

# *The Motives for Issuing Central Bank Digital Currency and the Challenges of Introduction Thereof*

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## SUMMARY

The idea of a central bank digital currency arose ten years ago for the first time, but by now it has become one of the most frequently discussed topics in the field of finances. Currently, some 100 central banks are researching and investigating the concept of a central bank digital currency (CBDC) and its implementation options.<sup>1</sup> Over half of these central banks have reached the development stage, and some are already conducting on-site experiments. However, the intense interest and the efforts made have not yet led to an increasing number of implementations, since so far only the Bahamas (Sand Dollar), the Member Countries of the Eastern Caribbean Currency Union (DCash) and Nigeria (eNaira) have introduced a CBDC. The other countries are currently still in one of the preparatory stages. The article briefly reviews the history of money digitalisation, and describes the various motives for issuing a CBDC, as well as the variety of challenges faced in the process of introducing a CBDC. It also presents the preparations taken so far for the introduction of the digital Euro, as well as Sweden's e-krona. Finally, it summarises the authors' views on the strategy Hungary should follow regarding a CBDC.

KEYWORDS: central bank digital currency, CBDC, digital euro

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## THE DIGITISATION OF MONEY AS A PRECURSOR TO DIGITAL CENTRAL BANK MONEY

The digitalisation of money already started in the 19<sup>th</sup> century, but it only really took off with the creation of the World Wide Web in 1989. The revolutionary change was brought about by the almost simultaneous occurrence of three developments:

① the emergence of mobile telephony and its third generation (3G), which offered higher data transmission speeds and enabled ubiquitous Internet access without fixed abode;

② the market introduction of the Internet-capable iPhone 3G smartphone, which had greatly expanded the utilisation opportunities of mobile phones; and

③ the emergence of a digital currency – the bitcoin – in 2008 which is not supervised by any monetary authority and whose payments are recorded in a public, decentralised (blockchain-based) ledger.

Together, these three factors have created the framework for payments to be initiated and processed at any time, without being tied to a specific location, without the need for intermediaries, through direct and peer-to-peer connections between endpoints. This has led to the development of a range of innovative financial services for payments, payment infrastructure and security.

Progress in the European Union was boosted by the adoption of Directive 2007/64/EC on payment services in the internal market (aka PSD1), which created the Single Euro Payments Area (SEPA) and opened the way for non-bank payment service providers.

The new Payment Services Directive on payment services in the internal market (aka PSD2)<sup>1</sup>, adopted in 2015, opened the way for further important changes. For example, it allowed the introduction of new account

information services and required two-step identification for enhanced security. Curfew restrictions imposed due to the coronavirus pandemic have caused a sharp change in payment patterns (BIS-CPMI, 2021). Due to the risk of infection, there has been a sharp decline in the use of face-to-face payment methods, such as cash payments, and a sharp increase in the number and value of online card payments.

But it is not only the rapid rise of digital payments that has led central banks to consider issuing their own digital currency. The emergence of digital currencies – the so-called ‘cryptocurrencies’ – to replace cash has also been a major challenge. The creation of cryptocurrencies was inspired by the global financial crisis, which caused loss of confidence in central banks and their issuance of *fiat* money, as well as the possibility of rapid electronic transactions. The first cryptocurrency – the bitcoin – was seen by many as a decentralised alternative to central banks. ‘Cryptocurrencies’ created in abundance combine cryptographic technologies with distributed ledger using blockchains to enable decentralised peer-to-peer (P2P) payments without intermediaries. Yet, cryptocurrencies have not spread as a means of payment in developed countries because, as in the absence of intrinsic value, national attachment and legal privilege (e.g., mandatory acceptance), cryptocurrencies show strong price volatility. In addition, blockchain payments have proven to be slow and energy-intensive (University of Cambridge, 2022).

The high volatility of cryptocurrency exchange rates is being addressed by the introduction of a new type of cryptocurrency, the global stablecoin. The stablecoin utilises distributed ledger technology but borrows the price stability of *fiat* currencies by linking their value to a key currency or a basket of financial assets. Seven of the ten most common stablecoins are backed by *fiat* money,

mainly the US dollar; the others are backed by algorithmic programming to oppress exchange rate fluctuations. So far, stablecoins have mostly been used to facilitate trading in cryptoassets, but because they are designed to maintain stability of value, they have greater potential for payment or store of value than 'ordinary' cryptocurrencies. However, it is reasonable for experts to point out that cryptocurrencies do not have all the basic functions of money and are therefore not suitable for payments, stablecoin being no exception thereto.

Nevertheless, many believe that bitcoin's decentralisation could soon make it the most widely accepted currency after the USD. And indeed, despite several major crashes, many people have not completely turned their backs on cryptocurrencies. The demand of buyers is peculiarly bifurcated: according to the surveys of the European Central Bank (ECB), the ownership of cryptocurrencies is paradoxically concentrated among the highest and lowest income households (ECB, 2021).

Although cryptocurrencies have now reached a significant capitalisation, they pose little risk to global financial stability, even despite their large price drops. This is because banks' direct exposure to cryptocurrencies has so far remained limited: only a few internationally active banks reported cryptocurrency exposure, but at just 0.02% of their risk-weighted assets (RWA), according to supervisory data at the end of 2020. However, given the interest of their customers, several banks and financial services providers are considering, and some have already started, to take a more active role in providing cryptocurrency services. Analysts fear that a further increase in the mass of cryptocurrencies could now infect the mainstream markets when it comes to panic selling. They recall that the collapse of the US secondary mortgage market in 2007–2008 caused a global financial crisis through leveraging.

An additional risk is that criminals and tax evaders attempt to benefit from the anonymity of cryptocurrencies to move large sums of money and layering it to disguise the origins. It is estimated that a quarter of all registered crypto transactions were linked to crime.

On the one hand, the popularity, proliferation and potential risk of cryptocurrencies have led central banks to call for regulating and supervising cryptocurrency trade. On the other hand, they have started to assess the benefits and risks of issuing their own digital money. They had good reason to do so: with the gradual decline in the use of cash in the digital revolution and the rise of cryptocurrencies, the rise of financial solutions that bypass the banking system could lead to the *de facto* loss of one of the central banks' monopolies, that is, the monopoly on issuing money. In order to continue to fulfil their core tasks – preserving the value of the currency, providing the money needed for the smooth functioning of the financial and payments system, playing their role in preserving financial stability and acting as lender of last resort in crisis situations – central banks need to adapt to the changed environment. This will also require a new appearance of central bank money, adapted to the digital age. One of the most obvious ways to do this is to issue CBDCs.

So far, we have outlined the two main drivers for the adoption of the CBDC, but there are further important factors motivating many central banks to consider the introduction thereof.

### Access to financial services

Promoting access to financial services – financial inclusion – enables families and businesses to achieve their long-term goals and prepare for the unexpected. G–20 leaders therefore see financial integration as a key issue

for development and economic stability. Since 2010, more than 50 countries have already started to develop and implement a National Financial Inclusion Strategy (NFIS). Digital financial inclusion involves the use of cost-efficient digital tools to reach people who have been excluded or underserved by financial services companies, with affordable financial services that can be provided at sustainable prices by the financial service providers.

*Table 1* shows the differences in financial inclusion between countries. The EU reached already a high degree of financial inclusion, thus the introduction of the CBDC will have only a limited impact on improving access to financial services. The situation is similar in North America and other member countries of the Organization for Economic Cooperation and Development (OECD), where digital services are nationwide used. At the same time, in other countries, there are a large number of people who are unbanked due to the less developed economy and the underdeveloped financial infrastructure in their area. In such countries, digitalisation, including the introduction of the CBDC, can bring a leap forward in development.

### Reducing the fees for international remittances

Remittance means money sent by migrants to their relatives in their country of origin. In 2021, remittances worldwide amounted to USD 553 billion. Half of this was directed to the top five destination countries: India, Mexico, China, the Philippines and Egypt.

According to a World Bank survey, in mid-2021, the cost of cross-border transfers equalled 6.30 percent of the amount transferred, or 4.99 percent for digital transfers. This cost ratio is a heavy burden for both the senders and the beneficiaries. Reducing high transfer costs

would boost economic growth in destination countries and increase global trade (World Bank, 2021).

Most central banks consider that cross-border CBDC arrangements would be suitable for reducing the fee and time of transfers. As these arrangements would involve central banks and commercial banks/payment service providers from two or more countries, cross-border CBDC systems would allow for immediate settlement, competitive exchange rates and could also take advantage of existing domestic payment channels. In addition, the use of CBDC, as a claim on the central bank, would eliminate credit risk between financial institutions involved in cross-border transactions, which would further reduce transaction fees. Therefore, one of the development objectives of central banks is to integrate remittance systems with domestic payment systems with help of CBDC.

### Preventing Big Tech companies from gaining excessive market influence

A further motivation is the concern of central banks that some large foreign service providers (e.g., Visa, Alipay) may gain excessive influence in national payment markets. The rapid and widespread expansion of Big Tech firms in the area of financial services and their interconnection with financial services firms creates new channels for systemic risk. In such partnerships, Big Tech companies are not yet financial institutions, but they are no longer exclusively technology service providers, either. In addition, they are seriously considering offering financial services on their own, as they have sufficient capital and client base to do so.

Such a direction of development raises a number of policy issues, as the current regulation and supervision of financial services provided by Big Tech firms is

Table 1

**BANKING INTENSITY IN SOME COUNTRIES**

Country	Population (million people)	The rate of unbanked population (%)	The rate of cash transactions (%)	The rate of card transactions (%)	The number of ATMs per 100.000 adults	Internet penetration (%)
Morocco	36.9	71	41	27	28.6	62
Vietnam	97.3	69	26	35	25.9	66
Egypt	102.3	67	55	27	20.1	45
Philippines	109.6	66	37	22	29.0	60
Mexico	128.9	63	21	44	61.5	66
Nigeria	206.1	60	24	27	16.9	70
Indonesia	273.5	51	13	34	53.3	55
Argentina	45.2	51	18	45	60.9	76
Kenya	53.8	44	40	25	7.7	83
<b>Romania</b>	19.2	42	78	19	64.4	64
Ukraine	43.7	37	60	28	96.3	57
South-Africa	59.3	31	11	43	65.3	56
Türkiye	84.3	31	8	71	84.0	65
Brazil	212.6	30	18	62	101.7	67
<b>Bulgaria</b>	7.0	28	63	26	94.3	63
Saudi Arabia	34.8	28	34	35	73.3	82
<b>Hungary</b>	9.7	25	45	44	61.0	77
Russia	145.9	24	17	37	165.5	76
India	1 380.0	20	17	32	21.0	34
China	1 439.3	20	6	22	95.6	54
<b>Czech Republic</b>	10.7	19	44	22	58.0	88
<b>Lithuania</b>	2.7	17	12	24	38.6	78
<b>Slovakia</b>	5.5	16	41	17	61.8	82
<b>Greece</b>	10.4	15	29	54	63.4	70
<b>Poland</b>	37.9	13	12	25	70.6	76
<b>Latvia</b>	1.9	7	12	49	58.3	81
USA	331.0	7	4	59	N/A	89
<b>Spain</b>	46.8	6	11	49	106.3	85
<b>France</b>	65.3	6	5	55	98.3	90

Table 1 continued

Country	Population (million people)	The rate of unbanked population (%)	The rate of cash transactions (%)	The rate of card transactions (%)	The number of ATMs per 100.000 adults	Internet penetration (%)
Italy	60.5	6	5	55	98.3	90
South Korea	51.3	5	2	73	267.0	95
Hong Kong	7.5	5	2	73	53.2	89
United Kingdom	67.9	4	7	56	110.3	95
Estonia	1.3	2	12	21	66.9	88
Austria	9.0	2	4	28	172.0	88
Singapore	5.9	2	4	75	58.8	84
Japan	126.5	2	6	68	124.1	93
Switzerland	8.7	2	2	25	97.2	94
Germany	83.8	1	4	11	119.9	93
Belgium	11.6	1	6	51	81.0	88
Australia	25.5	0	5	53	146.1	88
Canada	37.7	0	3	73	214.1	93
Denmark	5.8	0	3	54	44.8	97
the Netherlands	17.1	0	0	19	41.1	93
Finland	5.5	0	2	23	34.7	96
Sweden	10.1	0	2	46	31.9	96
Norway	5.4	0	3	50	31.6	97

Source: based on Merchant Machine, 10 June 2021

rather fragmented. At the same time, these companies have also shown a strong interest in issuing digital currencies, and they can rely on their large customer base to issue their own stablecoins, so that they can even be in a position to constrain competition in a sub-market. The only way to guard against this threat is through the application of appropriate prudential rules, strict competition supervision and enforcement of strict consumer protection rules, data security and data protection laws. The use of these tools was already urged by the

Financial Stability Board in 2020 (FSB, 2020)<sup>3</sup>. In the meantime, however, the development of crypto markets has accelerated at such a pace that the FSB’s report published in February 2022 (FSB, 2022) already warned that crypto markets could soon reach the point where they pose a threat to global financial stability and called on states to develop the necessary measures.

The FSB’s vision soon became a reality: the collapse of the Terra USD (UST) algorithmic stablecoin and native token LUNA in early

May 2022, due to a 99.9% loss in value, is unprecedented even in the cryptocurrency market. There was a simple reason for the bankruptcy: the main perk of the Terra ecosystem was the 'Anchor' borrowing protocol, launched in July 2020, which promised lenders an annual yield of 19.5%. However, the system operators could not back up the unrealistic promise of returns with real collateral, and there was no authority to prevent irresponsible bids from being published. Fortunately, the collapse did not trigger a general panic and did not drag the rest of the financial markets down with it. This is because crypto markets are currently operating outside the scope of traditional financial markets and the regulation thereof, as a separate ecosystem.

The lack of global rules and reservations about Big Tech companies led to the scrapping of the highly publicised libra (later renamed diem) stablecoin project initiated by Facebook (Murphy & Stacey, 2022). At the same time, the initial interest of the business community in the libra demonstrated to central banks that there would be strong market interest in a digital currency issued with the appropriate background. This is why several central banks intend to prevent the excessive proliferation of stablecoins, which have so far proven to be risky, by issuing CBDCs.

### The rising cost of producing and using traditional cash\*

The direct costs of using traditional cash are well known. On top of that, there are significant indirect costs: e.g., time spent on withdrawing and depositing cash; shortages due to theft or shortages in the cash stock; storage and custody costs. It is therefore not easy to compare the costs of holding and handling cash with the costs of digital payments. And in the absence of a comprehensive cost statement or cost

shifting, the use of cash (even apart from tax evasion) may be preferable to digital payments for the general public and some businesses (Deák et al., 2022).

But the main attraction of using cash is not its presumed cheapness. For centuries, three distinctive features have made banknotes the world's basic currency: universality, anonymity and direct exchangeability. Combining all of these features on digital platforms seemed almost impossible until the distributed ledger – a generalisation of blockchain technology – opened a way to digitise cash in a manner that meets all three of these features simultaneously.

As the costs are revealed, it is becoming increasingly clear that the use of digital money is socially more beneficial than that of traditional central bank money. Experience and surveys suggest, however, that the full migration from traditional banknotes to CBDC will take longer, because beyond the costs, familiarity and trust also play a major role. The coexistence of two types of central bank money implies, however, that the CBDC should be designed in a way to be as resembling as possible to conventional banknotes.

### Preserving 'monetary strategic autonomy'

Monetary strategic autonomy refers to the central bank's ability to pursue national interests and implement its preferred monetary policy without becoming dependent on financial institutions or infrastructures of third countries. For the EU and the ECB, the main instrument of strategic autonomy is to enhance the international role of the euro, as set out in the conclusions of the Council of the EU adopted on 5 April 2022 (Council of the EU, 2022). Besides deepening economic and monetary union, this can be achieved by promoting the use of the euro worldwide. But

the success of these efforts will also depend on whether the euro will be able to remain at the forefront of digitalisation as well, in the digital revolution in finances.

As can be seen from the above, there are five different factors that motivate the issuance of CBDCs. However, the importance attached to each of these factors have a different priority for central banks in developed and emerging countries. In developed countries, the introduction of retail CBDCs is driven mainly by the desire to increase the efficiency of domestic payments and payment security, as well as efforts to strengthen financial stability. In the distribution of CBDCs, developed countries typically wish to rely on the established network of banks and payment service providers, and therefore also want to limit in some way the direct access of the public to CBDCs.

The efficiency of domestic payments, the security of payments and the preservation of financial stability are important drivers for the preparatory work on retail CBDC also in emerging economies. However, in these countries, the commitment to introduce CBDC is mainly driven by financial inclusion considerations, where due to the lower development of the network of financial service providers the better service to the population becomes the most important aspect.

## IMPLEMENTATION CHALLENGES

As the overview so far has shown, the digitisation of money has reached now a crossroad and the policy and regulatory decisions being taken now will have an impact on the future monetary and payments environment. When it comes to the introduction of CBDC, valid answers must be given to a number of fundamental technical, legal and financial questions.

## Interoperability

Creating interoperability and interconnectivity between the different CBDCs under development will be critical to exploit their potential while preserving strategic autonomy. Interoperability needs to be achieved on four levels: business, technical, regulatory, and the ability to interoperate with legacy and peer systems. For the time being, there is a risk that the global CBDC ecosystem becomes fragmented, as many central banks are developing their own digital currencies in parallel, based on different technologies, standards and protocols. Fragmentation can make it difficult to use individual national CBDCs for cross-border payments (WEF, 2021). Intensive consultations are therefore ongoing within the BIS on national projects and the possibilities of linking them. SWIFT intends to play an active role in creating interoperability between countries, also to preserve its key role in the conduct of international financial transactions (Zhuang, 2022; BIS IH, 2021a).

## Cybersecurity

The widespread use of digital services and reliance on technological advances make financial market infrastructures more efficient and faster, but also more vulnerable to cyberattacks. It is estimated that cyber risk tripled between 2013 and 2020 (Panetta, 2022). In developed economies, the financial sector is among the most endangered ones at the moment, both because it is perhaps the most digitised and because criminals are looking to make money, and the most obvious place to attack is the financial sector.

Systemic cyber risk does not yet have a universally accepted definition; most definitions proposed so far are rather vague. This is partly because the concept of systemic



risk itself has not yet crystallised. The confusion is compounded by the fact that there are also significant differences of opinion between the professionals affected the system and those who operate it. However, there is full agreement that cybercrime needs to be tackled effectively and decisively, otherwise the financial sector as a whole and the users of its services could suffer huge losses, thus the confidence in the financial system would be undermined. In terms of regulation, the EU is in a favourable position due to the expected entry into force of the Directive on measures to ensure a high level of cybersecurity (NIS 2) and the DORA Regulation on digital operational resilience in the financial sector.

Only CBDCs with an ecosystem that provides at least the same level of security as traditional banknotes should be introduced, and only when the appropriate level of cyber protection is effectively in place.

### Eliminating technical vulnerability

The CBDC used by the general public must also have an offline payment function to allow CBDC transactions to be carried out in an environment where the Internet is not available for some reason. The offline function would allow, for example, in areas with limited IT connectivity, to pay aid in CBDC. In the offline system, transactions work in a similar way to cash, i.e., the settlement is in real time, tokens move between cards and mobile phones, and there is no need for a back-office settlement system. The central banks also consider offline functionality important, on the basis that the CBDC solution to be introduced must offer at least the same usability as traditional banknotes in order to be accepted by the public. However, offline functionality, e.g., due to possible multiple spending or fake token creation, is not yet fully

solved, although the Chinese e-CNY already offers some offline functionality<sup>4</sup> (Thales Group, 2021).

### Protection of personal data

Given that digital signals can be traced even when encrypted, and that the recording of individuals' payment habits in a database allows for the creation of a personal behavioural profile, it is particularly important that the CBDC ecosystem to be put in place exclude the collection and storage of personal data without the consent of customers.

This is confirmed by the results of the public consultation launched by the ECB on the digital euro (ECB – Eurosystem, 2021). For respondents, the protection of personal data was the most important issue (43%), well ahead of, for example, security (18%). This order of preference was observed regardless of respondents' place of residence, socio-demographic characteristics or status (nationality, education, etc.). The majority of respondents were in favour of 'a digital euro that can be used offline, based on confidentiality and privacy'.

### Effective prevention of money laundering and terrorist financing

Many criminals attempt to use cryptocurrencies to 'whitewash' their illegally acquired gains or to finance terrorist activities. Respondents to the ECB survey mentioned in the previous point, recognising the risk thereof, agreed that the digital euro should also have features that would allow, for example, the prevention of these illicit activities.

However, it is difficult to find a technical solution that both guarantees the confidentiality of personal data and allows

the tracing of payments related to offences and thus the identification of criminals. This dual requirement can usually only be met with appropriate legal guarantees.

### The legal framework for issuance

In most countries, there is a fundamental law on national currency as legal tender. Given that the legal definition of a national currency was created at a time when digital money was not even a utopian concept, the question to be examined is whether the issuance of the CBDC can be considered as a banknote issue and whether it is legal tender under the existing legislation. A CBDC is generally defined as a claim on the issuing central bank, consisting of a series of electronic signals, which is accessible to anyone. From this point of view, there is therefore no obstacle in principle to the CBDC becoming legal tender. However, it is necessary to consider whether the central bank can use the CBDCs it issues as a monetary policy instrument under its mandate.<sup>5</sup>

Central bank laws generally do not allow the opening of direct central bank accounts for individuals or businesses. In a two-tier banking system, the central bank would therefore offer accounts or digital wallets to the private sector to facilitate the management of CBDC holdings and payments for households and businesses. Potential intermediaries could include commercial banks and regulated non-bank financial service providers.

The issuance of CBDCs requires a legal framework that gives central banks a clear mandate to issue them.

The different versions of the digital euro (d€) envisaged by the ECB will also be assessed for legal compliance in the ongoing consultations. It appears that the retail d€ cannot be introduced under the current ECB

monetary mandate, as the majority legal opinion is that the introduction of retail d€ may already constitute economic policy. The function of such CBDCs goes beyond the achievement of monetary objectives, as they have a direct impact on socio-economic conditions and their impact on the banking sector could undermine the efficient allocation of resources. The introduction of a general purpose CBDC is only possible by amending the ECB's current mandate, which can only be done through a lengthy procedure.

Sweden's e-krona is at a more advanced stage of development than the digital euro, having already passed two years of testing. The possibilities and conditions for introducing the Swedish CBDC are currently being examined by the Swedish Parliament<sup>6</sup> (Sveriges Riksbank, 2022). The Swedish Central Bank has been working for some time to clarify the legal issues surrounding the introduction and is of course cooperating with the formal inquiry launched by the Parliament.

### SOME PRACTICAL IMPLEMENTATION ISSUES, WITH A SPECIAL FOCUS ON THE EURO ZONE

The decision to issue a digital currency by a central bank is a far-reaching matter that will have a significant impact not only on the financial sector, but also on the whole economy and society. In view of this, a comprehensive and thorough preliminary assessment of the costs and political and economic benefits of implementation is needed, in order to gain society's support.

In developed countries, including the European Union and the euro zone as a whole, the current monetary system already serves society and economy well. In the EU, retail payments are becoming faster and cheaper thanks to the digitalisation that has

been achieved so far. In terms of efficiency, the need for a new form of public funds – the digital euro – is therefore not obvious, nor is its introduction urgent from the point of view of financial inclusion. It is true that financial inclusion is far from complete in some EU countries, but there are no theoretical and practical obstacles to its achievement that can be removed by the introduction of CBDC alone.

Consequently, the ECB is driven by long-term strategic considerations for the introduction of the digital euro. All in all, the introduction of the digital euro (i) could be a useful tool to strengthen the euro's position as a global key currency; (ii) may be necessary to ensure that the use of the euro is not crowded out by non-euro-denominated digital currencies; (iii) could reduce the role of non-EU providers in the European payments sector; and (iv) would make a substantial contribution to further reducing cash flows.

The BIS surveys show that nearly three quarters of central banks in advanced market economies that are about to introduce some form of CBDC are considering implementing a two-tier model. Activities in which many central banks see a potential role for the private sector include servicing customers: e.g. implementing 'Know Your Customer' (KYC) processes and anti-money laundering/combating the financing of terrorism (AML/CFT). Three quarters of the central banks working on the development of retail CBDCs<sup>7</sup> are also exploring the possibility of creating interoperability with existing payment system(s), as this could facilitate the adoption of CBDCs, allow the coexistence of central bank and commercial bank digital money and enable banks and other payment service providers to fulfil all their customers' payment orders without direct connection to multiple systems. The combination of two tiers and

interoperability would reduce the cost of implementing CBDC and relieve central banks of the burden of maintaining a retail account.

Central banks, including the ECB, have to cope with the 'adoption and acceptance challenge', i.e., they have to find a middle ground between two extremes: on the one hand, they have to avoid introducing a 'dumbed down' version of CBDCs, as this could lead to a lack of demand for such CBDCs by consumers and businesses. On the other hand, it is also important not to set overly ambitious targets, as this could lead to the crowding out of private payment solutions and even the collapse of the banking sector.

The banks, with the involvement of the central bank, finance their loans mainly from deposits with them. A widely available CBDC could serve as a close – or, in the case of interest-bearing CBDC, almost perfect – substitute for commercial bank money. The substitution effect may reduce the aggregate amount of deposits in the banking system, which in turn may reduce borrowing opportunities or increase the cost of credit for households and businesses. Likewise, the introduction of an interest-bearing CBDC may cause an outflow of deposits to the central bank or reduce savings in, for example, money market mutual fund shares or treasury bills. Moving away from these low-risk assets may also reduce the availability of credit or increase the cost thereof. In order to mitigate these risks, the ECB is considering the introduction of a quantitative limit (e.g., EUR 3,000 per person) and less attractive conditions than for normal bank deposits, that is, CBDCs would mainly be introduced as a cash substitute for the monthly payment function only.

To ensure that the digital euro is not just a simple imitation of euro banknotes, it must

be possible for the d€ to support additional functions, such as smart contracts. How the conditionality at the heart of smart contracts and programmability can interact with CBDC as legal tender and the unconditional acceptance of payments needs to be carefully examined (EBF, 2021b).

It should be considered an important question to decide which actors – the public, businesses, banks and payment service providers, the central bank – and to what extent should be burdened with the costs of the use of the d€ and the purchase of the instruments, as these are essential issues for the acceptance and practical implementation of the d€ (EBF, 2021a).

A number of other specific questions need to be clearly answered when discussing the international use of d€. For example: Should € be used to pay abroad? Should a foreign CBDC be used for local payments? Should d€ be available to non-residents, or should all international payments using d€ necessarily include a conversion? Can the conversion from one CBDC to another be done directly and, if so, will there be a conversion cost and/or exchange loss?

In view of the social and economic importance and complexity of the introduction of the digital euro, both the ECB and the European Commission (European Commission, 2022) have organised a public consultation on the digital euro. The conclusions of these consultations could usefully be complemented by the reports published by the Swedish Central Bank on the e-krona tests (Sveriges Riksbank, 2022).

Based on the results of the consultations and the technical discussions, it is expected that the ECB will publish a detailed proposal for the introduction of the digital euro in consultation with the Commission in 2023, followed by the usual debate in the European Parliament and the European Council.

## WHAT TO DO IN HUNGARY?

The CBDC quickly attracted the attention of the National Bank of Hungary (NBH), and its leaders have for years discussed the opportunities offered by the CBDC in a number of studies (Banai & Nagy (eds.), 2021; Bartha, 2017; Fáykiss et al., (2021); Szabó & Kollarik, 2017). The NBH is among the central banks that are seriously considering the possibility of introducing CBDC. However, these investigations are somewhat behind the ongoing work in the ECB and the Swedish central bank. However, this is not a substantial delay, as the results of both projects can be put to good use for domestic implementation.

Given that Hungary has the same commitment to the euro as Sweden, it seems appropriate to observe the introduction of the Swedish e-krona. In the meantime, of course, Hungary must also keep an eye on how the preparations for the d€ are progressing, given the dominant role of the euro in Hungary's external economic relations. Therefore, if Hungary intends to introduce the CBDC before joining the euro area, it is essential that the domestic CBDC is compatible and interoperable with the d€ in all respects.

To make the domestic introduction of CBDC worthwhile for all stakeholders and in many ways, a one-off major effort would be needed to ensure that social groups that have not yet adopted digital payments quickly gain access to and desire to use digital financial services. As the cell coverage in Hungary can be considered nearly complete and new smartphones suitable for banking purposes can be purchased in a subscription package for between HUF 10–20k (approx. EUR 25 to 50), the most important accelerator of progress would be for the government to promote financial inclusion through a targeted campaign organised within the Digital Success Programme<sup>8</sup>. This campaign could also help

achieve the government’s target of enabling everyone to manage their official business, including financial services, using a mobile phone by 2025. The realisation thereof is

also helped by the fact that all retail shops are now electronically connected to the National Tax and Customs Administration and can therefore accept electronic payments.

## NOTES

<sup>1</sup> This article deals only with the CBDC that replaces banknotes, not with the central bank account money („wholesale” CBDC) used only in interbank circulation.

<sup>2</sup> One of the main objectives of the so-called second Payment Services Directive no. 2015/2366/EU is to create a more transparent situation for service providers and users in the sector, by standardising the rights and obligations for certain payment services and increasing security. Another key objective is to increase competition between old and new players in national payments markets, while ensuring a level playing field. The new regulation has paved the way for the so-called Open Banking by allowing external payment service providers to enter the payments ecosystem with new services.

<sup>3</sup> The FSB has paid particular attention to the launch of the Global Stable Coins (GSC). While their use can bring positive results for the global financial and economic system, it also poses serious challenges for supervisors and financial stability. The FSB has therefore made 10 policy recommendations on how to design the regulation, supervision and oversight of the GSC and manage its impact on financial stability.

<sup>4</sup> The offline CBDC payment is an electronic transaction that credits a digital claim between two participating devices without the need to connect to a network to complete it.

<sup>5</sup> In the digital age, the CBDC seems to be the most appropriate instrument to keep central bank

money as the anchor of the payment system, while maintaining confidence in both private and public funds, and, as the sole unit of account, performing one of the main social and economic functions of money. The issuance of the CBDC is strategically important for preserving monetary autonomy because their very existence provides a safe reserve solution in case of geopolitical tensions. In addition, CBDC can be a catalyst for new innovations, as it technically allows payment service providers to play a role in the development of new types of services.

<sup>6</sup> The legal challenges related to the e-krona can only be solved by setting policy objectives relating to the e-krona. The Swedish central bank will therefore have to wait for the legislator’s decision before deciding on the introduction of e-krona. However, the Swedish Riksdag (Parliament) has so far not set a deadline for defining the political goals to be achieved by the introduction of the e-krona.

<sup>7</sup> The current status of the implementation of CBDC in each country is continuously monitored on the CBDCTracker website (<https://cbdctracker.org/>). This website also provides regularly updated country-specific information.

<sup>8</sup> Hungary’s Digital National Development Programme is implemented by the Government Agency for Information Technology Development on behalf of the Government, acting as an umbrella organization, bringing together almost all domestic digitisation processes on a single platform for efficient development and operation.

## REFERENCES

- BANAI, Á., NAGY, B. (szerk.) (2021). Egy új kor hajnalán – Pénz a XXI. században, a Magyar Nemzeti Bank tanulmánykötete a digitális jegybankpénzről [At the Dawn of a New Era - Money in the 21<sup>st</sup> Century, a Book of Studies on Digital Central Bank Money by the Magyar Nemzeti Bank]
- BARTHA, L. (2017). Digitális pénzek [Digital Money], konferencia előadás [conference presentation], Budapest, Szervező [Organizer]: University of Corvinus, MNB Department 6 November 2017.
- DEÁK V., KAJDI L., NEMECSKÓ, I., VÉGSŐ, T. (2022). Az idő pénz – Fizetési módok társadalmi költségének felmérése [Time is money - Assessing the Social Cost of Payment Methods], *Hitelintézeti Szemle*, 2., pp. 5–36, <https://doi.org/10.25201/HSZ.21.2.5>
- FÁYKISS, P., HORVÁTH, B.I., HORVÁTH, G., KISS-MIHÁLY, N., NYIKES, Á., SZOMBATI, A. (2021). A pénz átalakulása a digitális korban [The Transformation of Money in the Digital Age], *Polgári Szemle*, pp. 4–6, <https://doi.org/10.24307/psz.2021.1206>
- MURPHY, H., STACEY, K. (2022). *Facebook Libra: the inside story of how the company's cryptocurrency dream died*, Financial Times, 10 March. <https://www.ft.com/content/a88fb591-72d5-4b6b-bb5d-223adfb893f3>
- PANETTA, F. (2022). *Adapting to the fast-moving cyber threat landscape* – Introductory remarks at the seventh meeting of the Euro Cyber Resilience Board for pan-European Financial Infrastructures
- SZABÓ, G., KOLLARIK, A. (2017). *Az MNB elmagyarázza, mi is az a digitális jegybankpénz [MNB Explains what Digital Central Bank Money is]*, portfolio.hu, 5 November 2017.
- ZHUANG, J. (2022). *Facilitating Cross-Border Payments*, 21 May, <https://cryptopotato.com/swift-experiments-with-cbdc-interoperability-for-facilitating-cross-border-payments/>

## ONLINE REFERENCES

BIS-CPMI (2021). Covid-19 accelerated the digitalisation of payments, 9 December, [https://www.bis.org/statistics/payment\\_stats/commentary2112.htm](https://www.bis.org/statistics/payment_stats/commentary2112.htm)

BIS CPSS (2012). Innovations in retail payments, 15 May, [https://www.hba.gr/UplDocs/Innovations%20in%20retail%20payments\\_cpss102.pdf](https://www.hba.gr/UplDocs/Innovations%20in%20retail%20payments_cpss102.pdf)

BIS IH (2021a). mBridge – Building a multi CBDC platform for international payments, 3 November, [https://www.bis.org/publ/brochure\\_mbridge.pdf](https://www.bis.org/publ/brochure_mbridge.pdf)

BIS IH (2021b). Project Dunbar: International settlements using multi-CBDCs, 8 November, <https://www.bis.org/about/bisih/topics/cbdc/dunbar.htm>

Council of the EU (2022). Press release, 5 Apr. <https://www.consilium.europa.eu/en/press/press-releases/2022/04/05/council-adopts-conclusions-on-strategic-autonomy-of-the-european-economic-and-financial-sector/>

EBF (2021a). Contribution to the ongoing debate on a Central Bank Digital Euro #3: How does a digital euro fit the payments landscape? 24 November, <https://www.ebf.eu/priorities/innovation-cybersecurity/digital-euro/>

EBF (2021b). Position Paper Central Bank Digital Euro – strategic issues – final clean, EBF\_043862, 2 February

ECB (2021). Consumer Expectations Survey: an overview and first evaluation, Occasional Paper No 287

ECB – Eurosystem (2021). Eurosystem report on the public consultation on a digital euro, 13 Apr. [https://www.ecb.europa.eu/pub/pdf/other/Eurosystem\\_report\\_on\\_the\\_public\\_consultation\\_on\\_a\\_digital\\_euro-539fa8cd8d.en.pdf](https://www.ecb.europa.eu/pub/pdf/other/Eurosystem_report_on_the_public_consultation_on_a_digital_euro-539fa8cd8d.en.pdf)

European Commission (2022). Targeted consultation on a digital euro, 5 Apr. [https://ec.europa.eu/info/consultations/finance-2022-digital-euro\\_en](https://ec.europa.eu/info/consultations/finance-2022-digital-euro_en)

FSB (2020). Regulation, Supervision and Oversight of “Global Stablecoin” Arrangements, 13 October

FSB (2022). Assessment of Risks to Financial Stability from Crypto-assets, <https://g20.org/wp-content/uploads/2022/02/FSB-Report-on->

[Assessment-of-Risks-to-Financial-Stability-from-Crypto-assets\\_.pdf](#)

Sveriges Riksbank (2022). E-krona report – E-krona pilot Phase 2, 6 April, <https://www.riksbank.se/globalassets/media/rapporter/e-krona/2022/e-krona-pilot-phase-2.pdf>

Thales Group (2021). Considerations on offline Central Bank Digital Currency payments – White paper, 13 December

University of Cambridge (2022). Cambridge Bitcoin Electricity Consumption Index, <https://ccaf.io/cbeci/index/comparisons>

The World Economic Forum (WEF) Digital Currency Governance Consortium (2021). Defining Interoperability, White Paper, 18 November

World Bank (2021): Remittance Prices Worldwide, Remittance Prices Worldwide – Issue 38