

# THE ROLE OF THE DIGITAL EURO IN A GLOBAL AND REGIONAL CONTEXT

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## **Abstract:**

*The digital transformation affected how we live, work, trade, travel and use different services. It also affected how citizens and businesses interact with governments, how we make our everyday payments and transactions. Step by step, it also influences the way monetary policy will be conducted in the future. The efforts to introduce a digital euro in the EU aim to respond to all those changes and transformations. The current paper will describe the concept, the role and the project itself for the future digital euro. It presents a large number of opportunities, including for Bulgaria, in relation to the future digital legal tender and means of payment. But the digital euro is associated with many challenges and risks, which will also be described. There are still many uncertainties about the design and concrete characteristics of the digital euro. However, one thing is certain. After its introduction, the digital and financial inclusion, the payment landscape and the ECB monetary policy will be substantially different.*

**Keywords:** digital euro, digitalisation, central bank, payments

## **1. Introduction**

Currently, the euro is the second most important currency in the global economy, the US dollar still holding the first place. The euro usually comprises a share of 20% in global trade, financial, debt, foreign exchange and other global markets. The other currencies, apart from the US dollar and the euro, have far smaller global importance. However, in order to preserve its influence in a digital era, the euro shall also go digital. As it is explained by the Member of the Executive Board of the ECB, if the European Union wants to prevent

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<sup>1</sup> This is a joined paper from Assoc. Prof. Kaloyan Simeonov and Savina Nedyalkova, PhD Student, including the introductory and concluding sections. Assoc. Prof. Kaloyan Simeonov focused its research on sections 2 and 3 and Savina Nedyalkova on sections 4 and 5. The opinions expressed in this paper are personal opinions of the authors and they do not engage the institutions in which they currently work.

the euro from losing significance on the global stage, transacting and investing in euro needs to be seen as safe, easy and efficient in the framework of the new digital payments and finance.<sup>2</sup>

The digital euro is a natural response to the trends to modernise payment services to reflect the changing needs of people and encourage innovation in the field of payment systems. This could increase choice, competition and affordability in digital payments and regulate the rapidly growing digital currency segment. The introduction of a digital euro is seen as an opportunity to support the European economy's digitalisation and the European Union's strategic autonomy by providing an alternative to online payment providers. The digital euro is a possible response to the significant decline in the role of paper money as a means of payment, a new channel for the implementation of the European Union's monetary policy and would serve to strengthen the international role of the euro. Last but not least, the optimisation of costs and processes through the introduction of the digital euro would support the reduction of the environmental footprint of the monetary and payment systems.

However, adopting new technologies in sectors with established traditional practices faces many challenges, including the different cultural attitudes towards risk and innovation in each country. The technical design choices for the digital euro will directly influence its energy consumption, presenting an additional challenge in balancing efficiency with environmental sustainability. The need to increase cybersecurity and the guarantee to prevent state and government interference in personal life are also substantial challenges for introducing and implementing the digital euro.

## **2. Concept and role of the digital euro**

The future digital euro is a form of Central Bank Digital Currency (CBDC). The CBDC is defined as a form of a digital currency that is issued by a central bank. It is equivalent to the respective fiat currency and may serve as a legal tender in the respective territory.<sup>3</sup> It shall be free of charge for the consumers, just like the cash is used by the citizens and businesses without any charges or fees.

A differentiation shall be made between a retail CBDC and a wholesale CBDC. The retail CBDC is usually a digital currency that is used by the public, the citizens and all types of businesses. The wholesale CBDC is used by credit institutions and other licensed financial institutions for large financial transactions. The two types of digital currencies are substantially different one from the other. This report is focused mainly on the use of the retail digital euro.

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<sup>2</sup> Cipollone, P. (2024), „Why Europe must safeguard its global currency status“, Financial Times, 11 June 2024.

<sup>3</sup> See: Investopedia, „What Is a Central Bank Digital Currency (CBDC)?“, last seen: 10 April 2025, <https://www.investopedia.com/terms/c/central-bank-digital-currency-cbdc.asp>.

As it is backed by the central bank, the digital currency shall be much more stable and secure than cryptocurrencies or stable coins. Taking into account the volatility and the likelihood of fraud in the case of cryptocurrencies and even stablecoins, the digital euro shall be much more credible and trusted. The trust shall also stem from the fact that the European Central Bank, which has a solid and widespread reputation, will be a guarantor for the stability of the digital euro itself.

Some unique attributes of cryptocurrencies are being explored and used by central banks to introduce Central Bank Digital Currencies backed by their full faith and credit, such as the digital euro. CBDCs like cryptocurrencies may use blockchain or other distributed ledger technologies. The characteristics of this technology will enhance transparency and traceability of transactions and serve as a single reference point, significantly contributing to the economy of the European Union in the long term.

Technologically, the digital euro drives modern payment infrastructure. It can spur the development of secure EU digital wallets, payment apps, and offline solutions compliant with European data standards. It enables fintech innovation in different areas, such as recurring payments and smart contracts.

Digital transformation is one of the driving forces behind the introduction of the digital euro. The development of the single digital market and the need to couple it with the establishment of the digital euro go hand in hand. Another stimulus for the introduction of the digital euro is the substantial decrease in the use of cash in the EU and the euro area.

The recent COVID-19 pandemic and the spread of limitations on physical contact between people boosted further the use of digital solutions, including in the payments area. After the pandemic, more and more people not only work on-line, but also make purchases and trade on-line.

The digital euro will be an alternative to other digital payment solutions, such as those that are offered by global card scheme operators or fintech companies. There will be many challenges for this new payment method to be introduced in the everyday life of the citizens and in the activities of the companies, as they already widely use the existing card schemes and fintech operators to perform their digital transactions and payments.

There is an increasing political support across the EU for the introduction of the digital euro, not only among institutions such as the European Central Bank, the European Commission or the European Parliament. Member States' central banks and governments also streamline their support for the introduction of the digital euro. It became much more than a monetary project or instrument, especially due to the need to ensure greater strategic autonomy in the EU and the euro area in the payment sphere.

Considering that the current digital payment systems and infrastructure are usually owned by foreign card schemes and players, the establishment of a European digital payment solution becomes not only a necessity but a must.

As the European Central Bank explained it, „if we do not bring central bank money into the digital age, we will hamper Europe’s competitiveness, resilience and strategic autonomy“<sup>4</sup>. This conclusion is even much more relevant after the new administration in the United States took the power and started to perform its unpredictable policy. The current problematic decisions of Trump in the area of security and trade may also quickly affect the payments environment and autonomy of Europe and the euro area in particular.

The need for strategic autonomy and further resilience is also recognised by the representatives of the national central banks. As a member of the Executive Board of the Deutsche Bundesbank explains it, the current geopolitical situation further increased the need for a united Europe. Introducing the digital euro shall overcome many current challenges, such as market fragmentation and over-dependence on non-European providers.<sup>5</sup> The Governor of the National Bank of Estonia also highlights the need to ensure a pan-European payment infrastructure solution for the foreign-owned payment card schemes and fintech solutions. He admits that currently, the EU authorities do not have a secure EU payment network. However, he stresses that it will not be easy to persuade consumers to use the future digital euro as it shall provide added value to the current efficient and highly rated card payment, mobile and instant payments solutions.<sup>6</sup> It shall be taken into account that currently around two-thirds of the card transactions in the euro area are settled through the international payment schemes.<sup>7</sup> One reason is the lack of a single and widespread Europe or euro area payment scheme.

The role of the digital euro is recognised also by the representatives of the private financial institutions in the EU. They admit that the digital euro shall overcome at least three significant current challenges for the monetary and payment environment in Europe. The first one being to balance against the riskier private cryptocurrency solutions. The second one is to find an alternative solution to the central bank’s monetary policy in times of decreasing use of cash and increasing role of digital payments. The third one is the already mentioned need to increase and safeguard the Europe’s strategic independence.<sup>8</sup> Another fourth challenge that will be tackled with the introduction of the digital euro will be to guarantee a better financial and payment markets stability.<sup>9</sup>

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<sup>4</sup> Cipollone, P. (2025), „The role of the digital euro in digital payments and finance“, Contribution to Bancaria by the Member of the Executive Board of the ECB, based on remarks at the Crypto Asset Lab Conference on 17 January 2025, published on 28 February 2025.

<sup>5</sup> Balz, B. (2025), „The digital euro: reshaping the future of Europe’s financial landscape“, the EUROFI magazine, April 2025, p. 172.

<sup>6</sup> Müller, M. (2025), „The digital euro: future-proofing payments in Europe“, the EUROFI magazine, April 2025, p. 173.

<sup>7</sup> Kretschmer, M. (2025), „Who controls Europe’s payments? The sovereign case for a Digital Euro“, Finance Watch, 20 March 2025.

<sup>8</sup> Blavet, Yv. (2025), „What’s in it for the consumer“, the EUROFI magazine, April 2025, p. 176.

<sup>9</sup> Demertzis, M. and C. Martins (2023), „Progress with the Digital Euro“, *Intereconomics, Review of European Economic Policy*, Volume 58, p.195-200.

The digital euro could also have another key role, i.e. to increase the opportunities for governments and law enforcement authorities to prevent and even decrease illicit activities. Financial transactions will be much more easily tracked and supervised, thus combating practices as money laundering and terrorist financing or any other criminal activity. If properly introduced and widely accepted, the digital euro will increase tax collection and decrease tax evasion and tax avoidance. However, these features will contrast with the need to ensure anonymity of transactions or to protect personal data according to the EU rules.

Another positive role of the digital euro is to foster further financial inclusion. Taking into account that this solution will be backed by the ECB and it will serve as a legal tender like the use of cash, the introduction of the digital euro may provide an opportunity for better access to affordable basic bank accounts for citizens across EU and the euro area. The latter will provide better financial and digital inclusion even for consumers that are remotely situated or are part of the vulnerable groups. However, in some cases, when vulnerable groups are digitally excluded, this may create future social problems and exclusion.

Last but not least, the digital euro may have the role to foster innovation in payment and closely associated areas. It will also provide opportunities to enhance competition and to improve the payment solutions that are available to consumers. The digital euro will stimulate the ECB to cooperate further not only with traditional commercial banks but also with fintech and other organisations.

### **3. The digital euro project**

The project for the digital euro has three main domains. The first one is the change it will introduce to monetary and payment policies, to the way we live and do business. The second one is related with the technical solutions and challenges that are associated with the establishment and future implementation of this new digital currency and legal tender. The third one is the changes that shall be introduced in the EU legal framework to allow the smooth and well-regulated introduction of the digital euro.<sup>10</sup> This section will describe the legal amendments and discussions that are currently on the table and that shall permit the establishment of the digital euro. These three domains are closely interrelated, and the advancement of all of them shall go hand in hand and in coordination between them.

The draft legal acts for the introduction of the euro, the so-call „single currency package“, were proposed in late June 2023. The package comprises three draft legal acts, namely:

- Proposal for a Regulation on the establishment of the digital euro – this is the main draft legal act from the package that aim to establish the

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<sup>10</sup> Due to the volume limitations for this paper, not all the aspects for the digital euro are analysed in details. For example, the monetary policy implications in relation to the digital euro are not discussed.

digital euro. It contains draft provisions in relation to its legal tender status, distribution, use as well as some essential technical features.<sup>11</sup>

- Proposal for a Regulation on the provision of digital euro services by payment services providers incorporated in Member States whose currency is not the euro – the draft legal text aims to specify the obligations for payment service providers that are incorporated in non-euro area Member States when providing digital euro payment services.<sup>12</sup>
- Proposal for a Regulation on the legal tender of euro banknotes and coins – although digital use of the euro shall be stimulated, the draft legal text aims that the mandatory acceptance of the cash shall be also guaranteed in the future.<sup>13</sup>

The Proposal for a Regulation on the establishment of the digital euro will ensure the legal basis for its implementation. Interestingly, the European Commission prescribes it in the information note to the package that this is a framework for a *possible new digital form* of the euro. The Commission recognises that it is ultimately to the ECB to decide if and when to issue the digital euro.<sup>14</sup> The main reason for this is the division of powers between EU institutions, considering that the monetary policy lies in the competence of the ECB.

In accordance with the draft proposal for the establishment of the digital euro, the ECB shall have the exclusive right to authorise the issue of the digital euro. It also specifies that the ECB and the national central banks may be the only institutions that will be empowered to issue the digital euro after the ECB authorisation.

Another key provision of the draft regulation is about the legal tender status of the digital euro. This status shall entail its mandatory acceptance in the euro area at full face value, similarly to the acceptance of the euro in cash.

The draft regulation prescribes rules also for the distribution of the digital euro as well as some technical features of the future digital legal tender. One of these draft provisions stipulates that the digital euro shall „have usage and service features that are simple and easy to handle, including for persons with disabilities, functional limitations or limited digital skills, and older persons.“ Other provisions include privacy and data protection, anti-money laundering and other provisions.

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<sup>11</sup> European Commission (2023a), Proposal for a Regulation of the European Parliament and of the Council on the establishment of the digital euro, COM(2023) 369 final.

<sup>12</sup> European Commission (2023b), Proposal for a Regulation of the European Parliament and of the Council on the provision of digital euro services by payment services providers incorporated in Member States whose currency is not the euro and amending Regulation (EU) 2021/1230 of the European Parliament and the Council, COM(2023) 368 final.

<sup>13</sup> European Commission (2023c), Proposal for a Regulation of the European Parliament and of the Council on the legal tender of euro banknotes and coins, COM(2023) 364 final.

<sup>14</sup> The proposals for legal acts are published at: European Commission (2023d), „Digital euro package“, [https://finance.ec.europa.eu/publications/digital-euro-package\\_en](https://finance.ec.europa.eu/publications/digital-euro-package_en).

In addition to the specific rules that are developed under the single currency package, the ECB also began drafting a single rulebook for the future digital euro. This is a set of provisions and standards that will describe further provisions related to its implementation. These draft legal texts are elaborated within the rulebook development group, established by the Eurosystem. This group comprises not only central bank representatives but also representatives from the retail payment market, i.e. consumers organisations, retailers and intermediary associations.<sup>15</sup>

## **4. Opportunities for the digital euro**

The digital euro will serve as a catalyst for modern payment technology – from mobile wallets to offline smart cards – all vetted for security and EU compliance. Early adoption and innovation in the digital euro will enable the EU to establish global standards for CBDC interoperability, privacy, and regulation.

The ECB is explicitly designing the digital euro system to interoperate with other currencies. Noneuro residents and also travellers could be granted accounts to hold digital euros temporarily. Crucially, the architecture includes multi-currency settlement features<sup>16</sup>. In practice, this means a Swedish bank or Federal Reserve could plug their CBDC into the same platform, enabling instant exchange between euros and krona, dollars or other CBDCs without additional correspondents.

Researchers and analysts note that by funding the core infrastructure, the ECB reduces risk for subsequent investments,<sup>17</sup> essentially creating an environment where innovation in digital payments can flourish. Both banks and tech companies benefit from a unified European payment backbone: they could integrate it with biometric IDs, wallets, or cross-border apps without reinventing rails country by country.

Another opportunity for the digital euro is for improving cross-border payments and trade, in both intra-EU and global settlements. Cross-border payments have faced challenges like inflated costs, low speed, limited access and insufficient transparency. Within the euro area, the digital euro will effectively create a single pan-European payment zone: residents and businesses would pay and receive digital euros instantly and at no extra charge anywhere in the EU. This overcomes today's fragmentation, where 13 of 20 countries rely on foreign card schemes<sup>18</sup> and avoids currency conversion costs for EU trade. So, the implementation of the digital euro could serve as a platform for cheaper,

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<sup>15</sup> European Central Bank (2024), „FAQs on a digital euro“, last updated on 2 December 2024.

<sup>16</sup> European Central Bank (2025), Speech by Piero Cipollone, Member of the Executive Board of the ECB „Enhancing cross-border payments in Europe and beyond“

<sup>17</sup> Boston Consulting Group (2024), The Digital Euro Could Herald a New Era of Innovation

<sup>18</sup> European Central Bank (2025) Report on card schemes and processors



faster cross-border payments and remittances via interconnected fast-payment systems, reducing transfer costs and chains. Moreover, it would have widespread benefits for supporting economic growth, international trade, global development and financial inclusion.

For Bulgaria, implementing the digital euro presents a transformative opportunity at both the macro and grassroots levels. Undoubtedly, the opportunities will be much bigger if Bulgaria joins the euro area in the near future. Although the digital euro will spread to a certain extent in the non-euro area Member States, subject to an agreement between the ECB and the respective national central bank, the benefits and opportunities for Bulgarian citizens and companies will be substantially higher if the euro becomes the legal tender in the country.

In the lead-up to euro adoption, Bulgaria should continue modernizing its payments infrastructure and legal frameworks to seamlessly integrate the digital euro. This includes finalising system upgrades, piloting digital payment services, and training financial institutions. Doing so will maximise early wins: Bulgarian consumers and businesses will become familiar with instant digital payments, and banks will have clear pathways to offer digital-euro accounts. The digital euro could reinforce Bulgarian banks and regulators, and when fully aligned, could help regional projects with Balkan economies. Moreover, involvement in the digital euro supports Bulgaria's position in EU digital policy discussions and signals Bulgaria's commitment to Europe's digital finance strategy and may unlock additional EU support or projects. For the euro-spending tourists, accepting digital euro payments, especially offline, increases ease of spending and may boost revenue from EU visitors.

After joining the eurozone, Bulgaria could immediately tap into the full potential of the digital euro. It will not only bring tangible benefits at home like inclusion, efficiency and innovation but also strengthen its integration into Europe's economic and geopolitical landscape. The digital euro's implementation will reinforce cybersecurity standards in Bulgarian finance as well. Bulgaria's strong IT workforce and growing digital hubs can capture these opportunities, potentially positioning Sofia as a regional fintech centre, leveraging the Eurozone's digital payments agenda. Bulgaria will also benefit from the enhanced strategic autonomy that will bring the digital euro to Europe and to the euro area in particular.

## **5. Challenges for the digital euro**

Whilst there are various potential advantages to the digital euro, there are also several disadvantages.

One of the biggest challenges is the adoption of the digital euro. The shift toward digital currencies may inadvertently marginalize segments of the population who lack access to digital infrastructure or possess limited digital literacy.



If cash becomes less available and CBDCs are not designed with inclusivity in mind, there is a risk of excluding vulnerable groups from the financial system. Affordability, accessibility, and the preservation of a level playing field among service providers are crucial to prevent such exclusion.

In a study<sup>19</sup> published in November 2023, the Bank for International Settlements found a direct correlation between trust in the privacy attributes of the CBDCs and the willingness of people to use them, namely because the trust in institutions to safeguard personal data varies within each country.

Opponents of digital currencies are raising concerns that the digital euro will enable governments to abridge civil liberties and human rights, using it as a means to censor individuals and exert control over its users. Authorities could censor users and transactions without due process or recourse. Such risks could be exacerbated in times of heightened political volatility, when governments may try to use CBDCs to enforce domestic political discipline.<sup>20</sup>

At the same time, the Joint Research Committee (JRC) looked at possible scenarios of demand for a retail-only euro central bank digital currency and assessed their impact on banks' balance sheets to explore potential effects on banks' intermediation capacity and financial stability. The JRC's test concludes that although the initial shock may not be substantial, the full dynamic effects of changes on the liability side following the introduction of the digital euro could be more nuanced and complex than the first-round impacts. These dynamics may result in the creation of position rents and the redistribution of income streams among banks of different sizes or across countries.<sup>21</sup>

Another JRC study<sup>22</sup> shows that the implementation of a digital euro could pose substantial challenges to the profitability of banks, especially for smaller financial institutions that heavily rely on deposit funds. The study examines the relationship between the adoption of the digital euro and bank profitability, by evaluating the extent to which banks depend on deposit profits.

A particular concern is that of energy requirements. It is important to consider the broader energy implications of digital infrastructures. Data centres, which would support the digital euro's operations, are projected to experience significant energy demand growth. The International Energy Agency (IEA) estimates that data centre electricity consumption could increase by 80% between 2022 and 2026, even accounting for efficiency gains.<sup>23</sup>

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<sup>19</sup> S. Choi, B. Kim, Y. Kim, O. Kwon, BIS Working Papers No 1147, Central Bank Digital Currency and Privacy: A Randomized Survey Experiment, Monetary and Economic Department; Nov 2023

<sup>20</sup> OECD (2023), „Central Bank Digital Currencies (CBDCs) and democratic values“

<sup>21</sup> Petracco Giudici, M., Di Girolamo, F., Central bank digital currency and European banks' balance sheets JRC 2023

<sup>22</sup> JRC, Working Papers in Economics and Finance, 2023/6, Bank profitability and central bank digital currency

<sup>23</sup> ECB Economic Bulletin, Issue 2/2025.

The energy consumption associated with the digital euro is intrinsically linked to its underlying technological infrastructure. As the European Central Bank progresses in developing its digital currency, it faces critical decisions that will determine its environmental footprint.

A centralized architecture, managed directly by the ECB or national central banks, offers a streamlined approach with lower energy demands. Such systems can process transactions efficiently, leveraging existing infrastructure and oversight mechanisms. This model aligns with the ECB's commitment to sustainability and operational efficiency.

Alternatively, decentralized systems, particularly those utilizing blockchain technologies, present a different set of considerations:

A solution with a Proof-of-Work (PoW) consensus mechanism, used by cryptocurrencies like Bitcoin, will be notably energy-intensive. Implementing a PoW-based digital euro could significantly increase energy consumption, potentially conflicting with the EU's climate objectives.

As a more energy-efficient alternative, Proof-of-Stake (PoS) mechanism relies on validators who stake their assets to confirm transactions. This method drastically reduces energy usage, with estimates suggesting consumption as low as  $10^0$  joules per transaction, compared to  $10^3$  joules for PoW systems. Adopting PoS could offer a balance between decentralisation and sustainability.<sup>24</sup>

The ECB is also exploring hybrid models that integrate both centralised and decentralised elements. Such configurations aim to harness the benefits of decentralisation – like resilience and user autonomy – while maintaining the energy efficiency and regulatory compliance of centralised systems.

## 6. Conclusions

Amidst the rapid evolution of the global financial ecosystem, the digital euro emerges as a pivotal initiative to fortify Europe's monetary sovereignty and enhance its influence in international finance. As digital currencies gain traction worldwide, the European Central Bank acknowledges the imperative to adapt, ensuring the euro's continued relevance and competitiveness.

The digital euro is envisioned as a secure, efficient, and universally accessible means of payment, complementing existing cash and electronic systems. By introducing a central bank-backed digital currency, the ECB aims to mitigate risks associated with the proliferation of private digital currencies and foreign central bank digital currencies (CBDCs), which could potentially challenge the euro's position and Europe's financial autonomy.

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<sup>24</sup> Cambridge University Press & Assessment, Volume 23 Issue 9, The Digital Euro and Energy Considerations: Can the ECB Introduce the Digital Euro Considering the Potential Energy Requirements?

Furthermore, the digital euro holds the promise of streamlining cross-border transactions, reducing associated costs, and bolstering the euro's appeal in international trade and investment. This initiative aligns with Europe's broader objectives of fostering innovation, ensuring financial stability, and asserting strategic autonomy in the face of technological advancements and shifting geopolitical dynamics. Its successful implementation will hinge on meticulous design choices that harmonize innovation with security, privacy, and inclusivity.

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