



Monetary sovereignty and crypto-assets: a central bank digital currency

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1 Introduction

In recent years, crypto-assets, tokens, stablecoins and central bank digital currencies have dominated the economic and financial spheres, as well as public debate, but there is often some confusion over what they actually mean.

So let's get one thing straight before we start: central bank digital currency is neither a crypto-asset nor a stablecoin. It's a form of money. The confusion arises because all three rely on the same underlying technology: distributed ledger technology or DLT, the best-known form of which is blockchain.

But beyond the technical jargon, there's a much bigger issue at stake in deploying a central bank digital currency: protecting European monetary sovereignty in a world increasingly dominated by dollar-backed stablecoins.

To discuss this, I am joined by Marie-Aline Vives, Head of the New Technologies, Innovation and Market Infrastructure Division at the Banque de France, and David Zhang, a digital currency research analyst in the same division.

Thank you both for joining us, and welcome to Dialogue & Co.

2 Key concepts of tokenised finance

2.1 DLT/blockchain: a hosting and exchange platform

LUCILE RIVES

Before we look at the differences between crypto-assets, stablecoins and central bank digital currencies – which we can call CBDC from now on – I'd like to start with what they have in common: they all rely on distributed ledger technology or DLT. Marie-Aline Vives, can you explain what DLT is?

MARIE-ALINE VIVES

Of course. As you said, DLT stands for distributed ledger technology. It's a ledger – a sort of huge register where information is recorded, entries are made. What makes this one different is that it's shared across a network. All network participants can access it. They can read it and add information to it using digital objects or pieces of computer code, which are also known as tokens.

2.2 Tokens: digital representations of assets

LUCILE RIVES

So DLT is a sort of infrastructure, a ledger or large database whose contents are replicated and shared among authorised participants. The database is used to store objects: the tokens you just mentioned, which are representations of assets. Can you tell us a bit more about them?

MARIE-ALINE VIVES

Yes. A token is a representation. It can represent a physical object. We're talking about DLT in finance, so in this case they represent securities or money.

Strictly speaking, you can have tokens without DLT. DLT is simply the technology used to record and share them. When you combine the two you get what's known as tokenisation: sharing objects on a ledger, which can be huge, so they can be accessed and modified by all network participants.

Another thing to bear in mind is that, when we talk about tokens, we're referring not just to these assets but also to something known as smart contracts. A smart contract is a piece of computer code, in other words a digital object that can perform actions on the ledger. You can use a smart contract to change the status of a token, for example.

Let's say I have a token representing a currency, which is recorded on my ledger and therefore belongs to me. I can use a smart contract to change the entry so the token now belongs to David Zhang.

LUCILE RIVES

Because the ledger isn't just used to store objects, it's also used to exchange them. You talked about representation earlier. What does a token actually look like in the digital world?

MARIE-ALINE VIVES

I think a supermarket trolley token or a casino chip is probably a good way to visualise it. Why do we use tokens? Because they represent something: they're objects in one universe that represent objects in another universe. They transpose them, if you like.

What do they look like? They're just computer code. If you're using the blockchain, what you see when you look at the ledger – because you can see them on the ledger – what you see is a line: an entry, an address, a balance, made up of characters – numbers and letters.

2.3 Tokenised assets

2.3.1 First and second-generation crypto-assets

LUCILE RIVES

So these tokens, these strings of numbers and letters, can represent different things: CBDC, bitcoins or stablecoins. But just because they're represented in the same way and recorded on the same infrastructure, it doesn't mean they're the same thing. Let's take a closer look at the assets themselves. David Zhang, can you remind us what crypto-assets and stablecoins are and why they shouldn't be confused with CBDC?

DAVID ZHANG

Maybe we should start by reminding listeners what money actually is. Money has three functions: it's a store of value, a medium of exchange and a unit of account. Crypto-assets and stablecoins don't fulfil these three functions. At the Banque de France, we usually distinguish between first and second-generation crypto-assets.

First-generation crypto-assets are assets represented in digital form and recorded on a blockchain, which is what we've just described. They're high-risk financial assets because they aren't backed by any reserve assets: they're not linked to the real economy. Their prices can therefore be highly volatile, which means they can't function as a store of value.

LUCILE RIVES

The best-known example is bitcoin.

DAVID ZHANG

Exactly. Bitcoin, which, incidentally, is currently going through a significant price correction.¹

Then there are the other crypto-assets you mentioned: stablecoins. They're what we call second-generation crypto-assets. In this case, the idea is to keep their value stable. They're backed by a basket of assets – currencies like the euro and the dollar, or public and private debt securities – to address the issue of volatility.

But stablecoins aren't entirely risk-free. In times of stress, if the issuer doesn't have enough reserves, or if its reserves aren't of sufficiently high quality, stablecoin holders may be exposed to losses. We've seen a number of stablecoin issuers collapse in recent years.

2.3.2 Central bank digital currency

LUCILE RIVES

That's crypto-assets, then. Now let's talk about central bank digital currency. What is it exactly? Why do we have to specify that it's a central bank currency, rather than simply calling it money?

DAVID ZHANG

To explain the difference, we need to look at the current structure of our monetary system. It's a two-tiered system. One tier consists of public money, issued and guaranteed by central banks, while the other consists of private money, which is issued by commercial banks, primarily through lending, and which serves to finance the economy.

LUCILE RIVES

And in the case of public money, issued by the central bank, there are two forms. The first, and most familiar, is retail money: the coins and banknotes we use every day. The second is wholesale money – which is less well known, mainly because it's not accessible to the general public. Banks and certain financial institutions have access to it through the accounts they hold with the central bank. It's this latter form of money that we're talking about today. When we talk about CBDC, we're referring to a tokenised form of this wholesale public money.

DAVID ZHANG

That's absolutely right. Not everyone can access public money in the same way. It depends on whether it's being used by the public for retail payments, or by banks and other major financial market participants for interbank payments or a large-value payments of, say, a billion euro.

When we talk about CBDC, we're referring to these major financial market participants and banks, and these interbank payments. It's not the same as the money the public uses for everyday payments.

3 Why should we tokenise central bank money? Speed, transparency, programmability and lower costs

LUCILE RIVES

The monetary system is, by nature, highly centralised, especially public money, where there's a single issuer, the central bank, and a network of intermediaries who exchange it. Even so, many participants in the traditional monetary and financial system see DLT and tokenisation as an opportunity. It's almost a paradigm shift, because DLT originates from the crypto sphere and is decentralised by design, with the shared ledger that we discussed earlier. What can we expect from tokenisation in the financial and monetary spheres, Marie-Aline Vives?

MARIE-ALINE VIVES

That's an excellent question, because the interbank system currently relies on intermediation and centralisation. It's important to note that the current interbank system works extremely

well. It has solid, resilient and efficient infrastructures, developed over several decades. We can already make programmable payments, ensure financial stability and transaction security, and so on.

But DLT creates scope for new opportunities and improvements. Transactions are already very fast, but DLT will allow us to go even further, right up to instant settlement. This could pave the way for a whole new type of transactions – faster, same-day settlement, and so on. But it also raises questions, notably about liquidity management, because each transaction will have to be settled directly, in real time. These are questions that still need to be answered. That's the first benefit, then: speed.

The second is the potential for transparency. In a standard blockchain, all information is accessible. It can be seen by all network participants and embedded in the objects we mentioned earlier. There are ways of making it more secure, of preventing certain parties from accessing it. It depends on the implementation. But there's strong potential for increasing transparency, which would be a real benefit. For example, there are legal requirements about identifying holders of short-term negotiable debt securities, and DLT can make it easier to comply with them.

A third potential benefit of blockchain is programmability. It already exists on non-DLT infrastructures. But with blockchain, you can link multiple transactions together, potentially on a large scale, to create a chain of transactions that are only validated when all conditions are met. For example, you can trigger a large number of payments simultaneously, at a given point in time, when specific events occur and the conditions are met.

LUCILE RIVES

Can you give us an example of the benefits of this transaction chain?

MARIE-ALINE VIVES

Yes. Imagine we agree to sell a financial security to each other, and that, when you receive it, you'll sell it on to David Zhang. We can do it in two stages: exchange the security for cash, wait until the transaction has completed and been recorded, then contact David Zhang and exchange it with him for cash. In a programmable transaction, you can specify that the security will be transferred from my account to yours, then to David Zhang's account as soon as the cash has been successfully transferred from one account to the next. You don't have to carry out two separate transactions. It's a chain, a group of transactions that are executed automatically when specific conditions are met. It offers greater flexibility.

Another advantage of DLT is cost savings. It depends on how the technology is deployed, the structure chosen, and organisation, and so on. But blockchain, and this idea of a network that everyone can access directly, can facilitate transactions and reduce the need for intermediation. A good example is cross-border transactions. When you want to send a payment to the other side of the world, it's generally done through correspondent banking, which is where your bank has an account at a bank in the other country, or in a third country, depending on the complexity of the chain. It takes time and it's expensive. With DLT, you can

have an application that simplifies these flows and where you no longer need an intermediary. It could really improve efficiency and lower costs.

4 Why should we tokenise central bank money? Preserving the monetary sovereignty of the euro

4.1 The challenge of sovereignty in the face of DLT infrastructures and dollar-backed stablecoins

LUCILE RIVES

As well as efficiency, speed, cost savings and transparency, there's another thing at stake with a central bank digital currency: European monetary sovereignty. Tokenisation is already happening – the private sector has been forging ahead. The networks we talked about are often non-European, and the objects or tokens circulating on them, especially stablecoins, are often issued by non-European players. Nearly all stablecoins are backed by the dollar. David Zhang, is there a risk that interbank payments could be made in dollar-backed stablecoins, to take advantage of the benefits of DLT?

DAVID ZHANG

You're right, the issue of sovereignty is a global one. It concerns the tokenised assets themselves, and the infrastructures on which they will circulate.

The risk is that non-European, especially American, firms will become the dominant providers of DLT technologies for tomorrow's financial market infrastructures. That's why it's so important for Europe to foster its own ecosystem, with European technology providers and, of course, euro-denominated tokenised assets, notably a CBDC.

Until we have a CBDC, stablecoins will remain the only available settlement asset in this tokenised ecosystem. That raises sovereignty concerns because, today, 99% of stablecoins are backed by the dollar. And dollar-backed stablecoins aren't sovereign assets. They're private forms of money, pegged to a currency that isn't the euro. The risk is that we get a form of digital dollarisation, in third countries or emerging economies looking to protect themselves from the volatility of their local currency. Europe also has this sovereignty issue. But the main risk is that a portion of bank deposits could be transferred into stablecoins, depriving commercial banks of the resources they use to finance the European economy, and forcing them to offer higher interest rates on deposits in order to retain them. So there's a genuine risk to sovereignty and to the financing of the economy.

MARIE-ALINE VIVES

For the time being, the risk is fairly limited, because stablecoins are still mainly used in the crypto ecosystem. Where they could really start to gain ground is in the cross-border payments I mentioned earlier. They could also be used for other types of payments. That's when we'll need to have sovereign, European alternatives. Most of all, we'll need euro-

denominated stablecoins. That's the most important thing. As David Zhang said, today, 99% of stablecoins are denominated in dollars. So the challenge is to develop European stablecoins backed by the euro.

4.2 The importance of developing tokenised private money denominated in euro

LUCILE RIVES

Right, because the CBDC isn't designed to be used for all tokenised payments. It's a settlement asset for the interbank market. In other words, through their central bank accounts, participants in the interbank market will have access to a settlement asset whose value in euro is permanently guaranteed, because it's issued by the central bank. But from what I can gather, we'll also need to develop tokenised private money denominated in euro, for those who don't have access to central bank money, especially if stablecoins start to be used more widely for payments, beyond the crypto sphere. Are there any projects underway to develop a tokenised commercial money in euro?

MARIE-ALINE VIVES

Yes, that's a very important point. Two forms of tokenised private money are being developed. The first is stablecoins, which we've already discussed. The second is tokenised deposits, which are simply traditional bank deposits in tokenised form. Various projects are underway in France and Europe, led either by individual players or consortia, to develop these new forms of money. It's extremely important from our perspective. In fact, in some cases, we've actively helped to drive these initiatives, because it's crucial that both forms of money exist in a tokenised environment.

LUCILE RIVES

But earlier, David Zhang, you talked about the risks stablecoins pose to financial stability. How can we reconcile this need to develop tokenised private money with the need to preserve financial stability?

DAVID ZHANG

What's clear is that managing the risks is non-negotiable. But we also want to encourage innovation and harness all the benefits of DLT and blockchain.

At the international level, bodies such as the Financial Stability Board and the Bank for International Settlements have published guidance on the regulation of crypto-assets and stablecoins, and common standards to ensure consistency across jurisdictions.

Europe has adopted a relatively pioneering regulatory framework, largely inspired by the 2019 PACTE Law – the French law governing crypto-assets. European regulators are guided by a simple principle known as technological neutrality, which can be summed up as “same activity, same risk, same rule”.

In 2023, they introduced the MiCA regulation, or Market in Crypto-Assets regulation, which created the world's first comprehensive regulatory framework for issuers of crypto-assets and stablecoins, as well as for crypto-asset service providers. It has provided much-needed clarity and visibility, while also creating a protective framework for users.

5 CBDC in practice

5.1 Pontes: a short-term pilot project for settlement in CBDC

LUCILE RIVES

We've summed up tokenised private money; now let's go back to CBDC. How do we switch from the current interbank system, with commercial bank money and a highly intermediated value chain, to one with tokenised money and securities? Marie-Aline Vives?

MARIE-ALINE VIVES

That's a very important question. With the Eurosystem, we've carried out a number of experiments, first from 2020 onwards, and then, in 2024, a vast programme of experiments on the settlement of tokenised transactions with a central bank asset, typically a wholesale central bank digital currency –the CBDC we've been talking about. What these experiments have shown is that, first of all, it's feasible, and second, it's really important for the development of tokenised financial markets, in other words for the European tokenised ecosystem.

So how do we create a CBDC? We'll have a token that represents central bank money. In other words, instead of having entries in accounts, we'll have a central bank money token recorded in a ledger and shared across a network. That's what the central bank currency is: this token. This is what the Eurosystem Pontes project is about, and it will be available from the end of September this year. We've been working on it for a while, and it's set to be launched very soon. It will be rolled out in phases, because it isn't easy to deploy a central bank digital currency.

In September, we'll have what we call the pilot version, which will gradually be improved and expanded with the addition of new functionalities. For example, in the pilot version, the central bank money token will only be available during a limited time slot, not 24/7. That's one of the main developments we'll see down the line. We were talking about the potential benefits earlier, such as instant payments: this will also mean increasing the amount of time the token is available.

The other thing is that in the pilot – our first version – we'll maintain a close link with what I described earlier, the accounts held with central banks. Transactions will only be considered final when they show up in these accounts. It's purely a legal issue, but one that's very important; we call it settlement finality. What is finality? It's the moment when a transaction is deemed irrevocable: you can no longer reverse it, even if one of the parties goes bankrupt. This is crucial for the security of financial transactions, and we'll have this finality on the

blockchain. It's very important point. The Pontes solution will gradually be improved between September this year and 2028, which is the target deadline.

5.2 Appia: a long-term project to ensure European tokenised systems are interoperable

LUCILE RIVES

The more we talk about DLT and blockchain, the more I realise that these ledgers could be highly fragmented. We could end up with a CBDC ledger and then a separate DLT for NEU CP tokens. I imagine that if commercial banks each develop their own commercial currency, we could find ourselves with a DLT for one bank, and another DLT for a different bank's tokens. There's a real risk of fragmentation. Is it something you're watching closely?

MARIE-ALINE VIVES

Yes, it's absolutely essential. We're moving from a concept – the one we described earlier, where we have a ledger on which objects are recorded and shared on a vast network – to the actual application of that concept. Naturally, that involves a lot of different initiatives. First there's an exploration phase, and then an experimentation phase, as I mentioned, with the Banque de France conducting experiments since 2020. But we're not the only ones.

With experiments, you always see silos emerge, with different groups working on different use cases. Today, we're moving towards widescale deployment. When that happens, you need a minimum amount of coordination, otherwise things become fragmented. As I said before, at the moment, we've got a highly efficient financial system which works very well. With DLT, we don't want to add something that's less efficient than what we've already got.

That's why coordination and interoperability – which are really what your question was about – are essential. We can't allow ourselves to end up with a fragmented ecosystem, split into silos that don't talk to each other. It would be a step backwards. I mentioned programmability earlier. If these silos can't talk to each other, we lose that programmability, and with it a lot of the benefits of DLT.

LUCILE RIVES

If we've got NEU CP tokens that can't be settled in CBDC, then the whole thing becomes meaningless.

MARIE-ALINE VIVES

Absolutely. If the different ecosystems don't communicate with each other, the whole thing is pointless. Interoperability is what allows these systems, or networks, to talk to each other. It's a question of standards too: everyone has to have more or less the same standards to be able to communicate. For example, what language do we use? What are the network rules? We've got networks that operate with one token format – we were talking about tokens earlier. For example, I've got a basic format that allows me to perform two functions: issue and transfer tokens. If the other system has got tokens that can only be issued, then we'll have

trouble working together. Standards are really important. There's also the way the overall ecosystem is designed, to make it as efficient as possible and really harness the benefits of financial market integration and of the technology. We need to take a holistic view. It's a discussion we're having not just at the French level, because that wouldn't make much sense as we're dealing with European markets, not just domestic ones. We're working on this at the Eurosystem level, with a project called Appia. The idea is to think about tomorrow's tokenised financial ecosystem and the different roles and responsibilities of the stakeholders. CBDC will obviously play a very important role as it remains the anchor of financial stability. But it's also an open discussion, conducted collectively with market participants, to define the outlines of what a tokenised ecosystem might look like, one that would enable us to go further — particularly in creating the Savings and Investments Union.

DAVID ZHANG

To add to what Marie-Aline Vives has just said, the challenge of fragmentation is perhaps twofold. We need to ensure new DLT infrastructures are interoperable, but we also need to make sure they can interact with the existing system, the “old system” if you like. So there's a twofold challenge with interoperability.

The French financial industry is taking this into account as it organises itself to contribute to tomorrow's European tokenised ecosystem. It is currently working on two projects. There's the Pythagore project, launched with Euroclear in 2025, which was discussed in a previous podcast. That's the first project underway in the French financial industry.

Then there's a second one involving a broader range of stakeholders: the Strategic Group on Innovation and Tokenisation, launched by the Banque de France, the French Financial Markets Authority and the French Treasury, where French industry participants – banks, financial players, market infrastructures – can talk to each other and find common ground with a view to fostering the adoption of tokenisation – in other words encourage the launch of real-life projects. The discussions are about much more than CBDC. The group is also looking at the interactions between CBDC, stablecoins and other tokenised assets, the infrastructures on which these assets will circulate, and the full range of funds and instruments that make up the current financial landscape.

LUCILE RIVES:

What sort of timeframe are we looking at?

MARIE-ALINE VIVES

Appia is a long-term project, but it should be launched soon. Because in the case of DLT and networks, we're thinking in terms of network effects – and in this case the cost of doing nothing is very high. We need to be ready to act now, even though we know that, with these things, deployment takes time – that goes without saying. But we need to start acting now, which is precisely what we are doing with Appia. It involves dialogue with the private sector, as I mentioned, and practical and analytical work that we are already carrying out today. We

need to think ahead and ensure a good time-to-market, because any delay will prove very costly.

LUCILE RIVES

Thanks to both of you. Join us again soon on Dialogue & Co.