL BANK, *Report on a digital euro*, 24.

⁸² Concerning current applicable EU AML legislation, see Directive (EU) 2018/843 of the European Parliament and of the Council of 30 May 2018 amending Directive (EU) 2015/849 on the prevention of the use of the financial system for the purposes of money laundering or terrorist financing, and amending Directives 2009/138/EC and 2013/36/EU (AMLD V).

⁸³ See SANDNER ET AL., *The Digital Programmable Euro, Libra and CBDC: Implications for European Banks*, July 2020, *EBA Policy Research Workshop Conference Paper*. Available online at: https://www.researchgate.net/publication/343334690_The_Digital_Programmable_Euro_Libra_and_CBDC_Implications_for_European_Banks.

of the GDPR,⁸⁴ the issuer of the currency (in our case, the ECB) will have the “burden” to respect the regulation if it acts as the entity responsible for the collection of such data. Therefore, the right balance should be reached between the needs to adequately protect user data and, at the same time, guaranteeing that the use of the virtual currency is in line with existing legislation against money laundering and terrorist financing. Evidently, both requirements have conflicting objectives.

9. Concluding remarks

In light of all the elements surrounding the project for the adoption of the Digital Euro, we can state that it will definitely touch at the heart of the ECB’s monetary policy and the banks’ role in our economy. It is remarkable the willingness and the efforts of the ECB, from one side, to do not leave the current architecture of the intermediaries behind but to take an inclusive approach which has, in turn, put the most of banks and providers of payment services in a positive and cooperative stance towards this challenge.⁸⁵ From the discussions and the public interventions of the latest months, it seems that nearly all the parties understood that to survive and flourish it is important to fight challenges embracing innovation and technology and not being overwhelmed by it. While this approach facilitates the adoption of the Digital Euro, thanks to a cooperative environment between public authorities, private players and the useful contribution of citizens and unions, it is still not exempt from very serious legal challenges, that is why this paper took the opportunity to analyse and flag several of those challenges that are coming up, or that already present, in this domain. The importance for the ECB to act fast is crucial. However, it is suggested to proceed with caution and with the ongoing contribution of all parties involved because it is undisputed that developments in crypto assets, stablecoins and, more generally, private digital initiatives are

⁸⁴ Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).

⁸⁵ Nevertheless, please note that some banks have raised some doubts on the adoption of the Digital Euro. See PARTZ, *Demand for digital euro not yet clear, says BBVA exec*, June 2021, *Cointelegraph*. Available online at: https://cointelegraph.com/news/demand-for-digital-euro-not-yet-clear-says-bbva-exec?utm_source=European%20Banking%20Federation%20newsletters%20and%20updates&utm_campaign=6a24d174db-EMAIL_CAMPAIGN_2018_04_25_COPY_01&utm_medium=email&utm_term=0_088668d33b-6a24d174db-80202884&mc_cid=6a24d174db&mc_eid=de1bcf9311.

moving swiftly. In this sense, it might be useful to include the banking sector in the governance of the Digital Euro if the ECB would decide to make use of the current financial intermediation network for its distribution.

While adopting the Digital Euro, another important issue that will have to be taken into account is the international role of the euro. The ECB should preserve the strategic independence of the euro with a view to the competition at the world stage with other strong currencies (i.e., US dollar). For this reason, it is not productive for the ECB to involve directly in retail payments as the central bank is not traditionally built to interact directly with end users. That is why the ECB representatives stated that they are offering “a raw material” that intermediaries can use in order to shape with different business models which will make use of the Digital Euro to offered to consumers. The ECB stated to not be interested in competing with banks and understood that expertise, objectives, and resources of the existing network of financial institution is a point of strength that will facilitate the shape and distribution of the CBDC. This is true also for KYC/AML reporting and for the onboarding of customers which represent the operational base of today’s bank activity. The ECB will offer a safe and costless mean of payment. The fact that the EU institutions and the ECB at the forefront are not interested in competing with the banking sector is proven by the backing of private initiatives in the field of payment services.⁸⁶ Digital Euro should be constructed as an alternative to cash, it should be digital and, therefore, less costly, even though the ECB acknowledged to have started the discussion on the adoption of such digital currency due to a change in the citizens’ behaviour. Indeed, citizens started to pay more digitally both considering the use of credit cards and the increase in purchases through online payments, which confirms a trend in the reduction in the use of cash. Cash is currently the only form of money issued directly by the central bank, an entity which is completely riskless, and the Digital Euro is representing a technological progress of such mean of payment.

Therefore, in our opinion, the most feasible solution foresees that ECB will engage in building the ecosystem, which will have to be shaped by banks and other payment businesses. This will ensure the solidity of the main infrastructure granted by the ECB while incorporating the expertise of the private sector. This solution will confirm that it is in the interest of the ECB to protect the intermediation function of banks and not to compete with it, thus causing no friction and not putting at risk the provision of monetary policy that certain banks are undertaking. Expertise is indeed a delicate issue

⁸⁶ *European Payments Initiative*. Available online at: <https://www.epicompany.eu/>.

because, as we described in throughout the text, issuing a Central Bank Digital Currency is a highly complex process and there is no experience of issuing a CBDC on a large scale. Nevertheless, while some countries (as China⁸⁷ or Sweden) are at the final stages of the issuance of such “public” digital currencies, many other central banks all over the world are engaging in cooperation and talks to ensure to the maximum possible extent that future solutions will be harmonised or (at least) that their fragmentation will be avoided. Luckily, the ECB is an active part of such networks. Those networks are also important with a view that the Digital Euro should be accessible also to foreign users in the same way as euro banknotes are available in third countries.

There are several challenges that the ECB (and its network) will have to face. As we have discussed, it will be crucial to ensure a smooth implementation of monetary policy, financial stability and privacy concerns. As we anticipated, financial stability could be protected with a limit of Digital Euro that every consumer could hold, making the ECB a peculiar provider of services.

Finally, according to the latest discussions, we expect the Digital Euro to be introduced in a progressive way, in order to scale up innovation and to be able to assess how consumers, businesses and the banking sector react to such innovation. Therefore, the Digital Euro, apart to be accessible at the international level, it should be competitive, to include cost reduction and an environmentally friendly design so to become a standpoint against private currencies, which are having a very high carbon footprint.⁸⁸ The Digital Euro will have to promote the digitalisation of the society and the technological advancement.

⁸⁷ Recently, the Chinese Digital Yuan has been flagged at a possible threat for the international role of the euro. See JONES, *ECB's Villeroy voices digital yuan threat*, June 2021, *Financial Times*. Available online at: <https://www.ft.com/content/b7ebed86-dc33-43eb-b6bd-6d783857b4ae>.

⁸⁸ JIANG ET AL., *Policy assessments for the carbon emission flows and sustainability of Bitcoin blockchain operation in China*, April 2021, *12 Nature Communications*. Available online at: <https://www.nature.com/articles/s41467-021-22256-3>.