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**Article**

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Intereconomics

*Suggested Citation:* Demertzis, Maria; Martins, Catarina (2023) : Progress with the Digital Euro, Intereconomics, ISSN 1613-964X, Sciendo, Warsaw, Vol. 58, Iss. 4, pp. 195-200, <https://doi.org/10.2478/ie-2023-0041>

This Version is available at:

<https://hdl.handle.net/10419/275720>

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Maria Demertzis and Catarina Martins

## Progress with the Digital Euro

Interest in central bank digital currencies (CBDCs) has been progressively increasing as the global financial system has become more digitalised. The focus in most countries, and certainly in those that were early adopters, has been on CBDCs for retail use, primarily for individuals and businesses to make payments domestically. Eleven countries already have a CBDC in operation and are motivated by the need to increase financial inclusion in their respective societies. A few other countries are in an advanced pilot stage and close to launching their sovereign currencies in digital form.

The European Central Bank (ECB) is interested in the digital euro for three reasons. First, the process of digitalisation has implied both the emergence of private currencies, like bitcoin, and the reduction in the use of cash. Private currencies challenge the role of sovereign currencies and can be a threat to both financial and monetary stability. At the same time, the reduced use of cash, and the possibility of it disappearing completely, may eliminate the anchor that establishes trust in the financial system. Second, while the euro area has both a deep financial system and advanced payment systems, most payment services are still provided by non-European companies. This, the argument goes, poses a risk to Europe's strategic autonomy. Last, there is always a need to be ready for technologies that are new now but will become mainstream in the future and will help improve payments further.

In the euro area, there is ongoing work on a digital euro for retail use, even though it is still in the investigation phase. The ECB has already produced three reports that explain its opinion about the design and purpose of a digital euro aimed at consumers. There are a few com-

plex trade-offs to be considered and several choices to be made. The ECB's intention, if it were to launch the digital euro now, is to avoid disrupting the current financial system.

Recent geopolitical tensions have stoked the interest in CBDCs for wholesale purposes and brought it forward to the discussion. The ECB has not given the issue much attention until now and has only recently expressed its intention to do so in the future.

### The ECB's thinking on the digital euro

The ECB's first thoughts on the digital euro were revealed in a report released in October 2020 (ECB, 2020) and by July 2021, the ECB's Governing Council decided to start the investigation phase (ECB, 2020). During this phase, the objective was to understand and analyse various design options for a retail digital euro that would serve European consumers best.

The digital euro project is still in the investigation phase, which will come to an end in October 2023. At this time, the ECB will decide whether to go on to the next phase and further develop and test the digital euro. The ECB has released three progress reports that demonstrate the evolution of its thinking.

### First progress report

Published in September 2022, the ECB's first progress report focused on the functionalities and limits for users (ECB, 2022a). Some key issues analysed were the intended operation of the digital euro, privacy considerations and online/offline use.

The report states that the digital euro should be used exclusively for payments and not as a form of investment. For now, it is intended for payments in physical stores, e-commerce platforms as well as person-to-person payments. This choice also reflects financial stability considerations, particularly as it aims to prevent excessive migration of bank deposits to the central bank, which could disrupt current financial dynamics. To ensure that the digital euro is not used for investment purposes, the Eurosystem foresees a set of tools that will be embedded in its design and that can be calibrated flexibly. One such tool would be a form of tiered remuneration, which would apply less attractive rates for

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Open Access funding provided by ZBW – Leibniz Information Centre for Economics.

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holdings above certain thresholds. Another type of tool establishes quantitative limits on the amount of digital euros everyone can hold.

In a speech in June 2022, Executive Board Member Panetta disclosed that individual holdings should be limited to around €3,000-€4,000, while stressing that initially, it would be preferable “to err on the side of caution” (Panetta, 2022). This implies total digital euro holdings of around €1-€1.5 trillion if all euro area citizens were to hold the maximum amount. Such digital euro amounts would represent a very small portion of banknotes in circulation (currently more than €1,500 trillion; ECB, 2023a) and around 11% of households’ bank deposits (currently around €9 trillion) if we consider the lower bound (Euro area statistics, 2023). Therefore, it is expected to not cause great disruptions in the financial system.

The digital euro should replicate cash features as much as possible. A key attribute of cash is its anonymity, i.e. people can make payments without transaction being traced back to them. Contrary to cash, digital euros will not be fully anonymous but the ECB will ensure the highest standards of privacy. This is due to worries about money laundering and the difficulty in controlling the amount in circulation, which is necessary to limit its use for investment purposes. Nonetheless, the ECB is looking for options for the digital euro to mimic cash features as closely as possible. This is a priority, particularly given how important privacy is for euro area citizens (ECB, 2021). One option envisions greater privacy for low-value payments while keeping checks in place for higher-value payments (“selective privacy”). The other would take privacy a step further by relying on physical proximity and offline functionality to ensure the transaction information is available only to the parties involved. The latter would already be very similar to paying with cash, even though it would be limited to low-value, low-risk payments. Indeed, it should be possible to pay with digital euros online and offline, with a third-party validated solution for online use and a peer-to-peer validated solution in the case of offline payments. However, as offline solutions involve greater technical difficulties, the digital euro would initially be limited to online payments only.

### Second progress report

The second progress report, released in December 2022, focused on defining the settlement and distribution roles, and ensuring an easy conversion between the digital euro and cash/private money (ECB, 2022b). The digital euro would be a direct central bank liability, in other words, account holders will have a direct claim on the central bank that is convertible one-to-one with the

euro. This differs from the euros that we use digitally today since deposits in a commercial bank in the euro area are only partially guaranteed by the state, to the amount of €100,000. The Eurosystem intends to retain full control over the issuance, redemption and settlement of digital euros, but has not yet decided which technology to use – traditional, distributed ledger technology (DLT) or a combination of both.

The distribution and direct interaction with the end users would be of the responsibility of so-called supervised intermediaries. These intermediaries would deal directly with the consumer; develop consumer-facing services, such as wallets; perform regular anti-money laundering checks; and provide the devices or interfaces that will enable payment with the digital euro in the various outlets.

The distribution model and ease of conversion between digital euro and cash/private money are important aspects of the design and may affect the uptake by consumers. As such, a seamless experience should be ensured regardless of the intermediary and the country, and the service of topping up or withdrawing digital euro holdings should be available at all times.

### Third progress report

The third progress report, released in April 2023, covers the central issue of access by euro area residents vs non-residents and provides more details on the distribution of digital euros and additional functionalities (ECB, 2023d).

Only residents (individuals, merchants and governments) will have access to initial digital euros released, although at later stages, non-residents could have access on the condition that they have an account with a euro area payment service provider. Also, access for citizens in the European Economic Area (EEA) and selected third-party countries could be envisaged in later releases of the digital euro.

The report also goes back to the issue of holding limits, indicating that for individuals there will be uniform holding limits, while zero-holding limits apply to merchants and governments. This means that the latter can receive and make payments in digital euros but will not have holdings. Only one account per individual will be allowed to facilitate the control over the amount of digital euros in circulation.

The process of opening an account (“onboarding”) should resemble what is already common practice for

## Box 1

**The ECB's current thinking on the retail digital euro – main features**

**Target users:** Primarily euro area residents (individuals, merchants and governments). Possible extension of access to non-residents.

**Intention:** Means of payment but not form of investment (avoid excessive migration of bank deposits to the central bank).

**Availability:** Both online and offline solutions envisaged.

**Limits:** Between €3,000 and €4,000 digital euros per capita. Limits apply to individuals, who may have only one account. Merchants would not have digital euro holdings but would accept and receive payments in digital euros.

**Privacy:** The digital euro should replicate cash features as much as possible, but does not provide full anonymity. There may be anonymity for low-value, low-risk payments.

**Issue and settlement:** Responsibility of the Eurosystem; digital euro is direct liability of the central bank (convertible one-to-one with the euro).

**Onboarding, distribution and services:** Responsibility of banks and other payment service providers (supervised financial intermediaries). These would perform the regular onboarding procedures (e.g. anti-money laundering checks) and can develop consumer-oriented services beyond the core mandatory functionalities.

**Access and use:** Via existing online apps provided by the payment service providers or via a Eurosystem app. Payments done using technology such as contactless payments or QR code.

Quelle: Demertzis and Martins (2023b).

opening an account in private banks. Payment service providers (PSPs) would be responsible for distributing digital euros. They would have to follow strict criteria that would ensure that all expected tasks can be performed and that there is a high degree of harmonisation across euro area countries. The access and use would be done via the existing online apps of the PSPs (“integrated approach”) or through a Eurosystem app (“harmonised entry point approach”), as per the choice of the end user. It is worth noting that the Eurosystem app would offer basic payment functionalities that would still be performed by PSPs, but the interface would be one and harmonised across the euro area. Payments would be done using technology already familiar to most European citizens, for instance, contactless payments or QR codes.

Providing core services and functionalities, such as opening or closing the account, or funding or defunding, would be mandatory both online and offline. Optional and value-added services could be provided on a voluntary basis to enhance user experience. A crucial

point made in the report is that the digital euro will not be programmable money. This means that the ECB would not determine or interfere with where, when, or for which purpose the digital euro is used for payments. Conditional payments (“payments that are instructed automatically when pre-defined conditions are met”)<sup>1</sup> would still be possible, as part of the value-added services PSPs could provide.

Cross-currency functionalities are also being investigated as a way of improving the transparency and efficiency of cross-border payments (as endorsed by the G20). This functionality could be implemented by ensuring interoperability between the digital euro and other CBDCs or by relying on a common infrastructure that could host multiple CBDCs.

Beyond the three progress reports, there have also been developments in other areas, such as a rulebook

<sup>1</sup> The ECB Digital Euro Glossary.

for a digital euro scheme, which establishes the main framework for the digital euro, and a compensation model, which aims to address the issue of economic incentives and fees given that the digital euro would be a public good.

Early in the second half of 2023, the Eurosystem will present all the design choices put forward during the investigation phase. The ECB's Governing Council will then reach a decision on whether to go forward with the development of the digital euro. A decision to continue with further development would mean moving on to the next phase and delving further into technical details and testing. It would not be equivalent to a decision on issuance: this would require the approval of regulation establishing a digital euro, which needs to be adopted by the European Parliament and the Council of the EU.

### What is the purpose of a digital euro?

CBDCs will have a dual purpose, just like their physical equivalent: first, to be used for retail transactions, typically by consumers and small businesses to make daily payments, representing a small part of total payments; and second, to be used for wholesale (i.e. in bulk) purposes by banks and other financial institutions, either domestically or cross border.

A central motivation for considering a digital euro stems from the increasing digitalisation in financial services. We observe that cash is used less and less, overtaken by digital payments. As the only public money, cash is considered the ultimate anchor of the financial system. The ECB worries that if it were to disappear, the system would also lose the monetary anchor which preserves financial stability and trust in the currency.

This argument derives from the fact that only public money is fully guaranteed and ultimately people run to it in case of distress. In the euro area, the deposit insurance scheme provides for a guarantee of up to €100,000 of commercial bank deposits. Thus, these deposits are generally expected to be convertible to central bank money but are only partially guaranteed.

The ECB sees the digital euro as the evolution of cash in the digital age, and hence a way to keep the trust in the system by protecting the role of public money. However, evidence shows that while cash payments are decreasing, cash will not disappear completely (Demertzis and Martins, 2023b). Additionally, the concern that cryptocurrencies are taking over is unjustified; as such they do not represent a threat to sovereign money (Demertzis and Martins, 2023a). Therefore, right now, this argument

alone is not strong enough to justify the launch of a digital euro for retail use. But even if it was, how could a digital euro be the anchor to the system if consumers are only allowed to have limited holdings? What advantage do 3,000 fully guaranteed digital euros offer compared to €100,000 currently guaranteed in commercial bank accounts in the euro area?

If, on the other hand, the ECB were to allow unlimited amounts of digital euros to be held in the form of deposits, that could potentially be a game changer. Having all deposits guaranteed by the state is an attractive proposition for the consumer. But for her to switch from commercial deposits to digital euros, she would need to see interest paid on these central bank accounts or she would be left worse off. But interest-paid deposits at the central bank would transform both the role of central banks as well as the role of financial intermediaries. Commercial banks that are currently mainly funded by deposits would have to find alternative operating models. What would be the cost to the system of providing such a guarantee? Would the money in circulation necessarily have to decrease?

The ECB would need to carefully consider the trade-offs between the number of holdings allowed (and, with it, the attractiveness for citizens) and the potential disruptions to the financial system, particularly to the current banking intermediation model.

The other major point provided as justification for a digital euro relates to Europe's strategic autonomy. The ECB (2023e) observes that "non-European payment-related service providers handle around 70% of European card payment transactions". The worry is that the high external dependency on foreign providers can pose a threat to Europe's payments resilience, especially in the context of heightened geopolitical tensions. The digital euro could address this concern, but it may distort competition and innovation in domestic payment systems. The strategic autonomy argument adds a layer of protectionism that would need to be very carefully formulated economically and politically, or risk going against the EU's own principles.

Lastly, the payment landscape in the euro area is still very fragmented. While the payment infrastructure (Target Instant Payment Settlement) for euro instant payments exists and is operational, there is no unique digital payment method widely accepted across the euro area. While there are PSPs that already provide highly innovative services that allow citizens to send money instantly to each other or pay in stores with a QR code, they operate mostly at a national level or among a few countries.

The digital euro would provide a truly pan-European solution and the ECB would provide a starting point for more innovation in Europe. However, it is important to understand why the digital euro is the best solution to a single pan-European payment system. Imposed coordination (like the IBAN system for bank deposits) could conceivably provide an adequate solution. Regulation therefore can achieve the same result with much less effort. Such a solution could then allow European players to become more competitive and grow, eventually reducing the market dominance of foreign payment service providers. Importantly, a public solution would distort the market for available payment methods in each country.

A digital euro would unequivocally be of great value added for wholesale use, particularly cross-border cross-currency transactions (Demertzis and Martins, 2023b). This is despite the fact that CBDCs for wholesale use are not much of an innovation, since central bank money in digital form is already used for wholesale (i.e., interbank) transactions.<sup>2</sup> Effectively, a wholesale CBDC would innovate simply by using the latest, more efficient technology, namely DLT.

There are two reasons why CBDCs used for cross-border payments may be revolutionary. First, new technology can provide sizeable gains in time and costs by reducing the inefficiencies inherent in the correspondent banking architecture.<sup>3</sup> Pilot projects with DLT show that the technology allows new ways for banks and central banks to connect with each other, bringing time and cost savings, and enabling the use of local currencies for international payments (BIS, 2022).

Second, two central banks that have CBDCs will be able to settle transactions between them and bypass the current dollar-dominated system. Recent geopolitical tensions ignited the interest in CBDCs for wholesale purposes across the globe, especially given financial sanctions. In the current system, the currency in which a transaction is conducted determines which central bank settles this transaction. Since a very big proportion of trade and financial flows are currently done in US dollars, it is US authorities who settle the bulk of global financial flows. Central banks across the world rely on the US infrastructure for settling global transactions. CBDCs have the potential to change that by equipping any central bank with the infrastructure needed to carry out settlements. In an increasingly fragmented world, a settlement system

that is operational between any two central banks would guarantee the continuity of economic activity and could bypass the US system.

As other countries start exploring and considering such alternative systems, the Eurosystem cannot afford to be left out of this debate. Now is the time when global standards are being set. For any country to contribute to such standards, they need to both understand the complex trade-offs involved in creating a CBDC and be active participants in global cross-border payment pilot schemes.

Recently, the ECB announced that it will start exploring DLT for wholesale application (ECB, 2023c). Given how much the ECB has already invested in understanding the workings of a digital euro, it can contribute to setting global standards and help promote global coordination.

Last, while the ECB's thinking on the digital euro is advanced, there is still a gap in the public's understanding of why a digital euro is useful to them. The ECB needs to take time to explain its motive for pursuing such a project and change people's perceptions. The public's support will be crucial for take-up. Clear communication that explains the value added of a digital euro and how it fits in the context of global developments would be highly beneficial.

## Conclusions

CBDCs constitute an important addition to the way financial systems operate currently. And while money is a public good, central banks need to justify what externality digital cash aims to solve and that physical cash or private payment solutions do not solve. Why is there a need for the state to intervene and provide a public solution?

The ECB's interest in CBDCs stems from the rapid digitalisation in finance that may risk eroding the trust in the financial system. Also, in an increasingly financially fragmented world, the ECB argues that Europe relies excessively on foreign payment service providers and that this poses a risk to the euro's resilience.

Even if a CBDC for retail use in the euro area is not of immediate added value, it is important to invest now to understand the complex trade-offs that are required for digital cash to be ready to operate in the future. The ECB needs to make more effort to participate in global initiatives that study how CBDCs benefit cross-border payments. Pilot studies so far report tangible benefits in both time and cost savings. But importantly, CBDCs

<sup>2</sup> Panetta (2021) explains that wholesale CBDCs already exist given that interbank transactions use central bank money.

<sup>3</sup> For more details, see Demertzis and Martins (2023b, 10-13).



have the potential to change the global standard in international payments (Demertzis and Lipsky, 2023). The ECB needs to be part of that conversation to help protect the EU's strategic interests in international finance.

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