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The digital euro: a materialization of (in)security

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ABSTRACT

The European Central Bank (ECB) has entered the preparation phase for the potential issuance of a digital euro. The digital euro under consideration represents a retail central bank digital currency (CBDC), a digital representation of central bank money that is intended for use by the general public. This article foregrounds the digital euro as an infrastructure that furthers European security ambitions. It argues that the development of the digital euro is a materialization of European (in)security rationales that aim to secure pan-European financial transactions amid growing geopolitical tensions. It focuses on the development of the technology and analyses how central bankers' scenarios of the future manifest in the anticipated design and prototypes. While the provision of a financial infrastructure is the most decisive security-related implication of the digital euro, the introduction of a new form of public money is the decisive financial feature with potentially wide-ranging implications for banks. Although the ECB seeks to balance the interests of banks and other financial actors in the development of the digital euro, its plans are still met with criticism. Finally, the article argues that the ECB exerts itself more explicitly than before as a geopolitical actor in its own regard.

KEYWORDS

CBDC; digital euro; financial infrastructures; geopolitics; European security

Introduction

> '*We need to prepare our currency for the future. While we haven't yet decided whether to issue a digital euro, we're getting ready.*'
>
> (Post by Christine Lagarde on X, Oct 18, 2023)

On 18 October 2023, the Governing Council of the European Central Bank (ECB) made an important, possibly historic decision. After two years of research on the development of a digital euro, it decided to move to the 'preparation phase' of the project. Based on first deliberations in which several important decisions have been taken, the form of the digital European currency will take shape ever more concretely over the coming years, even before the final decision on its issuance is made.

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On the day of the public announcement, the ECB launched a new website that would address a wider audience than the rather technical design which the ECB website usually displays. The website features a design and blue-purple color scheme that is different from the rest of the ECB's website, as well as two short video clips that showcase the benefits of the digital euro. The first clip highlights the words 'easy, safe, fast, reliable' as features of the digital currency and explains its concrete use cases, such as sharing bills and paying online and offline across Europe. The second video portrays the digital euro as embodying European 'shared values' that need to evolve and highlights the words privacy, inclusion, and euro area. It also explains that the digital euro would 'strengthen Europe's autonomy in the digital world' and make the European payments sector 'more resilient'. Both videos end with the appeal to 'embrace the digital era with the digital euro' (ECB, 2023e, 2023f).

This article analyzes how the digital euro aims to fulfill its promise to strengthen European autonomy. Going beyond the perspective of future use cases and claims of making payments more convenient, I argue that the most important implication of the planned central bank digital currency (CBDC) for international political economy (IPE) is its infrastructural ambition. The digital euro is based on and adds to European security rationales and thus explicitly links (geo)political concerns with a digital currency. It connects the introduction of a retail CBDC with the development of a digital infrastructure that enables its usage. What is perceived as threatening in the realm of payments is the fact that euro-denominated retail payments, especially those across European borders, rely to a large extent on non-European payment providers and processors. These dependencies on non-European actors were already framed as a security issue by the European Commission in 2020. This article shows how these considerations have intensified since Russia's aggression against Ukraine in 2022 and connects it to an intensified and more explicit involvement of the ECB in geopolitical developments.

The intensification of geopolitical tensions and the use of financial sanctions for political aims made the interconnection between global payment infrastructures and geopolitics increasingly visible (de Goede & Westermeier, 2022). As financial networks, such as SWIFT but also payment networks, such as VISA and Mastercard are perceived as geopolitical actors, policymakers seek to establish new or other ways to secure money transactions independent of foreign interference. Such efforts include those to develop alternatives to established systems, such as SWIFT and the correspondent banking system by countries that oppose the dominance of the US within these systems (Nölke, 2022). While much scholarly attention has been directed to implications for the hegemony of the US dollar (McDowell, 2023; Zhang et al., 2023), little attention has been directed to the financial security efforts of countries and regions, such as the European Union (EU) that are widely perceived to be close US allies but that are often heavily dependent on US-based providers of digital payments and credit card networks. In these cases, the currency is mostly irrelevant. Instead, the dependent regions' security efforts aim at the infrastructural level, meaning the technologies and actors that enable transactions.

This article analyzes the development of the digital euro as a financial infrastructure that seeks to further European security rationales. While the project is still in its infancy, studying the phase of deliberation and planning allows a glimpse into infrastructural 'hardwiring' (de Goede, 2021). That is, this article analyzes how contemporary political ambitions and expectations about the future are brought to

bear in the concrete design of financial technologies. As the current moment in time is widely perceived as transformative in technological and geopolitical regards, this article connects two interrelated questions: How do financial infrastructures shape European security rationales, and which rationales shape financial technologies that aim to become future infrastructures?

The following places the study of CBDCs at the heart of IPE: CBDCs question and potentially reconfigure established relations between states, central banks and financial institutions *via* and in financial technologies. They are not just a tool, but a key site for (re)designing international financial relations. The following thereby expands lines of research that have foregrounded the importance of financial technologies and financial infrastructures in the study of IPE (special issue edited by Bernards and Campbell-Verduyn (2019), Brandl and Dieterich (2023), Campbell-Verduyn and Giumelli (2022) and Robinson et al. (2023)). To account for the interrelations between digital currency, security and infrastructure, the article proposes to conceptualize the digital euro as a process of materialization of (in) security that is shaped by and shapes financial and security rationales. It focuses on the development of a financial technology and how central bankers' expectations of the future manifest in its planning and anticipated design. As this technology is not yet accessible for research, official documents published on the digital euro serve as the main entry points to the infrastructural politics of the digital euro. The following thereby traces the development of a financial infrastructure as a discursive-material process and shows how the discursive and the material are closely entangled.

The analysis rests on reports that document the digital euro project. By January 2024 the ECB lists more than 110 different publications on the topic on its website (ECB, 2024). While these include interviews, speeches and technical publications, two central documents stand out: The 'Report on a Digital Euro' (ECB, 2020) and the ECB's 'stocktake on a digital euro' (2023c). These reports summarize the processes around the topic. For a detailed understanding of the technical development, their analysis is supplemented by more detailed reports on the design choices and detailed development of the digital euro. The ECB provides regular reports, working papers and presentations on the topic. Further reports are provided by the Bank for International Settlements (BIS), which has become a main place for and actor in discussions and developments relating to CBDCs (Swartz & Westermeier, 2023). The basis for selection of reports to analyze was thematic relevance to the nexus of CBDCs and security as well as a thematic focus on the concrete design of CBDC infrastructure. The two mentioned main reports provided by the ECB (2020, 2023c) hereby serve as focal points for the wider discourse.

As central bank communications are the main source for this analysis, they must be understood as strategic, as a literature on central bank communications has shown (Diessner, 2023). The ECB carefully crafts and prepares its external communication. While it aims to explain and thereby legitimize its plans and considerations for the digital euro, its communication is limited by a specific understanding of the ECB's mandate and its self-depiction as a technocratic European institution. At the same time, the development of the digital euro is a challenge for the ECB's communication strategy. Until recently, central bank communication has been geared primarily toward financial market audiences that are able to interpret central banks' 'signaling' (Abolafia, 2007). The digital euro, however, requires

support by the EU's co-legislators, the Council of the EU and the European Parliament, as well as – eventually – European citizens. To gain broader support for the project, representatives of the ECB have thus engaged in numerous public events with stakeholders, market participants, political actors and NGOs. As plans to introduce CBDCs have been a topic at several high-level conferences and meetings, many public conversations and speeches, most notably speeches by high-ranking ECB representatives, are also part of the enfolding discourse on the digital euro. This discourse has thus far been limited mainly to the central banking community, stakeholders, market participants and think tanks. To supplement the analyzed material, the author has attended several events, on and offline, dedicated to the digital euro. On these occasions, in conversation with speakers and attendants, the author gained contextual knowledge on the process and how it is perceived. The analysis also includes prototypes as part of the digital euro infrastructure to exemplify how discursive claims materialize in the technology. To sum up, the analysis focuses on two main reports and further public communication by central banks and other financial institutions – reports by the ECB, the Bank for International Settlements (BIS) and the International Monetary Fund (IMF) – which are supplemented by statements by stakeholders, market participants and consulting companies as well as statements gathered and conversations at events dedicated to the digital euro.

The article proceeds as follows. The next section explains how the study of the digital euro connects the literature on financial infrastructures with that on the techno-politics of European security. It also provides the conceptual framework to study the digital euro as a materialization of (in)security. The section entitled "More than public money" provides an introduction into the current stage of development of CBDCs and furthers the argument that their crucial innovation is the underlying infrastructure. The following sections report on the empirical study of how the digital euro is developed as a European security project and how these security rationales intersect with the established financial architecture. The final section links the development of the digital euro to broader developments that might be captured as the geopolitization of central banks before the conclusion.

Infrastructure as materialization of (in)security

By conceptualizing the digital euro as a materialization of (in)security, the article connects scholarship on the importance of (financial) infrastructures with studies on European security that focus on the role of technology. This section first discusses the literature regarding financial infrastructures before it links these considerations to the study of the interrelations of finance and security and the role of technologies in European security.

Securing financial infrastructure

The importance of infrastructures in IPE has been discussed in two regards. On the one hand, studies on infrastructural power that refer to Michael Mann's (1984) work emphasize from a macropolitical perspective how states exert power in processes of financialization that have led to new forms of state-market hybridity

(Coombs, 2022; Coombs, Forthcoming). While this approach is most relevant for analyzing how digital currencies transmit state authority and challenges the boundaries between public and private spheres, a different strand of research is better suited to studying the development of the digital euro. That strand builds on insights both from the Social Studies of Finance and from Science and Technology Studies to focus on the socio-technical relations around mundane technical objects that enable global finance and financial processes (Pinzur, 2021; Pinzur, Forthcoming; Brandl et al., 2024). This article thus uses a conceptualization of infrastructure that takes into account its materiality (in the making) as much as the ideas and knowledge that shape this materiality (Bernards & Campbell-Verduyn, 2019; Beaumier & Kalomeni, 2022).

Infrastructure is understood as 'an articulation of materialities with institutional actors, legal regimes, policies, and knowledge practices that is constantly in formation across space and time' (Anand et al., 2018, p. 12). Infrastructure in this mode of inquiry is thus integrally material and socio-political and provides an entry point to the political economy of technology. As the digital euro has not taken its definite shape, the analysis here foregrounds the process of materialization. Despite their seemingly immaterial virtual character, digital currencies require a material infrastructure of wires, satellites, computer hardware and electronic devices, and even though software and databases seem more malleable than these materials, their materiality has also been emphasized (Dourish, 2017). As Anand et al. (2018, p. 12) argue further, in reference to Edwards et al. (2009), infrastructures have 'histories and "grow" incrementally in a dynamic temporal, spatial, and political environment (…) They are formed with the moralities and materials of the time and political moment in which they are situated.' The following analyzes how the infrastructure of the digital euro is shaped by the political moment in which it is developed, and it provides a tentative look at the potential socio-political repercussions of the ECB's digital currency.

The digital euro is a technology that aims to become infrastructural for European financial and security architectures. Yet, no system is inherently infrastructural; it can only be observed in an infrastructural relationship (Slota & Bowker, 2017, p. 531). In the process of its development, security and financial rationalities intersect but also compete. Both rationalities are present in communications about the digital currency, which seeks to advance the European security aim of strategic autonomy and contribute to the digitalization of the European economy. As this article discusses, the two rationalities do not easily converge. There are profound doubts about the financial benefits of the new digital currency, while its security implications remain largely uncontested.

The security aims of the digital euro – strategic autonomy and resilience – are not the first security rationales to enter discussions in the field of finance. Already before, but in particular after the 11 September 2001 terrorist attacks in the US, the fight against terrorism has driven the use of financial transactions to counter illicit activities. This form of financial security relies on the surveillance and analysis of transactions and the ability to 'follow the money' (Westermeier, 2023). Following the global financial crisis that began in 2007, several contributions have also analyzed how finance itself is handled as a (potential) security problem (Morris, 2018). As capital buffers resemble the concept of stockpiling and stress testing resembles the practice of scenario planning, these perspectives have shown

how post-crisis financial governance adopted new security logics that ultimately entered the field of finance (Tellmann, 2009). Increasingly, financial markets themselves have been perceived as a referent object of security, as part of 'critical infrastructure' which needs special protection – primarily to withstand the next financial crisis. This framing of financial markets as infrastructures involves a shift in understanding them not as 'market institutions but as the vital basis of the economic itself' (Langenohl & Van Riet, 2020, p. 3; Langenohl, 2022). The securitization of financial infrastructures, meaning their depiction as being threatened and in need of protection, is still present, but the perception and anticipation of potential threats to financial infrastructures have shifted as the empirical sections discuss. Increasingly, security efforts aim at protecting financial infrastructures themselves for two interconnected reasons. First, they seek to gain greater local governance over payment systems that are often run by international corporations. Second, they want to secure financial connectivity domestically and internationally to ensure the basis for economic exchange. Both rationales are also present in the securitization of the European financial infrastructure.

Materialization of (in)security

Scholarship that engages with the nexus of technology and security at the intersection of International Relations and Science and Technology Studies has foregrounded how the EU's security agendas have worked to bring new policy areas, such as technology and innovation into high politics (Hoijtink & Leese, 2019; Bellanova & Glouftsios, 2022; Müller & Richmond, 2023; Campbell-Verduyn & Hütten, 2023). The terminology of strategic autonomy originated in the security realm but has since been extended to other policy areas. Notions of strategic autonomy and (digital) sovereignty are a way to link technology with geopolitics (Monsees & Lambach 2022). They have become key elements of several European rationales as they address Europe's lack of influence over the management of the material basis underpinning its economy. Lambach and Monsees describe strategic autonomy as a European attempt to respond to a changing geopolitical landscape and to position the EU within that scene (ibid.). Such concepts lack a clear definition which however contributes to their adoption by a broad range of actors because they serve as empty signifiers, such that their lack of concrete meaning actually helps to build shared socio-technical imaginaries. They shape collective 'security thinking in the digital and technological domains, by organizing and bridging civil–military political and policy agendas, and by opening windows of opportunity for decision-making and EU-level joint action' (Csernatoni, 2022, p. 397).

This article bridges the literatures on the (politics) of financial infrastructures and the techno-politics of European security. The development of the digital euro is understood as a process of materialization of (in)security that connects public and private actors, their knowledge, legal regimes and material formations, such as the development of front- and back-end solutions, and existing and developing payment systems. Claudia Aradau (2010, p. 503) has shown how the 'materialization of infrastructure emerges in intra-action with material-discursive practices about "foundations of society"' and how these are perceived to be threatened and secured. Aradau thereby expands to the sphere of security the works of Karan Barad (2007), who has demonstrated how 'matter and meaning are mutually articulated, and neither can be

reduced to or explained in terms of the other' (ibid., p. 152). Aradau thus conceptualizes the process of securitization as a process of materialization that involves material and discursive practices. The empirical sections that discuss the digital euro as a European security project track how the digital euro is a materialization as much as a discourse on the matter. It is thus not a product, but a process of, materialization of European (in)security.

More than public money – central bank digital currencies

CBDCs have become a major topic within the central banking community. In a 2020 survey, the BIS found that more than 60 central banks are engaged in work on CBDCs (Boar & Wehrli, 2021). By the time of writing, this number had already increased to 114, and several projects have developed from research into pilot phases (CBDCTracker, 2024). What the BIS survey also shows is that the motivation to consider the introduction of a CBDC varies among countries, especially between 'advanced economies' and 'emerging markets and developing economies'. For example, 'financial inclusion' is a major motivation for the introduction of a CBDC in the former, less so in the latter. Specifically, the digital yuan is often connected to China's geoeconomic aspirations, which would make CBDCs the 'new technological arena for US–China monetary competition' (Huang & Mayer, 2022). Thus, the introduction of a CBDC hinges on domestic circumstances and challenges, as well as the perception of international dynamics (Ehlke et al., Forthcoming).

Although most CBDCs are still in the development phase and have not yet been issued widely, it is still possible to scrutinize the rationales and narratives that the differing projects employ. These early stages of infrastructural planning and fleshing out the design already foreshadow the infrastructural geopolitics that are envisioned and thus materialize in the architecture of the new currencies. Infrastructures of all sorts, especially large public projects, entail a certain vision of the future, and the way they are designed favors certain ways of usage over others. Infrastructures embody the cultural, political and societal conceptions that are dominant at the time of their planning and construction, and they carry specific notions about anticipated future developments (Folkers, 2017). Arguably, the design phase is the most political phase of infrastructural contestation and deliberation. Decisions made at an early stage entail and foreclose options that might follow.

Based on broader analysis of publications on the topic of CBDCs, Kuehnlenz et al. (2022) offer a comprehensive introduction. They focus on the type of money that CBDCs represent. As a first step they distinguish between three types of money that the current monetary system entails: '(i) cash, in the form of coins and banknotes created by the central bank, (ii) central bank reserves, which are the reserve balances of commercial banks held at the central bank and (iii) commercial bank money in the form of deposits held by the private sector at commercial banks. An important distinction between these types of money is that reserves at the central bank as well as cash are both the liability of the central bank, while commercial bank deposits are the liability of commercial banks' (p. 4). These three types of money are not equal. While central bank money can be considered to be risk-free, this is not the case for private money. As commercial banks may default, private money carries a certain risk. Whereas commercial banks have already had access to

digital forms of risk-free central bank money for several decades in the wholesale payment system, the only form of risk-free central bank money which the public can access is cash. This would change with the introduction of retail CBCDs.

This article foregrounds CBDC as infrastructure, meaning the materiality (in the making) as well as the ideas and knowledge that shape this materiality. The two features of the CBDC – digital public money and its infrastructure – are inextricably linked. Digital money is inherently tied to the infrastructure that enables the storage and transactions of the digital currency (Caliskan, 2020; Westermeier, 2023). CBDCs are not simply issued; they are designed. The design choices determine how the digital currency can be used and how it enables and disables financial relations. The infrastructure is the crucial element that brings digital money into being. Bluntly put, the innovation of retail CBDCs is not the fact that it is public money, but that public money is stored on a digital ledger and is thus digitally transferable and accessible. Crucial differences between CBDCs thus lay in the concrete architecture of their infrastructure. Two fundamental choices exemplify how the design of CBDCs alters how they enable financial relations.

One fundamental design choice is the technically mediated relationship between the central bank and citizens. A one-tier model would make the digital currency directly accessible for end users without intermediaries such as banks. The central bank would handle all payments and provide services to the end users. This model, however, is seen as 'inefficient, as it detracts from the central bank's main role of providing monetary and financial stability' (BIS, 2023). Most central banks favor either a two-tier model or a hybrid CBDC model in which private actors would handle most direct interactions with the end users while central banks would use differing mechanisms to manage transactions. The ECB decided at an early stage that it would prefer a hybrid model in which the digital euro is intermediated by the private sector (ECB, 2022).

Another profound design choice is the underlying ledger in which transactions are stored. In the case of private cryptocurrencies, the digital ledger – typically a blockchain – records transactions in blocks and authenticates them using specific mechanisms. Whenever users transfer digital money holdings to one another, this results in an update to the database of monetary records. Apart from the form of money they provide, another crucial difference between cryptocurrencies and CBDCs is the form of the ledger, thus the underlying data infrastructure. While Bitcoin relies on a decentralized system that records all transactions on a ledger that is distributed across a network, CBDCs will most likely rely on permissioned blockchain or similar ledgers that are not publicly accessible. Studies indicate that most central banks prefer a centralized ledger, updated by a single entity, i.e. the central bank (Sun et al., 2022). The ECB has published a study on a prototype which relies on a centralized infrastructure that will be discussed in more detail below (ECB, 2023a). The following section explains how these design choices as materialization of (in)security are entangled with broader European security efforts.

Securing the 'lifeblood of the european economy'

> *'Once relegated to the back-office, payments have become strategically significant. They are the lifeblood of the European economy.'*
>
> (European Commission, 2020)

'Payments have left the obscurity of back-offices and made it to the political and strategic level.' When Mairead McGuinness, European Commissioner for Financial Stability, Financial Services and the Capital Markets Union, made this statement near the end of 2020, she offered three reasons why payments had become relevant for high politics: Briefly, digital transformation, transactional data and strategic autonomy. That the payments sector is part of the digital transformation is one of the most 'visible signs': Paying contact-less or with the mobile phone has become routine in most places. The second reason is the increasing use of electronic and digital payments as a 'data goldmine'. As payments provide insights into people's lives, their behavior and preferences, transactional data have gained relevance for companies whose business models are data driven (McGuinness, 2020). Transaction data are especially valuable for companies whose business models are data driven, most of which are non-European (Ferrari, 2020; Westermeier, 2020).

The increasing use of money as a form of data is linked to the third aspect that the Commissioner names as a driver for the political importance of payments, which she connects directly to the EU's aim of strategic autonomy. She states that, 'Whoever controls payment systems increasingly controls our modern, highly digitalised economies.' However, within Europe control is not in the hands of Europeans, as the Commissioner explains. The cashless payment solutions – mainly credit/debit cards and increasingly digital means of paying *via* apps – that Europeans use when they pay across borders within or outside of the EU are not provided by European companies. She refers here to the dominance in Europe of US payment giants VISA and MasterCard in intermediating European payment transactions. Approximately, 70% of European card payment transactions are managed by payment-related service providers that originate outside of Europe. Notably, a substantial level of market concentration is observed among these non-European entities, particularly in segments, such as card transactions and online payments (Ioannou et al., 2023, p. 69ff; ECB, 2019).

The task to preserve European autonomy in payments was not seen as a task for central bankers right from the start of the debate. In 2020, the hope of European policymakers to counter the dominance of non-European payment giants rested on the shoulders of private companies, mainly the so-called European Payments Initiative (EPI), a private effort to create a pan-European payment system. In July 2020, a group of 16 major European banks from five countries (Belgium, France, Germany, the Netherlands and Spain) announced their support for the EPI. This group of supporters grew to 32 European banks and payment service providers in 2021. The EPI sought to offer a card for consumers and merchants across Europe, a digital wallet, and enhanced P2P payments. Customers should thus be able to enact transactions across Europe with a pan-European system. The project was also supported by the European Commission, and the national governments of Belgium, Finland, France, Germany, the Netherlands, Spain and Poland issued a joint statement endorsing the EPI (Federal Ministry of Finance, 2021). The ECB also welcomed the initiative, offered technical support and hinted at public policy possibilities to help the private solution gain traction (Finextra, 2019). Government-level support would be limited to policymaking and regulatory adjustments, while the EPI had hoped for financial aid (European System of Central Banks [ESCB], 2020).

In 2021, it appeared as if the EPI would add itself to a considerable history of failed European projects (Judt & Krueger, 2014). It ran out of steam and lost the support of most of its stakeholders as 20 banks pulled out of the project. Competition between several participants and the high cost of the implementation of a new payment scheme were the main reasons cited. For banks, it seems cheaper and easier to continue their cooperation with US credit card companies. In addition, the payment landscape differs among European countries. Some (digital) options have already been made available by national actors in some countries, but not in others. In April 2023, the EPI issued a statement that announced a reset of the project with plans to develop a digital wallet to facilitate instant payments across Europe. At the time of writing, the EPI develops 'a groundbreaking payment solution tailor-made for Europe's present and future' which foremost entails a wallet application.[1] As both the EPI and the digital euro now aim to become platforms for European payments, their relation and possible cooperation is not inevitable, but likely.

The rise of the digital euro is linked to, but certainly not precipitated by, the failure to establish a privately-run European payment solution. When the EPI was initiated, the possibility that a European CBDC would be developed was already being discussed. However, at that time the German Bundesbank and Banque de France had hoped that the EPI would succeed as they assumed that a private solution would be implemented more quickly than a CBDC that would be years in the making (Smith-Meyer, 2021). Further factors the central bankers cite as drivers of the development of CBDCs in general are cryptocurrencies (foremost the discontinued Libra project) as private alternatives to the public–private payment systems and the fact that other non-ECBs are developing digital currencies, foremost the digital yuan. These developments are perceived as risks to the established financial system and the position of central banks within the monetary system (Swartz & Westermeier, 2023).

The digital euro – a European security project

> When you look at your wallet and you look at your telephone and see the applications that you use for payments or the cards that you use for payment, you very soon realize that those means of payments are not necessarily European. (…) So we just have to be careful. Some people will call it sovereign autonomy, I prefer to call it resilience because that's really what it is.
>
> (Lagarde, 2023)

This section analyzes how the digital euro project developed between 2020 and 2023 with a focus on two major reports on the topic. As it will be shown, the tone and the level of detail changed during this time, most decisively after the Russian aggression against Ukraine started in 2022. While earlier speeches and publications were much more cautious about whether the digital euro would be developed and which benefits it would have, central bankers have become more determined and proactive in explaining the aims and benefits of the project. This also reflects a development within the central bank: At the beginning, around the year 2020, the project produced more questions than answers, as members of the ECB project

group recount at public events. Increasingly, the project has become a shared effort of the ECB and the central banks of the Eurozone, and its prospects have become clearer – including to central bankers themselves. Two main reports mark these developments and show how European security logics manifest in the development of the digital euro.

In a first step in January 2020, the Governing Council of the ECB established a High-Level Task Force that would advance work on CBDCs in the euro area. In October 2020, the task force launched the first significant publication on the digital euro, the 'Report on a Digital Euro', which sets out several reasons for proceeding with a digital euro. Several future scenarios are used to argue for the implementation of a digital euro linked to specific design recommendations. Scenarios are themselves a security practice and 'technique of uncertainty producing imaginative accounts for plausible futures' (Opitz & Tellmann, 2015). Scenario planning lies within the realm of preemptive security logics which seek to prevent certain perceived threats from materializing. Scenarios provide narratives that help to construct wanted and (in the eyes of the central bankers) unwanted financial futures. At the same time, these scenarios provide legitimation to act in the present with their reference to future-oriented security rationales such as strategic autonomy and resilience that have been transferred to the domain of payments.

The 'Report on a Digital Euro' presents seven such scenarios. It is remarkable that most of them describe a future in which the digital euro already exists in order to highlight the positive expected effects for Europe and the European economy. One scenario (ECB, 2020, p. 9) addresses external threats, such as when 'a form of money other than euro-denominated (i) central bank money, (ii) commercial bank deposits or (iii) electronic money becomes a credible alternative as a medium of exchange and, potentially, as a store of value in the euro area'. Under this scenario, a CBDC issued by a foreign central bank could be made available to European citizens, resulting in 'currency substitution as well as an increase in foreign exchange risk in the euro area economy.' Or 'technology firms [could develop] payment solutions not denominated in euro (such as global stablecoins) that could achieve a global footprint and become widely used for European retail payments.' The report explains why these developments are perceived as threatening: 'Such developments would foster innovation but could also threaten European financial, economic and, ultimately, political sovereignty.' The task force thereby links the topic of the digital currency to the foundations of Europe by posing a threatening scenario.

The 2020 report, which lays the groundwork for the further development of the digital currency, thus already establishes the connection between Europe's security politics and its currency. Not long before the report was published, ECB President Christine Lagarde (2020) gave a speech in which she summarized the two driving factors that push the Eurosystem to strengthen European payments capabilities: 'The first is changing consumer preferences and the second is competition to dominate payments on a global scale.' While this first driving factor is perceived as given (consumers will continue to shop online), Lagarde describes the second driver in more detail, referring to the reliance on 'foreign providers' which present a risk amidst the 'evolving global context': 'We are seeing an increase in protectionist policies, as sanctions and even exclusion from payment systems in recent years

have shown. This presents new risks of payment disruption—especially for jurisdictions that are overdependent on dominant system providers' (Lagarde, 2020).

With her remarks on sanctions, Lagarde thereby stresses that the use of sanctions and exclusion from payment systems is a potential challenge that is not limited to adversaries of the US – as the EU experienced first-hand in 2018. That year, after the administration of US President Donald Trump pulled completely out of the Joint Comprehensive Plan of Action (JCPOA) – the so-called Iran Deal – the financial messaging network SWIFT disconnected Iranian banks under pressure by the US administration (Robinson, 2022). For Iran's European partners who still adhered to the deal, the infrastructural disconnection of Iran made it impossible to uphold their commitments under JCPOA and to conduct trade with Iran. The situation led them to set up INSTEX as a European workaround for the established financial system and raised awareness that the threat of infrastructural disconnection was not limited to US adversaries (de Goede & Westermeier, 2022).

After the start of the Russian aggression against Ukraine in February 2022, the tone and priorities in the speeches of European officials on the digital euro shifted remarkably. In September 2022, Burkhard Balz, member of the Executive Board of the Deutsche Bundesbank, lists 'strategic sovereignty in European payments' as the first reason 'why we need a digital euro' (Balz, 2022). Members and representatives of other European institutions are even more explicit in linking the digital euro to most of Europe's existential issues. At a November 2022 conference, Thierry Breton, Commissioner for the Internal Market, characterized payments as a matter of sovereignty due to the lack of pan-European payment solutions. At the same event, Nadia Calviño, then Vice President and Minister for Economy and Digitalization of the Spanish Government, described the development of the digital euro as a 'highly geopolitical challenge' and argued that 'we have to see that this is underpinning the new world order which is in the making these days' (European Commission, 2022). The digital euro is thus directly linked with European geopolitical considerations, which are subsumed under the framework of strategic autonomy.

From scenarios to prototypes

A year later, in 2023, the ECB published another major report that summarizes the results of the investigation phase. 'A stocktake on the digital euro' does not provide scenarios but instead voices European insecurities, stating that,

> A digital euro would also address risks stemming from geopolitical tensions. The fragility of global supply chains exposed by the coronavirus (COVID-19) pandemic and Russia's war of aggression in Ukraine has painfully demonstrated the risks of relying exclusively on external suppliers for basic needs. (p. 4)

This could be read as drawing remarkable parallels between the European reliance on Russian gas to its reliance on predominantly US payment providers. The report continues by providing three ways in which the digital euro would strengthen Europe's resilience:

> First, it would ensure that, in addition to European private payment solutions (which so far have remained national), there would be a payment solution for the euro area under European governance. This would support the strategic autonomy of Europe's entire

> payment ecosystem. Second, a digital euro would be able to rely on its own underlying infrastructure. This would enhance the overall resilience of Europe's electronic payment system in the event of cyberattacks and technical disruptions. Third, a digital euro would also provide a pan-European platform on which European PSPs [payment service providers] could build services with pan-European reach for their customers. (p. 5)

These statements directly link to the comments made by Christine Lagarde cited at the beginning of this section on the aim of the design process. She prefers the term 'resilience' over 'strategic autonomy'. Whereas 'strategic autonomy' puts an emphasis on European efforts to gain a higher degree of independence, the term 'resilience' invokes a more technical nuance of governing uncertainty. Indeed, resilience enacts the logic of preparedness to anticipate unforeseen events and to be prepared for their occurrence. Unlike precaution or preemption, the logic of preparedness does not aim to stop a future event from happening. Rather, it focuses on limiting the effects of a possible event that threatens to disrupt everyday life (Anderson, 2010). The term 'resilience' originated in ecology and is now widely used in various areas, such as social psychology and disaster management (Walker & Cooper, 2011).

Within financial governance, resilience entails the conviction that future crises cannot be prevented, but their effects can only be limited. This rationale is taken a step further with the digital euro. Evelien Witlox, Program Manager of the digital euro project, explained at a 2022 event with industry experts that the resilience of the digital euro would depend on its usage (the extent to which it is widely accepted), whereas the presence of the infrastructure would already serve the goal of strategic independence (see also presentation by Witlox, 2022). The digital euro could provide a fallback solution if the scenario of a 'foreign digital solution' (hinting at the digital yuan which is already in use) expanding within Europe were to materialize and if geopolitical tensions intensified (Ioannou et al., 2023, p. 113). This line of thinking has also been evoked by the IMF, which proposes that a 'CBDC could serve as a "redundancy" system to complement non-CBDC payments, thereby potentially increasing payment system resilience. This would not necessarily require a high degree of adoption—as long as the CBDC is available, it would fulfill a useful role' (Soderberg et al., 2023). As central bankers stress in conversation and at public events, they work with a long-term perspective of five, 10 or 15 years and toward preparing for any future crisis that might occur. They still refer to the profound insecurities of the future, as Fabio Panetta, former member of the ECB Executive Board and currently Governor of Banca d'Italia, does when he states that preserving European autonomy would be even more critical in the future, 'as further expansion of large technology companies into payments would make the concerns I have outlined even stronger and more pressing' (Panetta, 2023).

How does the discourse of preserving European autonomy and promoting resilience materialize in the plans for the digital euro? A 'Prototype summary' (ECB, 2023a) provides concrete design options, such as the one for online cases, that is displayed in Figure 1. It shows how the underlying infrastructure of the digital euro could take shape and how tasks might be distributed between public and private actors once the digital currency is launched. In the described prototypes, the ECB would provide the back-end of the digital euro which includes the 'core settlement engine' which is later called N€XT, 'a bespoke design developed from scratch by the Eurosystem' (ECB, 2023a, p. 5). The architecture of N€XT is based

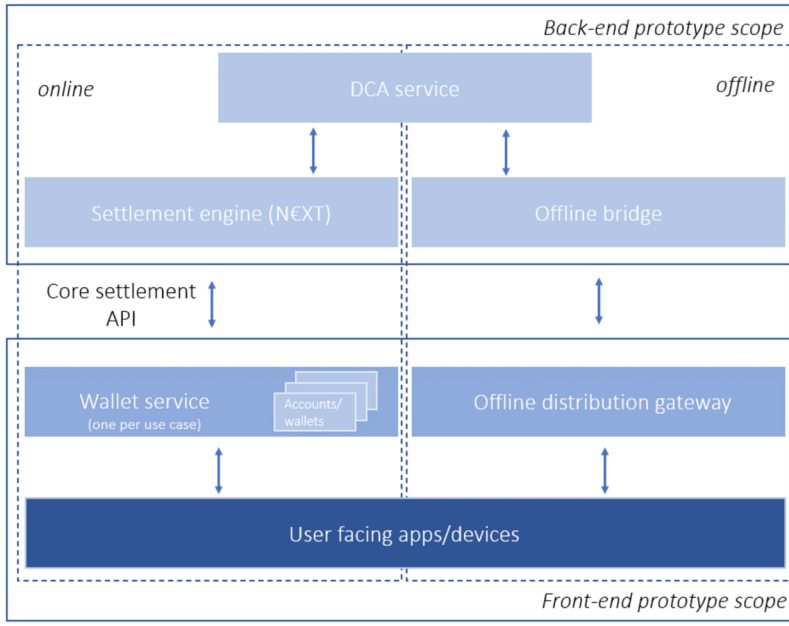

Figure 1. Front- and back-end prototype scope, taken from Digital euro – Prototype summary and lessons learned (ECB, 2023a, 2023b, 2023c, 2023e, 2023f, p. 4).[2]

on a UTXO data model, which is also used by distributed ledger technologies. This core technology would allow the Eurosystem to have control over central bank money settlements. Using so-called Application Programming Interfaces (APIs), the ECB enables the interaction with payment service providers that would provide applications for end users (the front-end). APIs are already established as a governing tool in payments and were a focal point of European Payment Service Directive 2 (PSD2, see Westermeier, 2020). The offline model, however, could be based on different data models and technical designs (ECB, 2023a).

The prototypes are thus materializations of (in)security as they show how the Eurosystem seeks to fulfill its aim to 'rely on its own infrastructure, thereby strengthening resilience' (ECB, 2023b). The ECB seeks to provide the core functions of the digital euro. In addition to the components that the Eurosystem will source internally, such as payment settlement, the institution issued calls for applications for digital euro component providers in January 2024 with contracts valued at up to €1.1 billion (ECB, 2024). The concession regime also specifies that only 'EU Nationals that are controlled by EU Nationals' are eligible as candidates, tenderers, members of a temporary grouping or subcontractors, i.e. any legal entity with registered offices in an EU member state or any natural person that has the nationality of an EU member state. The document also specifies 'control' as 'the ability to exercise a decisive influence on an undertaking, directly, or indirectly through one or more intermediate undertakings' (ECB, 2024, p. 4). These remarkable specifications for component providers show that the ECB aims to assemble the infrastructure of the digital euro exclusively by European actors.

The materialization of the digital euro thus mirrors how European security is perceived to be threatened and how it may be preserved. In terms of the design

concepts for the digital euro, matter is not simply generative, introducing new elements into existence; rather, the materialization of the digital euro has effects beyond its concrete design. Given the close interconnection within the central bank community and ongoing collaborative initiatives between the ECB and other central banks, their actions are closely monitored and factor into the considerations of other central banks. Of course, the ECB's plans for the prototypes are also essential for private payment providers that seek to provide the digital euro. The next section discusses the challenges that the materialized security rationales entail for the existing financial architecture.

Balancing finance and security

> How central banks navigate the digital era – such as innovating their payment systems and issuing digital currencies – will also be critical for which currencies ultimately rise and fall. This is an important reason why the ECB is exploring in depth how a digital euro could best work if launched.
>
> (Lagarde 2023)

Designing a digital currency entails the reimagination of the monetary system (Swartz, 2018). As discussed above, all parts that form the established financial system can potentially be adjusted and given new purpose, including the role of the central bank, the role of intermediaries, the form of cross-border financial transactions and the usage of public-private *vs*. public money. Therefore, the ECB's announcement that it would pursue the development of the digital euro created significant uncertainty for market participants and international partners and adversaries.

The decision to develop a retail CBDC immediately raises questions about the role of (other European) intermediaries. The ECB has repeatedly emphasized that they want the private sector to play a crucial role in the new monetary system – disintermediation was not on the table (Panetta, 2021). This ruled out the one-tier model of CBDCs in which the central bank issues the digital currency which is directly accessible to end users. Instead, the favored model is an intermediated one, which means that the CBDC is issued by the central bank and accessible for end users *via* commercial banks and other payment service providers.

During its two-year investigation phase, the ECB provided regular updates and cooperated with different stakeholders, most notably market participants and their stakeholder associations. The ECB closely interacted with the European Commission on a range of policy, legal and technical questions related to the digital euro and exchanged views with the European Parliament and the finance ministers of the euro area. Last, representatives of European civil society organizations are invited to seminars where ECB experts present their work. Still, the communication of the ECB has been primarily directed toward close circles of experts and practitioners. The public debate about the future of the European monetary system has only slowly started. Yet, banks and other service providers are alerted and raise concerns about the implications of the new CBDC as its design as a security infrastructure has implications for the financial industry.

While the provision of a financial infrastructure is the most decisive security-related implication of the digital euro, the introduction of a new form of public money is

the decisive financial feature. Within the hierarchy of money forms, CBDCs as public digital money would fall in the highest rank, above private money which is backed by public institutions (Murau & van't Klooster, 2023). In the past, the ECB did not draw attention to the differences between public money and private money. On the contrary, as Braun points out, the ECB and the German Bundesbank rather entertained 'folk theories of money' that dominated the public conception of the monetary system, which hold that 'all money is created equal, that banks are intermediaries, and that money is exogenous' (2016, p. 1067). But with the introduction of the digital euro, the ECB now emphasizes the differences between private and public money. Amidst the perceived threats relating to cryptocurrencies and money managed by non-European entities, the ECB has begun using the analogy of central bank money as a 'monetary anchor for payments' (Panetta, 2021).

The new emphasis on the public character of CBDCs, however, poses a challenge to the established financial system: If one can access the safest form of money, why should one hold a lesser form of money and keep it in an account at a commercial bank? Although the ECB does not say what exactly a 'monetary anchor' entails, banks argue that the 'anchor' itself would raise the risk of uncontrolled disintermediation of the banking system. The ECB reacts to these concerns by emphasizing that the use of the digital euro should be limited to a means of payment. The amount of digital euros that each citizen can hold could be limited to, for example, €3000 and thereby discourage the usage of CBDC accounts as a store of value. The ECB also stresses that they seek to limit the spectrum of services it offers compared to a bank account held with a private bank (Bindseil, 2020, p. 26). According to the current plans, the digital euro would be public money on a digital infrastructure, but it would nevertheless be a public-private endeavor as the ECB wants private actors to act as payment service providers, meaning they should provide the applications and means to access the digital currency. The infrastructural affordances, however, require a separation of public money and private money, represented in differing accounts for the digital euro and private money.

The paradoxes in the planned design show that the ECB seems to walk a tightrope to establish the digital euro as a security infrastructure but avoid making it too financially successful. One banking representative at an industry meeting made the comparison that the ECB would not only build the road but also the cars which drive on it, thus providing an analogy for the design of a CBDC that combines infrastructure and the value that it circulates and stores. The ECB's communication insists that it seeks to have a share in the market for payments, but it does not want to disrupt the market altogether. Economists have been vocal about these contradictions, arguing that the digital euro would not resolve market inefficiencies and questioning the 'unique selling proposition from the user's perspective compared with existing payment systems' (Bofinger & Haas, 2021). Potential users might largely ignore the new CBDC, as for a typical household the planned digital euro would have serious disadvantages: There would be the need to hold a parallel commercial bank account as there is no overdraft facility, and the €3000 threshold would require extensive monitoring. A report for the ECON Committee of the European Parliament, prepared by the former member of the supervisory board of the ECB, Ignazio Angeloni (2023), comes to the conclusion that the '"solution" that a digital euro entails does not have a well-identified "problem" behind it—in terms of inefficiencies or dangers of the status quo.' The report summarized the economic

arguments against the digital euro: 'The payment system is already efficient and constantly progressing; there are no "market failures" suggesting central banks should be directly involved; CBDCs will not succeed because central banks lack the necessary expertise to win the market; CBDCs may put financial stability at risk; CBDCs would distort and discourage private investment and innovation' (p. 20). In short, from Angeloni's economic perspective the digital euro would foremost pose a potential threat to the established financial order.

Despite the criticism coming from banks, analysts and economists, the ECB seems determined to continue with the development of the digital euro. While tensions between security and financial logics remain, the ECB seeks to resolve them by developing the infrastructure of the digital euro as a public-private endeavor. Thus, private companies are expected to provide parts of the new financial infrastructure. While money has long been a public-private 'template' (Ingham, 2020, p. 62ff), this has not been the case for the pipes and rails that enable its circulation. As the economists' remarks show, payments are perceived as a market in which private actors compete for a market share, less as an infrastructure provided for public use. While not radically challenging this perception, the digital euro can also be interpreted as a step toward turning payment infrastructure into a public-private template that mirrors the character of money that it helps circulate.

The geopolitization of central banks?

> *'The time to think about how to respond to changing geopolitics is not when fragmentation is upon us, but before.'*
>
> (Lagarde et al., 2023)

As the analysis of the proposed digital euro as a finance/security infrastructure has shown, the ECB increasingly highlights geopolitical security rationales in its decision making. Especially in the case of the digital euro, the nexus of financial technology and geopolitics has been present from the very beginning. Increasingly, high-ranking representatives of the ECB, foremost its president, are more vocal about the implications of geopolitics for a range of policy areas, and they position themselves as geopolitical actors. This is not to say that central banking was apolitical before. On the contrary, scholarship in political economy and economic sociology has foregrounded in numerous ways how the ECB has long functioned as a political actor (Gabor, 2016; Wansleben, 2023; Wullweber, 2024). The debate on the digital euro, however, shows that the ECB increasingly positions itself as such.

The ECB not only links its rhetoric about European autonomy to the communication of the European Commission. An extensive, but independent report by the International Relations Committee work stream that is staffed by the ESCBs – 56 authors from various ECBs – analyze the 'EU's Open Strategic Autonomy from a central banking perspective' (Ioannou et al., 2023). While the report does not officially represent the views of the ECB or the ESCB, its findings are nevertheless noticeable:

> While OSA [Open Strategic Autonomy Agenda] is not a direct goal of the ESCB, it is directly relevant for the economic environment in which it operates. In some cases, it is also directly relevant for the primary mandate of the Eurosystem/ESCB, as well as for some of its key principles, such as economic openness (Article 119 of the Treaty on the Functioning of the European Union, TFEU) and its competences, such as payment systems and financial stability (Article 127 TFEU) (ibid., p. 17).

The explicit link to the mandate of the Eurosystem thus provides legitimacy for central bankers to engage with the agenda of strategic autonomy. The ESCB report provides a comprehensive account of the geopolitical situation and cites a number of think tanks that have published on the matter of international security, such as the Center for New American Security and the European Council on Foreign Relations.

In numerous speeches and interviews, ECB representatives not only describe rising geopolitical tensions, but also sketch out possible responses for the ECB and Europe as a whole. For example, Fabio Panetta, then Member of the Executive Board of the ECB, has spoken on multiple occasions about 'protecting the euro area economy from global shocks' and increasing European resilience (Panetta, 2022b). The main protagonist in this regard is Christine Lagarde, the President of the ECB, who addresses the topic of 'Central banks in a fragmenting world' and the 'new global map' in two speeches (several quotes that introduce sections of this article are taken from them). In presentations and panel discussions, she warns of Europe's vulnerabilities and emphasizes the profound changes occurring in global trade, and depicts 'shifts from dependence to diversification, from efficiency to security, and from globalisation to regionalisation' (Lagarde, 2022, 2023). While these are two highly prominent representatives, reports on a survey conducted among ECB staff indicate unease with these positions, pointing to the technocratic character of the central bank (Arnold, 2024).

Recent scholarship has shown that central banks increasingly take positions that sit uneasily with the self-perception of the community of central banking that likes to present itself as politically independent and technocratic. As Quaglia and Verdun (2023, p. 3) argue, central banks' role in financial sanctioning against the Central Bank of Russia's reserves has furthered their role in 'monetary and financial warfare'. For the ECB in particular, the situation has led to a 'rebalancing of the stated objectives of the ECB, which has focused less firmly on "price stability" (primary objective) and has favored a broader set of other objectives, including European integration and geopolitical goals.' Quaglia and Verdun (2023) find this development puzzling, as it could 'drag' the central bank into the realm of geopolitics which could be 'detrimental to its ability to meet its objectives' (price stability) and potentially impact the institution's perceived independence. My analysis of the ECB's position in the development of the digital euro and recent statements by some of its most prominent representatives lead to the conclusion that the ECB has not been 'dragged' into geopolitics, but instead positions itself as an actor in its own regard. Future scholarship will need to closely monitor these developments and assess how geopolitical developments impact central banking and the role central banks take on in this regard.

Conclusion

This article foregrounds the digital euro as a finance/security infrastructure in which European security ambitions manifest in a financial technology. The development of the financial infrastructure is conceptualized as a materialization of (in)security co-produced by discursive and material practices. European security rationales have led to greater determination to proceed with the digital euro and thus explicitly link geopolitical concerns with financial technology.

The development and planning of CBDCs involve several core themes of IPE, not to speak of their future issuance. Already in the phase of planning and deliberation, financial relations between citizens, financial institutions and the (supranational) state are re-negotiated. Seemingly technical questions of connectivity and interoperability are deeply political as they define the quality and character of these relations. Further attention needs to be directed to questions of data sharing and privacy in the evolving governance of these technologies. On the international level, several initiatives and pilots have been initiated which have the potential to redesign the international financial architecture (Bank for International Settlements [BIS], 2023).

The case of the digital euro also shows how financial and security rationales are entangled in the planning of financial infrastructure, and how they collide. While in the past, financial rationalities have been driving the development of new technologies, the plans for the digital euro indicate that this dominance is contested. The ECB and other European institutions mobilize ominous visions of the future and depict the new digital currency as part of European security efforts. Despite the challenges ahead, the ECB and the national central banks of the Eurosystem are committed to developing the digital euro. While it is still open whether the new CBDC will be a success, the fact that the ECB plans to provide a European infrastructure for European payments is in itself a practice of security. The digital euro is furthered and driven by European security rationales and at the same time advances them by contributing to the agenda of resilience and autonomy.

While the development of a new European financial infrastructure is the most important security implication of the digital euro, the provision of digital public money is its most important financial implication. The digital euro as a retail CBDC would allow individual citizens to hold public money in a non-cash form. Introducing public money in this way, however, brings potential challenges to banks and other financial actors that perceive their position within the established financial architecture as threatened. The case thus shows that financial and security mechanisms are not necessarily mutually reinforcing, but that security logics may challenge financial ones and vice versa.

The commitment of the ECB and the central banks of the Eurosystem to further pursue and develop the digital euro can be seen as a signal that they want to strengthen their role as public institutions that aim to protect European interests amid growing geopolitical tensions. Though the role of these central banks over the past 15 years has primarily been to manage financial and economic crises, these steps toward a digital euro indicate a geopolitization of central banking. While it is yet to be decided how the current geopolitical security claims are hardwired into the financial infrastructures that CBDCs present, their development has already led central bankers to exert themselves more explicitly than before as geopolitical actors in their own regard.

Notes

1. https://www.epicompany.eu/https://www.epicompany.eu/
2. This model applies if the provider only intends to provide a reduced front-end scope (no wallet service). Otherwise, these services would also be provided by payment providers.

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