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Course of Cases in Business Law

DIGITAL EURO DEVELOPMENT SCENARIO: LEGISLATIVE IMPLICATIONS

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INTRODUCTION

Globalization and the fintech have encouraged the development of an interconnected network across continents. This interconnection fosters the need for an easier and faster way to make capital move globally. Therefore, the evolution has resulted in the introduction of innovative mechanism. The payment segment has been rapidly involved within this process. Indeed, in terms of payment methods, the progression resulted in the introduction of smartphones, payment apps, credit cards, which brought to a rapid decrease in the use of cash. Afterwards, the development of new assets such as cryptocurrencies and digital coins have impacted the way payment were made. Recently, the spread of the Covid-19 pandemic, due to the fear of infection, has enormously boosted the usage of these technologies. The latter brought several advantages in the citizens' daily life. Some of the positive aspects include financial integration and streamlining payment processes between States. At European level, the introduction of a digital euro would encourage the interconnection between the Member states. Furthermore, it would increase the purchasing power of Europe against other countries. As soon as the digital euro will be included within payments' method, the legislation should be adapted to it. First, the "new money" should be recognized by the Legislator, then regulations in terms of privacy and protection for consumers must be implemented.

Starting in 2018, the European Central Bank (ECB) started developing the digital euro project. Several Reports were issued examining the issuance of a digital currency released by the central bank to provide the public with access to a secure form of currency, to support the digitization of the European economy and actively encourage innovation in payments. In addition, the report states that, regardless of the type and operation, a digital euro would be a central bank electronic money to which all citizens and businesses would have access to make daily payments quickly, simple, and safe, as with banknotes but in different form.

This study adopts a qualitative research approach that consists of a theoretical and an empirical part. The development of the theoretical part was made possible through the analysis and study of documents relating to particular aspects of the introduction of central bank digital money and its development, with specific reference to the papers issued by the ECB. The theoretical part of this paper aims to provide a historical and theoretical framework of payment instruments to give coherence to the development of the analysis.

The empirical part was carried out through an initial analysis of the documents that form the basis of the European and national legal framework, namely the Italian Civil Code and the European Directives.

This thesis aims to examine the consistency of the actual discipline to the introduction of the central bank digital currency (CBDC) as a payment instrument in light of a particular feature: the identification of CBDC as money with legal tender. In particular, it explores the adaptability of the current discipline that regulates transactions in traditional money to the use of digital coins. It aims to determine whether amendments or additional disposals are needed. The challenge and the relevant impact of the phenomenon gave the choice of the topic.

The work is divided into three chapters. The first chapter, "The European environment for a digital currency," introduces the concept of money, its functions, and the process that led to the introduction of digital coins into the payment system. New currency models are revolutionizing the traditional concept of currency, first credit or debit cards, crypto assets, and then digital coins. The modern market requires faster, safer, and universally available payments. After introducing the single currency in the euro area, monetary policy was entrusted to the European Central Bank. The Member States shall aim to achieve common objectives and give the Union the necessary powers. The second chapter, "The European Central Bank project," focuses on the structure and how digital coins, namely the digital euro, can be issued in the market. The possible alternatives primarily concern the form: account-based or token-based. Another variable involves the financial institution responsible for allocating the CBDC: the ECB and other financial intermediaries. Regardless of the benefits of smooth payments and economic integration, there is no better structure for excellence. The choice of combination is based primarily on the objectives and strategies a state intends to pursue. Finally, the third chapter, "The regulatory framework for digital currencies," deals with the legislative analysis of the introduction of digital central bank coins. The Legislator intends to regulate and protect investors uniformly, following the rules established at the European level. Therefore, it is essential to determine the adequacy of the new payment instrument with the current regulation. In particular, the question arises as to whether CBDCs can be considered legal tender currencies and therefore fall within the scope of pecuniary obligations.

CHAPTER I

The European environment for a Digital Currency

I.I The role of money and the introduction of the single currency

Money is awarded to three significant roles: medium of exchange, account unit, and value store. The role of money as a medium of exchange derives from an over-definiteness demand for goods in the market. It is an instrument that creates economic efficiency and increases the overall trading market. It can be seen as an intermediary between sellers and buyers. Since currency is accepted worldwide as a standard of value, in modern economies, it represents a globally medium of exchange. The absence of a medium of exchange might hamper the equilibrium allocation that cannot generally be implemented in a short trading time. Consequently, it will require lengthy trade or a significantly more complex organization. Furthermore, as a unit of account, money is used to value goods and services and records debts, assets, and loans. This feature leads to three other intrinsic characteristics of money, such as divisible. Even if we divide money into infinite parts, it will have the same original value, fungible because each unit is the same with no change in value. It is also countable because we can make any operations with a unit of account. Nevertheless, there is widespread agreement that the unit of account is the least meaningful of money's three roles because this function might be replaced by any other means, such as stones, gold, and tobacco. As a unit of account money is used to compare the value homogeneously that society, through the market, attributes to very different products and services. This function facilitates economic decisions and contractual agreements because it unequivocally expresses the value of goods and services. Currency differs from other financial and tangible assets because it performs all three functions simultaneously. In other words, money is the most liquid¹ reserve of value since it can be exchanged for goods and services instantly and without loss of value. Therefore, it is the primary means of payment. Finally, the role of money within its transactions cannot be divided from its function as a store of value. The latter means that it maintains its value through time, rather than depreciating, and a stable currency is essential for citizens to maintain their trust in the

¹ The amount of time needed to sell a commodity is one of the elements that define its degree of salability, the less liquid the title and the longer it will take to find a buyer willing to buy it at a price equal to its actual value or, if the seller of the title does not want to wait long, the lower the price at which it will be sold. Menger K., *The Economic Journal*, Oxford, Oxford University Press, June 1892, Vol. 2, No. 6

economy². In addition, money has a store of value because it is an asset that can be invested, stored in a bank, and even used to purchase goods in the future. However, cash is not the only store of value; for instance, silver, gold, and crypto assets may have such characteristics. What distinguishes money from other stores of value is its liquidity because it is easily accessible at any time and place. In addition, the more liquid an asset is, the less its value will increase over time.

Academics defined money as a medium of exchange that sets all economic transactions globally due to its intrinsic value. The latter is a measure aiming at establishing how an asset is worth, perceived, or actual. However, scholars usually define money as meaning with instrumental value because it is used for a purpose, thus exchanging goods and services. Therefore, money is a unit of account, socially accepted, with which things are priced³. Once these assumptions are made, it should be emphasized that currency differs from all other types of goods because it does not directly satisfy an individual's need but serves as a means of exchange for achieving a particular satisfaction: trading and acquiring the object of consumption. In essence, what matters is its real value.

The history of the money goes back thousands of years, and since then, its influence has noticeably changed. Formerly, it took the form of commodity currency: an object made of a specific material with market value. Since the arrival of coins, society has been influenced by them in the way they managed and perceived economic transactions. If, on the one hand, money history has ancient origins, on the other hand, the economy started to affect society even earlier, when exchanges were based on barter: a direct trade of goods and services. The latter is the earliest form of commerce, based on giving what was not wanted directly for what was needed. In this scenario, the only applied rule was finding someone with needs to match. Thus, the object that intervenes to differentiate between sale and purchase is money. At first sight, it might seem that the use of cash doubles the trouble by making more exchanges, but a deep analysis shows that the balance of problems lies on the barter side. Indeed, the first difficulty in barter is to find two parties whose available properties mutually suit each other's needs. To make the barter match, there must be a double coincidence, which rarely happens. One of the reasons the money was introduced into the market was the need to overcome the inefficiency and the confusion of bartering goods.

² Jevons W. S., *Money and the Mechanism of Exchange*, The International Scientific Series, Vol. XVII

³ https://www.ecb.europa.eu/ecb/educational/explainers/tell-me-more/html/what_is_money.it.html

Indeed, this practice was limiting the transferability as well as divisibility of trades. The introduction of a currency solved those problems, and as a result, it became widely desired and valuable.

Therefore, legal, and social rules have been introduced, establishing a framework for individuals' economic behaviors. Different types of contracts generally regulate the transactions of goods and assets. The latter are valuable instruments that make financial processes less risky and more transparent. The scope of contract law is to solve disagreements after its creation. That is why it is essential to underlying the role of money as a "legal tender"⁴: an object that grants a right to the payer and at the same time protects buyers from any inconvenience. Hence, the wide acceptance of the rules of law allows money to become an international language that stimulates worldwide trades involving different currencies. The attribution of "legal tender" to the currency issued by the central bank is, instead, an instrument through which the State consolidates confidence in that currency without, however, releasing it entirely from the central bank's ability to pursue a monetary policy aimed at defending its value over time. In modern economies, private currencies are not legal tender and therefore do not entail any obligation of acceptance other than between the parties who freely decide to sign a contract in which they undertake to accept them as a form of payment⁵. The acceptance of this form of currency by third parties takes place voluntarily and is frequent, the greater the confidence in the possibility of being able to use it in transactions, the higher the certainty that it can eventually be converted into legal tender public currency. Banks issue a type of highly liquid private currency, bank deposit, or bank money, which, while not legal tender, is a common means of payment in advanced economies. The law states that the holder can dispose of the sums resulting to his credit at any time by requesting their conversion into legal currency at total nominal value. ATM, cheques, credit cards, and bank transfers are all commonly used tools to transfer or convert bank money into legal tender currency.

The coins used today in the leading economies have no intrinsic value linked to the value of the material they are composed of. In other words, the fact that currency is a store of value does not mean that it contains a value but represents it. The recognition of its value

⁴ Bossone B., Costa M., *La moneta è capitale o debito di chi la emette?*, in *Economia e Politica*, 9 December 2019 <https://www.economiaepolitica.it/banche-e-finanza/moneta-banca-finanza/la-moneta-e-capitale-o-debito-di-chi-la-emette/>

⁵ Ferrari A., Ferrero G., *Moneta pubblica e privata in un sistema economico moderno*, 2019 <http://www.francodebenedetti.it/http://www.francodebenedetti.it/wp-content/uploads/La-Moneta-Ferrari-Ferrero-2019-08-05.pdf>

depends on the recipient's confidence in a transaction to be able to use it in other transactions in the future. The use of money, therefore, depends on the ability of the issuer to preserve its value over time.

Since metal money was first coined between 1000 B.C. and 800 A.D., several of them have been exchanged in different countries. Gold has always been used as a medium of exchange and savings because of its precious value and rarity. The first use of gold coins is attributed to the Chinese.⁶ Later, coins became essential and were broadly produced by Romans in various metals, such as silver, bronze, or copper. These metals were commonly used for coinage rather than gold due to their scarcity, which precluded using them for daily-life payments. This created a close link between the growth of banks and the use of gold as money. As a result, people started to leave gold in a safe place to store it. However, carrying gold was inconvenient to use in a daily routine because of its weight and great value. So, banks began to issue certificates of deposits to substitute the gold, which was handed over as payment. However, gold and money have been, and still are, considered the same in many societies. Nowadays, most of the gold produced is turned into gold bars and used in international trade and exchange. Gold, together with the Dollars and Euros, has been commonly defined as peg currency⁷, a symbol of a more robust and developed economy.

Over time, several denominations have been used to name money, such as coins, cash, banknotes, coinage, etc. Still, regardless of the multiple synonyms, the importance linked to this complex instrument continues to be the same. The introduction of different currencies has increased the demand for foreign exchange, especially among merchants who need them to settle trades. The foreign exchange market is the oldest financial market, considered by scholars to be the basis for the rest of the economic structure. Since the currency market is the largest and the most liquid above any other financial market, instruments are bought and sold for various reasons, like hedging, arbitraging, and speculating. The currency markets have a relevant role also in government policy decisions and establishes how healthy an economy is. Thus, several currencies are valued by comparing their intrinsic value with those of another. For instance, the value of the Euro against the Dollar, which establishes how many Euros we need, to buy one Dollar. It is

⁶ Adams M. D., *Advances in gold ore processing*, Amsterdam, Elsevier, December 2005

⁷ A currency peg is a policy according to which a national government sets a specific fixed exchange rate for its internal currency with a foreign currency or basket of currencies, considered more robust and more reliable. Feenstra R. C., Alan M. T., *International Macroeconomics*, New York, Worth Publishers, 2016, 4th edition

essential to ask whether a currency is appreciated or depreciated⁸ against another one since this might influence the goods' prices and the volumes of foreign investments. Additionally, the exchange market might provoke currency wars, which occur when policymakers from different nations attempt to devalue their currency. On the one hand, this increases demand and helps stimulate their economy; on the other hand, several countries are involved in devaluing their nations' currencies.

However, the relationship between the currency market and the national government is based on balancing two of the three options provided by the macroeconomic policy aims: capital mobility, monetary autonomy, and exchange rate stability. In the modern intentional monetary system, floating exchange rates⁹ have been jointly imposed. However, each country has pursued a different policy mix decision. For instance, Europe forced the creation of a regional monetary union to eliminate the exchange rate risk. As a result, two or more States agree to use a single currency in the area through a monetary union. Thanks to that, the States involved in this contract fixed the exchange rates of the national currency. Furthermore, the monetary union also implies the setting up a single central bank that interacts with the national central banks and a single monetary policy. The European Monetary Union has been the most significant example of the 21st century. From an economic point of view, a monetary union helps reduce transaction costs in an increasingly combined market¹⁰. It also helps increase price transparency, thus increasing market efficiency. In addition, at first, a monetary union was considered a fundamental step toward further political integration.

The roots of the European (EU) single currency, the Euro, and the monetary union can be dated back to the beginning of the common market in 1958¹¹. The necessity of economic integration was fed by the spread of the financial crisis and three main reasons. First, the monetary union can be considered a response by European rulers to the increases in intra-European trade, which has led to different currencies and fluctuating exchange rates. Second, politically, there was a continual search for increased stability and security in

⁸ If a currency buys more than another one, it has appreciated, so its value has strengthened. On the other hand, if money buys less than another one, its value decreases, so it depreciates. Feenstra R. C., Alan M. T., *International Macroeconomics*, New York, Worth Publishers, 2016, 4th edition

⁹ The floating exchange rate is determined by the movement of supply and demand within the market. Feenstra R. C., Alan M. T., *International Macroeconomics*, New York, Worth Publishers, 2016, 4th edition

¹⁰ <https://www.britannica.com/topic/monetary-union>

¹¹ Arestis P., Brown A., Sawyer M., *The Euro: Evolution and Prospects*, Cheltenham, U.K., Edward Elgar Publishing Limited, 2001

Europe. Third, many economic interest groups finally perceived a single unified and integrated European economy as a start for a significant global economy. Furthermore, the purpose behind this enormous project was based on the need to replace different currencies and fluctuating exchange rates threatening the increase in European trade. Concerning the introduction of the single currency, it is necessary to recall Art. 128, first paragraph, TFEU, which states that "the European Central Bank shall have the exclusive right to authorize the issue of euro banknotes within the Union. The European Central Bank and the national central banks may issue banknotes. The banknotes issued by the European Central Bank¹² and the national banks constitute the only banknotes with legal tender status in the Union".¹³ Moreover, Art. 10 and 11 of Reg. EC No. 974/1998, on the introduction of the euro, provides in more detail that "From 1 January 2002, the ECB and the central banks of the participating Member States shall put euro banknotes into circulation. [...] these banknotes denominated in euro shall be the only banknotes having the status of legal tender in all participating Member States", also "From 1 January 2002, participating Member States shall issue coins denominated in euro or cents following the denominations and technical specifications".¹⁴

Furthermore, a political reason had an essential role in building the monetary union because the original idea was creating a political partnership by introducing the Euro. The supporters of the EU were looking for more stability and security within the member states. Over the first decade of the existence of the Euro, this currency has become the first international trade power. Following the launch of the Euro on 1 January 1999, economic conditions in the euro area have significantly improved.

Modern economies, including the Euro area¹⁵, are based on fiduciary money, i.e., declared legal tender issued by a central bank. The latter has no intrinsic value. Indeed, the paper used for banknotes is worthless. Still, it is universally accepted in exchange for goods and services because users trust that the central banks will keep the value of the currency stable over time. If the central bank fails to make this commitment, trust money will lose acceptance as a medium of exchange and any interest as a store of value. Nowadays, currency can have different representations other than the physical one, such as on a checking account as a computer record or as a deposit on a savings account. Digital, or

¹² <https://www.ecb.europa.eu/press/key/date/2018/html/ecb.sp180214.en.html>

¹³ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A12016E128>

¹⁴ <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1998R0974:20090101:IT:PDF>

¹⁵ https://www.ecb.europa.eu/ecb/educational/explainers/tell-me-more/html/what_is_money.it.html

electronic, currency constitutes monetary value stored. Electronic payments have seen rapid growth, but the use of cash is still widespread. In the euro area, the value of euro cash is guaranteed by the ECB¹⁶ and the national central banks of the euro area countries, which together form the Euro system.

I.II The development of Digital Currencies

In modern market economies over the years, it has become essential to address the issue of the payment system. Money is endowed with liberating power, thus enabling the extinction of a relationship of obligation, for example, from exchanging goods or services. So, the payments system is the set of instruments, operators, procedures, and rules necessary to realize the movement of currency between market participants. Their development has simplified economic transactions, for instance, by reducing the costs associated with holding money in liquid form and enabling remote transactions. However, due to many daily transactions, payment systems must have very specific characteristics, such as allowing the transfer of currency for institutions, such as banks and public administration, and private citizens and businesses. In addition, users require quick payments, which is then necessary to ensure high levels of security and affordable costs. If any of these elements were to fail, the conduct of economic activities would not be possible. Therefore, payment systems are a core element of the economy.

Furthermore, technological innovation has ensured that today's transactions occur predominantly in telematic form. As a result, currency, the so-called traditional payment system, has been put on the back burner and is thus used only for tiny day-to-day transactions, leaving room for electronic money and banking. In addition to the latter, it is worth noting how more and more tools are emerging in recent years as part of the fintech revolution. Euro bills and coins are legal tenders, and the latter are the only forms of public money directly available to everyone. Nonetheless, today we often use privately issued money as a substitute for central bank-issued money. The trust placed in private banknotes, such as bank deposits, credit cards, and electronic payments, is based on the ability to

¹⁶ European Central Bank, Banknotes and coins circulation, 2022
https://www.ecb.europa.eu/stats/policy_and_exchange_rates/banknotes+coins/circulation/html/index.en.html

convert it into public money at face value¹⁷ when issued. This allows the normal function of the payment systems and makes economic flows easier.¹⁸ Therefore, in a favorable environment where electronic payment volumes are gradually increasing, the revolution and digitization are guided by fintech. Several central banks around the world are questioning the appropriateness of introducing their digital currencies alongside the current physical coins and banknotes, namely the so-called Central Bank Digital Currencies (CBDC): a viable alternative to the usual payment instruments. A digital currency (DC) does not physically exist. Their singularity is the way they might be structured: the money is issued by a central bank, so it can be denominated as a sovereign currency. Thus, a regulated digital currency is subject to the country's monetary policy. DCs would be introduced as an alternative to traditional currencies. Their value is based on the willingness of digital currency to convert them into physical currencies, as the number of users that agreed to use them for trading within the market. For this reason, currency may be seen as a platform where people can "join" by trusting its value. So, transactions occur only between people who joined the forum and accepted the currency. As a result, the more people buy it, the more value there is in accepting it.

Nowadays, there are almost 600 DCs all over the world; globally, 87 countries are currently exploring a CBDC¹⁹, and this number is constantly growing. The spread of such instruments may be related to the challenges and innovation they bring compared to traditional currencies. As such, their use continues to grow time after time, and due to that, users, traders, and consumers will seek more detailed regulation to provide certainty to the market and protection for investors. So, the digital Euro can be thought of as central bank money offered and secured in digital form to citizens and businesses for their retail payments²⁰. Currently, there is no universal definition for CBDCs, which relies on the fact that they can be designed in multiple ways. Among the reasons advanced for the possible introduction of a CBDC is the decline in the use of cash²¹. Digitalization is changing our concept of "money" and the form we use it. The first idea to introduce CBDC was through

¹⁷ The face value is the amount displayed on banknotes. A numerical amount always remains the same unless the instrument is split.

¹⁸ <https://www.ecb.europa.eu/press/key/date/2022/html/ecb.sp220615~0b859eb8bc.it.html>

¹⁹ <https://www.atlanticcouncil.org/cbdctracker/>

²⁰ Fegatelli P., *A central bank digital currency in a heterogeneous monetary union: Managing the effects on the bank lending channel*, in *Journal of Macroeconomics*, 2022, Volume 71 <https://www.sciencedirect.com/science/article/abs/pii/S0164070421000902>

²¹ Scarcella L., *The implications of adopting a European Central Bank Digital Currency: A Tax Policy Perspective*, 2021 <https://kluwerlawonline.com/journalarticle/EC+Tax+Review/30.4/ECTA2021019>

the public-sector side, such as infrastructure, public education, public transport, and so on. Approaches differ according to each country's specific economic and political environment, as well as strategic goals. Some are still carefully analyzing the policy motive for issuing digital currencies, while a few are already actively creating prototypes or launching live pilot programs. The digitalization of economies has implications for many areas of economic research. With the massive volumes of data, those digital activities generate new opportunities and challenges for societies and the monetary system.

Virtual currencies are defined as “a digital representation of value that is neither issued by a central bank or a public authority, nor necessarily attached to a fiat currency, but is accepted by natural or legal persons as a means of payment and can be transferred, stored or traded electronically.”²² This is a very broad definition, which could potentially bring a wide range of service providers currently not regulated by this legal framework under its scope. Despite that, the Central Bank Digital Currency is a digital payment token issued and fully supported by a central bank and is legal tender. CBDCs can also be imagined as a digital extension of the existing forms of central bank money, namely cash and central bank settlement accounts. As a digital liability of the central bank, CBDCs could become a new instrument for settlement between financial institutions. Digital currencies use technology such as blockchain or Distributed-Ledger-Technology (DLT)²³, already used by cryptocurrencies like Bitcoin²⁴, that facilitate the interaction between CBDC and crypto-assets. The growth of such instruments has been possible thanks to the changing external environment characterized by innovation, globalization, and new technologies.

As soon as cryptocurrencies and stablecoins became more popular, the world's central banks realized they needed to provide an alternative. Formerly the rising role of data carries many opportunities to decrease information asymmetries, cut costs, and empower new forms of money. Moreover, electronic payment methods have rapidly increased during the

²² Vandezande N., *Virtual currencies under EU anti-money laundering law*, *Procedia - Social and Behavioral Sciences*, 2016, Vol. 229

²³ DLT refers to electronic registries distributed over a geographically wide network of nodes whose data are protected from potential cyber-attacks. Furthermore, the functioning of such logs is decentralized in that the storage is based on algorithms involving all or part of the participants, i.e., mechanisms useful for getting all nodes in the network to agree on the set of valid transactions. <https://uibm.mise.gov.it/index.php/en/lotta-alla-contraffazione/servizi-per-impese-e-consumatori/tecnologie-anticontraffazione/sot-servizio-orientamento-tecnologie-anticontraffazione/tecnologie-distributed-ledger>

²⁴ Bitcoin is a virtual currency created in 2009 by the pseudonymous Satoshi Nakamoto. Unlike other currencies, it does not have a central bank to support and distribute its currency. Still, it is based on two principles: a network of nodes, i.e., PCs, that manage it and strong cryptography to validate and secure transactions. There are about 9 million Bitcoins in circulation. The date value is around \$20,000. <https://www.finimize.com/wp/news/bitcoin-to-the-moon/>

COVID-19 pandemic. During such a period, people were scared to use physical money because they were germ carriers, so they started preferring contactless payment. The Bank of Italy's July 2021²⁵ report shows that the volume of online shopping rapidly increased from 25 % in February to 40 % in April 2020. This trade sector transformation had long been underway as sales through traditional means of payment slowed, and e-commerce grew. Despite the declining sales for many commodity sectors due to the lockdown, multiple companies have experienced an increase in sales through the integration of traditional and online sales channels. This is also thanks to the example set by large digital platforms (i.e., Amazon, eBay, etc.) that have further strengthened their position in the e-commerce market. However, another reason for the growth in digital payments is the comfort and rapidity they provide to the users.

As already mentioned, despite from crypto, central banks will use private blockchain networks that allow maintaining control over the money supply and access to the blockchain. In the 1990s, digital currencies tried to establish themselves without success, but in the 2000s, things have changed allowing them to rise in popularity and spread. Today digital currencies such as cryptocurrencies and virtual currencies have a significant role in the economy. Bitcoin, officially released in 2009 by the pseudonymous Satoshi Nakamoto²⁶, quickly became the standard for virtual currencies. All the world's bitcoin, as of November 2021, were worth just over \$1 trillion, or nearly 3% of all the world's money.²⁷

The recent interest in CBDCs is because they may offer potential benefits, such as financial inclusion, the enhancement of the payment system, and the improvement of cross-border payments. Overall, results in a global interconnection of trades. Despite that, there might be some risks to consider. One might be the reputational risks for central banks that may occur in case of problems (i.e., cyber-attacks or human errors). However, such risks may be easily mitigated through an appropriate system design. Therefore, cooperation among central banks will be relevant in building CBDCs with features that help reduce the

²⁵ <https://www.bancaditalia.it/pubblicazioni/mercati-infrastrutture-e-sistemi-di-pagamento/approfondimenti/2021-008/index.html>

²⁶ This is pseudonymous for the inventor of Bitcoin. According to him, the world is run on an egalitarian, math-based electronic money system controlled by a computer network. So, this system should be trustless, meaning it does not rely on a trusted party such as a bank or government. The main feature of its project is that those currencies are anonymous since, for Bitcoin's transactions, parties use pseudonyms that hide their identities. Gupta H., Cryptocurrency to CBDC: The Transition of Digital Currency, in FOCUS WTO, October-December 2021, Vol. 23, No. 4 <http://cc.iift.ac.in/research/docs/extract/209.pdf>

²⁷ <https://www.ecb.europa.eu/press/key/date/2022/html/ecb.sp220516~454821f0e3.en.html>

financial impacts and help facilitate backstops. The idea of central banks issuing digital forms of money is a natural evolution from the issuance of physical cash.

Moreover, banks have already had access to digital forms of money for several decades in the wholesale payment system. Yet the debate on the issuance of digital central money that is reachable to regular users has come out only recently. The motivations for issuing CBDCs, differ across jurisdictions. For instance, in advanced economies, central banks are studying CBDCs to sponsor security and payment efficiency. In this case, central banks see CBDCs as an opportunity to address risks to the safety of digital payments, reduce costs, and support central banks' mandates for the smooth functioning of retail and wholesale payments. On the other hand, in emerging market economies (EMEs) and developing economies, CBDCs have often been considered a means to improve financial incorporation, allowing universal access to digital funds for unbanked institutions.

According to Fabio Panetta (former director general of Banca di Italia and current ECB executive board member), the introduction of such payment instruments would be nothing more than a natural consequence of the digitization process²⁸. Panetta is a promoter of the CBDC project that the ECB developed. The latter is to be seen as an ambitious project through which the digital Euro would come to life. With the digital Euro, families, businesses, and citizens can carry out their daily cash transactions with increased speed, simplicity, and security due to the assurances established by the ECB. Such a CBDC is, in a sense, relatable to deposit accounts that each citizen can open with any central bank. In this sense, they share both characteristics of circulating money (they are a liability issued by the central bank). Still, they are also bank deposits (liabilities issued by commercial banks).

Despite the reasons and the potential benefits, it is essential to highlight the importance of public money, which cannot be replaced for two reasons. First, even if we live in an innovative world, few players have come to operate in specific segments of the payments market, like e-commerce. However, this trend could be increased by big tech players, which can offer payment services leveraging their large consumer base and dominant position in several markets. This could result in an unstable playing field that harms competition and raises data privacy concerns. Second, even digital payments will depend on the anchoring

²⁸ European Central Bank, *More than an Intellectual Game: Exploring the Monetary Policy and Financial Stability Implications of Central Bank Digital Currencies*, European Central Bank, April 8, 2022. <https://www.ecb.europa.eu/press/key/date/2022/html/ecb.sp220408~980e39957b.it.html>

role of public money to function equally. Indeed, the assurance that "one euro is one euro," regardless of its form, depends on our capability to convert, at par, private money into public money, which is the safest form of currency that is now accessible. This capacity allows us to say that "one euro is one euro"²⁹. Even though CBDC has been researching and experimenting with it for years, the project is still in the process of being validated. However, a gap in economic knowledge is still arising, caused by an imperfect set of frameworks for analyzing money and its uses. Therefore, several aspects must be improved, and more importantly, there is still room for legal adjustment at the European level.

I.III European Monetary System: features and functioning

The origins of the European Monetary System (EMS) go back to the end of the '70s, when it became operational, according to the Resolution of December the 5th (1978) of the European Council, composed of the Heads of State and Government of the nine members of the European Communities (EC)³⁰. All European countries that composed the EC, except for the United Kingdom (UK), decided to participate in the exchange rate mechanism of the EMS, thus accepting the related requirements. Indeed, a country's currency would be fixed by choosing to participate in the exchange rate mechanism. On the contrary, the currency would continue to float independently in those countries that did not participate in the exchange rate mechanism. In this case, monetary policies and exchange rates would not be subject to the constraints of the fixed-exchange-rate system and would not benefit from any advantages that the ERM may confer to members, such as lower exchange rate variability. Great Britain decided to keep the control of its economic regulation.³¹

Through the years, the EMS has experienced a few changes in its approaches. These occurred without modifications in the institutional setup of the EMS and remained within the framework laid down in the EMS Agreement, which has proved sufficiently flexible to adapt to these changes. The starting point for understanding this effort to build a sustainable and digital Europe is the construction of the single market. As stated in the preamble to the

²⁹ <https://www.ecb.europa.eu/press/key/date/2022/html/ecb.sp220516~454821f0e3.en.html>

³⁰ At that time, the countries were Belgium, Denmark, France, Germany, Ireland, Italy, Luxembourg, Netherlands, and the United Kingdom.

³¹ As of February, the 1st, 2020, the United Kingdom is no longer a member of the European Union and therefore considered a third country. The Trade and Cooperation Agreement provides a solid basis for preserving our longstanding cooperation. <https://www.imf.org/external/pubs/ft/weo/faq.htm>

Treaties, the European Union promotes economic and social progress for the States' citizens. To do so, it considers the principle of sustainable development in the context of the completion of the internal market and strengthening cohesion and environmental protection. In this sense, the founding rule is Art. 3 TEU third paragraph focuses on the characteristics of the internal market.³² However, these adjustments are a move away from the original intentions for the role and ultimate purpose of the EMS. Historically, the first formal steps of introducing a single currency go back to 1962, when the Commission signed a memorandum, thanks to which a discussion about monetary cooperation started. Since then, the member of the European Economic Community has never imposed a fixed exchange rate regime. At that time, Bretton Woods System³³ secured the stability of the exchange rate, and currencies were pegged to the US Dollar, considered the stronger currency worldwide. However, the Bretton Woods system collapsed, and each country followed different economic policies trying to solve the financial tensions. For this reason, a plan for an economic and monetary Union was needed. At first, the members agreed to prevent exchange rate fluctuation at 2.25 %³⁴. The capital controls by the single country were taken apart and officially banned as of 1990. Until that time, many events, including financial crises, characterized Europe. Therefore, countries increasingly started considering that the best way to handle these changes was building up a monetary union by introducing a system based on fixed exchange rates. Since the simultaneous trinity proposition was impossible, all central banks participating in this exchange rate mechanism had de facto renounced an independent monetary policy. Nevertheless, a single currency would ensure greater price transparency for consumers and investors, reduce exchange rate risks, decrease transaction costs and, consequently, increase economic welfare in the Community. Afterward, the twelve member States constituted the European Monetary Union (EMU) project, which started with the liberalization of European capital movements, and the

³² Capaldo G., Orlando S., *Annuario 2021. Osservatorio giuridico sulla innovazione digitale*, Roma, Sapienza Università editrice, 2021

³³ The Bretton Woods system is a system of international exchange regulation that characterized the period between the end of World War II and 1971 when it was abandoned. During the Bretton Woods conference, agreements created a system of rules and procedures designed to regulate international monetary policy to govern future economic and financial relations, preventing the return of possible world conflicts. The two main tasks of the conference were to create the conditions for stabilizing exchange rates against the dollar and to eliminate the unstable conditions brought about by international payments. The International Monetary Fund and the World Bank were established to achieve these goals. Roncaglia A., *Breve storia del pensiero economico*, Manuali Laterza, 2016

³⁴ Mongelli, Francesco Paolo, (2008), "European Economic and Monetary Integration, and the Optimum Currency Area Theory," *Economic papers* 302, Economic and Financial Affairs, February 2008 https://ec.europa.eu/economy_finance/publications/pages/publication12081_en.pdf

Maastricht Treaty (1992) enshrined it. To achieve a suitable level of monetary convergence among member countries, the Maastricht Treaty agreed that a country joining the Eurozone must have an inflation rate of less than 1.5% and a long-term interest rate of no more than 2% when compared to the three best performing states. Then, such rules were reinforced to grant fiscal stability. However, not all the twelve members achieved the criteria established by the Treaty at first. The principles were completed only in 1997, allowing the introduction of the single currency two years later. As a result of the difficulty in meeting the treaty's provisions, entrance into such an economic union was a shock for numerous countries. Indeed, this might be one of the disadvantages of a monetary union. In other words, a typical interest rate may increase the divergences from national inflation rates: some countries may obtain economic advantages over others. Moreover, even dealing with an ordinary external exchange rate with the rest of the world has been a divergence for some member states, especially for those with significant volumes in foreign trades.

In early 1994, the European Monetary Institute (EMI) was established to strengthen the coordination and cooperation within central banks; to deal with the regulatory, organizational, and logistical framework to favor a good relationship between the EU Members. The final stage of EMU was the introduction of the Euro and, consequently, transferring responsibility for the monetary policy to a single central bank. Thus, monetary integration is part of a broader process of European integration. Starting from a free trade area, where tariffs and quotas for member states were abolished, the integration ended with total economic integration, in which all the relevant economic policies were taken at the European level. In 1957 the Treaty of Rome was signed, and its aim was to eliminate impediments on the free movement of productive elements such as people, products, services, and money. However, it contains unclear provisions related to standard macroeconomic and monetary policy. According to the Treaty of the European Economic Community (EEC), Article 103³⁵ states that members should regard their stabilization policies as a common concern and share information about such policies. Additionally, Article 104³⁶ defines the currencies' external equilibrium, price stability, and external stability as general objectives for the Communities. While Article 107 declares exchange rate policies as a matter of common interest. The aim was to create overall monetary stability inside Europe and abroad. Foremost another purpose of the EMS was achieving a

³⁵ <https://eur-lex.europa.eu/legal-content/IT/TXT/PDF/?uri=CELEX:11957E/TXT&from=EN>

³⁶ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:11957E/TXT>

high degree of exchange rate stability as a basis for further economic integration. Among the aims for the foundation of EMS, there was the necessity for more increased cooperation between European countries through an exchange rate mechanism. The latter was based on a currency unit composed of a basket of twelve European currencies weighted by GDP (Gross Domestic Product). Thus, the project of EMS relies on the unique currency and the existing exchange rate mechanism.

On the other hand, many critics of the system feared that fixed exchange rates and the resulting requirement to intervene would deny the stability of countries and the independence necessary to control internal monetary expansion to contain inflation and cost movements. This agreement has brought significant economic and legal implications for its member. Thus, a complete financial and monetary system implies the free movement of goods, people, capital, and services within the Union. Furthermore, the irrevocability of the exchange rate and the use of a common currency is also implied inside the Union. The latter would depend on the successful functioning of these policies. This would mean introducing fiscal, economic, and monetary policies commonly used and, as a result, the transfer of national sovereignty to the center. Indeed, the implication of a monetary union includes the creation of specific common decision-making organs, such as the Central Bank and the Parliament.

Member States set out to achieve common goals and assign the powers necessary to achieve them to the Union. This is based on the principle of attribution, which states that the Union may only operate within the limitations of the powers granted to it by the member states in the treaties to fulfill the goals defined by them. While any competence not attributed to the Union by the treaties belongs to the individual states. Regarding the competencies of the Union, these are divided into exclusive, shared, and parallel competencies. The former is listed in Article 3 TFEU, such as monetary policy, customs union, and trade policy. In the case of concurrent competencies, the union and member states can enact binding laws, but members must accept the legislation of the Union. Finally, there are the parallel powers, in which the Union has a limited task, playing a role in supporting and complementing the device policies of the member states. At the beginning of 1993, the European Community started working as a single unified market as many domestic barriers were abolished in favor of the free circulation of goods, persons, and capital. As already mentioned, the benefit of the monetary unit is the presence of a fixed exchange rate system, according to

which the member states' currencies are allowed to fluctuate within narrow ranges. This is a practical reason for the Union to last in the long run.

The member states were forced to bear costs as a compromise for using a single currency. Two were the main costs: the loss of exchange rate as a weapon of macroeconomic management and the failure of seignorage³⁷ in high inflation countries. Since the monetary Union provides a convergence of inflation rates, countries with higher inflation will be forced to sell debt or reduce their budget deficits. The exchange rate is considered a weapon since countries may use it to adjust external trades and domestic wages and price movement. Moreover, since the launch of the Euro, it has become attractive in international trade, mainly for countries near the Eurozone. Therefore, the intention of the unique currency was focused on increasing price transparency and the competition across the E.U.

Concerning the structure of the monetary system, the initial idea was to build a configuration comparable to the US Federal Reserve System. Indeed, for the implementation of monetary policy, the Maastricht Treaty established a European System of Central Banks (ESCB) and a European Central Bank (ECB); these bodies have been operational since 1999. The monetary strategy is a responsibility of a large group, the so-called Governing Council, composed of the members of the Executive Board and twelve national central bank rulers of those that have adopted the Euro (Article 283 TFEU).³⁸ It is the ultimate decision-making body, so it defines the necessary guidelines and decisions to guarantee the ESCB's performance of its tasks. Additionally, it formulates the Union's monetary policy, namely decisions relating to intermediate economic goals, key interest rates, and the ESCB's reserve supply, and establishes the necessary procedures for its implementation. All these functions are regulated within the Statute of the European system of central banks and the European central bank³⁹. The members of the Executive Board are entitled to implement monetary policy within the Euro area following the decisions of the Governing Council and give the necessary instructions to national central banks. The General Council comprises the President and Vice-President of the ECB and the Governors of the Central Banks of all EU Member States. It contributes to the collection of statistical

³⁷ The seignorage is the profit made by a government by issuing currency instead of selling debt. More in detail, it is the difference between the face value of coins and their production costs.

³⁸ As the supreme decision-making body, it adopts the procedures and takes the decisions necessary to ensure the performance of the tasks delegated to the ESCB, formulates the monetary policy of the Union, and establishes the guidelines required for its implementation. <https://www.europarl.europa.eu/factsheets/en/sheet/85/the-institutions-of-economic-and-monetary-union>

³⁹ <https://www.ecb.europa.eu/pub/pdf/other/ecbinstitutionalprovisions2011en.pdf>

data and creates the necessary regulations for standardizing the accounting and reporting of national central banks' operations. Moreover, it coordinates the monetary policies of those Member States that have not adopted the euro and controls the functioning of the European exchange rate mechanism. In this regard, the General Council sets the fixed exchange rates of the currencies of the EU Member States against the euro.

The ECB, based in Frankfurt (Germany), oversees daily monetary policy. The ECB was, at first, designed as a non-state actor whose primary aim was issuing money. The ECB acts as the bank of the national commercial banks and even in this way can influence the flow of money and credit in the economy to achieve stable prices. It must be consulted on any proposed act of the Union that falls within its competencies and on draft monetary legislation of national authorities and holds broad power to formulate opinions. National central banks must be independent of their governments and subject only to the head of the ECB. All commercial banks can turn to the ECB to borrow from its reserves, usually to finance themselves in the concise term. The monetary function of bank liabilities is essential to provide payment services and determine the amount of money in circulation. To control the quantity of "external" money and thus the demand for central bank reserves by commercial banks, the ECB uses one main tool: it sets very short-term interest rates, the "cost of money." The ECB has the exclusive right to authorize the issuance of euro banknotes within the Union, but only national central banks physically issue euro banknotes. "Printing money" is an expression used to refer to the ECB's asset purchase program, a form of "quantitative easing ."By purchasing assets in the financial market, the ECB creates additional central bank reserves that can help reduce, through various channels, interest rates charged to households and businesses; the aim is to support the economy and finally keep the value of money stable since there is little room for a decrease in interest rates directly controlled by the ECB. So, the ECB does not print banknotes to purchase assets but creates money electronically, which is credited to the seller or intermediary, such as commercial banks. The seller can then use the additional liquidity to purchase other assets or, in the case of a commercial bank, provide credit to the real economy. The ECB always has a legal personality and is independent of national governments and other institutions of the Union. This independence aims to ensure the stability of the currency. On the other side, it also has political accountability: it is accountable for its activities to the other EU. institutions through the transmission of an annual report.

The activities of all central banks are governed by so-called "central bank laws" (which, in the case of monetary unions, take the form of a treaty). These laws license central banks, establish decision-making bodies, create the groundwork for their autonomy, and define their mandate. A central bank's actions outside its mandate are open to political and legal objections, notably under broad principles of administrative law. Article 5 of the Treaty of the European Union provides that "the limits of Union competences are governed by conferral." According to the Treaty, Article 105 states that the ECB's primary scope is to maintain price stability. In contrast, Article 107 states that all the bodies at the European level cannot seek or take instructions from any governments of the member states. Additionally, the European Central Bank can only approve the volume of coins issued by national central banks (Article 128 TFEU). The ECB may carry out certain activities related to the prudential supervision of credit institutions and other financial entities⁴⁰ (Article 127 TFEU).

There have been times in the history of the European Monetary and Economic Union when member states began to question whether that project, so supported at the beginning, was the best solution for single countries. For example, in 2005, Germany was one of the member countries that insinuated that after the introduction of the Euro, its economy slowed growth. Moreover, at the very top of the European bodies, it was implied that the economy had slowed down after the establishment of the EU and that the fate of the euro area declined.

I.IV European Banking System: tasks and composition

Given the essential role played by banks in the payment system, it is appropriate to mention the main features that characterize the banking union, which is ultimately aimed at completing and strengthening the Economic and Monetary Union (EMU).

The regulation of EC banking began in earnest in 1973 when the EC Council of Ministers adopted the Directive on the Abolition of Restrictions on Freedom of Establishment and Freedom to Provide Services in Respect of Self-employed Activities of Banks and other Financial Institutions⁴¹. This was aimed at ensuring the equal treatment of banks of member

⁴⁰ European Parliament, The institutions of Economic and Monetary Union https://www.europarl.europa.eu/ftu/pdf/en/FTU_2.6.2.pdf

⁴¹ <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:31977L0780>

states regarding entry into domestic markets and the conditions under which banks would be allowed to operate.

In 1977 the EC Commission adopted the First Directive on coordinating laws, regulations, and administrative provisions relating to the taking up and pursuing credit institutions. This established a definition of credit institutions and the principle of home country control, whereby the supervision of credit institutions operating in various member countries would be the responsibility of the home country. A directive on the Supervision of Credit Institutions on a Consolidated basis was adopted in 1983, along with two other directives relating to bank accounting formats and consumer protection adopted in 1986. However, banks operating in different countries remained subject to supervision by the host country and, thus, were subject to additional prudential requirements. In addition, the supply of cross-border services was severely impaired by restrictions on capital flows. The difficulty encountered by complete harmonization of national regulations was dealt with in the Second Banking Directive, passed by the EC Council of Ministers in December 1989.

This provides for complete freedom of banking services across intra-EC boundaries and includes minimum capital requirements, the monitoring and vetting of bodies that have substantial bank shareholdings, controls over banks' long-term participation in non-financial companies, and the establishment of a single banking 'passport' to permit activity anywhere within the EC.

The main reason for the establishment of the European Banking Union (EBU) relies on the need to reduce the fiscal cost of bank bailouts, together with the need to achieve a higher level of supervisory convergence and integration in the internal market, along with the need to break the vicious circle between the fiscal risks in the bank and sovereign sectors⁴². This project has completely transformed the economic, legal, and supervisory framework for the regulation and supervision of credit institutions in the Europe zone. When the Maastricht Treaty was signed, there were no points to forming a banking union system since banking markets were stable. Furthermore, no crisis was happening on the horizon, so the Member States were eager to protect their domestic banking markets. Indeed, initially, the project was strongly opposed, especially from the Bundesbank. The rejection was due to the draft of the EMU, which stated that the power to regulate and supervise financial institutions would have been given to the ECB. According to the opponents, such a rule would have implied that banks would have been financially rescued at the European level.

⁴² Sadeh T., Verdun A., *Explaining Europe's monetary union: A survey of the literature*, International Studies Review, 2009 <https://people.socsci.tau.ac.il/mu/talsadeh/files/2011/12/SadehVerdun09.pdf>

The banking union is a fundamental element of the economic and monetary union. In the beginning, the allocation of the single monetary policy to the ECB was not accompanied, in the Maastricht Treaty, by a transfer of banking supervision powers because of national authorities. The debate on the necessity of greater coordination of banking supervision at the European level has also been complicated by the tendency of some countries to entrust powers in this area not to the central bank but a different independent authority. Nonetheless, its creation relies on the crisis that spread in 2008⁴³ and the last crisis of the sovereign debt. For these reasons, the pillars of the EBU are stability, safety, and reliability. Moreover, banks had to be solid and capable of overcoming potential financial crises. The Single European Code is the pillar of the EU's banking union and financial sector regulation. It consists of a series of legislative texts that apply to all credit institutions, thus creating a level playing field within the EU. The aim is to guarantee that all banks are equally disciplined.

According to the Article 25 of the Statute of the European System of Central Banks stated that the ECB could offer advice and consultation by the member states on EU legislation regarding prudential supervision of financial stability and credit management. An adequate supervisory system must be built on the financial system's rules and control mechanisms. The first is comprised of clear and equal norms for all intermediaries engaged in the same activity; the second is comprised of proper supervision of individual intermediaries, known as microprudential, and of the risks inherent in the financial system a whole, known as macroprudential. At the macroprudential level, the ECB and the Bank of Italy carry out functions aimed at maintaining financial stability. The European Central Bank, in cooperation with the Bank of Italy (Banca d'Italia), is responsible for the supervision of Italian banks and banking groups, to a varying extent concerning their relevance. Thus, the macroprudential analysis identifies the financial system's risk factors and vulnerabilities that could threaten its stability to prevent or limit its effects on the real economy.

The financial supervision process may be thought of as a cycle. Close cooperation and coordination between the ECB and other bodies such as the European Supervisory Authorities, particularly the European Banking Authority, the European Systemic Risk

⁴³ The financial crisis of 2008 began in the early 2000s in the United States, the so-called subprime mortgage crisis. At the base of the housing bubble was the rapid increase in the provision of high-risk mortgages, that is, to those who did not possess the necessary guarantees. As a result, the financial institutions most involved in subprime mortgage disbursements experienced heavy losses. Subsequently, a chain ration was created that also affected the countries of Europe.

Board, the Basel Committee on Banking Supervision, and the Financial Stability Board are used to develop regulations and supervisory policies for all banks.

The EBU is based on three pillars: the Single Supervisory Mechanism (SSM) and the Single Resolution Mechanism (SRM); the European Deposit Insurance Scheme (EDIS), which is still in progress⁴⁴. The latter was suggested by the European Commission in 2015⁴⁵. This proposal has been made as part of a more comprehensive package of measures to complement the banking union. The EDIS system would ensure higher and more uniform insurance coverage in the euro area than that already provided by the National Deposit Guarantee Schemes (DGS) regulated by Directive 2014/49/EU. This system ensures that all deposits up to Euro 100,000 are protected throughout the EU. The introduction of EDIS would significantly reduce the vulnerability of national DGSs to large local shocks, ensuring that depositors' confidence level in a bank does not depend on the bank's location and weakening the relationship between banks and national rulers. EDIS would apply to deposits of less than EUR 100000 of all banks in the banking union. If one of these banks is insolvent or in resolution, to pay additional deposits or finance the transfer to another bank, the national DGS and EDIS will intervene.

The SSM constitutes the joint exercise, since November 2014, of tasks and powers of supervision of banks. It is based on two disciplinary sources, which are Regulation (EU) No 1024/2013⁴⁶, which empowers the European Central Bank for the supervision of all banks in the euro area, and Regulation (EU) No 1093/2010, amended by Regulation (EU) No 1022/2013⁴⁷ who align the current founding regulation with the new structure of banking supervision of the European Banking Authority (EBA). The new legislation is supplied by an Inter-institutional agreement between the European Parliament and the European Central Bank governing the dissemination of information provided by the latter, as supervisory authority, to competent bodies of the European Parliament. The Single Supervisory Mechanism is not a unique European institution but comprises existing European and national institutions: the ECB and the competent authorities for banking

⁴⁴ <https://www.europarl.europa.eu/factsheets/en/sheet/88/banking-union>

⁴⁵ https://finance.ec.europa.eu/banking-and-banking-union/banking-union/european-deposit-insurance-scheme_en

⁴⁶ Council Regulation (EU) No 1024/2013 on 15.10.2013 attributing to the Central Bank European specific tasks on policies relating to the prudential supervision of credit institutions. <https://www.lexisnexis.co.uk/blog/financial-services/financial-services-weekly-highlights-19-december-2019>

⁴⁷ Regulation (EU) of the European Parliament and the Council, 22.10.2013, No 1022/2013 amendment of Regulation (EU) No 1093/2010 establishing a European Supervisory Authority (Banking Authority), as regards the assignment of specific tasks to the European Central Bank under the Council Regulation (EU) No 1024/2013.

supervision under internal law. Therefore, Regulation 1024/2013 did not form a new European supervisory authority but founded a regulatory framework for the harmonious exercise of control of euro area banks by the ECB and national sovereignty. The centralization of competencies in Europe is achieved by giving a prominent role to the ECB. According to the decree, the latter is responsible for the effective functioning of the SSM. National supervisors and the European Central Bank shall be independent: they may not seek or receive instructions from Union bodies or the governments of the States. Even in the event of compliance with codes of conduct, the members of the EU act in complete independence and objectivity, following "the interests of the Union."⁴⁸ According to the concept of attribution of powers, a central bank may only execute or engage in activities for which it has acquired a mandate, either directly or by legislative directives. A central bank's objectives, functions, and powers constitute its mandate.

Regulation no. 1024/2013 establishes the ECB's roles in supervision and its powers towards the National Competent Authorities (NCA). The Central Bank is responsible for supervising the banks considered significant and the national authorities for the less effective banks. The ECB directly supervises the "significant" banks. The ECB, therefore, carries out these tasks based on strong cooperation between the national authorities of the Member States. To determine when a bank can be defined as such, the regulation provides criteria, including the case in which a bank has assets of at least 30 billion euros or at least equal to 20% of the country's GDP⁴⁹. All the other banks (so-called "less significant") are subject to the supervision of the national authorities within the framework of the instructions issued by the ECB and of a supervisory action carried out by it. However, if it deems it necessary, the ECB will have the power to take direct supervision of these banks as well. Indeed, the competence remains exclusively with the ECB for the issue or withdrawal of authorization and notifications of acquisition and disposal of qualifying holdings⁵⁰, and those types of participation in the capital of a company.

The tasks of the ECB in terms of supervision are limited to prudential. In this respect, the ECB may require national authorities to use the powers conferred on them by the conditions laid down by federal law unless these powers are expressly granted to the central bank.

⁴⁸ Art. 19, Reg. no. 1024/2013.

⁴⁹ In Italy the relevant banks are: Intesa SanPaolo, Mediobanca, UniCredit, Popolare dell'Emilia-Romagna, Popolare di Milano, Popolare di Sondrio, Popolare di Vicenza, Banca Popolare, Credito Emiliano, Iccrea Holding, Unione di banche italiane e società cooperative, Veneto Banca, Carige, Monte dei Paschi di Siena, Credito Valtellinese.

⁵⁰ Qualifying holdings are those shares other than savings shares.

More in detail, the roles are included within Art. 4, which states that the tasks of prudential supervision are conferred on the competence of the ECB's exclusive right concerning all credit institutions. They include: release or revoke the authorization of institutions; open a branch in a non-participating State; assess notifications of acquisition and disposal of qualifying holdings; assure prudential requirements on own funds, securitization, limits to significant risks, liquidity, on leverage; ensure the presence of corporate governance arrangements; carry out stress tests to ascertain whether the processes of the institutions allow management solid and risk hedging; exercise supervision on a consolidated basis; to carry out the tasks of supervising recovery plans⁵¹.

According to the Art. 10, the European authority has investigative powers. The ECB may require the disclosure of the information necessary for prudential supervision. The latter may carry out all essential investigations over banking institutions, investigating documents, examining books, and accounting records, obtaining written explanations, and organizing audits. Article 11 states that all banks are obliged to submit such requests.

Moreover, suppose the ECB carries out an entity obstacle to such activity. In that case, the competent national authorities shall provide the necessary assistance to ensure access to the premises to facilitate the work of the ECB. Furthermore, a centralized supervisory system does not exclude the need to address specific situations in the internal financial system and economy. So, national authorities may apply capital buffer requirements in addition to those already established by the ECB, as stated by Art. 5, par. 1. However, a notification to the ECB is required, which may raise objections, which the authority concerned must duly consider into consideration. Furthermore, in some specific cases, the Central Bank may apply ad hoc criteria for countries with higher systemic risk (Art. 5 par.2).

The EU banking legislation makes a clear distinction between regulatory and supervisory functions and the corresponding agencies. The European Banking Authority has the power to recommend to the EU Commission the approval of regulatory and implementing technical standards. In contrast, the power to adopt punctual supervisory decisions lies on the ECB and the NCA. The main task of the EBA is to contribute to the creation of the European Single Rulebook in banking, whose objective is to provide a single set of harmonized prudential rules for financial institutions throughout the EU. The ECB shall, in particular, be subject to binding regulatory and implementing technical standards developed by EBA and adopted by the Commission under Article 10 to 15 of Regulation

⁵¹ Brescia Morra C., *Il diritto delle Banche. Le regole dell'attività*, Bologna, Mulino, 2020

(EU) No 1093/2010 to Article 16 of that Regulation⁵². On the contrary, the ECB cannot adopt regulations in the domains falling within the competence of the EU or national legislators. In this area, the ECB may only draw the EBA's attention to a potential need to submit Technical Standards to the EU Commission.

On the other hand, The Single Resolution Mechanism pursues the main objective of an efficient resolution of failing banks that minimizes costs for taxpayers and the real economy. The competent authority at the European level is the Single Resolution Board. The resolution of all banks of the countries participating in the SRM should be managed by harmonized rules and shall be financed by a single fund, sponsored by the banks' contributions. The regulation of the supervisory mechanism determines the application of unique valuation rules of bank assets; this valuation is called "asset quality review," and ECB carries it out with standard criteria. For this purpose, the Authority of European banking has powers and tasks to develop technical standards, for the development of a single set of European standards, convergence and coherence of supervisory practices, and mediation between national supervisory authorities. In this context, the role of the European banking authority is customized to the definition of the technical control details established by the central bank.

The European Banking Authority will harmonize the regulations applicable to banks, issuing several sources of law. For instance, the authority elaborates technical standards, which consider the assessment of different risk profiles within the banking system, enhancing the prevention and recovery action and ensuring maximum homogeneity at the level of European rules and practices applied within the different types of banks. Furthermore, it is relevant to highlight that the non-euro Member States are not excluded from before supervisory mechanisms, but they may voluntarily take part in them.

It is, therefore, clear from the structure of the European banking system that each sector has its regulatory source. Still, high coordination is needed to avoid antinomies and overlaps between these texts in the absence of special rules derogating from the general ones. The banking supervision procedure is based on Art. 127 paragraph 6 TFEU, which requires a particular legislative process with the consent of the European Parliament. Conversely, the resolution mechanism finds its basis in Art. 114 TFEU, which provides for a different legislative procedure in which the Parliament is co-legislator. But outside the

⁵² D'Ambrosio R., *Quaderni di Ricerca Giuridica. Law and Practice of the Banking Union and of its governing Institutions*, Banca d'Italia, April 2020 <https://www.bancaditalia.it/pubblicazioni/quaderni-giuridici/2020-0088/qrq-88.pdf>

matters governed by the Treaty, it appears to be excluded from the decision-making process. Such a branched and intertwined structure increases the possibility of overlapping risks. That is, situations in which the rules and powers entrusted to different bodies on the same matter come into conflict and risk being prejudiced. The Single Rulebook is the result of several processes of standardization at the European level. It aims to provide a single set of harmonized prudential rules, which institutions throughout the EU must respect. The European Council coined the term Single Rulebook in 2009 to refer to the aim of a unified regulatory framework for the EU financial sector that would complete the single market in financial services⁵³.

European banking legislation was previously based on Directives that left room for different interpretations of those rules and legal uncertainty, enabling institutions to distort competition and making it burdensome for firms to operate across the Single Market. Moreover, the financial crisis has shown that these divergences can have disruptive effects in integrated financial markets. Once risks generated under the curtain of minimum harmonization materialize, the impact can often not be contained within national boundaries but spread across the EU single market. Therefore, it is crucial to use the exact definition of regulatory aggregates and the same methodologies for calculating essential requirements, such as capital ratios and liquidity standards.

⁵³ European Banking Authority, The Single Rulebook <https://www.eba.europa.eu/regulation-and-policy/single-rulebook>

CHAPTER II

The European Central Bank Project

II.I CBDCs vs Cryptocurrency and Stablecoin

The way we pay has changed over time. In the past 300 years, cash has been the only way in which households and companies can easily use central bank money to make any kind of transaction. However, thanks to technology's evolution new payment methods have been introduced, so people are making fewer payments in cash, although the total value of banknotes in the economy remains high. Compared to the previous year, the total number of non-cash payments made in the euro area increased by 12.5%, to 114.2 billion. This includes all payment services, such as credit cards, direct debits, e-money, and cheques. As a result, the total value of these payments also increased by 18.6%, to EUR 197 trillion.⁵⁴ For example, Nordic countries are currently the pioneer in digital payments development.

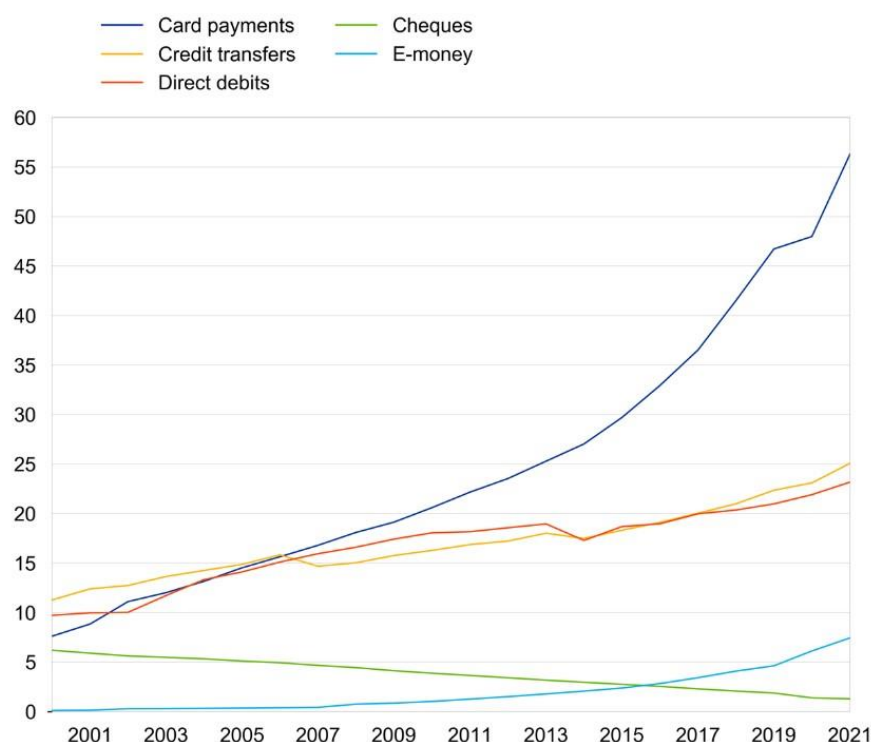


Chart 1: Use of payments systems in Europe within the last 20 years (number of transactions per year in millions). Source: ECB, July 2020

<https://www.ecb.europa.eu/press/pr/stats/paysec/html/ecb.pis2021~956efe1ee6.en.html>

⁵⁴ <https://www.ecb.europa.eu/press/pr/stats/paysec/html/ecb.pis2021~956efe1ee6.en.html>

Countries such as Norway and Sweden expect to stop accepting cash payments by 2025. Swedes, for instance, find it difficult to pay with cash because most retailers and consumers have switched to digital payments, so this has incited the Swedish central bank to reflect on an e-krona.

The current technological and social changes reflect the evolution toward a New Economy. In this evolutionary environment, blockchain and its multiple applications are one of the newest issues within the digital economy. The expectation of a cashless economy is more realistic than in the past. In this context, a discussion on the future of money in the New Economy has a solid base. Therefore, many ideas have been put forward, even if sometimes they are criticized or leave room for unresolved questions. Bitcoins were the first cryptocurrency that was created, and they perfectly match the New Economy concept. Despite being enormously popular since they provide users with transparency and anonymity, Bitcoin and other cryptocurrencies give rise to broad debates in terms of their legal status and their role as money.

A cryptocurrency is a digital money, which value is still increasing and changing from its start. It is mostly used as a payment instrument, speculation, and storage of value. Its value is a function of supply and demand. Cryptocurrencies are usually characterized by wide fluctuations. This volatility has proven to be a deterrent to users who would like to use these instruments as a unit of account and a store of value, and to a portion of traditional investors seeking to engage with a new asset class in what is already a complex market. This form of digital money uses blockchain technology and cryptography to protect the information about transactions and exchanges made on the digital market. The process of translating readable information into unbreakable codes is what cryptography is all about. Additionally, cryptocurrency is based on blockchain. It is a distributed ledger, which records individual transactions and ownership of all cryptocurrencies that are in circulation; it works together with blockchain “miners” that must update all transactions that occur and ensure the correctness of the information managed within the system. In this way, the security of the transaction is guaranteed. The first cryptocurrency emerged in 2009: Bitcoin. After that, several mixed Bitcoin were created, but they did not get obtain the same relevance within the market. The idea was to create a digital cash system that works on peer-to-peer technology. Each peer has a register that contains the tracks of every transaction that was made. When someone gives many cryptocurrencies to another user, that file is signed with a private key, and after that, the transaction circulates in the network

and is sent from one peer to all the other peers. There is a certain time that needs to elapse for the amount to be confirmed. Indeed, confirmation is a critical concept, and every transaction is based on it. A transaction can be falsified while it is still pending, but when it is confirmed, it becomes a part of the historical transactions of the blockchain. Miners⁵⁵ are the only ones who have control of the overall transactions: they can confirm them, take them, mark them as legit and let them spread through the network. Miners receive compensation for their job in Bitcoins. The difficulty of these financial instruments relies on the fact that governments and law regulations cannot completely control them. Its main characteristic is the fact that they are decentralized⁵⁶, which means that no one can control it.

The huge volatility of unbacked crypto has recently created interest in the so-called stablecoins. Indeed, the term has emerged intending to gradually decrease cryptocurrency's volatility through a sustained peg, thanks to traditional instruments such as a basket of stable and strong currencies. This financial instrument has generally the value of a stablecoin pegged to a specific currency, i.e., the US dollar. At first, this seemed to be the proper solution for the volatility problem, which would increase the use of such payment instruments. The value of stablecoins is "stable" on a specific currency-denominated basis, which makes them more viable as units of account or stores of value. To establish fully collateralized coins⁵⁷, the institutions that issue such kind of money must hold a large reserve in excess to ensure the value of the coins in circulation, as happens with common central bank money. In this light, for the investors, the need for transparency is a key point since it increases the risk of bank-run behaviors⁵⁸ which may occur in the case of an

⁵⁵ Miners are nodes that decide to join the network by delivering their computing skills to add blocks to the chain. Miners have the power of validating transactions and keeping the network secure, solving complex mathematical calculations thanks to the use of particular and very powerful hardware. When successful, they receive new bitcoins and block transaction fees as a reimbursement. A potential reward ensures a collaboration between nodes towards a single intention, discouraging selfish behavior and pushing an increasing number of people to dedicate themselves to cause. The more miners a blockchain has, the more secure the blockchain itself is. Therefore, the mining activity is based on the verification and addition of new transactions to a blockchain. The mining process maintains the integrity of the network and is responsible for the introduction of new coins into the existing circulating supply. Xu J., Bai W., Hu, M., Haibo T., Di W., *Bitcoin miners: Exploring a covert community in the Bitcoin ecosystem*, Peer-to-Peer Networking and Application 14, October 2020

⁵⁶ Decentralized finance is an emerging technology, especially used with crypto assets. The system is based on secure distributed ledgers which have the aim to remove the control of the banks and other financial institutions over any type of transactions.

⁵⁷ Those kinds of coins that are fully pegged to another one.

⁵⁸ The 1990s brought increased freedom of action for firms and banks, resulting in a distinct business cycle pattern. In particular, the United States drew money from all over the world in the 1990s, lured by the dollar's stability and the effectiveness of its economic system. This resulted in a significant increase in the value of

uncollateralized coin, where a lack of transparency and trust will be huge. This is the reason why the condition of the use of stablecoins is the full collateralization on a strong and reliable currency.

Existing payment systems transfer money that has been created either by the European Central Bank or by commercial banks, once authorized by the ECB. The prudential regulation and supervision help to ensure that banks' failures happen rarely, so they are obliged to protect families' deposits in the event of a failure because the commercial bank money used is not risk-free. Consequently, users can trust that the money will reliably maintain its value, even when it is being held over time. This safety and confidence may not exist to the same degree for new payment systems that have been proposed recently. In this scenario, stablecoins propose to create digital tokens or “coins” that users can transfer safely. However, depending on the nature of assets backing the “coin”, and how they are held, stablecoins may be unable to provide stability of value and redeemability at par back into commercial or central bank money. As a result, the value of stablecoins may be subject to comparable threats to the financial stability that are connected with the operational or financial collapse of the payment system itself due to the uncertainty as well as the huge volatility. These might be risks associated with the users' ability to manage their liquidity or fulfill their payment commitments, or they could be risks associated with the possibility that such swings could cause a breakdown in trust, which could lead to possible contagion risks for the system. There is also the possibility that stablecoins may be unable to interact with other types of payment systems, leading to closed loops and inefficiencies.

As well as digital coins, even for stablecoins, there is no real universal definition due to the insufficient studies made on them. This has caused many stablecoin inventors to assume that they fall outside current regulations because they are not explicitly mentioned. By contrast, leaving apart from technological implementation details, many stablecoins do appear functionally equivalent to the existing payment systems. The main feature that

the US stock market. Attracted by this extreme optimism, banks fostered speculation by lending even to people with no collateral (so-called subprime mortgages). As a result, as the property market began to recover, people found themselves unable to service their mortgages. On the other hand, the banks that had granted the loans found themselves in trouble: the value of the houses had plummeted, and they could no longer sell them. This collapse interested many other countries that invested in the U.S. housing market, including Ireland, Spain, UK. In 2008, the collapse of stock market prices led to devastating consequences: banks became insolvent, savers withdrew their savings, companies found themselves with numerous unsold products, and the state had to intervene to save struggling companies and banks. De Simone E., *Storia Economica*, Milano, FrancoAngeli, 2014, 5th edition.

characterizes stablecoins are the fact that they are not an existing form of currency, a direct relationship with the issuer is not needed, and they are tradable on the secondary market at quite a stable price. This definition helps at distinguishing and prevent relabeling as “real” stablecoins of other existing payment instruments. The stability of such financial instruments may be interpreted as the possibility to purchase similar goods and services from one day to the next one; it may also mean to be easily convertible for the equivalent amount of assets that the stablecoin is pegged to. Moreover, the stability is relative to the volatility of other currencies. The most common use of stablecoins is as intermediate instruments that help investors to hedge bets and smoothen their transactions on exchanges based on crypto assets. This is a utility function that is quite limited to the specific exchange-oriented investor that facilitates their transaction requirements in the absence of larger capital markets and deeper pools of capital on the exchanges. In the long run, stablecoins may become an excess technology because of the intermediary function they serve. They are a “translation device” between traditional finance and cryptocurrencies. As regards other uses in which stablecoins may be involved, we should mention cross-border payments⁵⁹ in which traders use stablecoins to take advantage of arbitrage opportunities and improve market efficiency. Speculative investors “freeze” their profits momentarily before making other investment decisions, consequently reducing their risk exposure of price fluctuation in case of an unstable cryptocurrency. Using stablecoins instead has become popular on cryptocurrency exchanges due to their intrinsic characteristics where traditional currencies are not accepted. Then, they are used as trading instruments to rapidly convert crypto into more stable currency. Furthermore, exchanging stablecoins instead of cryptocurrencies means evading introducing cash into the financial market, which requires not paying taxes. However, what users appreciate the most is the anonymity, or quasi-anonymity, that stablecoins provide. In this respect, the latter do not differ much from other cryptocurrencies. The anonymity level is higher than bank transactions but lower than cash flows, which are completely unregistered. It provokes critics regarding the potential use of stablecoins in trading in illegal markets. However, analyses show that criminals find cryptocurrencies, including stablecoins, too difficult to use and not anonymous enough.

⁵⁹ A cross-border payments refer to transactions that involve individuals, business, banks, or other financial institutions based in different countries. Furthermore, the companies involved in the transactions are incorporated under the laws of different countries. All the rules applicable in case of cross-border transactions are contained within the Consolidated Directive 2017/1132 (<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32017L1132>).

Nowadays there are several stablecoins projects, but the most significant one is Tether⁶⁰. The latter has been one of the first. It played an important role in the development of other stablecoins, and it is the most widely used. Since the creation process of Tether depends on private enterprise, the users do not put trust in central banks, for fiat money. As of July 2020, there was almost ten billion Tether circulating, with a 1:1 conversion with the dollar (i.e., 1 dollar = 1 Tether). Given the strong demand for a stablecoin, it comes without surprise that new players rushed into the market from late 2017 onwards. Despite all these characteristics, stablecoins are still niched financial instruments, not commonly adopted by the market, especially by the retail and services sectors. The safety given by them can be valued as a multifaceted issue⁶¹. Indeed, stablecoins have a high level of safety due to the use of DLT methods. This means they cannot be forged, and the possession of the assets is ensured. However, stablecoins carry risks and threats. The economic and legal environment may influence stablecoins fluctuation, for instance, legal changes may affect the way they are taxed. Moreover, in case of a lack of credibility due to insufficient reserves of the institution, the exchange rate will decrease and as a result, the value of stablecoins will decrease as well.

On the contrary, Central Bank Digital Currencies are a potential digital form of money that could be used alongside physical notes and coins; they are part of this wider story of digital innovation. CBDCs might potentially help inclusiveness and creativity in an economy that is becoming more digital and dynamic by offering new payment methods to both companies and consumers in the near future. However, they also raised important matters about the reshaping of our financial systems and the way people interact with money and payments. Nonetheless, e-money is not 'crypto-assets'. The latter is not issued by a central bank, can be highly volatile, and are not currently widely used for payments. CBDCs are fundamentally different from privately issued digital currencies such as stablecoins, which are a liability of private entities that seek to maintain stability in their price by pegging their value to a physical currency, typically about stable assets such as fiat currency. CBDC can be considered in two parts: the CBDC itself, an instrument issued by the central bank that can be transferred as a means of payment or held as a store of value, and the wider

⁶⁰ Tether tokens are the most widely adopted stablecoins, having coined the concept in the digital token. A disruptor to the conventional financial system and a trailblazer in the digital use of traditional currencies.

⁶¹ <https://arxiv.org/pdf/2005.12949.pdf>

“ecosystem” in which CBDC operates, including the supporting infrastructure that allows CBDC balances to be managed and payments, made.

The "money flower" graph (Chart 1 below) presented by Bech and Garratt⁶² and further adapted, can aid in framing digital central bank money in a larger framework that incorporates various forms of money, according to their distinguishing qualities (issued or not by CBS, restricted or general purpose, token or account-based, digital or tangible nature). This graph distinguishes many types of digital CB money: Digital central bank money has been available in reserve accounts of CB-managed wholesale payment systems. However, this sort of CB digital money is primarily kept for banks and, on occasion, other designated entities.

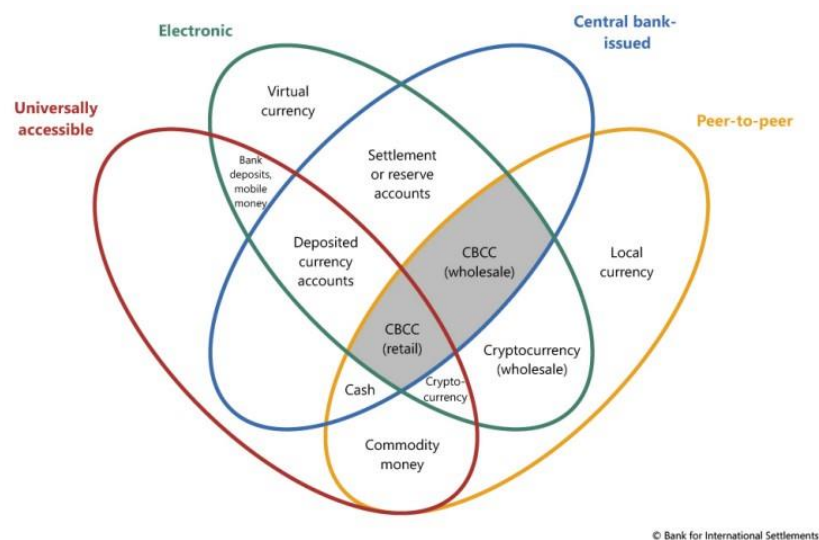


Chart 2 The Flower Money. the picture frames the money issued by central banks within a wider context that consider other types of currency, grouped by common characteristics. Source: Rochemont S., Ward O., *Understanding Central Bank Digital Currencies (CBDC)*, Institute and Faculty of Actuaries, Great Britain, March 2019 <https://taostartup.vn/wp-content/uploads/2020/07/Understanding-CBDCs-Final-disc.pdf>

A digital economy is characterized by network effects, and digital currency is a network asset. Consequently, the more people who hold and use the digital euro, the greater its attractiveness and value to other users will become. To be practical and attractive, CBDC would need to be directly convertible into cash and deposits. While retailers are starting to react positively to the virtual currency market, the currency’s success is subordinate to gaining public approval. The intrinsic value of e-money relies on its number of users:

⁶² Banca d’Italia, *A Digital Euro: A Contribution to the Discussion on Technical Design Choices*, Bank of Italy, July 26, 2021. <https://www.bancaditalia.it/media/notizia/a-digital-euro-a-contribution-to-the-discussion-on-technical-design-choices/>

without public trust, the system of virtual currency as an alternative payment method cannot exist. This way is complicated; it will require massive amounts of education and assurance to calm the skeptical public, particularly because of the volatility that may derive from these financial instruments. If it happens, the potential number of consumers willing to adopt Digital Currency as a regular means of payment will increase. CBDCs can be used as a means of payment, since today many tools allow instant and easy payments, such as bank transfers, apps for payments, QR codes, and so on. From this point of view then e-money would be placed within an industry filled with competitors and this does not facilitate its introduction. However, CBDC could improve and enable access to digital payments for categories of individuals, such as those without a bank account (in Italy the percentage of bankless households is about 7%⁶³). The latter is a basic requirement for the use of the tools listed above, and the CBDC could provide access to them at a minimal cost. If the prevailing motivation behind the non-use of bank accounts was the bank's distance, then the use of CBDCs would not solve the problem. The introduction of CBDC, however, could reduce the costs of cash to zero, particularly the costs of production, transportation, and disposal, which are other reasons that increased the percentage of households without a bank account. According to some estimates, these amount to about half a percentage point of the GDP of the European Union so about 76 billion euros. Additionally, one of the three functions performed by currency is being a store of value. This function, however, has associated costs, especially that of storing cash. These costs are around 0.5% of the amount deposited. The introduction of CBDC would reduce these costs and be an asset completely free of credit or liquidity risks. These aspects have raised fears: because of these features, CBDC could mark the decline of bank deposits, putting the entire banking system in crisis. For instance, banks would face considerable difficulties in "raising" resources and might even offer high positive rates that would constitute additional costs for them. However, as Dr. Panetta pointed out, this negative domino effect may not necessarily be realized; in fact, the ECB's aim is not to destroy the banking system. Banks would still be able to compete with the digital euro, as they could offer a wide range of services that the second does not. Finally, banks could increase their use of wholesale funding.

⁶³ According to the database of the Italian Central Bank <https://infostat.bancaditalia.it/inquiry/home?spyglass/taxo:CUBESSET=&ITEMSELEZ=&OPEN=true/&ep:LC=EN&COMM=BANKITALIA&ENV=LIVE&CTX=DIFF&IDX=1&/view:CUBEIDS=&graphMode=> and Panetta F., *21st century cash: Central banking, technological innovation and digital currencies*, Milan, Bocconi University, June 2018.

CBDCs although may be mistakenly related to cryptocurrencies, are profoundly different from them. Just like banknotes, in fact, CBDCs would be a liability of the central bank and would therefore be backed by its assets, the credibility of the central bank, and the rule of law. Cryptocurrencies, on the other hand, are liabilities that belong to no one, there is no asset backing them and no governance structure that can guarantee trust. For this reason, the value of a CBDC would not be affected by the excessive volatility that typically affects cryptocurrencies. Moreover, a digital euro would enjoy the same trust placed in cash, as it would be guaranteed too by a central bank, unlike cryptocurrencies. They cannot be considered a form of currency at all because it is not guaranteed by any central institution, moreover, they are not a generally accepted form of payment because they are not legal tender, and they do not provide protections for the user. While a possible digital euro would be completely unrelated to these characteristics. Some additional structural characteristics might be the fact that it offers broader access than BC's reserves. For this reason, it may have an independent operational structure from other Central Bank-issued currencies. And as regards retail transactions it may have greater potential functionality than cash.⁶⁴

By making a comparison between these digital financial instruments, we may conclude that the only feature in common is the technology at the basis: blockchain. Indeed, from a financial point of view, there are many differences. The main difference is based on the anonymity of the transactions. On one hand, CBDC's transactions will not be anonym, because intermediaries will implement a payment system that will verify the identity of the users by using some registers. On the other hand, crypto transactions are already anonym, so a valid alternative to cash, that is the reason why they spread so rapidly. Consequently, it is important to underlying that cryptocurrencies are not based or pegged to any type of physical currency. Other differences rely on decentralization: the CB establishes CBDC's rules, while cryptocurrency has its users and miners. From a legal point of view, cryptocurrency and CBDC differ in the regulation applicable to them. The first one is very difficult to control for the Governments since they do not have the power in imposing decisions. The motivation relies on its structure managed on its own without any supervision by external institutions. Indeed, since crypto has been created cybercrime has increased: illegal transactions on the dark web are mainly entitled to cryptocurrencies. Thus, along with CBDCs, both crypto and stablecoins are likely to become to co-exist on a

⁶⁴ Ramos D., Zanko G., *Review of Central Bank-Issued Digital Currency (CBDC) as a Vehicle for Widespread Adoption of Digital Assets*, Colombia, MobileyourLife, September 2020

new continuity, competing with today's most common forms of money: cash and bank deposits. Crypto and stablecoin use are still relatively small, but both are growing rapidly and could soon start having significant implications for the international monetary system. They are challenging our idea of money, creating a paradox, where they may be used like a currency without being one. It remains yet to be seen whether they are going to coexist, complement⁶⁵, or take over existing payment systems. In any case, we should aim to use more technology-neutral language, allowing us to focus on the truly disruptive potential of future money forms and apply new technologies.

II.II The hypothesis of the Digital euro

Money and payments are the essential base for societies and economies. Innovation is rapidly reshaping domestic and international financial infrastructure, with emerging forms of private money over public money. Safe and efficient transactions are fundamental to supporting a flourishing economy, also ensure monetary and financial stability, and protecting trust in the financial system. The huge drop in demand for cash in several European and other countries has pushed its marginal use to the limit. Therefore, the rapid rise in the use of digital payments is transforming the way people and businesses perceive transactions, and their impacts are now spread, with implications for broader public policy objectives. Moreover, the increase in the percentage of digital payments by consumers was incentivized by the COVID-19 pandemic, which increased people's fear of physical money use. The introduction of a CBDC could potentially enhance the efficiency of payments between authorities and the public sector, through benefits such as real-time settlement, a more resilient payments system through the provision of additional payment infrastructure, improved coverage of unbanked individuals, improved identity verification, and the possibility of efficiency-enhancing capabilities of CBDCs. In addition, an advantage would be the acquisition of skills and technological means to enable central banks to issue currencies with decentralized storage, accounting, and management (DLT). In order to achieve some of these benefits may require these new instruments to be adopted at a wide scale within a jurisdiction.

⁶⁵ Adrians T., New Framework for the Digital Economy: IIF Digital Bretton Woods Forum, IMF, 20 April 2022. <https://www.imf.org/en/News/Articles/2022/04/20/sp042022-new-framework-digital-economy>

Achieving a secure and resilient CBDC ecosystem requires careful decision-making in the design and configuration of any digital currency as well as in its ongoing operation, maintenance, and evolution. Countries may utilize different technologies to reach these objectives. All entities in a CBDC ecosystem (both public and private sector) should have data security and cybersecurity strategies, as well as operating frameworks consistent with national and international standards⁶⁶, such as the Fundamental Elements of Cybersecurity for the Financial Sector⁶⁷ set out by the G7 in 2016. The digital Euro should be designed to ensure that its introduction helps the Euro system achieve its core objectives and mandate, minimizing potential risks to the current financial environment and smoothly coexisting with cash, and at the same time being appealing to end users. To support the digitalization of the European economy, the e-money solution should be based on state-of-the-art technology with high-end performance and 365 days of availability. It should also be low cost, able to exchange information with existing payment solutions (i.e., credit transfers, direct debits, e-money, and card payments), and compliant with current regulations (e.g., PSD2)⁶⁸ throughout the entire Euro area, thus leaving room for private initiative to develop advanced features and value-added non-core services for their customers, so that it becomes more attractive. Experts from the ECB and the national central banks of the euro area countries have drawn up some key requirements for a successful digital euro, such as the ease of access to the public without any restriction in terms of users, solidity, the security ran by the guarantee provided by the central banks, the efficiency, and respect for the privacy for the users. Moreover, it should be recognized as a legal tender for the Euro area and the CB should guarantee the convertibility of CBDC into cash and vice versa.

⁶⁶ <https://finance.yahoo.com/news/g-7-cbdc-principles-urge-011110851.html>

⁶⁷ The non-binding core elements established by the G7 in 2016 are designed to warn of and provide tools needed to address potential cyber risks. In fact, these are becoming increasingly dangerous and diverse in recent decades. These core elements are therefore designed for the financial sector and public and private entities to adapt to the specific threat and operational landscape. Then each entity can implement its security strategy based on the constituent elements. Public authorities within and across jurisdictions can also use the elements to guide their public policy, regulatory and supervisory efforts. Working closely together, therefore, can result in strengthening the cybersecurity of the international financial system. https://www.ecb.europa.eu/paym/pol/shared/pdf/G7_Fundamental_Elements_Oct_2016.pdf

⁶⁸ Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No 1093/2010, and repealing Directive 2007/64/EC. This directive establishes the rules under which member states distinguish the following categories of payment service providers: credit institutions, electronic money institutions, post offices entitled to provide payment services, the ECB and central banks of individual member states, and payment institutions. https://ec.europa.eu/info/law/payment-services-psd-2-directive-eu-2015-2366_en

Based on these conditions, Digital Euro should have the following characteristics: the ability to pay anywhere and instant, contactless payments, especially for person-to-person payments. People would also appreciate options that give them control over their personal data, for that reason, privacy must be ensured for everyone. Moreover, its design should consider features to limit the excessive conversion of bank deposits into e-money, to have a lower impact on central banks' balance sheets. An applicable option would be to remunerate the deposits with a variable interest rate that depends on the amounts held, this would ensure that the Euro system fully keeps control over the total amount of digital euros in circulation. On the other hand, applying a zero or a relatively attractive remuneration rate up to a relatively low cap will incentivize the use of the digital euro by individuals and businesses; at the same time, a lower interest rate for amounts beyond the threshold will discourage its use as a form of investment or safe harbor. CBDC may be equally safe and free of credit risk⁶⁹ as physical cash but could be more convenient as a means of payment for both public and private users, particularly for electronic and cross-border payments.

There are three forms of money widely used: banknotes, bank deposits, and central bank reserves. Banknotes are physical currencies widely used and issued by the ECB and controlled by the national central banks. Householders, businesses, and commercial banks, to ensure customers' deposits, hold most of the circulating currency. While banks deposits exist because banks issue loans, especially for enterprises and domestic users. They are a liability of the banking system⁷⁰: banks stand ready to convert those deposits into central

⁶⁹ Credit risk determines an asset's ability to repay its debts. The greater the credit risk, the higher the interest rate required on the asset to offset its risk. This risk is identified using ratings: a judgment, an evaluation based on the analysis of quantitative and qualitative data and information. Customarily, these ratings are issued by rating agencies, such as Moody's, S&P's, and Fitch Rating. In addition to depending on intrinsic business performance, credit risk also depends on the business cycle; in fact, it tends to increase in periods of recession and decrease in periods of expansion. <https://bit.ly/3AynEef>

⁷⁰ The bank deposit is, in part, governed by the rules of the Civil Code (art. 1834) in the section dedicated to banking contracts. The money-keeping function may be one of the reasons an individual might enter into this kind of contract. If a person deposits an asset for safekeeping purposes, she typically pays a consideration for the deposit; in a bank deposit, it is usually expected that the bank pays respect to the depositor for the enjoyment of the availability of the sum of money. The reason, however, why bank deposits are considered a form of money lies in the fact that, in most cases, deposits are linked to a bank account. The latter is a store through which banks and individuals regulate their relationships to give and have reciprocal by annotations in an account rather than by payments in legal currency. According to Article 1852 of the Italian Civil Code, if the deposit contract is settled on a current account, the account holder can always dispose of the resulting sums to his credit. He can, therefore, withdraw sums deposited at any time using payment instruments other than legal tenders, such as cheques, ATMs, and credit cards. The reason we can establish that deposits generate money lies in the use of the deposit multiplier. The latter is a mechanism that determines banks' ability to encourage the increase of deposits when granting loans and thus create new bank money. Starting from an initial monetary base and requiring citizens to pay a sum of money to a bank, the bank can create additional bank liquidity. After the compulsory reserves have been set aside, banks can use the availability of deposits to grant loans and thus to re-import money into the market. Therefore, depending on the monetary

bank money in the form of physical cash or to honor payments made by customers. Therefore, commercial bank money in the form of deposits has credit risk. Consequently, commercial banks hold accounts at the ECB to ensure their reserves. These assets are used by banks when they need to do payments between each other, and they are usually risk-free. A CBDC may be equally safe and have no credit risk and similar effectiveness as an ordinary means of payment. However, it is not possible to substitute deposits with digital money given that deposits of commercial banks offer other types of services, such as credit facilities, which would not be offered by them. The bet is based on the possibility of companies bundling other useful services with a CBDC account and the incentive to substitute away from bank deposits will also depend on whether they are remunerated or not.

To be attractive and accepted, CBDC should be offered in the form of all primary payment instruments and be convenient as existing private solutions. Furthermore, it should allow anonymous payments to ensure people's privacy, as cash does. Nowadays, two distinctive features could be the possibility to make offline payments, which is something that users cannot do with other digital payment methods, and the opportunity to do instant credit transfers between commercial banks. However, the most relevant aspect is that CBDC will promote financial inclusion for those without bank accounts because of a lack of knowledge, distance from branch banks, or high operating costs. At an international level, a Digital Euro will help strengthen the abroad role of the European currency. Despite all the economic and social motives that incentivize the issuance of CBDC, there are also policy reasons for CB and regulators to consider issuing them.⁷¹ Governments' interests rely on the pursuit of the following feasible goals: the functionalization of digital currency to unconventional monetary policies; boosting the efficiency and security of the payments system; financial stabilization and inclusiveness; and stronger privacy safeguards for users. As stated in Article 22 of the ESCB/ECB Statute⁷², the doctrine promotes the functionalization of digital money for the betterment of payment system operating

nature of their liabilities and the lending activity, banks can increase the currency in circulation. Brescia Morra C., *Il diritto delle Banche. Le regole dell'attività*, Bologna, Mulino, 2020

⁷¹ Bindseil U., Panetta F., Terol I., *Central Bank Digital Currency: functional scope, pricing, and controls*, Frankfurt, ECB Occasional Paper Series No. 286, European Central Bank, December 2021 <https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op286~9d472374ea.en.pdf>

⁷² "The ECB and national central banks may grant facilities, and the ECB may make regulations, to ensure efficient and reliable clearing and payment systems within the Union and in relations with third countries.", BCE, *Protocollo (N. 4) sullo Statuto del sistema Europeo di Banche Centrali e della Banca centrale europea*, September 2011 <https://www.ecb.europa.eu/pub/pdf/other/ecbinstitutionalprovisions2012it.pdf>

conditions. So, Central banks are considering issuing CBDC because they oversee sustaining the trust in national currency by maintaining public access to and full availability of CB money in an environment where consumers and businesses are turning to digital payments. Due to e-money characteristics, the public would perceive them as interchangeable. This is because Central bank Digital Currency is anchored to central bank money. This anchoring per se is fundamental for preserving financial and monetary stability. Strategic monetary autonomy also contributes to the CBDC's attractiveness as an incentive because the ability to pay in a manner that is both secure and efficient is a need for any modern society; then the electronic payments industry, is a market in which it is difficult to have strong market power, yet its appeal has grown as has its competitiveness. Therefore, individuals and central banks must consider new competitors, sometimes equipped with more advanced technologies⁷³. Finally, by being the prevailing means of exchange there are funding privileges. The European summit has emphasized strategic autonomy since payment instruments controlled and supervised from abroad have achieved a predominant position in important segments of the European retail payments market.

If on one hand, central banks need to establish digital currency as a widespread means of payment to make CBDC successful, on the other hand, they should avoid it becoming a form of investment. The ability to pay digitally anywhere is one of the elements that would guarantee the success of these new instruments, indeed such financial instruments must be paid anywhere, pay safely, pay privately.⁷⁴ Such as for cash, a public network needs to be set up, based on two features of central bank money: only the money issued by CB can be a legal tender, moreover, it is the safest and most stable payment asset in the economy. Central banks were entitled to the role of issuing banknotes when paper and coins were the only forms of central bank money and since then several institutional and legislative changes have been introduced. This suggests that legislation may be required for central bank money to be legal tender independently from its digital form.

⁷³ Analysis and research paper on the cashless society and payment growth in Europe made by Pwc, a multinational consulting firm. <https://www.pwc.com/it/it/industries/banking-capital-markets/cashless-society.html>

⁷⁴ Bindseil U., Panetta F., Terol I., *Central Bank Digital Currency: functional scope, pricing and controls*, Frankfurt, ECB Occasional Paper Series No. 286, European Central Bank, December 2021 <https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op286~9d472374ea.en.pdf>

Two types of CBDCs may be implemented: wholesales and private⁷⁵. The leading cases for wholesale CBDC, which is made available only to commercial banks and clearing houses for use in the wholesale interbank market, consist of increasing efficiency in domestic or cross-border interbank payments. Today, these processes in some countries can be inefficient and entail costs, time, and counterparty risks to banks. By employing this type of digital currency, central banks hope to achieve increased efficiency in interbank payments and interbank securities trading and settlement. The leading cases for retail CBDC, which is made widely available to the public, relate to the ability to potentially increase financial inclusion or to serve as a strategic alternative to physical cash in economies where cash dwindles. CBDC acts as a substitute or complement for cash and an alternative to traditional bank deposits. For some countries, this form of digital currency could have the potential to incentivize participation in the banking sector for the under-banked, improve peer-to-peer and overseas payments, and potentially improve KYC (know you the customer) and AML (anti-money laundry)⁷⁶ functionalities or curb illicit activities. In regions with decreasing use of cash, it could serve as an important counterweight to retail payment applications developed by the private sector.

One of the main reasons behind its introduction is the EU's attempt to be a leader in the field of digital currencies, which now are almost entirely under private hands and issued by companies or other organizations. This can harm certainty in the currency and trust in the payments system. The expanding digital money market has the potential to revolutionize the way money is exchanged, its introduction into global venues is tense with challenges and potential pitfalls. Virtual currencies are not yet universally recognized as official means of paying, so developing standardized systems for their use is essential. For the currencies to be lasting, their legal status must be improved. Regulatory systems are booming, with approaches being taken by various governments. Current regulatory measures are in their early years and continue to evolve with the rapidly expanding industry. Regulations will offer greater legitimacy to a currency fighting to gain global acceptance. They will standardize elements of the market and minimize at least some of the volatility. Even

⁷⁵ Bindseil U., *Tiered CBDC and the financial system*, Frankfurt, ECB Working Paper, No. 2351, 2020 <https://www.econstor.eu/bitstream/10419/228229/1/1686436750.pdf>

⁷⁶ KYC and AML are different aspects of a financial institution's job based on the laws and regulations about money laundering and counter-terrorist financing. AML concerns to an entire program and it widely covers how companies align their employees, processes, and technology to uncover money laundering across the enterprise, while KYC is just one component of that program. <https://www.dowjones.com/professional/risk/glossary/anti-money-laundering/kyc-vs-aml/>

though governments are testing a different combination of regulatory steps, their end purpose is the same: to limit fraud, protect consumers, respect economic authority, and institute viable taxation methods.

CBDCs must be issued within the framework of central bank mandates which serve a public interest. The current projects on digital currency reflect local challenges. For example, improving digital payments with the aim of reducing the costs of cash management and promoting financial inclusion of unbanked citizens, by offering them access to tools at minimum or zero costs⁷⁷. There are several ways in which the digital euro could support the ECB's aim to keep monetary and financial stability, through the provision of a new form of money and a new payments organization. The overall adoption of Digital Currency by users in a context offering different alternatives as digital payments will depend on its ability to appear as a neutral, reliable, and efficient means of payment⁷⁸. We must also recall that the digital euro would exist alongside cash and deposits, and it would not replace them, thus the introduction of a CBDC would not threaten banks' deposits. However, if digital money issued by the central bank will be a success, households, and firms will own it and use it, making their bank deposits a hybrid. The substitution will be mostly only partial, as it is expected to be limited by design choices. A wide range of reasons for introducing digital currencies is dependent not only on the technological factors and characteristics of the monetary environment of adoption but also on the selection of appropriate purposes in connection to the operational model to be used. Several intermediation designs can handle the daily functioning of a CBDC. The first option is a direct CBDC, that would centralize all functions at the level of the central bank. Alternatively, it can be used as a hybrid CBDC in which the central bank will play a supervisory role, while dedicated supervised intermediaries would ensure the regulatory checks over customers, distribute the CBDC to clients and provide them with services allowing the use of new "currency". Commercial banks have an interest in continuing to use central bank money because it influences their long-term strategic positioning. Even if money distribution still represents a cost rather than a source of income for banks, they do it because it is intrinsic to their business model: convert sight deposits into cash at par or within a very short period. Convertibility is one of the core activities of central banks. If

⁷⁷ Pannetta F., *21st century cash: Central banking, technological innovation and digital currencies*, Milan, Bocconi University, June 2018

⁷⁸ https://ec.europa.eu/info/system/files/economy-finance/ip167_en_chapter_iv.pdf

there were no demand from users for central bank money, neither in physical nor digital form, bank deposits would not be different from other forms of debt.

A key factor sustaining the accessibility of cash is that people usually hold banknotes in case of need, even if they barely use them. The equivalent effect in CBDC would be to facilitate as much as possible the process by which citizens own a digital bank money account or wallet, even if each user would fund it differently. A CBDC account or wallet would probably need to be linked with a liquidity source, for instance, a bank account, and an identity and identifier code. Moreover, it would be especially relevant to set floors: the users should set floors that will trigger automatic funding requests and caps, that will trigger automated defunding orders.

At the local level, the incentives for payment service providers (PSPs) to offer CBDC payment services will depend on the impact on costs, potential revenues, and exclusivity. The costs that will have to be sustained by front-end providers of payment services and central banks need to be defined precisely. The more costly items that fall upon PSPs, the more central banks will need to consider additional incentives to encourage service supply. While revenues depend on their ability to reach a wider range of consumers to offer their services. While the exclusivity would be granted with licenses to a limited number of PSPs to offer CBDC payment services for a defined period, with the possibility to renew it.

I.III The Design for the CBDC

As regards the outlines, two are the alternative technical formats that central bank money may pursue: account-based and token-based. On one hand, CBDC could be offered in the form of deposit accounts with the central bank to all public and firms. In other words, the public and firms would hold funds electronically in CBDC accounts at the central bank, the ECB, or in specially designated accounts at qualified depository institutions.⁷⁹ This design is analogous to that of debit cards. Under this approach, the central bank would process each payment transaction by simply debiting the payer's account and crediting the payee's account. In the beginning, commercial banks would provide the service to exchange bank

⁷⁹ Bordo M. D., Levin A. T., *Central Bank digital currency and the future of monetary policy*, Cambridge, NBER Working Paper No. 23711, August 2017
https://www.nber.org/system/files/working_papers/w23711/w23711.pdf

deposits into CBDC and banknotes, charging a competitive fee. To avoid imposing a burden on lower-income families, the fee could be minimal for making small and infrequent transfers, while fees would be substantial for larger and more frequent transfers. The former proposes a solution for more effective wholesale payment system administration via cash transferable only to banks (and not to the public); in addition to limited and confined access, this model would inevitably be nominative. Because of their decentralization, the most significant benefit is the decrease in collateral costs and savings in central bank oversight of transactions. One key advantage of an account-based system is that CBDC payments could be practically immediate and lower transaction costs. This is a relevant difference from the token-based system where the cost of verification for a would-be inevitably expensive. Otherwise, the CB could offer a digital token currency that would circulate in a decentralized way without a central ledger. The CB to issue CBDC tokens that would circulate electronically among individuals and corporations according to a condition that they might only rarely be redeposited back at the central bank. Access is envisaged as universal (not limited) and anonymous (not nominative) in the token-based paradigm, and if provision is made for the non-expensiveness of its usage, the major currency hypothesis is closed to the concept of banknotes (except for materiality and its electronic management). Furthermore, anonymity is based on uses, categories of users, or circumstances (unspecified), representing an element of flexibility. Besides, just like for cryptocurrency, this approach would use a distributed ledger technology for verifying the chain of ownership of each token and remotely validating payment transactions, without requiring the direct engagement of central banks or any other clearinghouse⁸⁰. The property is given using Public Key Cryptography Infrastructure (PKI), which is a digital signature by which an individual can prove possession of his CBDC. In contrast to bitcoin and other virtual currencies, the central bank would determine the supply of CBDC tokens. This leads to a certain status of anonymity, meaning that the central bank would not know who holds the issued tokens⁸¹. In practice, we should no longer rely on profit-oriented private banks for transfers. These institutions would continue to play the role of agents putting money into

⁸⁰ A clearing house is subject, a market body serves as the automatic and mirror counterparty (seller to original buyer and buyer to original seller) to all contracts entered in a market to reduce the danger of transaction default. The effective completion of transactions is secured by two means: the limiting and selection of parties admitted to the market (and therefore having connections with the clearing house) and the collection and administration of margin payments provided by admitted parties. Mishkin F. S., Stanley G. E., Beccalli E., *Istituzioni e Mercati Finanziari*, Milano, Pearson, 2019, 9th edition.

⁸¹ Bindseil U., *Tiered CBDC and the financial system*, Frankfurt, ECB Working Paper, No. 2351, 2020 <https://www.econstor.eu/bitstream/10419/228229/1/1686436750.pdf>

circulation as is the case for the current physical currency; new tokens would first be purchased by commercial banks in exchange for financial assets and individual citizens, in turn, would then be able to acquire tokens in exchange for cash or bank deposits. It is important to highlight that providing central bank accounts to citizens requires an identification system and therefore the question arises whether the central bank should rely on national identification systems or should build a new internal identification system. This would make this system less inclusive than the token-based. However, it must consider the fact that an account-based structure would not require a significant initial investment, as in the case of DLT.

Although these two models seem to differ, they are not: both are based on a form of recording. Moreover, the CBDCs would also be a liability for central banks, just as the banknotes and the ECB's reserves are today. To mediate this dichotomy and to maximize the positive aspects of both systems, some central banks would have proposed a hybrid structure, according to which CBDCs would be based on tokens embedded in a closed structure of certified accounts. Independently from the design that would be chosen, ECB organs agree on the inability to suddenly abolish the use of cash. Instead, the process should be smooth, so the CB could facilitate the gradual overcoming of cash by making CBDC widely available to the public by giving them the right time to convert cash into CBDC by also applying fees, as previously mentioned.

The main problem with the project for the introduction of the digital euro, and thus the choice of its structure, concerns the role of the Central Bank on the one hand and other financial intermediaries on the other. The types of architectures on which the new central bank currency may be issued are: Two-tiered Architecture (indirect CBDC), Direct Issuance Architecture (direct CBDC), and Hybrid Architecture (hybrid CBDC).⁸² All three models are joined by the role of the ECB, which is the only body entitled to issue and redeem CBDCs. In addition, each architecture could use both the token-based and the account-based system.

The indirect model is most suggestive of the current two-tier financial system, where private intermediaries have an integrated role within the system. Hence the great advantage

⁸² Kumhof M., Noone C., Central bank digital currencies – design principles and balance sheet implications”, Bank of England Working Papers, May 2018, no 725. <https://www.bankofengland.co.uk/working-paper/2018/central-bank-digitalcurrencies---design-principles-and-balance-sheet-implications>

of this model is that all activities with retail consumers are outside the competence of the Central Bank. The latter only keeps track of wholesale accounts and deals with the

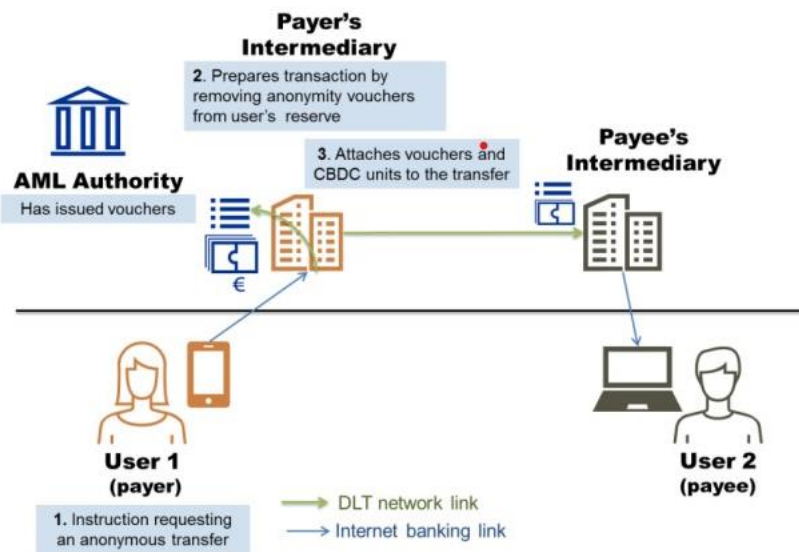


Chart 3 Transfer of CBDC with the use of AML vouchers. Source: ECB

execution of bank payments. However, this system shows a great weakness since the CBDC would no longer be a credit to the Central Bank but a private institution. This means that the model would not solve the current problems of trust with private institutions by offering retail financial services. This implies that in situations of financial crisis or insolvency of the private sector, the Central Bank could not in the first instance honor the claims of consumers because it does not own them.

When the intermediary receives a CBDC request, it may check the client's balance after the transactions in case there is a need for refunding. In other terms, the intermediary requests digital currency instead of the final beneficiary. This means that the issuing central bank does not limit the supply of CBDC in a way that could lead to excess demand from its users, since limits are applied at the level of each wallet. Conversion to and from CBDC always occurs at a ratio of one-to-one, to ensure that CBDC has the same value as alternative forms of the same currency. The actual cash transfer does not occur through ECB involvement, as that role is assigned to a third party, which has direct contact with end customers. The intermediary's node then initiates the transfer by following a process that varies depending on whether the AML authority is involved in the transaction.⁸³

⁸³ European Central Bank, *Exploring Anonymity in Central Bank Digital Currencies*, United Kingdom, IN FOCUS, December 2019 <https://www.ecb.europa.eu/paym/intro/publications/pdf/ecb.mipinfocus191217.en.pdf>.

In case there are no vouchers, the intermediary will prepare the transfer for the AML authority the system would be like the picture below.

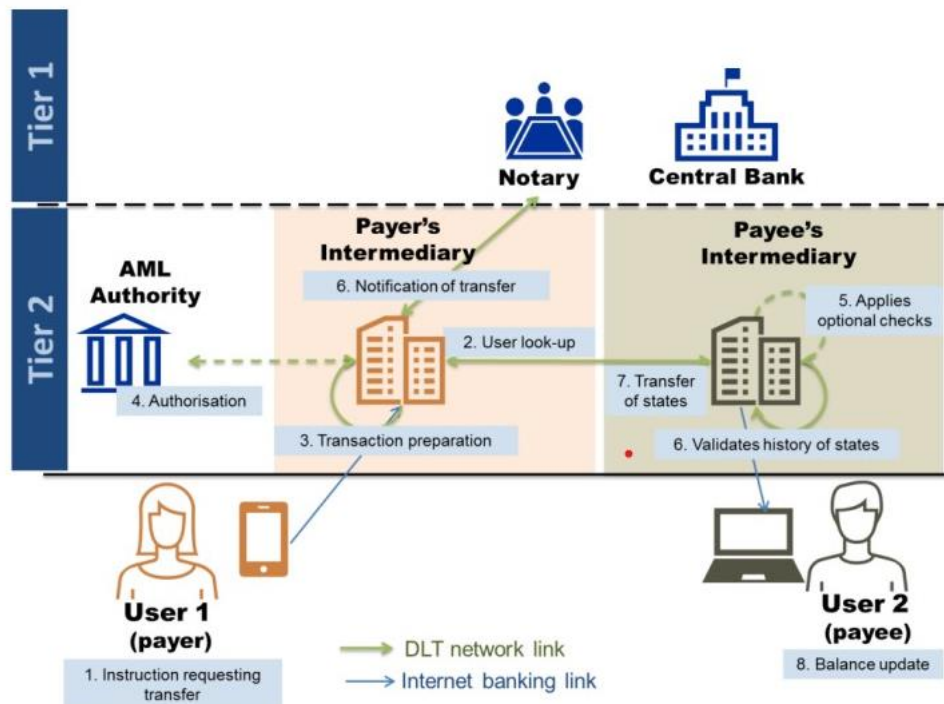


Chart 4 Transfer of CBDC with the implication of AML authority. Source: ECB

Whereas if it introduced the Direct Issuance Architecture, the CBDC would be a direct credit to the central bank, which would always keep track of all balances and all retail transactions using a register that would be updated daily. Such a model, for its characteristics, turns out to be the simplest model to implement and the most centralized because centralizing the operativity of the system on the ECB, private institutions could potentially be excluded.

However, since it would not be necessarily dependent on commercial banks, this model has some limitations⁸⁴. Due diligence in customer relations or retail KYK may prove difficult for such an important institution to implement, as such a service would require significant expansionary intervention. However, the latter would not be necessary for the private sector, which appears to be more efficient in the management of technical capacity in this respect, as can already be seen from their current work with credit cards.

⁸⁴ Banca Centrale Europea, *Exploring anonymity in central bank digital currencies*, In Focus, December 2019, n. 4. <https://www.ecb.europa.eu/paym/intro/publications/pdf/ecb.mipinfocus191217.en.pdf>

The verification of accounting and distribution technological modes relates to an earlier choice regarding the declination of writable models and is based on criteria that vary depending on whether the models are account-based or token-based⁸⁵. First and foremost, it detects the selection of a "sovereign" model. This paradigm envisions not only the complete replacement of circulating currency (legal and banking) with a digital currency of state issuance, and a government of monetary policy to be implemented primarily through the definition of the mass issued, but also the redefinition of the banking structure by separating the activities of issuing and managing the payments system from financial activities in general, and the division of banks into commercial and investment banks. This would not be the first time we have been concerned about the possibility of guaranteeing that individuals can deposit money with central banks, primarily for insurance purposes, while also distinguishing banks into "commercial" institutions, suppliers of the central bank, and "investment" institutions⁸⁶. If one does not lean toward such a model, which is now seen as a radical alternative, the decision of advancing to a central money issue predestined to live with cash and bank money, or intended to replace them, is essential. A second option is then provided, which is to issue money that is lent at the price of a set interest rate or interest-free. In line with each of these models (save the sovereigntist paradigm), one can choose to issue a currency that is universally transmissible and differentiated in terms of the sorts of usage (starting with a distinction between wholesale, and retail purchases).

The "hybrid CBDC" model, as the word says, is an intermediate structure in which credit remains with the Central Bank, but private institutions participate in the model because they are involved to support system operations and payment management. Most hybrid models, which do not adhere to a pure sovereigntist model, accept coexistence with cash (but do not wish to eliminate it), choose an interest-bearing currency, prefer the account-based option, and aim for universal use rather than being overly restricted in terms of types of use. Peculiar in this model is the legal framework that supports the claims, which are kept by the Central Bank separate from the balance sheet of payment service providers. In

⁸⁵ Bosi G., *Taking CBDC seriously*, Bologna, Il Mulino, April 2020, Vol. 1

⁸⁶ Just think of the Glass-Steagall Act, signed in 1933 by the U.S. Congress in response to the financial crisis of '29. During the stock market crash commercial banks were accused of being too speculative in the pre-Depression era. The law established the separation between commercial banking and investment banking. Barriers. The Glass-Steagall Act set up a regulatory firewall between those banking activities. Particularly, commercial banks were involved with the activities of taking deposits and making loans, while investment banking concerned securities dealing and underwriting activities. De Simone E., *Storia Economica*, Milano, FrancoAngeli, 2014, 5th edition.

this way, if the private institution should go bankrupt, the CBDC's holdings are not considered part of the assets of the PSP at the disposal of creditors and therefore the system would ensure the portability of digital assets and the Central Bank would be able to manage the transfer of the relationship to a new institution, allowing the customer to continue to operate. It then retains a copy of all retail CBDC availability, allowing it to transfer retail CBDC availability from one PSP to another in the event of a technical failure.

Even central money, like currency, may be produced in three ways. It can be issued as a liability, with a corresponding obligation on the part of the issuer, using the mechanism unique to the exchange of liquidity (as is typically done by entering into swap agreements aimed at the provision of foreign currency). Alternatively, as in outright monetary transactions, it can be issued in unlimited amounts through purchases of short-term and sovereign securities that the central bank undertakes to "sterilize," in which case the central bank renounces its preferred creditor status (concerning the first hypothesis), a condition that would bring this issuance closer to the provision of risk capital. Finally, it can be distributed in the form of helicopter money⁸⁷, that is, without repayment requirements, but not indiscriminately, for the direct benefit of users, thereby disintermediating its distribution with respect to the financial liquidity transmission channel.

According to the proof of concept drawn up by the ECB, it is possible to implement a simplified CBDC payment system that allows users some level of privacy for lower-value transactions, while maintaining a high level of privacy for higher-value transactions. As shown by the report, it would be possible to create a system that ensures on one hand the high value of privacy but still has a check for AML. Indeed, an AML authority might be a mandatory entity, which will have the aim to check users' identities for transactions with a large value. However, this check may be bypassed using vouchers issued by AML authority that will be available to individuals for a limited period if they decide not to disclose their identity. Such an instrument is to limit the number of anonym transactions.

⁸⁷ Because of the crisis, central banks have employed a variety of unconventional monetary policies aimed at stabilizing nominal demand in the face of significant disruptions in financial markets. These policies had several intermediate goals, such as market making, managing long-term interest rates or asset values, and credit assistance through subsidies. They helped to stabilize financial markets following the fall of Lehman Brothers and the ensuing banking crisis. Their impacts on the actual economy, on the other hand, remain unknown. Milton Friedman's helicopter money is a sort of monetary stimulation that injects cash into an economy as if it were tossed out of a helicopter. It seeks to increase a country's money supply by increased expenditure, tax reduction, or increased money supply. Feenstra R. C., Alan M. T., *International Macroeconomics*, New York, Worth Publishers, 2016, 4th edition.

II.VI Financial benefits

In a cashless society, it would be expected that there would be no coins or notes publicly available and that all money would be exchanged in a digital form. It is not expected that there will be a move to ban notes and coins but as the number of digital transactions increases and the withdrawal of cash from ATMs (Automated Teller Machines) declines, it seems that the developing world is moving towards a less cash society. Governments are trying to improve and introduce proper legislation to regulate any cryptocurrency, including digital currency, that is affecting the payment system.

Central banks have underlying different potential benefits from the issuance of their digital currencies. This revolutionary item will improve the synergies within the payments system, involving those people without access to a bank account by for example reducing the cost of opening and managing it.⁸⁸ A CBDC could also improve capital allocation by making access to payments easier and reducing transaction costs, thereby helping unlock many business opportunities. Consequently, this may guarantee and support the potential digitalization of the economy at the European level, against other already digitalized countries. Introducing CBDCs would primarily combine the efficiency of a digital payment medium with the security of central bank money. A CBDC could improve the efficiency and safety of both retail and large-value payment systems. On the retail side, the focus is on how a digital currency can improve the efficiency of making payments. There could also be benefits of having a CBDC for wholesale and interbank payments; for example, it could facilitate faster settlement and extended settlement hours. A CBDC could also support the removal of low-value coins through the delivery of electronic change. Payment services are not without costs they are generally expensive. The price of services is usually composed of two parts: margin cost and markup. The margin cost is the costs deriving from the process of providing the services, that is why its value depends on the nature of the payment, as well as the technology, the more the transaction is digitalized, the lower the costs will be. While the markup is the value charged by the firm for the issued service, it depends on its market power and the competition. Through the introduction of the CBDC, the competition in the payments services would become higher because the public may

⁸⁸ Christopher J. W., *CBDC - A Solution in Search of a Problem?*, Speech by Mr. Christopher J Waller, Member of the Board of Governors of the Federal Reserve System, at the American Enterprise Institute, Washington, D.C., 5 August 2021

prefer to make payments directly through the ECB to bypass the costs added by the banking system. Also, deposits would flow from commercial banks to CBDC accounts, this would convince banks at lowering their fees. Hence, CBDCs could foster competition in banks' funding markets by reducing banks' market power and improving contractual terms for customers, with little effect on intermediation⁸⁹.

CBDC would be based on a distributed ledger, as cryptocurrency does since it improves efficiency, turnaround times, and verification in areas such as real-time lending underpinned by borrower risk management based on smart contracts; management of liquidity and cash, virtual portfolios, and management of currencies; audit and control of counterparty risk; mitigation of operational risk; and regulatory compliance. This list contains the reasons that can support the issuance of a CBDC in advanced economies and more specifically a Digital Euro within the Eurozone. Some of these motivations are defensive, meaning they aim at protecting financial stability and the good functioning of payment systems or at preserving the ability of the euro-area institutions to exercise the role established by Treaties. Other motivations are more assertive. A CBDC can help foster the spreading of digitalization across the economy and bring innovation to money and payments. A digital euro could be issued to support the digitalization of the European economy and the strategic independence of the European Union; in response to a significant decline in the role of cash as a means of payment; as a new monetary policy transmission channel; to mitigate risks to the normal provision of payment services; to boost the international role of the euro against other currencies, and to support improvements in the overall costs and ecological footprint of the monetary and payment systems.

The issuance of a digital euro would give the citizens of the Euro area the chance to use the central bank's currency for digital pay throughout the eurozone, as they currently do with cash for physical payments. First, the role of the public currency as an anchor of payment systems must be preserved to ensure in an orderly manner the coexistence, convertibility, and complementarity of the various forms of money. An anchor is needed to safeguard the integrity of the single currency, monetary sovereignty, and the European financial system. Secondly, a digital euro would contribute to our strategic autonomy and economic efficiency by providing a common European payment method. At the European level, a digital euro would help to strengthen the strategic autonomy and resilience of the euro retail

⁸⁹ <https://www.ecb.europa.eu/press/key/date/2022/html/ecb.sp220408~980e39957b.en.html>

payments market, also allowing it to respond to possible disruptions in the flow of euro payments as a result of geopolitical risks. The issuance of a digital euro would promote sovereignty and stability at the European level in two ways: by contributing to the development of payment services governed by Europe and by promoting a resilient euro retail payments ecosystem.

An important advantage to consider is that CBDC does not face the same restrictions as banknotes for use in e-commerce. When it comes to innovations at an early stage in the private sector, often central banks prefer first to carefully weigh the added value these provide against the investment required to make them available in that segment. This is what ECB is doing with CBDC by defining a long timetable for the project. As stated, we can preliminarily establish that CBDC offers many advantages in the accessibility of retail payment, convenience, efficiency, and stability.

Furthermore, CBDC would facilitate a more rapid and secure settlement of cross-border transactions⁹⁰. CBDC would be particularly beneficial for lower-income households, which tend to rely mostly on cash, and for small corporations, which carry huge costs for handling cash or significant interchange fees for taking payments via payment cards. The disclosure of the concept of CBDC brought with it a discussion on whether these are necessary if they are only a way for central banks to tighten their grip on their economies against the popularization of cryptocurrencies and how can they stand against attractive decentralized systems. A report published by the World Economic Forum⁹¹ highlights that the adoption of CBDC brings the potential for faster and cheaper domestic and cross-border payments since there are no production costs associated with electronic currencies, to improve AML/KYC functionalities to prevent tax evasion and fraud, and to provide alternatives to digital payment technologies offered by the private sector.

In such an instance it may be found that a digital currency with Central Bank backing may be a credible alternative. Once the digital euro has been designed, it is important to introduce effective tools to discourage it from being used as a form of investment than just as a means of payment. A possible way is the imposition of quantitative constraints on the amount held on an individual basis. An alternative is to discourage the use of the digital

⁹⁰ Ramos D., Zanko G., *Review of Central Bank-Issued Digital Currency (CBDC) as a Vehicle for Widespread Adoption of Digital Assets*, Colombia, MobileyourLife, September 2020

⁹¹ World Economic Forum, *Central Banks and Distributed Ledger Technology: How are Central Banks Exploring Blockchain Today?*, Switzerland, 2019 March

euro as a form of investment by applying remuneration above a certain threshold, that is, lower rates on higher amounts. This would avoid negative effects on the financial system and monetary policy.

The benefits of a widely accessible CBDC may be limited in case the Central Bank-issued fiat money would be eclipsed by privately issued e-money. Indeed, the commercial objective of private e-money providers, which aims to maximize their profits, does not align with a fiat currency. The State provides the payment of benefits using fiat currency. For instance, governments issue social welfare using fiat currency and if the privately issued e-money has a monopoly then there may be a social welfare cost. Therefore, if privately issued e-money would be more widely accepted and used than fiat currency, then those receiving benefits would be at a disadvantage relative to the wider public.

II.V Critics

Some central banks have begun to investigate the possibility of issuing their digital currencies. The development of new financial technologies, the decline of cash, and the advent of digital currencies have all fueled this research. The introduction of a CBDC will have ramifications for the function of the central bank and may influence financial intermediation. Commercial banks and a small number of other entities already have access to CBs' digital account-based central bank money. Cash, on the other hand, is available to all consumers; nevertheless, when cash usage drops, so does access to the safety of CB money. However, because of the complexities of the financial system, any adjustments must be carefully evaluated.

A study published by the Central Banks of Canada, the UK, and Singapore focused⁹² on the possibility of CBDC to improve counterparty credit risk for cross-border interbank payments and settlements. The wholesale version of CBDC limits its use to only financial institutions and markets. The current model for cross-border payments relies upon CBs operating the infrastructure within which commercial interbank obligations must settle. However, there are limitations to this system as there are time lags for cross-jurisdictional

⁹² Rochemont S., Ward O., *Understanding Central Bank Digital Currencies (CBDC)*, Institute and Faculty of Actuaries, Great Britain, March 2019 <https://taostartup.vn/wp-content/uploads/2020/07/Understanding-CBDCs-Final-disc.pdf>

payments, during which counterparties are exposed to credit and settlement risk from their correspondents. The study analyses the use of wholesale CBDCs as an alternative approach to cross-border payments and found: that a jurisdiction-specific wholesale CBDC which cannot be exchanged across borders offers little benefit over the existing model; it could significantly improve counterparty credit and payment and settlement risks. The benefits of these CBDCs include 24-hour availability, anonymity, and eliminating counterparty credit risk for participants. However, all the wholesale CBDCs were found to perform worse than the existing governance framework. The wholesale CBDCs would lead to a mix of benefits and drawbacks for Central Banks' future role and oversight. There have been several worries raised concerning the possible impact of a digital euro on the financial system. Indeed, if not correctly constructed, its key strengths—security and liquidity—could have an influence on monetary and financial stability on different fronts⁹³. Firstly, financial intermediation and capital allocation may be impacted (i.e., disintermediation, effects on traditional banks' cost of financing, central bank/commercial bank conflict) because if clients decide to transfer deposits to the central bank in digital euros, the banks will incur huge funding costs (possibly even offering a positive interest rate, adding to the bank's costs). Opening digital euro accounts directly with the central bank might disintermediate the traditional banking system. As a result, CBDC may have a negative structural influence on credit allocation and therefore economic efficiency: adopting a CBDC may result in increased central bank intervention in financial systems. As a result, central banks may play a larger role in distributing financial resources, which may result in total economic losses if such entities are less successful at distributing resources than the private sector. It may drive central banks into uncharted areas while strengthening political authority. Another front to consider is financial stability in times of crisis: for example, during a crisis, a digital euro might hasten "digital leakage" from commercial banks to the central bank. CBDC might intensify bank-run dynamics: the establishment of a CBDC would entail problems that extend further than payment systems and monetary policy transmission and implementation. A CBDC with wide objectives may increase the volatility of commercial bank deposit funding. Even though it is founded primarily for payment purposes, a flight to the central bank may occur on a large scale during times of stress, offering a challenge to commercial banks and the central bank in dealing with such crises. While considering

⁹³ European Central Bank, *More than an Intellectual Game: Exploring the Monetary Policy and Financial Stability Implications of Central Bank Digital Currencies*, European Central Bank, April 8, 2022. <https://www.ecb.europa.eu/press/key/date/2022/html/ecb.sp220408~980e39957b.it.html>

the global financial system, if a digital euro were not designed in such a way as to prevent its use as a form of investment, its benefits would be accompanied by the risk of amplifying international shocks. During a systemic banking crisis, owning risk-free CBDC issued by a central bank may become significantly more tempting than bank deposits. Run-on bank deposits might aggravate the crisis's impact⁹⁴. Even in the absence of a crisis, freely convertible digital bank money might completely drown out bank deposits, jeopardizing the two-tier banking system's survival. The efficient flow of credit to the economy would very definitely be hindered in this circumstance. Therefore, the main concern is whether CBDCs could influence the size of the central bank's balance sheets. This is significant because the size of a central bank's balance sheet influences its revenue (by seigniorage), market footprint, and, ultimately, the amount of risk it must manage. The impact might be neutral, for example, if a CBDC partially substitutes banknotes in circulation, resulting in a balance-sheet exchange between these two liabilities. If banks have sufficient reserves at the central bank, this would likewise be the case when client deposits at commercial banks are substituted with CBDC.

From a macroeconomic aspect, the prospect of a drop in deposits is a major worry related to the development of a CBDC and according to the balance sheet identity, a decrease in deposits on the liabilities side must be balanced by an increase in other obligations or a commensurate loss in assets. It should be underlined that the issue of financial intermediaries is not exclusive to a digital euro. Any additional form of digital money, such as stablecoins, international CBDCs, or cryptocurrencies, has the potential to disintermediate banks by weakening the role of deposits as a payment mechanism and store of value. In this sense, a CBDC would allow regulators to establish an intermediation architecture in which parties other than banks would increasingly perform the intermediary function. Banks should make deposit compensation more attractive to reduce deposit withdrawals. The higher the deposit rate necessary to retain at least a portion of possible withdrawals, the greater the demand for CBDC, the lower the interest rate elasticity of this demand, and whether the CBDC is interest-bearing. Deposits and CBDC are not perfect substitutes;⁹⁵ when banks have market power, the introduction of a CBDC diminishes

⁹⁴ Mersch, Y., *Digital base money: An assessment from the ECB perspective*, European Central Bank speech, Helsinki, 16 January 2017 <https://www.ecb.europa.eu/press/key/date/2017/html/sp170116.en.html>

⁹⁵ Clemens U., Cousin G., Feller J.B., Monteiro D., Salto M., *The economic consequences of central bank digital currencies*, Quarterly Report on the Euro Area (QREA), Directorate General Economic and Financial

deposits, although to a smaller amount. Deposits are more than just a steady, low-cost source of liquidity for banks. They also attract clients and help to provide loans and other financial services, such as payment services. Banks may also change their business arrangements, such as securitizing loans or acting as intermediaries under the CBDC clause. On the liability side, banks may replace deposits with other financing, such as market funding or banking system funding. In the second instance, the central bank may choose to make up for any decrease in savings by providing replacement central bank money. Bank financing would not be reduced in this case. Its makeup would change, but this would have no impact on loan availability or financial sector stability. On the asset side, banks may decide to use as much of their surplus reserves as feasible, especially if they are partially charged a negative interest rate. Concerning possibly fundamentally decreased bank deposits because of CBDC implementation, the financial stability implications are mostly determined by how banks change their balance sheets in response. Financial stability issues may also occur because of decreasing bank profitability. This might be the case if banks raise deposit rates to compete with the CBDC, if the decline in deposits was offset by more costly sources of funding, and/or if it meant decreased fee income.

The balance sheets of the CB and commercial banks would stay unaltered if people replaced banknotes with CBDC. However, if households substitute CBDC for commercial bank deposits, commercial banks would incur a financial loss, potentially leading to the banking industry's "disintermediation." Deposits with minimal reward may be expected to move some amount into riskless CBDC, resulting in a loss of commercial bank funding of an equivalent scale. Banks would have to try to offer better deposit conditions to protect their deposit base as much as possible, but this would result in higher financing costs for banks and a loss of commercial bank seignorage. The effects of a CBDC that completely substitutes currency on the CBs' balance sheet would be neutral; however, the consequences for the CBs' balance sheet if CBDC replaces commercial bank deposits are not: in this case, the digital money component will extend the Balance sheet and CBs will have to fill the gap left by banks.

The most essential question is whether digital money should be traceable or engineered to provide anonymity to the greatest extent feasible. Cash has always been a fantastic tool since it provides for third-party anonymity in transactions while leaving no trace. While this suggests that it is an effective form of payment for illegal activities such as money laundering, terrorism funding, or tax evasion, it also protects user privacy. The ability to track our digital transactions might have significant economic and ethical repercussions. As a result, the option does not belong just to central banks, but also to the political domain.

Interest payments, for example, would make a CBDC a more viable option for bank deposits. This would increase deposit volatility and, in extreme cases, may even assist a digital bank run (the likelihood of which is raised by the presence of a CBDC): in difficult circumstances, depositors could migrate quickly and at no cost from their bank account to the CBDC. The central bank might mitigate such risks, for example, by limiting the amount of CBDC that each investor can hold at this time. The ECB presents a proof of concept for a CBDC solution based on distributed ledger technology, allowing caps to be applied in holders' wallets.

Payments into a wallet/account that result in excess holdings would simply be refused, or the payment for CBDC holdings beyond a specific threshold would be reduced to zero - although this would generate a lot of technical concerns. Simultaneously, an interest-earning CBDC would strengthen the transmission of monetary impulses to banks, families, and enterprises. In downturns, by lowering the remuneration of digital currency, the central bank could encourage banks to lower deposit rates; it could push them below zero (assuming cash is no longer available), improving its ability to stimulate the economy in extreme conditions without resorting to unconventional measures. A similar dynamic would be at work during upturns when a rise in the remuneration of the CBDC (which would represent the floor of market rates) would compel banks to move quickly to boost the remuneration of their deposits. A change from interest-free cash to an interest-bearing CBDC would affect seigniorage in various ways: in addition to the direct effect on central bank interest payments, it would have indirect effects by lowering the costs of supplying cash (positive impact) and increasing demand for central bank liabilities (negative impact) (positive impact). The total effect is uncertain, but it might be large and have non-trivial distributional implications: central bank earnings, handed to the State and spent as the State sees appropriate, could vary dramatically after currency holders are compensated. The political and economic implications of this should not be ignored.

Even when digital money schemes are lawful, a major actor is rarely controlled or overseen, leaving the total picture ambiguous. As a result, consumers are less protected by regulations, such as redeemability or a deposit guarantee program, and are more subject to the many hazards the rule is supposed to reduce.⁹⁶ Another hurdle for potential clients is the difficulty in creating even a basic understanding of how virtual currency scheme's function; most of the time, only little data is available. Because of the severe absence of information on legal requirements, users are nonetheless at risk of being confronted with unforeseen regulatory demands that render contracts unlawful or unenforceable. As the ECB accurately indicated, most nations' taxation structures are not yet clearly defined and may alter abruptly, resulting in greater consumer costs. Furthermore, while using virtual currencies to pay for goods and services, clients are not protected by any return rights afforded by EU regulation for transfers from a traditional payment account.

The World Economic Forum⁹⁷ also cites the prospect of exclusion for communities who are unwilling or unable to fully adopt CBDC, which may further marginalize them, as well as greater vulnerability and exposure to cyber-attacks and power outages, and that a blockchain-based CBDC would exacerbate the inherent blockchain issues of scalability, secrecy, key management, and transaction speeds⁹⁸.

⁹⁶ Clemens U., Cousin G., Feller J.B., Monteiro D., Salto M., *The economic consequences of central bank digital currencies*, Quarterly Report on the Euro Area (QREA), Directorate General Economic and Financial Affairs (DG ECFIN), European Commission, vol. 20, No. 3, 2021 https://ec.europa.eu/info/system/files/economy-finance/ip167_en_chapter_iv.pdf

⁹⁷ World Economic Forum, *Central Banks and Distributed Ledger Technology: How are Central Banks Exploring Blockchain Today?*, Switzerland, March 2019

⁹⁸ Ramos D., Zanko G., *Review of Central Bank-Issued Digital Currency (CBDC) as a Vehicle for Widespread Adoption of Digital Assets*, Colombia, MobileyourLife, September 2020

CHAPTER III

The regulatory framework for Central Bank Digital Currency

III.I Money as a legal tender

Once the technical characteristics of CBDCs have been analyzed, it is therefore appropriate to study their legal aspects. For this reason, the following analysis focuses on the legal value of money, the consistency between the current legislation and digital currency⁹⁹, as well as the analysis of possible legislative interventions.

One of the most common types of private money is bank money. The latter has the advantage of being convertible into legal cash upon sight. Like other types of private currency, bank money is created through an exchange of responsibilities between those who receive it, namely citizens, and those who produce it (i.e., issuing institution). In legal terms, circulating money is the only legal tender used by families and corporations within a state's territory or within the area of countries that have agreed to adopt a single currency¹⁰⁰. For instance, euro is the only money with legal tender status within the Eurosystem. The overall acceptance of its real face value comprises the responsibility to accept and the capacity to discharge the payment obligation regulated by the internal legislator. However, there is a lack of integration in the legal idea of money. Within the limits of the legal framework, the concept of "money" (in and of itself) does not exist. Instead, the idea of money is divided into various subcategories throughout the legislative contexts in which it is investigated.

The concept of contributions is as narrow as it possibly can be. The idea that cash, such as banknotes and coins, may be considered a legal tender has been disproved for a long time. However, since the middle of the 1970s, a notion has been circulating that suggests it is possible that bank money, such as checks, bank circulars, and credit orders on the current account, may be considered a manner of satisfying monetary commitments under article 1277 of the Italian civil code (I.c.c.)¹⁰¹. Following the provisions of Section 1 of this Article,

⁹⁹ In this section the term "digital currency" will be used as a synonym for CBDC.

¹⁰⁰ Ferrari A., Ferrero G., *Moneta pubblica e privata in un sistema economico moderno*, 2019 <http://www.francodebenedetti.it/http://www.francodebenedetti.it/wp-content/uploads/La-Moneta-Ferrari-Ferrero-2019-08-05.pdf>

¹⁰¹ Art. 1277, I.c.c.: "Pecuniary debts shall be extinguished by currency of legal tender in the State at the time of payment and by its nominal value. If the sum due was determined in a currency that is no longer legal tender at the time of payment, it must be made in legal tender with the value of the first."

monetary obligations may be settled using money that is recognized as a valid form of payment. Unless otherwise stated by the parties, the delivery or transmission of the check establishes a "with recourse" transaction rather than a "without recourse" transaction, giving the immediate extinguishing effect of the debt being excluded. This is the case regardless of whether the check is circular or issued by a bank because it is a means of payment, unlike the bill of exchange.

The regulations for the code mode of payment of pecuniary obligations are included in the provisions for articles 1182, and 1197 of the Italian Civil Code¹⁰². The prevailing jurisprudence of the Court holds that the interpretation of Article 1277 is that pecuniary debts are extinguished with a currency that is legally tender in the State. The fulfillment of a monetary obligation is regarded as a direct performance for the eradication of debt: a process in which parties involved are required to cooperate by observing behavior that will be evaluated; in the case of the creditor, according to the rule of fairness and, in the case of the debtor, according to the law of diligence. The creditor may refuse any other means of payment, including the bank draft, which is also aided by particular reliability and security about how it was issued.

Since Article 1277 I.c.c. is a derogating rule, it effects inapplicable the principle according to which a creditor is not required to accept debt securities, even if backed by special guarantees of issuer's solvency (such as bank drafts), if there is an express or presumed expression of the creditor's intention to do so. Thus, this principle is applicable only when there is a representation of the creditor's intention, explicit or assumed, to accept the transaction. Furthermore, even if the delivery of checks is not the same as paying in cash, this cannot be construed as an extinguishment of the obligation where the creditor's rejection seems to violate the standards of fairness. As the collaboration is only due to getting the object of the service, not a different object, the latter requires the creditor to collaborate in line with Art. 1175 I.c.c. The latter must guarantee cooperation in order to receive the object of the service. However, these principles, which have been laid out so far, are applicable if the monetary debt does not exceed the sum of EUR 12,500. If it does,

<https://www.brocardi.it/codice-civile/libro-quarto/titolo-i/capo-vii/sezione-i/art1277.html?q=1277+cc&area=codici>

¹⁰² Art. 1182 c.c. states that "an obligation relating to a sum of money shall be discharged at the domicile of the creditor at the time of maturity" <https://www.brocardi.it/codice-civile/libro-quarto/titolo-i/capo-ii/sezione-i/art1182.html?q=1182+cc&area=codici>

Art 1197 c.c. states that "The debtor may not be released by performing a performance other than that due, even if of equal or greater value, unless the creditor agrees." The rationale of that article is that the creditor is entitled to obtain the original benefit. <https://www.brocardi.it/codice-civile/libro-quarto/titolo-i/capo-ii/sezione-i/art1197.html?q=1197+cc&area=codici>

it exceeds a particular discipline (D.l. 143/1991 converted into L. 197/1991)¹⁰³, which continues to be in full force under Art. 1227. Therefore, the primary concept is that the fulfillment of the monetary obligation takes place through cash transfer, which is achieved by the actual delivery of monetary pieces into the hands of the creditor. This is accomplished by physically delivering the money into her possession. A financial obligation is comparable to debt in that it requires the provision of certain fungible things. Case law has also concluded that to discharge the financial obligation, "alternative payment mechanisms are permissible"¹⁰⁴ if they guarantee the creditor the same effect as cash payment and, that is, give the availability of the required amount.

The limit beyond the discipline is when the creditor's refusal becomes illegitimate, even when the obligation's payment is subject to good faith. This limit derived from the Italian Civil Code Articles 1175¹⁰⁵ (which imposes the obligation to act under fairness rules) and Art. 1375¹⁰⁶ (which states that the contract must be performed in good faith).

According to this evolutionary interpretation of Art. 1277 Italian Civil Code (in the judgment mentioned afterward), the Corte di Cassazione accepts that this availability may be treated as a cashier's cheque because the provision was in place before the constitution was ratified, and the bank served as an intermediary between the parties. The issue of pecuniary obligations was one of the cases discussed by the Supreme Court Judgment No. 26617 on September 18, 2007¹⁰⁷. More specifically, the inquiry asked whether an extinguishing effect is only achieved through payment in cash or also through the delivery of cashier's checks, namely any other kind of payment instrument. In addition, it examines the possibility that the creditor may later refuse to accept payment from the debtor in any manner other than monetary compensation if the latter is in breach of their obligations. The major focus of the judgment is on the binding nature of demanding payment in the form of

¹⁰³ <https://www.gazzettaufficiale.it/eli/id/1991/07/06/091A3072/sg>

¹⁰⁴ Ferrari A., Ferrero G., *Moneta pubblica e privata in un sistema economico moderno*, 2019 <http://www.francodebenedetti.it/http://www.francodebenedetti.it/wp-content/uploads/La-Moneta-Ferrari-Ferrero-2019-08-05.pdf>

¹⁰⁵ The article refers to the idea of fairness, which may be followed by good faith in an objective meaning, which can be seen as the need to conduct in a manner that is loyal and honest. Both ideas are abstract and devoid of any substance; the judge must provide meaning to each to define the specific instances brought before him. While it is the debtor's responsibility to fulfill the creditor's interest, it is the responsibility of the creditor to work together with the debtor. <https://www.brocardi.it/codice-civile/libro-quarto/titolo-i/capoi/art1175.html?q=1175+cc&area=codici>

¹⁰⁶ The legislator states that good faith must govern the entire life of the contractual relationship because it expresses a need for fundamental protection of the parties. Good faith is a criterion for assessing the conduct of the parties in the performance of their obligations, as they are bound by several duties of cooperation. <https://www.brocardi.it/codice-civile/libro-quarto/titolo-ii/capov/sezione-i/art1375.html?q=1375+cc&area=codici>

¹⁰⁷ <https://www.miolegale.it/sentenze/cassazione-civile-sezioni-unite-26617-2007/>

legal tender currency and the categorical rejection of other means of payment. However, the condition to which they are subject is that they ensure that the creditor has the same effect as the cash payment¹⁰⁸. Therefore, the refusal by the creditor to receive the compensation should be assessed in the light of good faith (1175 I.c.c.¹⁰⁹). To the borrower remains at risk of convertibility, so the obligation can be considered expired when the transaction is successful.

Within the discipline of pecuniary obligations, the Italian Civil Code omits the definition of "currency," despite the latter having as its object a sum of money. It is also not constitutionally permissible to identify the currency with the state currency. Since the ECB is now in charge of monetary policy, this function assigned to the European level would be an obligation that the State could no longer fulfill today. The rationale is based on the legislator's decision to examine monetary obligations from a functional standpoint. As a result, more emphasis is placed on how these are extinguished rather than on defining the common lines, i.e., definition. In fact, according to Art. 1277 cod. Civ.¹¹⁰, the opening article of the dedicated section, the dominant rule is that pecuniary debts are extinguished with legal tender in the State at par value. This final rule relates to legal regulation (the extinction of the obligation), but it does not imply the identification of a legal definition of "currency." Thus, it is left to the specific laws (Art. 1281 I.c.c.) and, failing that, to the interpreter to define what currency is and, therefore, when one has a pecuniary obligation, with all the effects that derive from it.

At the bottom of the will, in the use of the terms "currency having legal tender," the Legislator could be intended to exclude all those not state-owned currencies deliberately. The discipline distinguishes between bonds denominated in legal money and those denominated in foreign currency (Art. 1278 I.c.c.). When the idea of lawful tender money in the State is combined, it is observed that its inverse is the currency that does not have

¹⁰⁸ Paracampo M. T., *Introduzione ai profili giuridici di un mercato unico tecnologico dei servizi finanziari*, Torino, G. Giappichelli Editore, Seconda edizione, 2019.

¹⁰⁹ It is a concept in itself devoid of specific content, for this reason it will have to be the court in the legal context to determine whether the provisions of the article have been complied with. <https://www.brocardi.it/codice-civile/libro-quarto/titolo-i/capo-i/art1175.html?q=1175+cc&area=codici>

¹¹⁰ "Pecuniary debts shall be extinguished by currency of legal tender in the State at the time of payment and by its nominal value." Therefore, a payment made in dollars can be legitimately refused in Italy because the delivery of the money to which the debtor is bound represents his performance. Art. 1277 concerns not only debts of money ex mortgage, but in principle considers all debts that have as object a sum of money based on any cause. Thus, in this context, the devaluation of the currency is considered by the legislator as negligible. <https://www.brocardi.it/codice-civile/libro-quarto/titolo-i/capo-vii/sezione-i/art1277.html?q=1277+cc&area=codici>

legal tender in the State. The latter group includes sovereign currencies, which have legal standing in another country, and non-state currencies, which serve as a driving force in political decisions. It should be noted that the choice of the ideal unit of measurement and of the monetary pieces that are legal tender in one State does not exclude that other units of measure and other financial elements may be chosen in the action of private individuals. The question at this stage is whether digital currencies fit within the purview of monetary obligations, that is, if digital coins may be classified as money. To see if the digital euro can be classified as a currency. The currency's three purposes have been stated and discussed: exchange rate instrument, value measurement, and liquidity reserve.

III.II From pecuniary obligations to CBDCs

Now it should be relevant to claim with the analysis based on the pecuniary obligations' discipline and its implication in the central bank digital currency. In more recent doctrine, the prevailing view is that the rule that cash is the only legal means of payment of pecuniary obligations should be invalidated. Instead, alternative means of payment that remove the material transfer of money, such as the cashier's check, should be recognized as having *datio in solutum*, with "sum of money" understood to mean the ideal function of the monetary medium. This view holds that the rule that cash is the only legal means of payment of pecuniary obligations should be invalidated. The idea behind everything is called the dematerialization of money, which involves changing the fundamental right of metallic money by replacing it with writing and electronic money. This is the basic regulation. In these terms, there would be a lack of the nominal principle governing payment procedures since it considers currency for its nominal value and not for purchasing power. Thus, the trend line is toward the elimination of cash transfers, not only because of the need to simplify the payment technique (avoiding the use of significant amounts of cash) but also because custody, circulation, and exchange through cash are deemed inefficient and insecure, particularly for significant amounts of money. The elimination of cash transfers is the next logical step in the evolution of the financial system (considering that in practical experience and the business world, the settlement of most pecuniary obligations and almost those of significant amounts is made by bank drafts or alternative means of payment, L. 5.7.1991, No. 197).

Since bank deposits are typical payment methods in the current socioeconomic setting, money circulation typically occurs with increasingly complex instruments. Consequently, the Legislator has introduced alternative payment methods within the existing discipline, frequently making them mandatory and requiring an evolutionary constitutional development. The dispute should therefore be settled in a way that the debtor is permitted to pay, freely, in the legal tender in the State or using a cashier's check for monetary obligations with an amount that is less than EUR 12500 or for which the law does not require a different method of payment. In the first scenario, the creditor is not allowed to refuse payment because the obligation placed on the debtor by the delivery of the currency has been satisfied. On the other hand, the creditor is allowed to refuse performance, but only for justifiable reasons that are evaluated following the rule of correctness and objective good faith. In the second scenario, the debt is discharged with the effect of release when the creditor acquires the legal availability of the sum of money; however, the risk of the cheque's inconvertibility is transferred to the debtor. In the former scenario, the debt is discharged with the effect of release when the debtor pays off the debt.

The European Court of Justice, in Judgment No. 264 of 2015¹¹¹, stated: "constitute services rendered for consideration operations consisting in the exchange of traditional currency for units of virtual currency and vice versa, carried out against payment of a sum corresponding to the margin constituted by the difference between, on the one hand, the price at which the operator concerned acquires the currencies and, on the other hand, the price at which he sells them to his customers".

The currency serves primarily as a means of exchange: by definition, legal tender is "external" (unsecured state money, foreign currencies, gold), and market injection of private bank money is not seen as a macroeconomically important variable. However, such a currency would make it viable for the government to fund welfare expenditures, compensate for decreased tax revenue through the currency's issuance, and carry out direct distributions in the form of a "citizenship dividend." CBDCs' difference from the other sovereign and statist currencies is mainly measured in terms of its role as a unit of account: the digital central bank currency is not meant to serve as an alternative and independent measure to the euro. In this regard, the unit of issue of "external" currency would be identical to the extent used to quantify the central bank's "internal" resources. The risk of digitization's challenge is precisely this: it leads to qualifying solutions that cannot

¹¹¹ <https://curia.europa.eu/juris/document/document.jsf?docid=170305&doclang=IT>

appropriately concentrate on the dimensions on which the novelty of digital phenomena is rejected and that therefore end up imposing rather, but without construct, the categories of reference.

As a result, cryptocurrency is a payment instrument rather than a financial instrument¹¹² since it serves as an intermediary in trades. Therefore, it is not based on its economic framing but rather based on the broader concept of "payment instruments," that virtual currency should be included among them and not counted instead among financial instruments or products. The cryptocurrency, to which today we can refer, if it is currency, is different from all the others in circulation: it does not have a political-legal link with the territory and is not governed. It can easily be deduced that its value measure depends on the exchange ratio compared to other currencies. This exchange ratio is given by significant fluctuation on an ontological level. Because cryptocurrencies are unique, an *ad hoc* conversion rate to a legal tender currency must be determined. Moreover, cryptocurrencies are very volatile, not digital coins. Because to their nature, the latter is more safe securities, and their volatility would correspond to what now defines the value of the euro in the currency market. Digital coins, on the other hand, are money issued by a government agency, the central bank, and are thus guaranteed instruments. Despite that, the exchange rate for CBDCs would be based on the prevailing exchange rate between the euro and foreign currencies. Cryptocurrencies are already spontaneously used by users for economic transactions, especially on e-commerce sites, and digital coins could also perform this function as a measure of value. At the same time, the ability to capitalize on values is a judgment of the potential capacity of a tool. Since an instrument is used for trading and is a measure of value, it is also potentially eligible to capitalize value. Therefore, it is precisely the fact that it is exchanged between an indefinite audience of subjects and in many transactions that gives this instrument the ability to capitalize value.

CBDC differs from tax money in that it is a public certificate (or voucher) that, if certain circumstances are met¹¹³ (e.g., a length of time has passed after issue), can be used directly by the holder to discharge tax obligations. Because this money lacks legal value, its use as

¹¹² According to IAS 32, a financial instrument is that instrument that is "assets for one party and liabilities for another party". Bossone B., Costa M., *La moneta è capitale o debito di chi la emette?*, in *Economia e Politica*, 9 December 2019 <https://www.economiaepolitica.it/banche-e-finanza/moneta-banca-finanza/la-moneta-e-capitale-o-debito-di-chi-la-emette/>

¹¹³ Ferrari A., Ferrero G., *Moneta pubblica e privata in un sistema economico moderno*, 2019 <http://www.francodebenedetti.it/http://www.francodebenedetti.it/wp-content/uploads/La-Moneta-Ferrari-Ferrero-2019-08-05.pdf>

a form of payment is contingent on creditor approval. Furthermore, the absence of legal tender does not contradict the terms of European treaties on the currency issue.

The compatibility of the role of the monetary instrument (CBDC) with the legal system is relevant to the goals of this research. The principal foundation behind this analysis is that independent of its form, the value of money equates with the value of credit in units of the account¹¹⁴. The latter is the first difference between CBDC and official currency: the digital currency is not meant to be introduced as a replacement for the existing euro. Indeed, in studies on digital currencies, including the digital euro, the notion of sharing of primary and bank currency would win out. Users would then have current accounts in both currencies, with the option to transfer funds between them. Then they'd be interchangeable. The growth of the phenomenon has impacts from the legal point of view. In this regard, it may be relevant to underline the potential legal difference between CBDC and virtual currency. The latter has no *datio in solutum*, but only on a conventional basis, that is, where the beneficiary accepts the said currency as a means of extinguishing the pecuniary obligation: there is, therefore, no legal qualification by the State authority, as a means of payment not refused by the creditor and capable of fulfilling the pecuniary obligation by freeing the debtor. There is, therefore, no legal qualification by the State authority as a means of payment that cannot be refused by the creditor, and which can fulfill the pecuniary obligation by freeing the debtor. The European Commission has emphasized that virtual currencies are digital representations of value or rights that could benefit both market participants and consumers significantly. By simplifying capital raising processes and strengthening competition, crypto activity issuance can be a more economical, less costly, and inclusive approach to financing small and medium-sized enterprises (SMEs). Furthermore, when utilized as a payment method, they can provide potential for cheaper, quicker, and more efficient payments, particularly on a cross-border basis, because they reduce the number of middlemen. This raised the question of whether a digital currency issued by a central bank should be placed on the market: it would not be a parallel currency but simply a representation of legal money based on distributed registration technology¹¹⁵. Not a new unit of account, in short, but a new means of payment (CBDCs have nothing to do with cryptocurrencies such as bitcoins: like banknotes, CBDCs are central bank

¹¹⁴ Bosi G., *Taking CBDC seriously*, Bologna, Il Mulino, April 2020, Vol. 1

¹¹⁵ Greco G. L., *Valute virtuali e valute complementari, tra sviluppo tecnologico e incertezze regolamentari*, in *Rivista di Diritto Bancario. Dottrina e giurisprudenza commentata*, Trento, Università degli Studi di Trento, pubblicazione trimestrale, gennaio/marzo 2019

liabilities, backed by their assets and reputation. For this reason, CBDCs are not destined to suffer from the excessive volatility that characterizes cryptocurrencies.). The advantages of such an official digital currency would be more excellent stability and security than a private virtual currency. As a result, the CBDC would assume the characteristics of legal tender. But, in truth, such legal discrepancies do not arise from the materiality of money. Consequently, even if our discipline lacks authority in this regard, according to the previous article 1277 of the Civil Code, the jurisprudence is ready to solve the problems related to the equivalence of legal tender and bank money. According to the Bank of Italy, from a legal standpoint, "cash currency issued by a central bank (i.e., euro, the European Central Bank) is the only form of legal tender; its creation is based on rigorous procedures that ensure general confidence in the currency and the stability of its value over time. On the other hand, bank scriptural money is a type of private currency. Bank money is issued by banks and is accepted by everyone because it can be converted into legal tender." However, according to some sources, bank money is also legal cash kept by CBs to make payments. Furthermore, legal philosophy may conclude that CBDC has no actual store of value unless it is accompanied by supplementary currency.

III.III Legislative analysis

Several doctrine proposals exist on how to qualify and regulate the new technological instrument that are influencing the market of payments: some attempt to frame it through Art. 810 c.c.¹¹⁶, since digital currency are intangible assets; others believe it is a private or complementary currency¹¹⁷, always applicable under the mechanism provided by Art. 1278 c.c.¹¹⁸; others, on the other hand, link them to debt or financial products.

¹¹⁶ According to article 810 c.c. "Goods are things that can be the object of rights". Where, by "goods", in juridical terms, we mean all those things suitable to satisfy the need of man. <https://www.brocardi.it/codice-civile/libro-terzo/titolo-i/capo-i/art810.html?q=810+cc&area=codici>

¹¹⁷ Complementary coins are electronic means of payment, and for this reason, they are often combined with digital coins, but they complement and do not replace legal currencies. In practice, they are used in some territorial areas to purchase goods and services and, on other occasions, within circuits, such as scriptural money of cooperative credit, to record and secure the netting between receivables and payables arising from commercial transactions between the participants in the course. Paracampo M. T., *Introduzione ai profili giuridici di un mercato unico tecnologico dei servizi finanziari*, Torino, G. Giappichelli Editore, Seconda edizione, 2019.

¹¹⁸ If the sum due is determined in a currency not having legal tender status in the State (c.c. 1277), the debtor has the right to pay in legal currency, at the exchange rate on the day of maturity and the place established for payment. <https://www.brocardi.it/codice-civile/libro-quarto/titolo-i/capo-vii/sezione-i/art1278.html?q=1278+cc&area=codici>

The practical requirements of, first and foremost, security and trade facilitation led man to seek tools that would allow wealth movements while avoiding the physical displacement of monetary pieces. As a result of the approach, other ways of payment have emerged, some of which are equally beneficial for persons who have not been involved: the cheque and the cashier's cheque. Consequently, the evolution has been limited to payment operations, with money remaining in the background due to physical immutability of the pieces. The rise of a cashless society was predicted in this sense in the 1960s and 1970s. Digital money represent an additional step: they transform the coin into its most intimate essence. The introduction of e-money gives the possibility of the rapid and direct extinction of the bond between distant subjects. The unmediated movement of currency is returning, but it can now be accomplished among absentees. The problem of time, or the time it takes for money to move from the availability of one subject to the availability of another, is easily solved. Circulation speed can be increased to its maximum. However, the introduction of these instruments requires some adjustment at the legal level. Part of the doctrine holds that different types of payments (such as cheques, cashiers or banks, and transfers) have reached such a diffusion that they are comparable to money. The payments sector and the traditional economy are undergoing dramatical drastic changes due to the introduction of new payment instruments: cryptocurrencies and digital coins. In support of this analysis, it is important to note some features and differences between cryptocurrencies and digital coins¹¹⁹.

It is time to specifically place the bond in digital currency within the discipline of monetary obligations. It has already been said that a pecuniary obligation can be that relating to money itself. It follows that pecuniary obligations should also cover the obligation in digital currencies. Analyzing the case referred to in Art. 1278 I.c.c. in our legal system, even those in non-State currencies may be covered by pecuniary obligations. The effect is that the debtor frees himself by paying with the same cryptocurrency deducted in the bond but "has the right" to pay in legal currency, i.e., in euros, at the exchange rate on the day set for payment. The consideration of the intrinsic value of cryptocurrencies remains vague to the extent that blockchains may have the most varied uses in the digitized world, thus ending up resembling, as far as functions are concerned, the metals of the digitalized world. The question then arises as to whether a rule which has hitherto been of very little practical use,

¹¹⁹ Campagna M.F., *Criptomonete e obbligazioni pecuniarie*, in *Rivista Diritto Civile*, 2019

namely that which has as its reference the debt of a monetary kind having intrinsic value¹²⁰. The historical reason for the rule goes back to the metallic essence of some coins, which had value regardless of the number they indicated. The reference to the intrinsic value has therefore been historically understood with exclusive regard to the precious metal contained in the coin. But the above historical reason would not be sufficient to exclude a newer interpretation of the provision. Art. 1280, paragraph 1, I.c.c.¹²¹: the application of the latter seems to be, in fact, the legal tender of the monetary species of intrinsic value at the time when the obligation arose. While the conditions for establishing the introduction of legal tender cryptocurrencies are lacking, at least for the time being, it seems fair to conclude that the case cannot be applied at the moment. While for digital coins, being first and foremost instruments issued by the Central Bank and guaranteed by it, are instruments that have their value linked to that of the euro, today's legal tender currency. As a result, it can be said that digital coins are also legal tender and can therefore be included in the framework of financial obligations. It has been observed that trade is free to choose whether to maintain the old medium of exchange or create a new one. But suppose it adopts a new medium of trade within the limits of the legal bargaining power granted to the parties. In that case, it will also attempt to make it a standard of deferred payments to remove validity, at least for the future, to the norm that attributes absolute liberating power to the State's means of payment.

The use of blockchain technology can be counted among the legal assets and falls within the notion of “thing” established by Art. 810 I.c.c. It is necessary to highlight the differentiating elements of crypto activity that could be used for digital coins compared to any digital information already protected by the Legislator. Other digital resources, such as

¹²⁰ Art. 1280 c.c.: The payment must be made with a kind of currency having intrinsic value if the title of debt establishes this, provided the currency had legal tender when the obligation was assumed. However, if the currency is unavailable, has no longer course, or its intrinsic value is altered, the payment is made with a current currency that represents the intrinsic value that the monetary species due had when the obligation was assumed. <https://www.brocardi.it/codice-civile/libro-quarto/titolo-i/capo-vii/sezione-i/art1280.html?q=1280+cc&area=codici>

¹²¹ The payment must be made with a kind of currency having intrinsic value, if this is established by the title of debt, provided that the money was legal tender at the time when the obligation was assumed. The explanation that can be attributed to the first subparagraph is that if the parties have chosen a specific means of payment, this must be observed. This article deals with the case where the parties have agreed that an amount of the debt in a metallic currency was legal tender at the time the obligation was assumed. Since coins with intrinsic value are no longer in circulation, it can be seen that where at the time of payment, those metallic monetary species are no longer available or that the State alters their metallic content, the cost can be made in legal tender currency, but in a numerical sum that represents the present value of the sum that should have been paid, at the time of the onset of the obligation. <https://www.brocardi.it/codice-civile/libro-quarto/titolo-i/capo-vii/sezione-i/art1280.html?q=1280+cc&area=codici>

databases, images, videos, industrial secrets, business ideas, and computer programs, have value because of the information they receive. However, they need legislative laws to protect citizens, such as copyright law, or technological protection systems, such as Digital Rights Management (DRM), to protect, exercise, and manage such rights in the digital world, preventing infringement.¹²² So, there is a link between the digital component and the law since any "thing" involves changes in people's legal and personal spheres must be regulated. It is, therefore, a thing that, being able to form the subject of rights, is also a good ex-Art. 810 I.c.c. expressed in digital form, that is, in computer language, limited in number, scarce, because the technology gives uniqueness to the data recorded in the blockchain, and fungible, given the absence of a precise individuality. Therefore, it can be concluded that digital coins can be traced back to the scope of Art. 810 I.c.c. as an intangible thing, a possible object of law, and, therefore, a legal good in all respects, even if immaterial as to consistency. The need to bring digital money within the discipline governing the currency falls within the possibility of applying all the subordinate laws to transactions in digital currency. Indeed, once digital currency would be defined as "money", all users would be preserved by the law. The discipline in the matter of contracts, such as the Art. 1277 c.c. may be just an example. Regarding possible traceability to the definition of "financial instruments," the provisions of art. 1, paragraph 2 of Legislative Decree no. 58/1998 (TUF)¹²³ appear conclusive. It states that "payment instruments" (because they are closer to the sphere of consumption than to the use of savings) "are not financial instruments," implying that CBDCs, like legal tender, would fall outside of this category and, as a result, the legal framework for the province. The legislator, therefore, disciplines the virtual currencies in a unitary way, not distinguishing them for type, although these last ones do not cover various functions. For this reason, more detailed legislation would allow better supervision and coordination of the use of CBDCs, which differ in form from cash. In addition to this argument, CBDCs are issued and guaranteed by a European public authority, the ECB, and can therefore pursue the three aims of the currency. These "reforms" underline an orientation of the European legislator more favorable to the technological innovation towards which we are heading.

¹²² Giuliano M, *Le risorse digitali nel paradigma dell'art. 810 cod. civ. ai tempi della blockchain. Parte seconda*, in *La Nuova Giurisprudenza Civile Commentata*, no. 6, November 2021, pag. 1456

¹²³ https://www.consob.it/documents/46180/46181/dlgs58_1998.pdf/e15d5dd6-7914-4e9f-959f-2f3b88400f88

The release of a CBDC does not happen exactly like that of a traditional currency. The relationship between the CBDC and the central banks must be analyzed both in terms of the mandate, which governs the functions and powers, and what a central bank can do and how it can do so¹²⁴. In this respect, there appears to be no impediment to the issuance of the Digital Euro since there is nowhere in the TFEU that the Euro must necessarily be physically fit for banknotes or coins. The regulation Europe should introduce should be reasonable given the creation of a single European market for services. In addition, these rules should intervene in the security field for citizens and the primary users of digital coins. This legislation should be unique to facilitate the provision of services in the different Member States. This work should be done by considering the core tasks of monetary policy as stated in the Treaty and the Statute of the ESCB, according to which the Euro system should carry out oversight of clearing and payment systems. Under the Article 127, paragraph 2, of the Treaty¹²⁵, as reflected in Article 3, paragraph 1, of the Statute, one of the fundamental tasks of the ESCB is to "promote the smooth functioning of payment systems". At the European level, electronic money was introduced within the legal framework by Directive 2000/46/EC of 18 September 2000¹²⁶. This directive states that electronic money is a "surrogate" for coins and banknotes stored in an electronic device, be it a microchip card or a computer. The dematerialization of the currency blends perfectly with the European and Italian order, moving based on the traditional scriptural money. Later, the European Parliament recognized cryptocurrencies through a law called European Directive No. 156 of 19/06/2018, referring to the EU Directive 2018/843 of the European Parliament and of the Council of 30 May 2018. The latter amends Directive (EU) 2015/849 on the prevention of the use of the financial system for money laundering or terrorist financing and amending Directives 2009/138/EC and 2013/36/EU¹²⁷. The European Parliament, through these directives, indirectly gave recognition to cryptocurrencies as electronic coins, and every EU member state should start to apply it by the end of 2023. The European Union member states will have to use and transpose it¹²⁸. Italy has transposed

¹²⁴ <https://www.altalex.com/documents/news/2021/01/06/euro-digitale-e-central-backed-digital-currency#p2>

¹²⁵ "Without prejudice to the objective of price stability, the ESCB shall support the general economic policies in the Union with a view to contributing to the achievement of the objectives of the Union [...]. The ESCB shall act in accordance with the principle of an open market economy with free competition, favoring an efficient allocation of resources" <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A12016E127>

¹²⁶ <https://eur-lex.europa.eu/legal-content/IT/TXT/HTML/?uri=CELEX:32000L0046&from=en>

¹²⁷ De Luca N., Passaretta M., *Le valute virtuali: tra nuovi strumenti di pagamento e forme alternative d'investimento*, Netherlands, in La Società, no. 5, 1 May 2020

¹²⁸ <https://www.lecriptovalute.org/regolamentazione-criptovalute-europa-consob/>

the legislative decree of 4.10.2019, n. 125, EU, through Directive n. 843/2018 EU (so-called V Anti-Money Laundering Directive). It also contains the definition of virtual currency: "the digital representation of value [...] used as a means of exchange for the purchase of goods and services or investment and transfer purposes, stored and traded electronically".¹²⁹ This definition follows the one introduced by the EBA¹³⁰. According to this directive, digital currency and cryptocurrency have no intrinsic value. However, this statement is misleading, especially concerning digital coins, because any commodity has a value. After all, it is the market that assigns it according to its characteristics or the functions it can perform.

The proposal for a Regulation of the European Parliament and the Council on crypto-asset markets and amending Directive (EU) 2019/1937¹³¹ contains several packages concerning digital finance, measures to encourage and support the appropriate exploitation of the potential of digital finance in terms of innovation and competition, mitigating its risks. This proposal aligned with the Commission's priorities to create a Europe ready for future challenges and focused on more digitization. The digital finance package includes a new strategy to ensure that the Union embraces the digital revolution, allowing European businesses and consumers to take advantage of digital finance.¹³² The proposal is based on Article 114 TFEU¹³³ which gives the European institutions the power to lay down the appropriate provisions for the realignment of the laws of the Member States relating to the

¹²⁹ https://finance.ec.europa.eu/financial-crime/eu-context-anti-money-laundering-and-counteracting-financing-terrorism_en

¹³⁰ The EBA considers virtual currencies to be "a digital representation of value that is neither issued by a central bank or public authority nor necessarily attached to an FC but is used by natural or legal persons as a means of exchange and can be transferred, stored, or traded electronically. [...]The term 'digital representation of value' is close to the monetary concept of a 'unit of account' but includes the option to consider virtual currency as private money or a commodity". <https://www.eba.europa.eu/sites/default/documents/files/documents/10180/657547/81409b94-4222-45d7-ba3b-7deb5863ab57/EBA-Op-2014-08%20Opinion%20on%20Virtual%20Currencies.pdf?retry=1>

¹³¹ Dickinson A., *The Proposal for a Regulation of the European Parliament and of the Council on Jurisdiction and the Recognition and Enforcement of Judgments in Civil and Commercial Matters*, New York, SSRN, 20 September 2011 https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1930712

¹³² https://eur-lex.europa.eu/legal-content/IT/TXT/HTML/?uri=OJ%3AC%3A2021%3A152%3AFULL#ntr11-C_2021152IT.01000101-E0011

¹³³ Consumer protection policy aims to promote the health, safety, and economic interests of consumers, as well as their right to information, education, and the organization for the protection of its goods. Consumer policy is a shared responsibility between the countries of the European Union and the European Union. According to Article 114 TFEU, any decision on measures to approximate the laws of EU countries shall be taken under the ordinary legislative procedure and after consulting the European Economic and Social Committee. An EU country may maintain or introduce measures to stricter consumer protection than that provided for by the EU, provided that they are compatible with the Treaty and are notified to the Commission. https://eur-lex.europa.eu/legal-content/IT/TXT/?uri=LEGISSUM:consumer_protection

internal market. The proposal aims to remove obstacles to the establishment and improve the internal market's functioning in financial services by ensuring complete harmonization of the applicable rules. Any divergence of crypto activity frameworks, regulations, and interpretations could hamper the ability of service providers to expand their activities at the European level. This leads to high costs, legal complexity, and uncertainty for service providers operating in the crypto activity sector, limiting the development and expansion of such activities in the Union.

According to the proposed regulation, crypto assets, in particular electronic money tokens, have a precise monetary substitution dimension, considering the three functions of the. The definition of "electronic money tokens" refers to the function of a medium of exchange and that of a store of value. The proposal for a Regulation emphasizes the function of a means of exchanging electronic money tokens, noting that they are intended to be used as a means of payment and that they aim to stabilize value by anchoring themselves to a single fiduciary currency and that these crypto-assets, such as electronic money, are electronic substitutes for coins and banknotes and are used for making payments¹³⁴. This proposal shows that the terms "asset-linked tokens" and "e-money tokens" are used, in whole or in part, as currency substitutes. In addition, the proposed regulation provides for double supervision of issuers of electronic money tokens, namely joint control of the competent national authority (NCA) and EBA. The NCA would be solely responsible for ensuring that the relevant issuers comply with the specific requirements. At the same time, the NCA would monitor compliance with all other provisions set out in the proposed regulation.

In 2021, the seven big economies (i.e., Canada, France, Germany, Italy, Japan, UK, and the USA) held in G7 meeting¹³⁵ to discuss and highlight the line guide for the issuance of digital currency by the central banks. The result has been a document based on thirteen fundamental principles about the emission of CBDCs. The documents underlying the commitment to issue such financial instruments on transparency, security, and privacy basis, as well as respecting the legislation. On this topic, coordination and cooperation are fundamental to guarantee innovation at the public and private levels and benefit the users and the financial system. According to G7 members, any digital currencies must support and not damage the central bank's ability with its obligations. Some of the 13 points include

¹³⁴ Doguet J. J., (2013), *The Nature of the Form: Legal and Regulatory Issues Surrounding the Bitcoin Digital Currency System*, 2013, Vol. 73 Louisiana Law Review <https://digitalcommons.law.lsu.edu/lalrev/vol73/iss4/9/>

¹³⁵ G7, *Public Policy Principles for Retail Central Bank Digital Currencies*, United Kingdom, 2021

financial and monetary stability; legal and governance frameworks: appropriate national legal, regulatory, supervisory, and oversight frameworks are essential to ensure trust, resilience, security, and confidence in any CBDC. The latter might involve new responsibilities for authorities, enable new policy opportunities, and potentially bring entities in a CBDC ecosystem into contact with personal data; data privacy: public and private-sector entities in any CBDC ecosystem should only access, hold, process, or share users' data where this data is necessary to achieve clear, open, and legal purposes; economic competition; mitigation of the risk for illicit purposes; financial inclusion; energy and environment; international development¹³⁶.

The uncertainty of jurisprudence (both Italian and abroad) and the various approach adopted by the regulators of the different states are a sign of the phenomenon's complexity. It is not easily understandable by the legislator, who cannot understand the underlying technology and the socio-economic context in which the phenomenon is located. Different private law issues would arise depending on the design of the digital euro and on the purpose for which the Euro system issues¹³⁷. Thus, if the digital euro were to be published as an instrument of monetary policy and only accessible to central bank counterparties, the Euro system could invoke, as the legal basis, Article 127 of the TFEU¹³⁸ in conjunction with the first sentence of Article 20 of the Statute of the European System of Central Banks (ESCB)¹³⁹. If, instead, the digital euro were to be made available to households and other private entities through accounts held with the Euro system, it could invoke, as the legal basis, Article 127 of the TFEU, in conjunction with Article 17 of the Statute¹⁴⁰. Furthermore, if the digital euro is issued as a settlement medium for specific payments accessible only to eligible participants, the most reasonable legal basis for its issuance

¹³⁶ Nabilou H., *Central Bank Digital Currencies: Preliminary Legal Observations*, Journal of Banking Regulation, February 6, 2019 <https://ssrn.com/abstract=3329993>

¹³⁷ https://www.ecb.europa.eu/pub/pdf/other/Report_on_a_digital_euro~4d7268b458.en.pdf?40bb7a2e2497a9c0a0a71a510e87440c

¹³⁸ Art. 127, par. 2 TFEU states that the fundamental tasks of the ESBC are the implementation of the monetary policy of the Union; promoting the operation of payment systems; and managing the official foreign reserves of the Member States.

¹³⁹ Art. 20 ESCB, “Other instruments of monetary control”, states that the Governing Council may decide upon the use of other operational methods of monetary control as it sees fit. <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:11992M/PRO/SEBC/20&from=IT>

¹⁴⁰ Art. 17 ESCB, “Accounts with the ECB and the national central banks”, states that the ECB and each national CBs may open accounts for credit institutions, public entities etc. <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A11992M%2FPRO%2FSEBC%2F17>

would be Article 127 of the TFEU in conjunction with Article 22 (ESCB)¹⁴¹. Finally, if the digital euro were to be issued as an instrument equivalent to a banknote, then the most suitable legal basis for its issuance would be Article 128 of the TFEU in conjunction with the first sentence of Article 16 of the Statute of the ESCB¹⁴².

If users have direct access to the digital euro, the Eurosystem will become the sole provider of payment services for the digital euro. However, when end users have intermediated access, the Eurosystem would rely on third parties to distribute the digital euro. Furthermore, retail access to the digital euro entails considerable legal novelty, while non-retail access would be more straightforward, as it would be more similar to present practices. For example, a retail account-based digital euro could be implemented by opening accounts directly with the Euro system or through supervised intermediaries. In contrast, the distribution of a digital bearer euro (i.e., token-based digital euro) would likely require the involvement of supervised intermediaries.

According to the principal powers' attribution, the issuance of CBDC will require a firm anchor in the mandate established by central bank law. This is necessary because the distribution of CBDC is novel, and it may potentially arise polemic. Therefore, without a clear and explicit authorization to issue CBDC, doubts can arise about which financial institution is legally authorized to issue such currency. The implication of this principle is that today, most central bank laws are explicit on the powers of central banks to give their three standard liabilities, namely banknotes and coins, book money accounts, and usually bills.

To determine whether the issuing of CBDC fits inside the ECB's mission, an examination of the clauses of the central bank statute about two components of its mandate is required: the functions and powers. The lack of a clear and solid legal foundation for issuing token- and/or account-based CBDC can readily be overcome by targeted central bank legislation amendment. In the case of issuance of CBDC in token-based form, a few amendments

¹⁴¹ Art. 22 ESCB, "Clearing and payment systems", The ECB and national central banks may provide facilities, and the ECB may make regulations, to ensure efficient and sound clearing and payment systems within the Union and with other countries. <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:12016M/PRO/04&from=SL>

¹⁴² Art. 16 ESCB, "Banknotes", the Governing Council should have the exclusive right to authorize the issue of banknotes within the Europe. The ECB and the national central banks may issue such notes. The banknotes issued by the ECB and the national central banks should be the only one to have the status of legal tender within the Union. <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:12016M/PRO/04&from=SL>

might need to be made to central bank laws¹⁴³. First, the central bank law should generally include an explicit function "to issue currency" without limiting such practice only to banknotes and coins. Then, to implement the above procedure, the relative powers should be prepared with an explicit reference to the issuance of currency both in the form of banknotes and digital tokens. On the contrary, the issuance of CBDC in the form of account-based might require different measures. Since it is a structure suitable for the general public, Central bank legislation should be amended to include a particular ability to open current accounts for citizens. This can be done directly by mentioning the public in the central bank law or indirectly by allowing the competent decision-making body of the central bank to decide on the categories of persons and entities that have access to current accounts in the central bank's books. Monetary law is the regulatory framework that provides the legal foundations for using the monetary value in the economy and the legal system. The fundamental premise of monetary law states that a sovereign State's the responsibility to design and construct its currency system. In many nations, the Constitution establishes the fundamental laws controlling the relationship between the state and the monetary system.

Finally, we can claim that the adoption of CBDC would not affect the formation of an official monetary unit by a state or monetary union. In other words, CBDC will not be a new "currency unit." As a result, while the definitions above refer to CBDC as a "new form of money," they do not pertain to this part of monetary law, regardless of CBDC's design attributes.

III.IV The development of CDBC's in other countries

By analyzing the various statements and guidelines issued by the supervisory authorities of different States, it is possible to observe that there is no uniformity of views regarding the legal qualification of virtual currencies¹⁴⁴. According to the Securities and Exchange Commission (SEC), a virtual currency is a digital representation of money that can be

¹⁴³ Bossu W., Itatani M., Margulis C., Rossi A., Weenink H., Yoshinaga A., *Legal Aspects of Central Bank Digital Currency: Central Bank and Monetary Law Considerations*, Washington D.C., International Monetary Fund Working Paper, November 2020
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3758088

¹⁴⁴ <https://www.dirittobancario.it/art/la-qualificazione-giuridica-delle-criptovalute-affermazioni-sicure-e-caute-diffidenze/>

exchanged digitally, that embed all the functions of traditional cash. Tokens or virtual coins may also represent other rights. Consequently, in certain cases, tokens or coins will be financial instruments and cannot be legally sold without registration with the SEC or based on an exemption. The Federal Financial Supervisory Authority has clarified that, according to the regulations in force in German law, "bitcoins are financial instruments."

Many central banks are ahead of the European central bank in terms of the practical introduction of CBDCs. For example, the Chinese central bank has already issued a virtual currency and is in the testing phase. The fragmented and discontinuous dissemination of information on the progress of the development of the Chinese digital currency has not allowed us to understand how close the project is to the final launch on a national scale. The E-Yuan is already de facto operational for 15%¹⁴⁵ of the population, concentrated in 12 major cities where pilot tests are underway. The e-Yuan is a currency with full legal tender alongside the traditional local currency. The People Bank of China (PBOC) has decided to establish a mixed model, between token and account based. However, the new digital currency does not produce interest; the Chinese central bank took this choice to clarify the distinction between these and bank deposits. Concerning transparency, total anonymity is not guaranteed, even for small transactions. It is a "withholding" of information against third parties concerning the authorized authority. However, the central bank retains the ability to access even "anonymous" transactions if the central government requests. Currently, the development model of e-Yuan seems to be directed to the domestic market, so small daily payments alongside cash. This appears to be in line with the strategic objective of the Chinese government to increase control over financial flows within the country's economy for anti-money laundering and combating capital flight.

A survey conducted by the Bank for International Settlements showed that out of 63 central banks, over 70% were conducting work on CBDC by 2018, with 31% focusing on issuing them for general purpose, 13% on wholesale and the remaining 56% on both scenarios¹⁴⁶. Sweden's central bank, the Riksbank, has presented an economic study concentrating on the "e-krona," their proposed CBDC. They establish a central bank's function as "a lender of last resort," since they may increase the supply of publicly issued money and extend credits to banks, allowing them to meet temporary liquidity shortages. They do, however,

¹⁴⁵ Minenna M., Cina: la grande crescita silenziosa dello Yuan digitale, in "Il Sole24Ore", 14 February 2022 <https://www.ilsole24ore.com/art/cina-grande-crescita-silenziosa-yuan-digitale-AEufHqDB>

¹⁴⁶ Ramos D., Zanko G., *Review of Central Bank-Issued Digital Currency (CBDC) as a Vehicle for Widespread Adoption of Digital Assets*, Colombia, MobileyourLife, September 2020

emphasize that the present monetary and payment systems may become less helpful in a world where globalization is becoming more prevalent by the day. As a result, they have contemplated releasing electronic krona, which, by design, protects its users' privacy and enables for deployment in the private sector as well as participation from foreign enterprises for enhanced cross-currency transfers. Cash used in Sweden has declined for many years¹⁴⁷. The citizens have good reason to expect that the decline will continue, and the cost of accepting money will become prohibitive so that it will no longer be taken in the future. So, the state needs to have a role in the payment market. The e-krona would be a complement to cash, as well as to current electronic payments. Sweden is a country where electronic payments beyond cards have recently increased significantly, but usage is markedly lower among the aged. The Riksbank recognizes that some members of society, such as the aged and other vulnerable groups, may require a more transparent, more user-friendly product to discourage exclusion. The e-krona might be "value-based". However, current DLT versions are deemed too immature, but they are not ruled out in the future. The Riksbank envisions a platform where digital currency payment service providers (PSPs) may connect and disseminate the money. The Riksbank believes that these PSPs may use DLT to provide their services. A value-based approach would be consistent with the Riksbank's legislative mandate (the Sveriges Riksbank Act)¹⁴⁸, but an account-based e-Krona would necessitate changes to the commission. An account-based e-Krona is not ruled out, but the Riksbank notes that coordination with other agencies would be necessary, so dialogue should begin. The next stage will be a pilot program to better inform the decision on whether to issue a full-scale e-Krona.

The central banks in emerging countries may experience the most significant gains from implementing distributed ledger technologies where existing financial processes and technology systems are not yet highly efficient or deeply rooted. As a result, they may also achieve greater financial inclusion by implementing CBDC.

For instance, the Bank of Thailand and the South African Reserve Bank, among others, are experimenting with CBDC in large-scale pilots for interbank payment and settlement efficiency. In addition, the Eastern Caribbean Central Bank is exploring the suitability of

¹⁴⁷ As shown by the graph, the amount of payment in Swedish kronor has decreased in the last ten years. <https://www.statista.com/statistics/674315/cash-usage-in-sweden-by-payment-size/>

¹⁴⁸ https://www.bis.org/publ/qtrpdf/r_qt1709f.pdf

distributed ledger technologies to advance multiple goals, from financial inclusion and payment efficiency to payment system resilience against storms and hurricanes.

The National Bank of Cambodia¹⁴⁹ will be one of the first countries to employ blockchain technology in its national payments system, which will be available to consumers and commercial banks. It is experimenting with blockchain technology in the second half of 2019 to boost both financial inclusion and increased banking system efficiency.

Another meaningful example of CBDC is the Uruguayan e-Peso. The Central Bank of Uruguay's recently completed pilot project would rank as the most sophisticated and tangible CBDC trial¹⁵⁰. The pilot aimed for greater access, labor market formalization, and efficiency of the payment system. The availability of ATMs and other cash dispensing mechanisms has grown enormously, but cash withdrawals have plateaued, and cash in circulation has fallen. Because of these changes and further its broader financial inclusion goals, the Central Bank of Uruguay decided to issue, circulate and test an e-Peso. Unique digital banknotes in several denominations were published for distribution to an "e-note manager platform." The platform acted as a registry of the ownership of the digital banknotes. The concept of a digital currency came mainly from the country's demand for economic inclusiveness: the Financial Inclusion Law of 2014 established universal access to cash, labor market formalization, and payment system efficiency as primary aims. Given the expanded availability of financial services in Uruguay in recent years, the usage of debit and/or credit cards, POS, ATMs, and transfers between banks have increased. This highlights the discrepancies created by a financial system based on economic competition, where certain conditions and terms do not necessarily cover the needs of most of the population.¹⁵¹ The project has already received backing from international corporations (IBM), national payment networks (Redpagos), and the Central Bank of Uruguay. It is designed to do away with the necessity for an active internet connection, keep transactions anonymous but traceable, and provide immediate settlement, among other security advantages over cash. The pilot has deemed a success and closed in 2018, after which all

¹⁴⁹ <https://www.weforum.org/agenda/2019/04/this-new-form-of-currency-could-transform-the-way-we-see-money/>

¹⁵⁰ Barontini, C., Holden H., Proceeding with caution – a survey on central bank digital currencies, BIS Paper No. 101, January 2019

¹⁵¹ Ramos D., Zanko G., *Review of Central Bank-Issued Digital Currency (CBDC) as a Vehicle for Widespread Adoption of Digital Assets*, Colombia, MobileyourLife, September 2020 <https://sigma.world/news/review-of-central-bank-issued-digital-currency-cbdc-as-a-vehicle-for-widespread-adoption-of-digital-assets/>

e-Pesos were canceled. Then, the program enters an evaluation phase, and several questions are considered before a decision on further trials, and potential issuance can be made. These include design-specific challenges, such as how best to manage the stock of digital banknotes in different denominations, as well as broader questions on the level of anonymity the e-Peso would have, whether it would bear interest, the final role of the central bank and what the broader impact on businesses and the economy would be.

Otherwise, the United States has not launched an official project for digitizing the dollar. The reason for this is the dominant position of the United States in international trade and the role of the dollar as a reference currency for world markets¹⁵². Moreover, developing a CBDC requires a considerable amount of investment, being a territory still unexplored. Therefore, the Federal Reserve wants to wait for other countries to test and introduce their CBDC and then adopt the most capable of maintaining the pre-eminence of the American uniform in its digital version.

Regarding EU, the current geopolitical landscape could weaken the euro's role at the world level, with adverse consequences for international trade. However, the ECB could defend the European export model through a digital euro, increasing its independence from the dollar. In addition, a European digital currency could give a strong message of cohesion and commitment to the European integration project. On this basis, the ECB decided in January 2020 to set up a Task Force to study the risks and opportunities arising from the issuance of the digital euro. The first published report outlines the favorable scenarios for the allocation of the digital euro. Benefits include increased digitization and innovative drive in the payment system, which should improve the sector's efficiency. In July 2021, the Governing Council of the ECB, therefore, decided to launch a pilot project to define more precisely the technical characteristics of the digital euro. This phase will last two years, after which the ECB will have to determine the convenience of this new digital currency. Furthermore, the presence of a European CBDC could strengthen the transmission mechanisms of monetary policy, overcoming even the limits of the traditional money. In the next four years, many central banks will determine whether to adopt blockchain and distributed ledger technology to improve their procedures and economic well-being. However, given the systemic importance of central bank processes and the

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https://www.treccani.it/magazine/agenda/articoli/economia-e-innovazione/Guerra2_valute_digitali_di_banca_centrale.html

relative immaturity of blockchain technology, CB need to consider all known and unknown risks to implementation carefully.

CONCLUSION

The aim of this thesis was to analyze the compatibility between the rules governing payments in currency and the future introduction of digital central bank coins.

In a nutshell, the investigation showed that CBDCs are central bank-issued payment instruments that can be used together with coins and banknotes. The basic structure of digital currencies involves the use of blockchain technology. The same is already used for some time by cryptocurrencies, so the two financial instruments are often confused with each other. However, the distinction turns out to be quite obvious, as transactions in CBDC, unlike the crypto, do not provide anonymity because intermediaries will implement a payment system that will verify the identity of users using some registers. There are several possible combinations of models for CBDC emission. As for the technical structure of digital currency, this can be account-based and token-based. In the first case, CBDCs are offered to the public through central bank deposits. In this way, private individuals and companies would hold capital electronically in the deposits of a central bank or the ECB. Alternatively, the CB could offer a decentralized digital currency.

In this way, the central bank issues CBDC tokens that circulate electronically, provided that they can only rarely be deposited with the central bank. Access is universal and anonymous. One last choice is the role played by the institution that issues digital coins. Central bank digital currencies raise many fundamental questions about the architecture and operation of the monetary and financial system, and of the economy more broadly. The types of architectures on which the new central bank currency can be issued are: Two-tiered Architecture (indirect), Direct Issuance Architecture (direct), and Hybrid Architecture (hybrid). Each model is complemented by the role of the ECB, the only body authorized to issue CBDCs. Regardless of the technical structure chosen, the primary need for the public is to maintain anonymity in transactions, as is currently the case with cash payments. Indeed, in the various reports published by the ECB, the intention and importance of implementing a simplified CBDC payment system that allows users a certain level of privacy for transactions of lower value is repeatedly stressed, maintaining a high level of privacy for higher value transactions.

The project's success lies in the voluntary acceptance of this new form of currency by third parties; in this way, the greater the confidence in the possibility of using it in transactions, the greater the certainty that it can be converted into legal tender.

In advanced economies, the different forms of currency do not have an intrinsic value linked to the price of the material they are composed of but are instead fiduciary. That is, they are based on the recipient's trust to be able to use them over time without loss of value. As for private currencies, which are a liability of the private sector, this ability to preserve their value depends on the balance sheet "solidity" of the issuer. Legal tender is the legal instrument that ensures the use of currency issued by the central bank within a state or within the territory of the States which have undertaken to use a common money based on an agreement (i.e., Euro area). In practice, however, the effective use as a payment instrument of the currency issued by the central bank is ultimately based on its credibility in conducting a monetary policy aimed primarily at price stability.

For the project to be completed, the legal aspect and compliance with the regulations must also be considered. The difficulty of this analysis concerns the lack of a clear definition of the Legislator of the currency. The latter is defined based on the interpretation of the provisions in which it is regulated. However, the most appropriate discipline for analysis lies in the articles dealing with pecuniary obligations, which in the Italian Civil Code is contained in Art. 1277 and later. The prevailing doctrine holds that the interpretation of Article 1277 is that pecuniary debts are extinguished with a legal tender currency in the State. For this reason, the creditor is not obliged to accept different forms of payment.

However, the most recent interpretation of the legislation allows the debtor to settle the obligation through alternative means, as the condition to which the parties are subject is that the creditor has the same effect as the cash payment. So, at this point, the question is whether digital currencies issued by central banks fall within the scope of monetary obligations, that is, whether digital currencies can be classified as money. Digital coins, primarily instruments issued by the Central Bank and guaranteed by it, are instruments whose value is linked to the euro, the current legal tender. Consequently, it can be argued that digital coins are also legal tender and can therefore be included in the framework of financial obligations. At the European level, electronic money was introduced into the legal framework by Directive 2000/46/EC of 18 September 2000. The directive states that electronic money is a "surrogate" for coins and banknotes stored in an electronic device, be it a microchip card or a computer. The dematerialization of the currency blends perfectly with the European and Italian order, moving based on traditional scriptural money. The introduction of the CBDC would not change anything regarding establishing an official monetary unit by a state or monetary union. In other words, the CBDC should not be a new

"monetary unit." When the above definitions refer to the CBDC being a "new form of money," they do not refer to this aspect related to monetary law. According to the allocation of key powers, the issuance of the CBDC will require a firm anchorage in the mandate established by central bank law. This is necessary because the distribution of the CBDC is a novelty and can potentially give rise to controversy. Therefore, without a clear and explicit authorization to issue CBDC, doubts may arise about which financial institution is legally authorized to issue such currency.

Without a digital euro, the establishment of big economies of other central bank-issued digital currencies, as well as their cross-border use, might threaten the euro's international importance. Indeed, CBDCs offer benefits in terms of efficiency, scalability, liquidity, and security that could be used to facilitate cross-border payments. The CBDC can thus increase the attractiveness of a currency and its use as a global payment unit. A digital euro would maintain the availability of a monetary anchor in the digital age, acting as a public good. It would promote innovation, increase the efficiency of payments, and support the overall economic efficiency of the European Union. The digital euro can only succeed if European citizens use it for daily expenses. Therefore, the digital euro design is of the utmost importance and must provide added value compared to existing solutions.

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Digital euro development scenario: legislative implications

Executive Summary

The purpose of this thesis is first to introduce the concept of money, its various forms, the functions it can serve, and the complex organizational and legislative mechanisms for regulating it. The focus will shift, then, to what concerns the processes and legal procedures that regulate the different payment methods, with particular attention to the social and macroeconomic context of currency circulation: globalization and technological progress have had a decisive impact on their development, which will be deeply analyzed.

The empirical part of the thesis aims to illustrate and investigate the legal environment of currency development in a period of technological solid progress and globalization, focusing in particular on the so-called CBDCs (Central Bank Digital Currencies). The latter are digital currencies developed directly by central banks, which are trying to standardize and modernize their monetary system in response to digitization.

Technological innovation has ensured that today's transactions occur predominantly in telematic form. As a result, cash and banknotes used in traditional payment system, have been put on the back burner and are thus used only for tiny day-to-day transactions, leaving room for electronic money and banking. Over the course of a few decades digital forms of payment have gradually taken over from traditional ones, drastically accentuating this trend during the pandemic. The response to the changes due to digitization, such as electronic payments with digital apps and cryptocurrencies, led central banks to respond by creating their digital currencies, the CBDCs.

The banks' adaptive process is characterized by implementing new regulations within the legal system already in place for traditional currencies. This entails an economical cost but, more importantly, enormous complexity at the legal and bureaucratic level so that central banks can continue efficiently regulating money in circulation. Central banks have a few primary purposes, including maintaining price stability, maintaining stable inflation levels, supervising the banking system and individual banks, and regulating and controlling payment flows.

This last point indicates the need for a complex legislative system that aims to stabilize the monetary economy of a country (or several countries). It must have an absolute value for any form of payment, whether cash or digital. The rules are established through a constantly evolving legislative context, mainly because of the rapid changes moving the real economy.

The focus on the legal system behind CBDCs aims to identify the strengths and difficulties within a digitized monetary system and the ways central banks can regulate and control digital currencies' activity. However, to define the legislative context in which money can be efficiently regulated, it is necessary to identify the different roles of the same within the economic system.

First of all, money is a medium of exchange, and as such, it must be standardized in order to be efficient. It, therefore, makes it possible to exchange between various players on the markets: those who need to sell and those who need to buy. Standardization allows free trade between agents more easily as standardization increases (think of the economies of different countries adopting the same currency as the European Union). Globalization has therefore led to more excellent uniformity of the currency, and the current digitalization seems to be increasing this trend more, making payments between different countries more efficient.

The second value of money is as a unit of account, which allows you to assign a value to a specific asset according to the market's needs. This is a strong standardization component that allows all agents to evaluate their expenses and purchases consistently and uniformly. Finally, money can be conceived as a store of value: if it is stable, it guarantees those who hold it the right to use it to support their costs and evaluate possible investments.

An instrument with these characteristics needs regulation to maintain the stability necessary for the functioning of a country's economic system and the efficiency of exchanges between different countries. Digitization and globalization, therefore, require a solid legislative adaption that meets the needs of new markets. The recent interest in CBDCs is because they may offer potential benefits, such as financial inclusion, the enhancement of the payment system, and the improvement of cross-border payments. Overall, results in a global interconnection of trades. The development of a digital currency is the innovation conceived by central banks to conform to the progress of payment methods. Indeed, with the digital Euro, families, businesses, and citizens can carry out their daily cash transactions with increased speed, simplicity, and security due to the assurances established by the ECB. However, this process requires solid legal support that aims to regulate and stabilize the mechanisms on which CBDCs are based and these same currencies.

Given the regulatory complexity of CBDCs, it is essential to establish the legal framework and the possible actions that can be taken at the legislative level to ensure the stability of these currencies and the economic system as a whole. In this thesis, in particular, the focus is on the digital currencies developed by the ECB and on the legal challenges that this

entails: adapting the current monetary regulations to the new payment methods and the new currencies is necessary.

The reason the ECB has decided to develop its digital currency is mainly found in the digitization of payment processes. In the last 20 years, non-cash payments made in the euro area have increased by 12.5%, with an even more drastic increase in the pandemic period. As a result, some countries have even foreseen a final stop to using cash in the coming years. In addition, the birth of cryptocurrencies and the blockchain system has led regulators to ask themselves important questions about the legal aspects and the economic consequences that derive from it. The latter form of payment, in particular, is decentralized and is not based on central regulation but simply on its number of users.

This kind of system, therefore, currently, is probably not able to make up for traditional payment methods, not being characterized by a system or an authority that maintains its stability but is instead highly volatile and unpredictable in its changes.

Therefore, introducing a CBDC requires a strong awareness of users who will use it. However, at the same time, it could guarantee an increase in digital payments, for example, allowing those who do not have a current account to access these currencies or reducing the costs related to the transport and production of physical money. If the means for the development of an efficient digital currency would already be available thanks to the current digital payment methods and the blockchain system, the regulation of a digital currency issued by central banks should still be defined in a concrete way and the current laws to regarding updated and structured based on the new concept of money.

The challenges facing the ECB are considerable. First, there is the need to guarantee a system that can manage and administer payments in digital currency 24 hours a day, 365 days a year, without interruption. Payments should also be instant and support contactless. Furthermore, payers should be encouraged to switch to CBDCs rather than traditional methods. The former should therefore be designed to meet solid attractiveness and reliability requirements to entice agents to use them in daily exchanges. Trust in the issuing institution, the ECB in this case, is essential to guarantee the correct development of this digital currency, without which the system could not hold up. Secondly, a highly efficient cybersecurity system should be implemented, which can block possible cyber-attacks and simultaneously, not violate the users' privacy. Finally, CBDCs should be recognized as "legal tender" in the euro area and should be able to be freely converted into currency, without incurring any risk and without complex procedures.

Another issue could be the control of the central bank's balance sheet. For example, the possibility of free conversion of CBDCs into physical currency would entail a source of enormous uncertainty in the ECB's coffers, which would instead have the purpose of guaranteeing the stability of the monetary system. The solution should therefore allow the free conversion of currencies while maintaining an adequate level of stability.

It is increasingly evident that an ambitious project such as the development of a CBDC by the ECB is bound to certain legal aspects necessary to manage the entire process, from structuring to proper functioning. The project impacts not only the individual private individual who would use digital currencies for their payments but also the financial institutions themselves, exploiting CBDCs to increase the efficiency and speed of interbank exchanges, reducing costs. The distinction, in this case, is identified in private CBDCs and wholesale CBDCs, respectively. Currently, interbank exchanges between some countries are still prolonged and expensive (think, for example, of countries with highly volatile currencies such as the Brazilian Real). The use of a CBDC, which is extraordinarily standardized and easy to exchange, would drastically increase the speed of transactions while reducing commission costs.

Again, a robust legal framework is necessary to make this mechanism work, regulating transactions between different countries and interbank transactions within single entities of the same country to avoid bankruptcies or liquidity crises. At the level of intermediation in the digital currency system, different operating models can be adopted, such as: centralization of processes; the process management is entrusted to individual intermediaries supervised by the ECB. In both cases, individual banks in the euro area are forced to rely on the ECB, mainly to obtain the liquidity they need.

Currently, this activity is carried out and settled quickly with traditional currency. Private individuals, in turn, place their trust in individual banks because they are a source of money for their daily expenses and investments (the store of value we discussed previously). The ease with which they can draw on the funds they need and the authority of the institution with which they are deposited guarantees the confidentiality of individuals who rely on traditional currencies. The focal point established by the ECB would be adapting this existing system for the classic money but using the CBDC. If the banking infrastructure allowed the latter to be found easily, agents would be encouraged to use it daily as they do now with traditional currencies.

There is no shortage of criticism of CBDCs that has been leveled over the years. For example, the credit risk for cross-border transactions could be higher due to the different legislation in individual countries (on the acceptance of digital currency, for example).

Furthermore, using CBDCs could lead to a decrease in traditional bank deposits and, therefore, to difficulty allocating credit by banks. In the event of a banking crisis, it could be accentuated by the strong attractiveness of digital currencies, which would incentivize individuals to withdraw liquidity from bank deposits to exchange it for personally held digital currency. Finally, as already highlighted above, bank balance sheets could be affected by the presence of CBDCs if bank deposits replaced them. Those just described are just some of the aspects to be considered by the ECB in the digital transition phase.

As with "private" cryptocurrencies, CBDCs are also based on the blockchain system, as mentioned above. The regulator will therefore have to lay the legal foundations for regulating this currency starting from the same method on which it is based. The big difference with the former is that if traditional cryptocurrencies currently guarantee the anonymity of the parties to a transaction, the central bank's digital currency cannot do the same, having to regulate the trade itself while protecting the identities of the parties.

The ECB must also structure the issuance of the currency, which can be carried out through account-based or token-based mechanisms. With the first modality, the ECB holds the CBDCs in its digital deposits, and the individual beneficiaries can draw directly from them. This method is more similar on a structural level to the classic system of guarantees and current accounts already present in the current banking system.

Alternatively, the ECB can act as the supervisor of a decentralized system, effectively making transactions in CBDCs more similar to those of standard cryptocurrencies, with the addition of control by the issuing institution (again, in order to guarantee the stability of the system). The ECB should be the only entity capable of issuing CBDCs. Operationally speaking, the issue can take place in three different ways: two-tiered Architecture (indirect); direct Issuance Architecture (direct); hybrid Architecture (hybrid). The critical feature that disregards the method used is the fact that agents must remain anonymous, but at the same time, transactions must be regulated. The direction of the ECB is to ensure a greater level of anonymity for higher-value transactions and vice versa for lower-value trades.

Given the current legislation, an in-depth analysis can be developed based on article 1277 of the Italian Civil Code. The latter states that debts should be extinguished with the legal tender currency of the country in which they are contracted. In legal terms, circulating money is the only legal tender used within a state's territory or within the area of countries

that have agreed to adopt a single currency. For instance, euro is the only money with legal tender status within the Eurosystem. However, there is a lack of integration in the legal idea of money. Within the limits of the legal framework, the definition of "money" does not exist. Instead, the idea of money is divided into various subcategories throughout the legislative contexts in which it is investigated. Following this theory, therefore, agents would not be incentivized to use CBDCs for transactions, as they are not accepted to pay their debts. More recently, a legal context is being structured to accept alternative forms of payment to cover debts with respect to the country's existing currency (see, for instance, Directive 2000/46/EC of 18 September 2000). More specifically, the inquiry asked whether an extinguishing effect is only achieved through payment in cash or also through the delivery any other kind of payment instrument. This interpretation rely on the fact that creditor must the same effect as the cash payment and in this occasion the obligation will close.

It is clear that a first step in the direction of accepting CBDCs has been made, taking alternative payment methods, but it remains necessary to define which way is acceptable. The latter must necessarily be a monetary means, thus making it mandatory to define digital currency as a legal tender currency if it is officially and legally accepted as a payment method. CBDCs' difference from the other sovereign and statist currencies is mainly measured in terms of its role as a unit of account: the digital central bank currency is not meant to serve as an alternative and independent measure to the euro. In this regard, the unit of issue of "external" currency would be identical to the extent used to quantify the central bank's "internal" resources. The need to bring digital money within the discipline governing the currency falls within the possibility of applying all the subordinate laws to transactions in digital currency. Indeed, once digital currency would be defined as "money", all users would be preserved by the law. Therefore, the point of debate is given by the fact that since the CBDC is a currency issued by the ECB, it is directly linked to the euro, the legal tender currency in the euro area. It could therefore be assumed that the use of digital currency is legitimate, but the debate is still open.

A further issue to be taken into consideration is the still substantial discrepancy between the various countries of the European Union. Italy, for example, is a country still firmly rooted in the traditional currency and has embraced the transition to digital more slowly than the countries of northern Europe, which instead plan to switch to a 100% digital economy within a few years. The discrepancy highlighted is the result of structural differences that may need to be remedied to effectively conclude the issuance of CBDCs

within the country, guaranteeing the efficiency of the system. A further problem could be the designation of the authority that would issue the digital currency on a legal and concrete level and the definition of a supervisory authority. To determine whether the issuing of CBDC fits inside the ECB's mission, an examination of the clauses of the central bank statute about two components of its mandate is required: the functions and powers. The lack of a clear and solid legal foundation for issuing token- and/or account-based CBDC can readily be overcome by targeted central bank legislation amendment. Ultimately, the digitization of banks and the entire world economy is already well established, although sometimes there is a lack of a system regulating new innovations. The CBDCs project could have great potential in terms of efficiency and competitiveness for all euro area countries, but it also represents a vast legislative challenge: the most outdated regulations need to be adapted to new realities, even starting from well-established foundations.

This study, therefore, aims to provide a possible vision of legal interventions necessary for the correct functioning of the CBDCs system, starting from the existing legislation. Many points are still open on the future of these currencies, and the debate on the changes that can be addressed in the current legislation in this regard is equally open. Nevertheless, the CBDC can increase the attractiveness of a currency and its use as a global payment unit. A digital euro would thus maintain the availability of a monetary anchor according to the digital era; it would also promote innovation, increase the efficiency of payments and support the overall economic efficiency of the European Union. Therefore, the design of the digital euro is of the greatest importance and must provide added value compared to existing solutions.